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THE RESEDACEAE

*A taxonomical revision of the family
(final instalment)*

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PREFACE

The first instalment of this revision of the *Resedaceae* was published on July 7, 1967 (p. 1-98, tab. 1-17). Now, more than 10 years later the second and final instalment follows; the demands of present-day university democracy are not conducive to voluminous and intricate scientific research and publications.

The work was completed by Dr. ABDALLAH and myself but the msc. needed checking, polishing and editing before it could go to press. Mr. G. BOELEMA did this painstaking and time consuming task very ably, in high spirits and undauntedly. Thanks to his help and to the generosity of the authorities of the University at Wageningen, the revision is now completed and published.

Miss L. TH. M. E. VAN DER RIET (now Mrs L. TH. M. E. MAAS) made the drawings, in the same way as she did for the first instalment. Two tables were done by Miss I. ZEWALD (nos 3 and 90). Mr. M. R. MOUTHAN assisted in the registration and labeling of some 20.000 herbarium specimens. Prof. dr. F. A. STAFLEU and Dr. W. T. STEARN repeatedly advised.

To the list of Herbaria are to be added: HEID: Bot. Inst. d. Univ., Bergheimer Strasse 1, Heidelberg, Germany; MPU: Inst. Bot., Univ. Montpellier, Montpellier, France; TL: Lab. Bot., Fac. Sc., Allée Jules Guesde, Toulouse, France.

Dr. ABDALLAH, Mr. BOELEMA and I spent months in trying to decipher collector's names and the localities they noted on their labels. Often we were unable to arrive at a clear conclusion and it was then decided to approach some sort of spelling which seemed the best among several possibilities. It is hoped that the numerous shortcomings in this respect will not be criticized too severely; we tried our best.

While this second instalment appears as No. 14 of the *Mededelingen Landbouwhogeschool* 78, both instalments, the textual parts and the atlas of figures united, will appear as an issue of *Belmontia*.

H. C. D. DE WIT

5. *Reseda* LINNAEUS

Gen. Pl. ed. 5, 1754, p. 207; Houttuyn, Nat. Hist. 2(8), 1777, p. 722; Lamarck, Fl. Fr. 3, 1778, p. 202; Murr., Syst. Veg. ed. 14, 1784, p. 448; Necker, Elem. Bot. 2, 1790, p. 242; Moench, Meth. Pl. 1794, p. 57; Murr., Syst. Veg. ed. 15, 1798, p. 369; Willdenow, Sp. Pl. 2(2), 1799, p. 876; Brotero, Flora Lus. 2, 1804, p. 305; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 724; DC. in Duby, Bot. Gall. ed. 2, 1, 1828, p. 66; Reichenbach, Fl. Germ. 1830-32, p. 696; Link, Handb. 3, 1831, p. 323; Richter, Codex Bot. Linn. 1835, p. 462; Webb et Berthelot, Phytog. Canar. 1, May 1837, p. 101; Raf., Fl. Tell. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 123; Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 97; Bertoloni, Fl. It. 5, 1842, p. 23; Ledebour, Fl. Ross. 1, 1842, p. 235; Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 240; Gren. et Godr., Fl. Fr. 1, 1848, p. 187; Hausm., Fl. Tir. 1851, p. 104; Visiani, Fl. Dalm. 3, 1852, p. 94; Buchenau in Bot. Zeit. 11, 1853, p. 361-372, 377-390, tab. VIII (morphol.); Muell. Arg., Mon. Rés. 1857, p. 96, tab. 1-9, lit. ! (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boissier, Fl. Or. 1, 1867, p. 423; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 555; Oliv., Fl. Trop. Afr. 1, 1868, p. 103; Lange in Willkomm et Lange, Prodr. Fl. Hisp. 3, 1880, p. 889; Arcang., Comp. Fl. It. 1882, p. 66; Battandier in Batt. & Trab., Fl. Alg. 1888-90, p. 83; Terracciano in Caruel, Fl. It. 10, 1894, p. 157; Rouy et Foucaud, Fl. Fr. 2, 1895, p. 239; Post, Fl. Syr. Palest. Sin. 1896, p. 111; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 180; Coste, Fl. Fr. 1, 1901, p. 159; Pirotta, Fl. Col. Erit. in Ann. R. Inst. Bot. Rom. 8(5), 1903, p. 259; Morstatt, Beitr. Kenntn. Resed. (in Fünfstück's Beitr. Wiss. Bot. 5) 1903; Muschler, Man. Fl. Egypt 1, 1912, p. 438; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 123; Blatt., Fl. Aden in Rec. Bot. Surv. Ind. 7, 1914-16, p. 110; Thonn., Fl. Pl. Afr. 1915, p. 227 (repr. Hist. Nat. Class. 27, 1962); id., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 46; Ramis, Bestimm. Fl. Aeg. 1929, p. 97; Dinsmore in Post, Fl. Syr. Palest. et Sin. ed. 2, 1, 1932, p. 137; Bolle in Engl. et Prantl., Nat. Pflz. fam. ed. 2, 17b, 1936, p. 684, 687; Czerniak. in Komarov, Fl. URSS 8, 1939, p. 607; Merr., Ind. Rafin. 1949, p. 132; Andr., Fl. Pl. Anglo-Egypt. Sud. 1, 1950, p. 69; Cufod. in Bull. Jard. Bot. Brux. 24, Suppl. 1954, p. 159; Keay in Hutch. et Dalz., Fl. W. Trop. Afr. ed. 2, 1(1), 1954, p. 108; Hutch. et Dalz., Fl. West Trop. Afr. ed. 2, 1(1), 1954, p. 108; Täckholm, Stud. Fl. Egypt 1956, p. 331; Elf. et Taylor in Hubb. et Milne-Redh., Fl. Trop. E. Afr., Resedaceae, 1958, p. 3; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 274; Clapham et al., Fl. Br. Isl. ed. 2, 1962, p. 186; Quézel et Santa, Nouv. Fl. Alg. 1, 1962, p. 438; Yeo in Tutin, Heywood et al., Fl. Europ. 1, 1964, p. 346; Rech. fil., Fl. Lowl. Iraq 1964, p. 324; Coode in Davis, Fl. Turk. East Aeg. Isls 1, 1965, p. 499; Zohary, Fl. Palaest. 1, 1966, p. 331.

Luteola [Tournef.] Webb et Berthelot, Phyt. Can. 1, May 1837, p. 104; Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 103; Fuss, Fl. Transsilv. 1866, p. 86; Rouy et Fouc., Fl. Fr. 2, 1895, p. 250.

Arkopoda Rafinesque, Fl. Tell. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 73;

Merrill, Ind. Rafin. 1949, p. 132.

Pectanisia Rafinesque, Fl. Tell. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 72; Merrill, l.c.

Tereianthes Rafinesque, Fl. Tell. 3, cent. VIII, 1837 (Nov.-Dec.), p. 72 (= *Tereianthus* Fourr. in Ann. Soc. Linn. Lyon N.S. 16, 1868, p. 342); Merrill, l.c.

Resedella Rchb., Handb. 1837, p. 261, nom.

Eresda Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 101.

Stefaninia Chiovenda, Fl. Somala 1929, p. 77 (= *Stephaninia* auctt.).

Annual or perennial herbs or suffruticose, ascending or erect.

Stems pithy, as a rule finally hollow (pith disintegrating). Indumentum, if present, pilose (hairs whitish, flattened, wrinkly, blunt) or, more often, consisting of small, conical or mitriform trichomes or papillae.

Leaves sometimes rosetted, always partly along the stem, entire or incised, or imparipinnatifid or -sect, decurrent laminar rims and midrib (if sometimes very narrowly and continuous onto the stemribs), rarely petiolate, spirally arranged. Blade (often long) attenuate (and decurrent onto the petiole). Midrib and side-nerves prominent on the lower surface, in lobed leaves excentric. Basal minute dents, perhaps glandular, present in the position of stipules.

Flowers zygomorphous, in terminal, simple or branched racemes, solitary in the axil of a bract (which is accompanied at each side by one basal dent), white, cream, yellow or greenish. Bracteoles absent.

Sepals as many as and alternating with the petals, (4-) 5-6 (-9), very short connate at base, usually the superior sepal largest, persistent or deciduous.

Petals appendaged, the appendage consisting of a winged claw (claw widened, \pm auriculate), or with a peltately attached claw (a transverse apical rim running in front of the limb-base). Limb incised in various ways. Lateral and anterior petals variously reduced.

Receptacle carrying a fleshy, more or less obliquely campanulate or infundibuliform disc, which includes the lower part of the stamens and the ovarial stipe, and which is usually extended posteriorly, as a flat, crescent-shaped rim.

Stamens 7 to over 40, usually between 12-25, connate at base (merged with disc). Anthers versatile, introrse (at first), ellipsoid to subglobular, longitudinally dehiscent.

Ovary superior, pluricarpellate (carpels usually 3-4, fused marginally) with parietal, simple or forked placentas, one-chambered, top gaping, very rarely closed, carpel apically narrowed to a 'tooth' (style indistinct); stigma the lacerate top (or also the adaxial surface of the ovarial tooth).

Ovules in 1 or more, usually somewhat irregular rows, hanging, imbricate, numerous. Capsule usually gaping; walls herbaceous or membranous.

Seeds more or less reniform, swollen, smooth or rough, papillose or rugose; radicle often bulging, pointing to the hilum; sinus closed or not, sometimes provided with carunculoid tissue. Radicle almost equalling the cotyledons; plumule not visibly differentiated.

Type: *Reseda lutea* L. (cf. HITCHCOCK and GREEN, Int. Rules Bot. Nom. 3rd ed., 1935, p. 142, and Prop. Br. Int. Bot. Congr. 1930, p. 157).

Distribution: *Reseda* is indigenous around the Mediterranean, the subgenus *Glaucoseda* being confined to the western Mediterranean area (Pyrenees, Spain, Morocco, Algeria). *Reseda* is also native to the Canary Islands, Cap Verde Arch., Sahara, East Africa, Asia Minor, Caspian Sea basin, SW. Asia and NW. India; its occurrence above 50° lat. possibly only as introduced weeds. It is a striking example of a Tethyan distribution (cf. e.g. CROIZAT, Space, Time, Form 1962, p. 63).

Taxonomical notes: LINNAEUS based the genus *Reseda* on *Reseda* [TOURNEFORT] (Inst. 2, 1700, p. 423). He selected this name and included *Luteola* [TOURNEFORT] and *Sesamoides* [TOURNEFORT] (l.c., p. 423, 424) in *Reseda* L.

The name *Reseda*, TOURNEFORT reported to have been coined by PLINY (Lib. 27, cap. 106; see: History, p. 6) who stated that 'near Ariminum a herb is known which is called *Reseda*; it calms diseases, and all inflammations'. From the plates it is evident that *Reseda* [TOURNEFORT] is based on a species of *Reseda* as accepted by LINNAEUS and all later authors. *Luteola* ('Gaude') [TOURNEFORT] represents *Reseda luteola* L., and *Sesamoides* [TOURNEFORT] was validated by ORTEGA in 1772 (cf. TOURNEFORT, Elem. 1, 1694, p. 335, Inst. 2, 1700, p. 423, tab. 238, and ORTEGA, Tab. Bot., 1772, p. 24).

Luteola [TOURNEFORT] was adopted by RUPPIUS as a genus (Fl. Jen., ed. Hall., 1745, p. 290) but this is a pre-Linnean publication which, moreover, did not follow the Linnean method of binary nomenclature. Both TOURNEFORT and RUPPIUS obtained the name *Luteola* from C. BAUHIN (Pinax 1623, p. 100). BAUHIN stressed its affinity with *Reseda* auctt. and noted that earlier authors named this taxon *Luteum* or *Lutum*. The generic name *Luteola* was introduced into nomenclature by WEBB (WEBB et BERTH., Phyt. Can. 1, May 1837, p. 104–105). WEBB eloquently put forward the reasons why, in accordance with earlier authors, *Luteola* WEBB ought to be adopted as a taxon segregated from *Reseda*.

It is obvious that *R. luteola* L. is well distinguished from species like *R. alba* (cf. subgen. *Reseda*, section *Leucoseda*) and also that *R. luteola* is somewhat closer allied to the species in subgenus *Glaucoseda*. One could defend the view to accept it as a genus (*Luteola* [TOURNEFORT] ex WEBB) but on the other hand the characters binding *R. luteola* to the remainder of *Reseda* L. are so numerous and judged to be so much more significant than the separating characters that it was decided to retain *Luteola* [TOURNEFORT] ex WEBB within the genus *Reseda* (subgenus *Luteola*). For the several new combinations published by WEBB, see under the species.

Resedinia RAFINESQUE (Fl. Tell. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 72) was published as a family ('this little family of mine'). RAFINESQUE compared it to 'some *Hypericinae*', and it was also 'akin the *Euphorbides*'. 'How JUSSIEU and

others put them near the *Capparides* with a single style is rather strange' (l.c., p. 72). RAFINESQUE also wanted to subdivide the genus *Reseda* L. into 'several good genera': *Reseda* RAF., *Tereianthes* RAF., *Pectanisia* RAF., *Arkopoda* RAF., *Hexastylis* RAF. (this afterwards substituted by *Stylexia* RAF.) and *Dipetalia* RAF. All names are reduced in the present study to *Reseda*, *Oligomeris*, or *Caylusea* (see there). The typification by RAFINESQUE of the several names is not accepted here for nomenclatural reasons of various nature. In particular this is to be noted as regards *Reseda*. RAFINESQUE suggested as the type *R. odorata*, but as he refers to *Reseda* RAF. and not to *Reseda* L., and also because his wording is ambiguous, GREEN's typification of *Reseda* L. (*Reseda lutea* L.) is not invalidated by RAFINESQUE's earlier statement.

RAFINESQUE published as a monotypic genus *Arkopoda* RAF.; it was based on *Arkopoda luteola* (L.) RAF. (= *Reseda luteola* L.). The generic name *Luteola* [TOURNEFORT] WEBB et BERTH. (Phytog. Can. 1, May 1837, p. 104) preceded *Arkopoda* RAF. (Nov.-Dec. 1837). *Reseda luteola* L. is to be maintained as a species of *Reseda* L., *Arkopoda* RAF. is reduced to the synonymy of the genus *Reseda* (see MERRILL, Index Raf. 1949, p. 132).

RAFINESQUE proposed a genus *Pectanisia* RAF. (l.c., p. 72), based on a single species, *P. phyteuma* RAFINESQUE. To all appearances RAFINESQUE adopted *Reseda phyteuma* L. as its base (see MERRILL, l.c.) and there is no reason to judge *Pectanisia phyteuma* different from *R. phyteuma* L. Accordingly, *Pectanisia* RAF. is reduced to the synonymy of *Reseda* L.

The name is explained by the words pecten (comb) and anisos (Gr.): unequal, and so refers to the appearance of the limb of the superior petal; its lobes are like an 'unequal comb'.

RAFINESQUE proposed a new genus *Tereianthes* RAF. (l.c.), (a name alluding to 'incised flowers'; terein (Gr.): to tear, and anthos (Gr.): flower), to include the species *T.* (= *Reseda*) *undata*, *T.* (= *Reseda*) *fruticosa*, *T.* (= *Reseda*) *glauca* and *T.* (= *Reseda*) *alba*, all Linnean species. There is no ground to distinguish this group of *R.*-species as a separate taxon. It is to be noted that RAFINESQUE referred to '*Reseda fruticosa* L.' which name was never used by LINNAEUS, although MERRILL also quoted this (l.c.); possibly *R. fruticulosa* L. or *R. suffruticosa* L. were intended.

REICHENBACH (Handb. 1837, p. 261) published *Resedella*, basing it on 2 species of *Reseda*, i.e. '*R. dipetala, glauca*', and citing '*Luteola T. Reseda T.L.*' as synonyms. The genus *Reseda* L. antedates *Resedella* RCHB. Therefore *Resedella* RCHB. is reduced to synonymy.

When publishing *Eresda*, SPACH (Hist. Nat. Vég. Phan. 7, 1839, p. 101) stated that *Eresda* was an anagram of *Reseda*. He gave a full description of the only species which he thought to represent *Eresda*, a genus different from *Reseda*. This species was *Eresda alba* (L.) SPACH, based on *Reseda alba* L. which is cited by SPACH in synonymy. SPACH further added as synonyms *R. fruticulosa* L. and *R. undata* L. (l.c., p. 102). As *R. alba* L. is a species of *Reseda* L. in the present revision, *Eresda* SPACH falls into synonymy.

Stefaninia CHIOVENDA (Fl. Somala 1929, p. 77) was based by CHIOVENDA

on a single species: *S. telephiifolia*. He stated that *Buhsia* BUNGE was an allied genus, while placing *Stephaninia* in *Capparidaceae*. It was correctly cited by HUTCHINSON (Gen. Fl. Pl. II, 1967, p. 305) that the genus belongs in *Reseda*. The correction of the original spelling to *Stephaninia* is permitted and was practiced.

It is a peculiar point that the inflated capsules of *Stephaninia telephiifolia* (and the allied species *R. ellenbeckii*) are closed but this is not a sufficient reason to segregate these species as a genus. All significant characters refer *Stephaninia* to *Reseda*. The presence of a 2-carpellate, 1-chambered capsule should not be seen as a link to *Cruciferae* but may be seen as an approach to *Capparidaceae*.

At our request prof. F. WEBERLING studied the ontogeny and anatomy of the stipuloid organs in *Resedaceae* and he concluded that the basal dents are to be interpreted as stipules, whereas the basal laminar dents in subg. *Glaucoreseda* are reduced laminar lobes (Acta Bot. Neerl. 17(5), 1968, p. 360–368).

It is possible that the full measure of viability of the seeds is also dependent on being completely ripened. Incidental trials showed that, at any rate, the seeds will not remain viable during a period of many years.

The distributional pattern within *Reseda* deserves to be studied in various aspects, e.g. in relation with the theory of 'biotype depletion' (STEBBINS in Madroño 6, 1942, p. 241–272) because here is a conglomerate of wide-spread and variable species and narrow endemics, and there is in some cases evidence of geographic isolation or an 'island' effect (subgenus *Glaucoreseda*) but sometimes there is no evidence of this kind of geographic isolation at all.

For various notes: see under *Resedaceae*, p. 6–35. Add to p. 28 the following:

HEGNAUER (Chemotaxonomie der Pflanzen 6, 1973, p. 51–56) summarized the phytochemical data on *Resedaceae* and concluded that the family is allied, most probably, to *Cruciferae*, as indicated by chemical findings. While HEGNAUER remarked that the chemical knowledge of *Resedaceae* is 'very incidental' ('sehr lückenhaft') we add that the facts provided by various sources are severely limited as to their value, because conserved specimens (herbarium) of investigated taxa are lacking. Without a certain and controllable identification much of the chemical research is scientifically ambiguous (see also this revision p. 27–30). For *R. luteola* in particular see HEGNAUER, l.c., p. 725–726, 783–784 (cf. also R. DARNLEY GIBBS, Chemotaxonomy of Fl. Pl. I, 1974, p. 575; III, 1974, p. 1518 etc.).

Key to the supraspecific taxa of *Reseda*

- 1. Carpels 2; ovaries and capsules closed. **subgen. 1. Neoreseda**
- 1. Carpels 3–6, very rarely 2; ovaries and capsule gaping above.
- 2. Placenta forked in upper part. Sepals and filaments persistent. Leaves entire.
- 3. Sepals 5 (–6). Carpels 4 (–5 or more). Leaves up to 3 mm wide.
- **subgen. 2. Glaucoreseda**

3. Sepals 4. Carpels 3, very rarely 2 or 4. Leaves at least $\frac{1}{2}$ cm wide. **subgen. 3. Luteola**
2. Placenta entire, not forked. **subgen. 4. Reseda**
4. Seeds mostly small, $\frac{2}{3}$ - $1\frac{1}{2}$ (-2) mm long; sinus wanting or narrow, often carunculoid tissue adjacent to the closed sinus. Testa smooth or finely rugulose or papillose; outermost layer persistent.
5. Carpels 3. Leaves entire or variously incised; if pinnate then seeds smooth, ca. 2 mm long. Superior petal deeply multipartite, laciniae dilated above and filaments (tardily) deciduous. **section 1. Reseda**
5. Carpels (3-) 4-5. Leaves pinnate or bipinnate, rarely some leaves tri-sect. Seeds finely papillose or rugulose, up to $1\frac{1}{2}$ mm long. Superior petal 3 (-5)-lobed; laciniae not dilated above. Filaments persistent. **section 2. Leucoreseda**
4. Seeds large, ($1\frac{1}{2}$ -) 2- $3\frac{1}{2}$ mm long; sinus wide, filled with carunculoid tissue. Testa coarsely rugose or papillose, outermost layer detaching or persistent. **section 3. Phyteuma**

Subgen. 1. Neoreseda (PERKINS) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: Sect. *Neo-Reseda* Perk. in Engl., Bot. Jahrb. 43, 1909, p. 417; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 690.

Top of ovaries and capsules closed. Carpels 2. Placenta entire. Seeds $\frac{3}{4}$ -1 mm long, finely papillose, sinus narrow, carunculate. Sepals 5-6, deciduous. Filaments deciduous. Leaves entire or tripartite, rarely variously divided.

Type species: *R. ellenbeckii* PERKINS.

Distribution: Tropical East Africa, Ethiopia, and Somalia.

Remarks: 2 species. Closed, bicarpellate capsules (walls membranous) are most unusual in *Reseda*, and even in the *Resedaceae*. On the other hand, on account of the very many other characters linking subgenus *Neoreseda* to the other taxa in *Reseda*, *Neoreseda* is best kept within the generic limits of *Reseda*. CHIOVENDA (Fl. Somala 1, 1929, p. 77) placed *Reseda* (*Stefaninia*) *telephiifolia* in *Capparidaceae* (fruits closed, 2-carpellate!). PERKINS (in Engl., Bot. Jahrb. 43, 1909, p. 417) made *R. ellenbeckii* to the type-species of section *Neoreseda* PERKINS. However, this isolated taxon certainly deserves the rank of a subgenus.

Subgen. 2. *Glaucoseseda* (DC.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: Sect. *Glaucoseseda* DC. in Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Muell. Arg., Mon. Rés. 1857, p. 196 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 580; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 896; Henriques in Bol. Soc. Brot. 10, 1892, p. 81; Rouy et Fouc., Fl. Fr. 2, 1895, p. 249; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347.

Tereianthes Rafinesque, Fl. Tell. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 72, no. 703 (pro genere).

Luteola sect. *Leucophrys* Webb, Otia Hisp. 1839, p. 19.

Reseda sect. *Leucoseseda* DC. in Duby sensu Gren. et Godr., Fl. Fr. 1, 1848, p. 189 (p.p.).

Placenta bifurcate in the upper part and entering into teeth-bases. Carpels 4, very rarely more, or less. Capsules gaping, subglobose, erect. Seeds ca. 1 mm long, smooth to very rarely short-papillose; sinus narrow, ecarunculate. Sepals 5–6, persistent; filaments persistent. Leaves entire, less than 3 mm wide, mostly with some minute dents at the base.

Type species: *R. glauca* L.

Distribution: Restricted to the Pyrenees, Iberian Peninsula, and NW. Africa.

Remarks: 5 species. *R. glauca* dates from 1753. It is designated as the type species, because it characterizes the subgenus best.

Subgen. 3. *Luteola* (DUMORTIER) ABDALLAH et DE WIT, *nov. comb. et stat.*

§ I. *Luteola* [Bauh.] Dumortier, Fl. Belg. 1827, p. 116, basionym; DC. in Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Gren. et Godr., Fl. Fr. 1, 1848, p. 190; Muell. Arg., Mon. Rés. 1857, p. 202 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 425; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 582; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 897; Battandier in Batt. et Trab., Fl. Alg. 'Dicotyl.', 1888–90, p. 86; Henriques in Bol. Soc. Brot. 10, 1892, p. 82 (pro sect.); Rouy et Fouc., Fl. Fr. 2, 1895, p. 250; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347.

Luteola Webb in Webb et Berth., Phytog. Canar. 1, May 1837 (1836–40), p. 104; Spach, Hist. Nat. Végét. Phanerog. 7, 1839, p. 103 (pro genere).

Arkopoda Rafin., Fl. Tellur. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 73, no. 705 (pro genere).

Placenta bifurcate in the upper part and entering into teeth-base. Carpels 3, very rarely 2 or 4. Capsules gaping above, subglobose, erect. Seeds ca. 1 mm long, smooth, glossy; sinus wanting, ecarunculate. Sepals 4, persistent. Filaments persistent. Leaves entire, 5–8 mm wide; dents, if present, glandular, dark brown.

Type species: *R. luteola* L.

Distribution: Wide-spread, natural limits uncertain, originally circum-mediterranean.

Remarks: Only one species, *R. luteola*.

In Flora Europaea 1, 1964, p. 347, P. F. YEO used 'Section *Luteola* DUMORTIER' as a section in the genus *Reseda*. It is doubtful whether DUMORTIER actually intended to publish (or adopt) a taxon in *Reseda*, in the rank of our present-day 'section', to be named '*Luteola*'.

DUMORTIER (Fl. Belg. 1827, p. 116) wrote '*Reseda* NECK.' and '§. 1. *Luteola* BAUH. – Sepala 4. Capsula depressa'. From this no conclusion can be drawn about the hierarchic rank of DUMORTIER's '§', whether he intended to name a subgenus or a section (based on BAUHIN's *Luteola*). Now DUMORTIER stated in his 'Praemonenda' (l.c., p. 2): 'Genera per sectiones naturales dividere tentavi'. To us it seems that DUMORTIER may have meant by 'sectio naturalis' a taxon which is now currently named 'subgenus', and not our modern 'section'. However, it is also possible to take DUMORTIER at his word, thereby maintaining the current usage of the symbol '§' by YEO, which is followed here.

By accepting *Luteola* [BAUH.] DUMORTIER as a section, it follows that *Resedotypus* DUMORTIER also is a name for a section (l.c.). Because *Resedotypus* contains the type species of *Reseda*, it falls into the synonymy of section *Reseda*.

In Flore de France (vol. 2, 1895, p. 250) ROUY and FOUCAUD used in the treatment of *Reseda* 'Section IV. *Luteola* DC. apud DUBY'. However, in a footnote on the same page they stated: 'Nous accepterions volontiers la section *Luteola* DC. comme sousgenre *Luteola* Nob. caractérisé etc.'. The statement amounts to: 'We would certainly be prepared to accept the section *Luteola* DC. as a subgenus *Luteola* Nob. characterized etc.'. As they applied in the running text 'section' it can only be understood that they proposed the rank of subgenus tentatively, and did not definitely accept the name *Luteola* in that rank (Art. 34 (1) (2)) which is, therefore, not to be admitted as an earlier subgeneric name.

Subgen. 4. *Reseda*

Placenta entire, not forked above. Carpels 3–4, very rarely more, or less. Capsules gaping above, erect or pendulous. Seeds $\frac{2}{3}$ – $3\frac{1}{2}$ mm long. Sinus wide, narrow or wanting, often carunculate; outer layer sometimes tardily detached.

Sepals 5–8 (–more); filaments deciduous or not. Leaves entire or variously dissected.

Distribution: Coinciding with the generic distribution; many endemics.

Remarks: 47 species.

Sect. 1. *Reseda*

Sect. *Reseda* Endl., Gen. 1836–40, n. 5011 (p.p.); Raf., Fl. Tell. 3, 1837 (1836), p. 72, no. 702; Spach, Nat. Hist. Végét. Phan. 7, 1839, p. 97 (p.p.); Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348 (p.p.).

Sect. *Resedotypus* Dumortier, Fl. Belg. 1827, p. 116 (p.p.).

Sect. *Resedastrum* Duby, Bot. Gall. ed. 2, 1, 1828, p. 66 (p.p.); Gren. et Godr., Fl. Fr. 1, 1848, p. 187 (p.p.); Visiani, Fl. Dalm. 3, 1852, p. 94 (p.p.); Muell. Arg., Mon. Rés. 1857, p. 116 (p.p.) (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 423 (p.p.); Muell. Arg. in DC., Prodr. 16(2), 1868, p. 559 (p.p.); Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 892; Batt. in Batt. et Trab., Fl. Alg. 'Dicotyl.' 1888–90, p. 84 (p.p.); Rouy et Fouc., Fl. Fr. 2, 1895, p. 243 (p.p.); Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688.

Sect. *Leucoreseda* DC. in Duby, l.c. (p.p.).

Sous-section *Eureseda* Rouy et Fouc., Fl. Fr. 2, 1895, p. 246.

Seeds often small, $\frac{2}{3}$ – $1\frac{1}{2}$ (–2) mm long, smooth or minutely rugulose or papillose; sinus narrow or wanting, often overgrown by carunculoid tissue if closed. Capsules usually erect. Carpels nearly always 3 (–4). Limb of superior petal 3–multipartite, lateral lobes of 3-partite limb usually much wider than central lobe, entire or \pm incised. Sepals 5–8(–more), deciduous or persistent. Leaves entire or variously divided.

Distribution: Coinciding with the generic distribution, few wide-spread, the majority narrow endemics.

Remarks: 31 species (see p. 113). Seeds of *R. sa'adae* and *R. tefedestica* unknown. The immature seeds of *R. gilgiana* were described in the protologue as 'rugulose'. For the first two species, the presence of numerous small ovules on each placenta suggests a development of numerous, small seeds, possibly ca. 1 mm long, with either smooth or nearly smooth testa. Therefore, *R. sa'adae*, *R. tefedestica*, and *R. gilgiana* are referred to section *Reseda*.

The characters of the seed are, especially in subgenus *Reseda*, accepted to be significant and guiding. Thus, sect. *Resedastrum* DUBY (Bot. Gall. ed. 2, 1, 1828, p. 66) was not maintained as a taxon, but split into two parts, one referred to

section *Phyteuma*, and the other (containing the type species of *Reseda*) incorporated in section *Reseda*.

Ser. 1. Reseda

Seeds $\frac{2}{3}$ – $1\frac{1}{2}$ (–2) mm long, smooth, even at high magnification they appear smooth or almost so.

Distribution: The majority endemics; *R. lutea* wide-spread, coinciding with the generic distribution.

Remarks: 19 species. The number of lobes of the superior petal and their relative width characterize two subseries. One species (*R. buhseana*) intermediate to Ser. 2.

Subser. 1. Reseda

Eureseda Rouy et Fouc., Fl. Fr. 2, 1895, p. 246 ('sous-section').

Limb of superior petal 3-partite, lateral lobes (much) wider than the central lobe. Seeds 1– $1\frac{1}{2}$ mm long (often up to 2 mm in *R. lutea*), smooth, glossy; sinus closed, sometimes carunculate. Ovary usually 3-toothed.

Distribution: All endemics, except for *R. lutea* which coincides with the generic distribution.

Remarks: 6 species of which *R. urnigera* intermediate to Subser. 2. The lateral lobes of the superior petal in *R. lanceolata*, *R. lutea* and *R. urnigera* var. *boissieri* are often shallowly lobed or cleft, or even rather deeply partite in *R. lutea* var. *muelleri*, suggesting affinity to subseries *Multilaciniata*.

Subser. 2. Multilaciniata ABDALLAH et DE WIT, *nov. subser.*

Petali superioris limbus profunde multipartitus, lobi laterales plus minusve lobo centrali latitudine aequantes; lobi interdum dimorphi.

Type species: *R. stricta* PERS.

Limb of superior petal deeply multipartite, lateral lobes narrow, often slightly wider than central lobe, occasionally lobes dimorphic. Seeds $\frac{2}{3}$ – $1\frac{1}{2}$ mm long, smooth, glossy, sinus closed or narrow, often carunculate if closed, outer layer persistent.

Distribution: All endemics, in the Mediterranean and Red Sea regions, and in India.

Remarks: 14 species of which *R. buhseana* intermediate to Ser. 2, and *R. urnigera* intermediate to Subser. 1. *R. stricta* PERS. is designated as the type species, being the earliest one described in this taxon. Ripe seeds of *R. sa'adae* and *R. tefedestica* are not known, but these two species seem best placed in *Multilaciniata* on account of their close relationship to the other species of this subseries. In *R. buhseana* var. *dshebeli*, *R. hemithamnodes*, *R. macrobotrys* and *R. pruinosa* the seeds are very obscurely rugulose or papillulose, thus suggesting affinity to ser. *Asperula*. On the other hand, the excentric-orbicular disc in *R. bungei*, *R. buhseana* and *R. macrobotrys* suggests another trend of affinity to *Asperula*. *R. germanicopolitana* and *R. tomentosa* suggest affinity to sect. *Leucosedea* by their pinnate leaves.

Ser. 2. *Asperula* ABDALLAH et DE WIT, nov. ser.

Semina minutissime rugulosa vel papillosa, $\frac{2}{3}$ -1½ mm longa, subnitida; sinus angusta tamen aperta, ecarunculata.

Type species: *R. amblycarpa* FRESEN.

Seeds $\frac{2}{3}$ to just over 1 mm long, minutely rugulose or papillose, ± glossy, sinus narrow, not closed, ecarunculate. Limb of superior petal (3-)multipartite, rarely bipartite or entire, all lobes narrow, almost of same width, often dimorphic or central lobe rather wider than lateral lobes. Leaves entire or ternately divided.

Distribution: Narrow endemics in SE. Mediterranean and Red Sea regions up to Persia and Somalia, Ethiopia, and the Sudan.

Remarks: 13 species of which *R. buhseana* intermediate to Ser. 1. *R. amblycarpa* designated as the type species because it is the earliest published species in the series. The limb of the superior petal is usually 3-partite in *R. alphonsi* and *R. microcarpa*. More limbs to one petal may occur (especially in *R. microcarpa*), but on the other hand a bipartite or even entire limb is often seen in *R. microcarpa* (affinity with ser. *Reseda*). The testa of the seeds of *R. buhseana* and *R. stenostachya* is minutely but distinctly rugulose, suggesting affinity to subser. *Multilaciniata* as represented by *R. buhseana* var. *dshebeli*, *R. hemithamnodes*, *R. macrobotrys* and *R. pruinosa*.

Sect. 2. *Leucoreseda*

DC. in Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Gren. et Godr., Fl. Fr. 1, 1848, p. 189 (p.p.); Muell. Arg., Mon. Rés. 1857, p. 99 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 423; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 556; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 890; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 83; Henriques in Bol. Soc. Brot. 10, 1892, p. 75; Rouy et Fouc., Fl. Fr. 2, 1895, p. 240; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347; Zohary, Fl. Palaest. 1, 1966, p. 332; Kaercher W. et E. Valdes-Bermejo in Anal. Inst. Bot. Cavanilles 32(2), 1975, p. 165-174.

Sect. *Resedastrum* Duby sensu Visiani, Fl. Dalm. 3, 1852, p. 94 (p.p.).

Tereianthes Raf., Fl. Tell. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 72 (pro genere, p.p.).

Eresda Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 101 (pro genere, p.p.).

Reseda sect. *Resedina* Rchb. ex Peterm., Deutschl. Fl. 1849, p. 67 (fide Muell. Arg. in DC., Prodr., l.c.).

Seeds $\frac{2}{3}$ - $1\frac{1}{3}$ mm long, minutely papillose or rugulose, subglossy, sinus narrow, ecarunculate, outer layer persistent. Carpels 3-4, very rarely 2 or 5. Filaments persistent. Limb of superior petal 3 (-5)-lobed, incisions often to half way down the limb, lobes narrow-oblong, often tapering towards the apex, never linear-spathulate; appendage wanting, rarely developed (*R. fruticulosa*). Disc rarely wanting (*R. alba* ssp. *decursiva*). Sepals 5-6, persistent. Leaves pinnatifid or -sect, rarely bipinnate.

Type species: *R. alba* L.

Distribution: All endemics, except *R. alba* which is a wide-spread species.

Remarks: 3 species. *R. alba* L. dates from 1753 and is the most eligible type of the section. The lateral extension of the claw in *R. alba* ssp. *decursiva* is usually wanting or indistinct; the disc also is rudimentary or lacking. In *R. alba* var. *trigyna* the carpels are 3, suggesting affinity with subser. *Reseda*. On account of the seed characters this series comes close to ser. *Asperula*.

KAERCHER and VALDES-BERMEJO published on the caryology of the section *Leucoreseda* (l.c.) and found: $n = 10$. They listed caryological literature on *Reseda*.

Sect. 3. *Phyteuma*

Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 894; Henriques in Bol. Soc. Brot. 10, 1892, p. 79; Rouy et Fouc., Fl. Fr. 2, 1895, p. 234 ('sous-section').

Sect. *Resedotypus* Dumort., Fl. Belg. 1827, p. 116 (p.p.).

Sect. *Resedastrum* Duby, Bot. Gall. ed. 2, 1, 1828, p. 66 (p.p.); Gren. et Godr., Fl. Fr. 1, 1848, p. 167 (p.p.); Visiani, Fl. Dalm. 3, 1852, p. 94 (p.p.); Muell. Arg., Mon. Rés. 1857, p. 116 (p.p.) (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 423 (p.p.); Batt. in Batt. et Trab., Fl. Alg. 'Dicotyl.' 1888-90, p. 84 (p.p.); Rouy et Fouc., Fl. Fr. 2, 1895, p. 243 (p.p.); Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688 (p.p.).

Sect. *Reseda* Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348 (p.p.).

Pectanisia Raf., Fl. Tell. 3, Cent. VIII, 1837 (Nov.-Dec.), p. 72, no. 704 (pro genere).

Reseda L., Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 97 (pro genere, p.p.).

Seeds large, ($1\frac{1}{2}$ -) $2-3\frac{1}{2}$ mm long, coarsely rugose-undulate or rarely papillose, outer layer tardily detached or rarely clinging. Capsules usually pendulous. Carpels nearly always 3. Limb of superior petal deeply multipartite, rarely 3-partite with lateral lobes much wider than central lobe and \pm incised. Sepals 5-8 (-more), persistent. Leaves entire, 3-fid or variously divided, never all pinnatisect.

Type species: *R. phyteuma* L.

Distribution: The mediterranean region up to Persia, few wide-spread, the other narrow endemics.

Remarks: 13 species. *R. phyteuma* dates from 1753, and is here designated for the first time as the type species (LANGE, l.c., made no choice). *R. stenobotrys* suggests affinity with sect. *Reseda* ser. *Asperula* on account of its papillose seeds. *R. arabica* and *R. jacquinii* sometimes suggest relationship with sect. *Reseda* ser. *Reseda*, when the lateral lobes of the 3-partite superior petals are very wide and the incisions rather shallow. On the other hand, these species have more significant characters attributed to section *Phyteuma*. Probably the most homogeneous section in subgenus *Reseda*.

Ser. 3. *Phyteuma*

Groupe *Laciniatae* Rouy et Fouc., Fl. Fr. 2, 1895, p. 243 ('sous-section').

Limb of superior petal (deeply) multipartite, lobes laciniate, linear, -spathulate or -(ob)ovate, often dimorphic.

Type species: *R. phyteuma* L.

Distribution: Coinciding with the section; many endemics.

Remarks: 12 species. The lateral lobes of the superior petal in *R. arabica* are often rather shallowly incised suggesting affinity with series *Crenulata*.

The name '*Laciniatae*' given by ROUY et FOUC. (l.c.), could not be adopted here (cf. Code Art. 22).

On account of the testa-characters the 2 following subseries have been distinguished.

Subser. 3. *Phyteuma*

Seeds coarsely rugose-undulate, outer layer tardily detached.

Type species: *R. phyteuma* L.

Distribution: Coinciding with the distribution of the section.

Remarks: 11 species. One of the most homogeneous groups in the subgenus *Reseda*.

Subser. 4. *Papillosa* ABDALLAH et DE WIT, nov. subser.

Semina laxe papillosa, propago exterior persistens.

Seeds laxly papillose (outer layer of testa persistent).

Type species: *R. stenobotrys* MAIRE et SAMUELSSON.

Distribution: Narrow endemics.

Remarks: One species. On account of the testa-characters this series suggests affinity with ser. *Asperula*.

Ser. 4. *Crenulata* (ROUY et FOUC.) ABDALLAH et DE WIT, nov. comb. et stat.

Basionym: Groupe *Crenulatae* ROUY et FOUC., Fl. Fr. 2, 1895, p. 245 ('sous-section').

Limb of superior petal deeply 3-partite, lateral lobes much wider than central lobe, subobovate to semi-lunate, usually shallowly incised.

Type species: *R. jacquinii* RCHB.

Distribution: SE. France and NW. Spain.

Remarks: One species, suggesting affinity to subser. *Reseda* by the characters of superior petal and to ser. *Phyteuma* in case the lateral lobes of superior petal are rather deeply incised.

SUMMARY: In the course of time 6 sections, or taxa of sectional status, have been segregated in *Reseda*, i.e. *Luteola* DUMORT. (1827), *Glaucoredsa* DC., *Leucoredsa* DC., *Resedastrum* DUBY (all in 1828), *Phyteuma* LANGE (1880), and *Neo-Reseda* PERK. (1909).

Sections *Luteola*, *Glaucoredsa* and *Neo-Reseda* have been raised to the rank of subgenus. Sections *Leucoredsa* and *Phyteuma* are maintained in their previously accepted rank. Section *Resedastrum*, which originally included *R. phyteuma*, *R. odorata* and *R. lutea*, is now partly referred to sect. *Phyteuma* and partly to sect. *Reseda*.

The following table represents the systematy of the infrageneric taxa in *Reseda* L. and the species belonging in each one as accepted in the present study:

Subgenus 1. Neoreseda: *R. ellenbeckii* and *R. telephiifolia*.

Subgenus 2. Glaucoredsa: *R. battandieri*, *R. complicata*, *R. glauca*, *R. gregensis*, and *R. virgata*.

Subgenus 3. Luteola: *R. luteola*.

Subgenus 4. Reseda:

Section 1. Reseda:

Series 1. Reseda:

Subseries 1. Reseda: *R. crystallina*, *R. duriaeana*, *R. globulosa*, *R. lanceolata*, *R. lutea*, and partly *R. urnigera*.

Subseries 2. Multilaciniata: *R. aucheri*, *R. bungei*, *R. germanicopolitana*, *R. haussknechtii*, *R. hemithamnodes*, *R. macrobotrys*, *R. pruinosa*, *R. sa'adae*, *R. scoparia*, *R. stricta*, *R. tefedestica*, *R. tomentosa*, and partly *R. buhseana* as well as *R. urnigera*.

Series 2. Asperula: *R. alphonsi*, *R. amblycarpa*, *R. elata*, *R. gilgiana*, *R. microcarpa*, *R. migiurtinorum*, *R. muricata*, *R. oligomeroides*, *R. sphenocleoides*, *R. stenostachya*, *R. villosa*, *R. viridis*, and partly *R. buhseana*.

Section 2. Leucoredsa: *R. alba*, *R. fruticulosa*, and *R. undata*.

Section 3. Phyteuma:

Series 3. Phyteuma:

Subseries 3. Phyteuma: *R. alopecuros*, *R. arabica*, *R. armena*, *R. balansae*, *R. diffusa*, *R. inodora*, *R. media*, *R. odorata*, *R. orientalis*, *R. phyteuma*, and *R. tymphaea*.

Subseries 4. Papillosa: *R. stenobotrys*.

Series 4. Crenulata: *R. jacquinii*.

Key to the species and infraspecific taxa of *Reseda*¹

- 1a. Capsules (and ovaries) closed at top (Ethiopia, Somalia, Kenya).
- 2a. Leaves 5–14 cm long, 1½–5½ cm wide. Capsules obovoid to -ellipsoid. Seeds echinate. **17. ellenbeckii**
- 2b. Leaves up to 3 cm long and 1 cm wide. Capsules subglobose (-ellipsoid). Seeds short-papillose. **48. telephiifolia**
- 1b. Capsules (and ovaries) gaping.
- 3a. Sepals 4. Carpels 3, rarely 2. Leaves entire, usually more than ½ cm wide. **30. luteola**
- 3b. Sepals 5 or more.
- 4a. Placenta transverse or forked.
- 5a. All ovules (4–6) collateral, transverse in the constricted ovary. Leaves partly 3- or palmatifid (terminal lobe ca. 8 mm wide). **22. globulosa**
- 5b. Ovules partly superposed, partly collateral (placenta forked in upper part). Leaves subulate or linear, up to 3 mm wide. Capsule ± globular.
- 6a. Leaves provided with 3–5 (–6) pairs of small, marginal, usually hyaline dents at the base or lower half, sometimes some leaves with only 2 pairs of dents.
- 7a. Dents only on the lower part of leaf, hyaline. Limb of lateral and anterior petals entire. **54. virgata**
- 7b. Dents as a rule up to over the middle of leaf; sometimes herbaceous. Limb of lateral and anterior petals usually 2–3-fid; rarely entire. **9b. battandieri var. limicola**
- 6b. Leaves without dents or at most with 2 pairs of hyaline, basal dents.
- 8a. Leaves ca. 1 cm long, densely fasciculate. Taproot stapelioid. **23. gredensis**
- 8b. Leaves 2–6 (–8) cm long, rarely fasciculate.
- 9a. Pedicels of capsules 4–8 mm long. Anthers rough. **9. battandieri**
- 9b. Pedicels of capsules up to 2½ mm long.
- 10a. Seeds finely papillose. Plants 5–15 cm tall. **9c. battandieri var. tuberculata**
- 10b. Seeds smooth. Plants 20–50 cm tall. Anthers smooth.
- 11a. Lobes of the limb of superior petal linear or narrow-oblong, ca. ½ as long as the limb. Ovarial teeth ⅓ as long as the ovary. Capsules 2–3 × 3½ mm. Seeds with a minute protuberance opposite the radicle; middle layer of the testa smooth. **12. complicata**
- 11b. Lobes of the limb of superior petal triangular, up to ⅓ as long as the limb. Ovarial teeth ca. ½ as long as the ovary. Capsules 4 × 5 mm. Seeds without a protuberance; middle layer of testa finely tessellate. **21. glauca**
- 4b. Placenta entire (not forked above), vertical.

¹ To name *Reseda* specimens by means of the key, as a rule flowers and mature capsules are required.

- 12a. All stem-leaves at both sides repeatedly incised ('pinnatisect'), lobes sometimes again incised; rosette-leaves often more or less entire. Sepals persistent or tardily deciduous.
- 13a. Leaves with white villous indumentum or papillose-hirsute. Filaments deciduous. Seeds smooth, not rugulose or papillose.
- 14a. Appendage of superior petal decidedly longer than the limb; central lobe of the limb much longer than adjacent lobes. Capsules much shorter than their pedicels. **19. germanicopolitana**
- 14b. Appendage of superior petal much shorter than the limb; limb flabellate. Capsules much longer than their pedicels. **49. tomentosa**
- 13b. Leaves glabrous or scabrid.
- 15a. Filaments deciduous. Limb of superior petal very deeply (5-) 7-11 (-15)-partite; lobes linear spathulate. Seeds smooth and glossy. Terminal leaf-lobe much longer and larger than lateral lobes; lateral lobes gradually attenuate into a long pseud-petiolule. **49b. tomentosa var. glabrata**
- 15b. Filaments persistent. Limb of superior petal usually 3-5 (rarely more)-partite; incisions often shallow or limb merely notched. Seeds rugulose or papillose, dullish. Terminal leaf-lobe usually shorter and smaller than lateral lobes (except *R. fruticulosa* var. *attenuata*); lateral lobes broadly decurrent along the midrib.
- 16a. Capsule widest above the middle, obovoid or obovoid-cylindric. Flowers (pale) yellow. **51. undata**
- 16b. Capsule cylindric or cylindric-ovoid. Flowers white.
- 17a. Pedicel slender, in fruit up to 5 (-8) mm long.
- 18a. Disc poorly developed, almost wanting. Claw usually not or scarcely auriculate. **1b. alba ssp. decursiva**
- 18b. Disc well developed, extended posteriorly. Claw distinctly auriculate. **1a. alba ssp. alba**
- 17b. Pedicel absent or almost so, thick, in fruit up to 1 (-4) mm long.
- 19a. Superior petal with a transverse rim in front of limb-base. **18. fruticulosa**
- 19b. Superior petal without a transverse rim in front of limb-base. **1b1. alba var. decursiva**
- 12b. Leaves entire or variously and irregularly incised, often mingled with \pm pinnate leaves, but never all stem-leaves pinnately divided.
- 20a. Limb of superior petal deeply 3-partite (the lateral lobes much wider than the central lobe and often irregularly incised or entire).
- 21a. Lobes of the limb of superior petal almost similar in shape and size; or limb entire.
- 22a. Sepals persistent. Seeds smooth and carunculate. **29. lutea**
- 22b. Sepals deciduous.
- 23a. Floral disc expanded only posteriorly. Limb of anterior petal 3-partite. Appendage of superior petals about as long as the limb. **3. alphonssi**
- 23b. Floral disc excentric orbicular. Limb of anterior petal entire. Appendage

- of superior petals distinctly longer than the limb. **33. microcarpa**
- 21b. Lobes of the limb of superior petal dimorphic, each lateral lobe much wider than central lobe, margin of the lateral lobe entire to shallowly cleft.
- 24a. Filaments persistent. **13. crystallina**
- 24b. Filaments deciduous.
- 25a. Central lobe of superior petal as long as or longer than lateral lobes. Seeds smooth and glossy.
- 26a. Flowers horizontally directed or almost nodding. Limb of anterior petal entire. Stamens 22–24. Capsules 3–5 times as long as wide, finally strictly erect. Seeds ecarunculate. **28. lanceolata**
- 26b. Flowers erect. Limb of anterior petal usually 2–3-partite. Stamens 16–18 (–20). Capsules up to twice as long as wide. Seeds carunculate.
- 27a. Ovaries and capsules glabrous or scabrescent on the ribs. Stipe, especially of capsules, widely exerted above the disc. Lateral lobe of superior petal shallowly lobed to entire. **52b. urnigera var. boissieri**
- 27b. Ovaries and capsules (at least the ribs) coarsely-papillose. Stipes obscurely exerted above the disc. Lateral lobe of superior petal entire. **15. duriaeana**
- 25b. Central lobe of superior petal decidedly shorter than the lateral lobes.
- 28a. Ovules 6–10 on each placenta. Capsules nodding.
- 29a. Ovaries (and capsules) densely papillose. Seeds smooth and glossy. **15b. duriaeana var. papillosa**
- 29b. Ovaries (and capsules) smooth, glabrous (ribs scabrescent). Seeds rough and dull. Sepals reflexed in fruit. **27. jacquini**
- 28b. Ovules (10–) 12–15 (–30) on each placenta. Capsules usually erect. Seeds glossy, smooth.
- 30a. Flowers white. **28b. lanceolata var. constricta**
- 30b. Flowers yellow.
- 31a. Inflorescence subcorymboid, greatly lengthening when fruits develop. Floral disc with strongly erose margins. Ovaries and capsules (coarsely) papillose. Capsules narrow cylindric. **13. crystallina**
- 31b. Inflorescence when young cylindric-conical, attenuate towards the tip. Floral disc with entire or at most ciliate margins. **29. lutea**
- 20b. Limb of superior petal with (4–) 5 or more, usually very deep, incisions.
- 32a. Central lobe of superior petal decidedly shorter than the adjacent lobes.
- 33a. Sepals deciduous. Seeds smooth.
- 34a. Capsules cylindric. Leaves as a rule partly divided. Laciniae of superior petal as a rule dimorphic. Seeds carunculate. **29a4. lutea var. muelleri**
- 34b. Capsules globose or clavate to obovoid. Leaves all entire. Laciniae of superior petal similar in shape. Seeds ecarunculate.
- 35a. Leaves less than 1 cm wide. Laciniae of superior petal wide, shorter than the appendage. Capsules globular. **31. macrobotrys**

- 35b. Leaves over 1 cm wide. Laciniae of superior petal narrow, longer than the appendage. Capsules clavate to obovoid. **7. aucheri**
- 33b. Sepals persistent.
- 36a. Filaments persistent. Seeds coarsely rugose.
- 37a. Laciniae of the lateral lobes of superior petal narrow-spathulate or -obovate; margin of the appendage finely papillose. Glabrous or scabrescent-papillose low herbs. **5. arabica**
- 37b. Laciniae of lateral lobes of superior petal linear; margin of the appendage densely ciliate. Usually sturdy hirsute herbs. **2. alopecuros**
- 36b. Filaments deciduous.
- 38a. Limb of superior petal palmatifid, all incisions at same level and at most down to $\frac{3}{4}$ of the limb. Flowers small, and like capsules very laxly distributed along a very long inflorescence. Leaves partly trifid. **8. balansae**
- 38b. All incisions down to limb-base or limb of superior petal with two central, much deeper incisions than the incisions of lateral lobes (i.e. limb 3-sect).
- 39a. Seeds smooth. **29a4. lutea var. muelleri**
- 39b. Seeds rugose, never smooth.
- 40a. Seeds with some apical carunculoid tissue. Sepals reflexed under the ripe capsule. Capsules up to $1\frac{1}{2}$ cm long, some globose some cylindrical-globose. **39b. phyteuma ssp. collina**
- 40b. Seeds with carunculoid tissue only in the sinus.
- 41a. Capsules globose (\pm as long as wide).
- 42a. Ribs of capsule smooth.
- 43a. Disc glabrous. Anthers (and filaments) asperulous. Sepals not reflexed. **50b. tymphaea ssp. anatolica**
- 43b. Disc velutinous. Anthers (and filaments) smooth. Sepals reflexed under ripe capsules. **36b. odorata var. neilgherrensis**
- 42b. Ribs of capsule scabrid. Anthers (and filaments) asperulous. Sepals not reflexed. **5b. arabica ssp. moroccana**
- 41b. Capsules cylindric to -globose, decidedly longer than wide (and nodding at maturity).
- 44a. All incisions of the limb of superior petal down to limb-base. Sepals scabrid.
- 45a. Laciniae of the limb of superior petal linear. Disc glabrous. Terminal leaf-lobe very distinctly the largest. Capsules with large, long teeth. **26. inodora**
- 45b. Laciniae of the limb of superior petal broadly linear or linear-spathulate, widened towards a rounded top. Disc velutinous.
- 46a. Flower-pedicel equalling the sepals, 3-4 mm long. Incisions of the limb of superior petal not quite reaching limb-base. **32. media**
- 46b. Flower-pedicel twice as long as the sepals, 6-8 mm long. Incisions of the limb of superior petal reaching limb-base. **38. orientalis**
- 44b. Incisions (at least of lateral lobes) of the limb of superior petal not

- reaching limb-base, often ca. half way down.
- 47a. Seeds with regular rows of widely spaced papillae. Laciniae of the limb of superior petal ca. 23–25. **44. stenobotrys**
- 47b. Seeds coarsely rugose. Laciniae of the limb of superior petal ca. 15.
- 48a. Filaments distinctly dilated above the middle.
- 49a. Sepals not or scarcely increased at maturity of capsule. Some leaves pinnatisect. Ribs of capsule scabrid, plant more or less hairy. **32. media**
- 49b. Sepals much increased at maturity of capsule. No pinnatisect leaves present. Ribs of capsule (nearly) smooth; plant (almost) glabrous. **39. phyteuma**
- 48b. Filaments filiform or subulate.
- 50a. Leaves entire. **6. armena**
- 50b. Leaves partly variously divided.
- 51a. Ribs of ripe capsule coarsely scabrid or papillose. Plants as a rule more or less hairy.
- 52a. Filaments persistent or tardily deciduous. Usually velutinous-hirsute herbs. **2. alopecuros**
- 52b. Filaments early deciduous.
- 53a. Erect herb. Never pinnatisect leaves present (entire or 3-partite). Flower pale yellow. Stamens ca. 25. **14. diffusa**
- 53b. Decumbent or ascending herbs. Some pinnatisect leaves present. Flower white. Stamens up to 20.
- 54a. Laciniae of superior and lateral petals comparatively broad, spathulate or ligulate (incisions down to the very limb-base). Ripe capsule on a 10–15 mm long pedicel (sepals less than half as long). **38. orientalis**
- 54b. Laciniae of superior and lateral petals narrow, more or less spathulate (incisions not quite reaching the limb-base). Ripe capsule on a less than 1 cm long pedicel (sepals slightly shorter). **32. media**
- 51b. Ribs of ripe capsule and the pedicels smooth or very nearly so.
- 55a. Incisions of the lateral lobes of superior petal up to half way down; laciniae of the limb linear. Capsules cylindric-ovoid. **27b. jacquini ssp. litigiosa**
- 55b. Incisions of lateral lobes of superior petal almost down to limb-base (deeper than half way down). Capsules broadly cylindric to obovoid.
- 56a. Limb of anterior petal deeply 3-partite. Anthers and upper part of filaments asperulous. Disc glabrous or nearly so. **50. tymphaea**
- 56b. Limb of anterior petal entire. Stamens smooth. Disc densely velutinous. **36. odorata**
- 32b. Central lobe of superior petal as long as or longer than the adjacent lobes.
- 57a. Flower-pedicels capillary and arching. Superior petal often shorter than the lateral petal (ca. $\frac{2}{3}$ as long as the lateral). **46. stricta**
- 57b. Flower-pedicels stout or slender, straight, sometimes flowers sessile. Superior petal as long as or longer than the lateral.
- 58a. Silky velutinous herbs. Sepals (sometimes tardily) deciduous.

- 59a. Limb of superior petal 5-palmatifid and flabellate; lobes linear-spathulate (almost of same shape). Capsules obovoid, 5 mm long. Leaves entire, elliptic-obovate, petiolate. **34. migiurtinorum**
- 59b. Limb of superior petal consisting of a large, oblong central lobe; central lobe much longer and wider than the cockscomb-like lateral lobules which are inserted on both sides of its lower half. Capsules (sub)cylindric, 15 mm long. Leaves entire or partly trifid, narrow-ovate and attenuate towards base. **53. villosa**
- 58b. Glabrous, papillose-scabrid or at most puberulous herbs.
- 60a. Capsules nodding.
- 61a. Side-walls of ovary (and capsule) densely papillose or warty. Ovarial teeth strongly inflated.
- 62a. Ovary 4-toothed. An annual herb. Stems ± smooth. . . . **47. tefedestica**
- 62b. Ovary 3-toothed. Perennial. Stems muricate. **40. pruinosa**
- 61b. Ovaries and capsules glabrous and smooth, or the ribs scabrescent. Ovarial teeth usually hardly inflated.
- 63a. Leaves linear, ca. $1\frac{1}{4}$ mm wide. **42. scoparia**
- 63b. Leaves not linear and variously shaped, at least 5 mm wide.
- 64a. Ovules 30–45 per placenta. Sepals 7–9, usually 8. Laciniae of the limb of superior petal attenuate towards their acute tops. . . . **41. sa'adae**
- 64b. Ovules 5–12 (–16) on each placenta. Sepals (5–) 6 (–7). Laciniae of the limb of superior petal linear-spathulate with rounded tops.
- 65a. Seeds coarsely rugose.
- 66a. Sepals (almost) smooth. Lobes of the limb of superior petal of same shape, linear-spathulate.
- 67a. Disc puberulous to velutinous. Leaf-blade short attenuate at base. Inflorescence dense, short. **36. odorata**
- 67b. Disc glabrous. Leaf-blade long attenuate at base. Inflorescence lax, very slender, ca. 40 cm long. **8. balansae**
- 66b. Sepals scabrid or at least scabrescent. Central lobe of limb of superior petal linear, lateral laciniae of the limb narrowly spathulate. Leaves very long attenuate towards the base. **38. orientalis**
- 65b. Seeds smooth or finely papillose.
- 68a. Capsule obovoid to clavate, not stipitate, with a narrow pore. A shrublet. Seeds finely papillose (papillae in rows). **55. viridis**
- 68b. Capsule urnshaped, widely gaping, long stipitate. Seeds smooth, glossy, carunculate. **52. urnigera**
- 60b. Capsules erect.
- 69a. Seeds papillose.
- 70a. Capsule cylindrical, at least twice as long as wide.
- 71a. Leaf (-lobes) 1–2 mm wide.
- 72a. Side-walls of ovary warty or papillose. Stem pruinose (by colourless papillae). Pedicels in fruit up to 3 mm long. **45. stenostachya**
- 72b. Side-walls of ovary smooth. Pedicels in fruit 7–10 mm long.
- 73a. Leaves all entire. **42. scoparia**

- 73b. Leaves deeply tripartite. **37. oligomeroides**
- 71b. Leaf (-lobes) 5 mm wide or wider.
- 74a. Side-walls of ovary warty. Central lobe of limb of superior petal wider and longer than lateral.
- 75a. Leaf smooth. Ovary 4-toothed. **47. tefedestica**
- 75b. Leaves muricate. Ovary 3-toothed. **40. pruinosa**
- 74b. Side-walls of ovary smooth.
- 76a. All leaves entire.
- 77a. Leaves canescent, white hairy. Capsules at least 10 mm long. More than 30 ovules per placenta. **53. villosa**
- 77b. Leaves glabrous or papillose, pustulate or scabrid.
- 78a. Limb of superior petal with ca. 15 (10 or more) incisions, longer than appendage. Stamens not exerted. Seed with one broadly truncate ending. Flower yellow. **16. elata**
- 78b. Limb of superior petal with 3-7 (less than 10) incisions. Seed rounded or pointed at both ends.
- 79a. Ovules 15-20 per placenta. Capsule strongly constricted below the teeth. **43. sphenocleoides**
- 79b. Ovules 30-40 per placenta.
- 80a. Capsule fusiform, not constricted. Limb of superior petal with ca. 7 incisions, shorter than the appendage. Flower white (when fresh). Stamens far exerted. **4. amblycarpa**
- 80b. Capsule cylindric, ± constricted. Limb of superior petal with ca. 3 incisions, ± equalling the appendage. Flower yellow(ish). Stamens not exerted. **3. alphonsi**
- 76b. All or some leaves incised.
- 81a. Leaves canescent, white hairy. Capsules at least 10 mm long. More than 30 ovules per placenta. **53. villosa**
- 81b. Leaves glabrous or papillose, pustulate or scabrid.
- 82a. Seed with one broadly truncate ending. Limb of superior petal with ca. 15 (more than 10) incisions, longer than the appendage. Central lobe spatulate, much wider than the lateral. **16. elata**
- 82b. Seed rounded or pointed at both ends. Limb of superior petal with 3-7 incisions, shorter than or equalling the appendage. Central lobe ca. equally wide as the lateral.
- 83a. Capsule ca. fusiform, not constricted. Stamens far exerted. Flower white (when fresh). **4. amblycarpa**
- 83b. Capsule cylindrical. Stamens not exerted. Flower yellow(ish). **3. alphonsi**
- 70b. Capsule not cylindrical: (ob)ovate, urceolate, globular, fusiform or ca. ellipsoid, length up to $1\frac{1}{2} \times$ width.
- 84a. Side-walls of ovary warty or papillose.
- 85a. Leaf (-lobes) subulate. **45. stenostachya**
- 85b. Leaf (-lobes) more than 3 mm wide.
- 86a. Ovules ca. 40 per placenta. Laciniae of limb of superior petal broad,

- ligulate. Ovary 4-toothed. **47. tefedestica**
- 86b. Ovules 15–25 per placenta. Lacinae of limb of superior petal narrow, linear. Ovary 3-toothed.
- 87a. A shrub. Stamens deciduous. Capsular pore narrow. **55. viridis**
- 87b. A herb. Stamens persistent. Capsular pore wide.
. **35b. muricata ssp. patzakiana**
- 84b. Side-walls of ovary smooth.
- 88a. Incisions in limb of upper petal 2–3.
- 89a. Capsule ± globose, bulging over the seeds. All leaves entire. Ovules 9–15 per placenta. **33. microcarpa**
- 89b. Capsule ± ellipsoid, side-walls grooved, widely gaping but constricted below the teeth. Usually at least some leaves incised. **3. alphonsi**
- 88b. Incisions in limb of upper petal (4–) 7–8 (–10).
- 90a. All leaves entire.
- 91a. Seeds with regular rows of close papillae. Pedicels up to 6 mm long. Capsule widest at or above the middle. . . **10b. buhseana var. asperula**
- 91b. Seeds smooth and vaguely tessellate-rugulose. Pedicels up to 2 mm long. Capsules widest below the middle. **25. hemithamnodes**
- 90b. Some or all leaves incised. Pedicels up to 6 mm long. Capsule (ob)ovoid, pyriform, ellipsoid or fusiform.
- 92a. Flowers white (when fresh).
- 93a. Capsule spindle-shaped (pore narrow). Ovules ca. 40 per placenta. **4. amblycarpa**
- 93b. Capsule (ob)ovoid or globular-urceolate (pore wide). Ovules 15–25 per placenta. **35a. muricata ssp. muricata**
- 92b. Flowers golden yellow. Ovules ca. 25 per placenta. Capsular pore gaping. **20. gilgiana**
- 69b. Seeds smooth or, rarely, vaguely veined.
- 94a. Side-walls of ovary papillose or warty.
- 95a. Leaf (-lobes) 1–2 mm wide. **45. stenostachya**
- 95b. Leaf (-lobes) 1–1½ cm wide. **11b. bungei var. scabrida**
- 94b. Side-walls of ovary smooth (by colourless papillae). . **45. stenostachya**
- 96a. Capsule cylindric.
- 97a. Leaf subulate. Capsule narrowly cylindric. Ovules 35–40 per placenta. **42. scoparia**
- 97b. Leaf ovate-spathulate. Capsule broadly cylindric, long stipitate. Ovules 10–15 per placenta. **52. urnigera**
- 96b. Capsule (ob)ovoid, fusiform, urceolate (urnshaped), pyriform, globular or ellipsoid.
- 98a. All leaves entire. Ovary 3-toothed. Seed with a minute protuberance opposite the bulge over the radicle.
- 99a. Central lobe of the limb of the superior petal distinctly shorter than lateral. **31. macrobotrys**
- 99b. Central lobe of the limb of the superior petal equalling or exceeding the lateral.

- 100a. Capsule widest clearly below the middle (urceolate). Limb of superior petal 7-laciniate. Bract twice as long as the pedicel, persistent. **25. hemithamnodes**
- 100b. Capsule widest at or above the middle. Limb of superior petal 7-11-laciniate. Bract deciduous.
- 101a. Limb of superior petal flabellate-laciniate (11 laciniae). Capsular pore narrow. **24. haussknechtii**
- 101b. Limb of superior petal 6-7-laciniate.
- 102a. Capsule \pm globular.
- 103a. Stamens ca. 24. Capsular pore narrow. Seed very smooth, glossy. **11a. bungei var. bungei**
- 103b. Stamens 15-17. Capsular pore wide. Seed partly rugulose. **10a. buhseana var. buhseana**
- 102b. Capsule clavate, obovate. **7a. aucheri var. aucheri**
- 98b. All or part of the leaves incised.
- 104a. Seed wrinkled-veined. Capsular pedicel up to 6 mm long. Capsular pore wide. A spartioid, usually glabrous and glaucous herb. **10c. buhseana var. dshebeli**
- 104b. Seed smooth.
- 105a. Capsule clavate, not stipitate, rough on the ribs, side-walls grooved (sulcate), pore narrow. Seed ecarunculate. **7b. aucheri var. bracteata**
- 105b. Capsule short-cylindric, long stipitate, smooth on the ribs, side-walls flat, widely gaping. Seed carunculate. **52. urnigera**

Sp. Pl. 1, 1753, p. 449; id., Syst. Nat. ed. 10, 2, 1759, p. 1046; id., Sp. Pl. ed. 2, 1, 1762, p. 645; id., Syst. Nat. ed. 12, 1767, p. 330; Mill., Gard. Dict. ed. 8, 1768, no. 5; Houltuyn, Nat. Hist. 2(8), 1777, p. 728; Link, Fl. Fr. 3, 1778, p. 206; Murr., Syst. Veg. ed. 14, 1784, p. 448 et l.c. ed. 15, 1798, p. 368; Willd., Sp. Pl. 2(2), 1799, p. 879; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 726; Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 449; Hornem., Hort. Hafn. 2, 1815, p. 502; St. Amans, Fl. Agen. 1821, p. 187, quod nom. (see Taxa et nom. rej.); Spreng., Syst. Veg. 2, 1825, p. 464; Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Rchb., Fl. Germ. 1830-32, p. 696; Link, Handb. 3, 1831, p. 324; Richter, Codex 1835, p. 463; Rchb., Ic. Fl. Germ. Helv. 2, 1838, p. 22, tab. 101, fig. 4447-4448; Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 102; Boiss., Voy. Bot. Esp. 2, 1839-45, p. 75; Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 242, 'sp. dubia'; Walp., Repert. 2, Suppl. 1, 1843, p. 752; Guss., Enum. Pl. Vasc. Ins. Inar. 1854, p. 28; Muell. Arg., Mon. Rés. 1857, p. 100-107, tab. 6, fig. 86 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 425 et Suppl. 1888, p. 69; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 557; Lange in Willkomm et Lange, Prodr. Fl. Hisp. 3, 1880, p. 891; Arc., Comp. Fl. It. 1882, p. 66; Batt. in Batt. & Trab., Fl. Alg., 1888-90, p. 83; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 180; Rouy et Fouc., Fl. Fr. 2, 1895, p. 240; Post, Fl. Syr. Palest. Sin. 1896, p. 111; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 180; Coste, Fl. Fr. 1, 1901, p. 159; Muschl., Man. Fl. Egypt 1, 1912, p. 439; Briquet, Prodr. Fl. Corse 2(1), 1913, p. 123; Ramis, Bestimm. Fl. Aeg. 1929, p. 98; Pamp., Prodr. Fl. Ciren. 1931, p. 234; Dinsmore in Post, Fl. Syr. Palest. Sin. ed. 2, 1, 1932, p. 137; Jah. et Maire, Cat. Pl. Maroc 2, 1932, p. 315; Senn. et Maur., Cat. Fl. Rif. Or. 1933, p. 11; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 665-688, fig. 427d; Claph. in Claph. et al., Fl. Br. Isl. 1952, p. 238; Täckh., Stud. Fl. Egypt 1956, p. 332; Roles in Claph. et al., Fl. Br. Isl. Ill. 1957, tab. 63, fig. 247; Claph. in Claph. et al., Fl. Br. Isl. ed. 2, 1962, p. 187; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 438, tab. 38, fig. 1219; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347; Coode in Davis, Fl. Turk. East Aeg. Isls. 1, 1965, p. 500, fig. 20 (7-8); Zohary, Fl. Palaest. 1, 1966, p. 332, tab. 483.

R. a. α Linn., Sp. Pl. 1753, l.c. (= var. *alba*).

R. a. ' β *undata*' DC., Fl. Fr. 5, Suppl. ('vol. 6') 1815, p. 599; Terr. in Caruel Fl. It. 10, 1894 (1893), p. 181, nom. illeg. (= var. *alba* as well as its subordinates).

R. a. u. a. *tenorii* Terr., l.c.

R. a. u. b. *sardoa* Terr., l.c.

R. a. u. c. *incisa* (Ten.) Terr., l.c.

R. a. u. d. *brevipes* (Muell. Arg.) Terr., l.c.

R. a. a. *laetevirens* Muell. Arg., Mon. Rés. 1857, p. 101 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858) (= var. *alba* as well as its subordinates).

R. a. l. a. *hexasepala* Muell. Arg., l.c.

R. a. l. b. *macrantha* Muell. Arg., l.c., p. 102.

- R. a. l. c. vulgaris* Muell. Arg., l.c.
R. a. l. v. cc. abortiva Muell. Arg., l.c., p. 104.
R. a. β firma Muell. Arg., l.c.; Rouy et Fouc., Fl. Fr. 2, 1895, p. 241 (= var. *alba* as well as its subordinates).
R. a. f. a. major Boiss. ex Muell. Arg., l.c.
R. a. f. b. minor Muell. Arg., l.c., p. 105.
R. a. f. subv. *incisa* (Ten.) Rouy et Fouc., l.c.
R. a. γ maritima Muell. Arg., l.c., p. 105, nom. illeg.; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 83, nom. nov.; Rouy et Fouc., Fl. Fr. 2, 1895, p. 241; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 180 (= var. *alba*).
*R. a. *brevipes* Muell. Arg. in DC., Prodr. 16(2), 1868, p. 558 (= var. *alba*).
R. a. β hookeri (Guss.) Arc., Comp. Fl. It. 1882, p. 66; Terr. in Caruel, Fl. It. 10, 1894 (1893), p. 181; Bornm. in Verh. Zool.-Bot. Ges. Wien 48, 1898, p. 558; Heldr. in Bull. Herb. Boiss. 6, 1898, p. 236; Vandas, Rel. Formánek. 1909, p. 45; Dinsmore in Post, Fl. Syr. Palest. Sin. ed. 2, 1, 1932, p. 137 (= var. *alba*).
R. a. α vulgaris (Muell. Arg.) Terr., l.c., p. 180; Rouy et Fouc., Fl. Fr. 2, 1895, p. 241 (= var. *alba* as well as its subordinates).
R. a. v. a. macrantha (Muell. Arg.) Terr., l.c.
R. a. v. b. suffruticulosa Terr., l.c.
R. a. v. c. maior (Boiss. ex Muell. Arg.) Terr., l.c.
R. a. v. subvar. *obtusa* Rouy et Fouc., l.c., nom. illeg.
R. a. δ myriophylla (Ten.) Terr. in Caruel Fl. It. 10, 1894 (1893), p. 182 (= var. *alba*).
R. a. δ brevipes (Muell. Arg.) Rouy et Fouc., Fl. Fr. 2, 1895, p. 242 (= var. *alba*).
R. a. subsp. *angustifolia* Formán. in Verh. Naturf. Ver. Brünn 34, 1896 (1895), p. 333 (= var. *alba*).
R. a. var. *minor* (Muell. Arg.) Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 180 (= var. *alba*).
R. a. forma *maxima* Heldr. in Bull. Herb. Boiss. 6, 1898, p. 236 (= var. *alba*).
R. a. forma *leptostachys* Heldr., l.c. (= var. *alba*).
R. a. forma *micrantha* Faure et Maire in Bull. Soc. Hist. Nat. Afr. Nord 22, 1931, p. 278; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 315, sub ssp. *eu-alba* (= var. *alba*).
R. a. subsp. *eu-alba* Maire in Mém. Soc. Sc. Nat. Mar. 7, 1924, p. 167 (by inference), et in Bull. Hist. Nat. Afr. Nord 23, 1932, p. 166; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 315; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1015; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 438 (= ssp. *alba*).
R. a. var. *subtrimeria* Maire et Samuelss. in Arkiv Bot. Stockh. 29A, 2, 1939, p. 15; Emb. et Maire, l.c., sub ssp. *eu-alba* (= var. *alba*).
R. a. subsp. *decursiva* (Forsk.) Maire in Mém. Soc. Sc. Nat. Mar. 7, 1924, p. 167 et in Bull. Soc. Hist. Nat. Afr. Nord 23, 1932, p. 166 (nom. provis.); Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 315; Emb. et Maire, l.c., p. 1016 (= ssp. *decursiva*).
R. a. d. forma *ochroleuca* Maire in Mém. Soc. Sc. Nat. Mar., l.c. (= var.

propinqua).

R. a. d. var. *trimera* Maire et Sennen in Bull. Soc. Hist. Afr. Nord 23, 1932, p. 166; Jah. et Maire, l.c. (= var. *trigyna*).

R. a. d. var. *tetramera* Maire in Bull. Soc. Hist. Nat. Afr. Nord, l.c. (= var. *decursiva*).

R. a. d. β *propinqua* (R. Br.) Maire in Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016 (by inference) (= var. *propinqua*).

R. a. d. p. forma *ochroleuca* Maire in Emb. et Maire, l.c. (= var. *propinqua*).

R. a. d. var. *eremophila* (Boiss.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 30, 1939, p. 261 (by inference); Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016 (= var. *decursiva*).

R. a. d. e. subvar. *tetragyna* Maire et Weiller in Bull. Soc. Hist. Nat. Afr. Nord, l.c. (= var. *decursiva*).

R. a. subsp. *gayana* (Boiss.) Maire forma *trigyna* (Batt.) Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 315 (= var. *trigyna*).

R. a. subsp. *tricuspis* (Coss. et Ball ex Coss.) Maire in Jah. et Maire, l.c.; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1015; Sauvage, Fl. Subér. Mar. 1958, p. 76 (= var. *trigyna*).

R. a. t. var. *trigyna* (Batt.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 26, 1935, p. 188; Emb. et Maire, l.c. (= var. *trigyna*).

R. a. subsp. *myriosperma* (Murb.) Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 315; Emb. et Maire, l.c. (= var. *myriosperma*).

R. a. subsp. *pau* Sennen, Diagn. Nouv. Pl. Esp. Mar. 1936, p. 123; Emb. et Maire, l.c., p. 1016 (= var. *alba*).

R. a. subsp. *maritima* Muell. Arg. ex Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 438 (= var. *alba*) (author's name misprint 'Mill').

R. suffruticulosa L., Sp. Pl. ed. 2 and 3, 1762 and 1764, p. 645; Bertoloni, Fl. It. 5, 1842, p. 29; Rchb., Fl. Germ. 1830-32, p. 696; id., Ic. Fl. Germ. Helv. 2, 1837-38, p. 22, tab. 101, fig. 4449; Gren. et Godr., Fl. Fr. 1, 1848, p. 189; Hausm., Fl. Tirol. 1851, p. 105; Visiani, Fl. Dalm. 3, 1852, p. 94; Strobl, Fl. Etna in Oesterr. Bot. Zeit. 35, 1885, p. 132 (= var. *alba*).

R. decursiva Forskål, Fl. Aeg.-Arab. 1775, LXVI no. 250; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 559; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 83; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 181; Muschl., Man. Fl. Egypt 1, 1912, p. 440; Hand.-Mazz. in Ann. K. K. Naturhist. Hofmus. 27, 1913, p. 56; Blatt., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 47; Ramis, Bestimm. Fl. Aeg. 1929, p. 98; Dinsmore in Post, Fl. Syr. Palest. Sin. ed. 2, 1, 1932, p. 137; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688; Täckh., Stud. Fl. Egypt 1956, p. 332; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 276, fig. 84; Quéz. et Santa, Nouv. Fl. Alg. 1, 1932, p. 440, tab. 38, fig. 1220; Blakelock in Kew Bull. 1948 (3), 1949, p. 394; Burt et Lewis, Fl. Kuw. in Kew Bull. 1949, p. 304; Rech. f., Fl. Lowl. Iraq 1964, p. 325; Zohary in Bull. Gov. Iraq 31, 1950, p. 75; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347; Zohary, Fl. Palaest. 1, 1966, p. 332, tab. 484 (= var. *decursiva*).

R. d. abortiva Muell. Arg., l.c. (= var. *decursiva*).

- R. d. β propinqua* (R. Brown) Bornmüller in Bot. Centralbl. 28(2), 1911, p. 129 (= var. *propinqua*).
- R. d. var. foliosa* (Post) Hand.-Mazz. in Ann. K. K. Naturhist. Hofmus. 27, 1913, p. 56; Dinsmore in Post, Fl. Syr. Palest. Sin. ed. 2, 1, 1932, p. 137; Zohary, Fl. Palaest. 1, 1966, p. 333 (lit. cit. inaccurate) (= var. *propinqua*).
- R. tetragyna* Forsk., Fl. Aeg.-Arab. 1775, p. 92, et LXVII, nomen tantum (= var. *decursiva*).
- R. undata* L. sensu Lamarck et DC., Fl. Fr. ed. 3, 4, 1805, p. 726 (= var. *alba*).
- R. miriophylla* Tenore, Fl. Nap. 1, Prodr., 1823, p. XXVIII; id., l.c. 4, 1830, p. 258 ('*myriophylla*'); id., Syll. 1831, p. 232; Walp., l.c. (= var. *alba*).
- R. propinqua* R. Brown in Denh. et Clapp., Narr. Trav. N. C. Afr. App. 1826, p. 227; Muell. Arg. in Bot. Zeit. 14, 1856, p. 33; id., Mon. Rés. 1857, p. 114, tab. 6, fig. 90 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 425; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 559; Ball in Journ. Linn. Soc. Bot. 16, 1877, p. 337; Batt. in Batt. et Trab., l.c.; Post, Fl. Syr. Pal. Sin. 1896, p. 111 (= var. *propinqua*).
- R. p. var. foliosa* Post, l.c. (= var. *propinqua*).
- R. p. var. eremophila* (Boiss.) Batt. et Jah. in Bull. Soc. Hist. Nat. Afr. Nord 12, 1921, p. 7 (= var. *decursiva*).
- R. fruticulosa* L. b. *glaucescens* Guss., Prodr. Fl. Sic. 1, 1827, p. 537 (= var. *alba*).
- R. f. a. major* Ten., Syll. 1831, p. 252 (= var. *alba*).
- R. f. b. minor* Ten., l.c. (= var. *alba*).
- R. eremophila* Boiss., Diag. Pl. Or. Nov. Ser. 1, 2(8), 1849, p. 54; Webb, Frag. Fl. Aeth.-Aeg. 1854, p. 25; Muell. Arg., Mon. Rés. 1857, p. 109, tab. 6, fig. 88 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858) (= var. *decursiva*).
- R. e. α abortiva* Muell. Arg. ll.cc., p. 111 (= var. *decursiva*).
- R. hookeri* Guss., Enum. Pl. Vasc. Ins. Inar. 1854, p. 28 (= var. *alba*).
- R. kurdica* Boiss. et Noë in Boiss., Fl. Or. 1, 1867, p. 426; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 558; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688; Zohary in Bull. Gov. Iraq 31, 1950, p. 75; Blakelock in Kew Bull. 1955(4), 1956, p. 561; Rech. f., Fl. Lowl. Iraq 1964, p. 325 (= var. *propinqua*).
- R. tricuspis* Coss. in Bull. Soc. Bot. Fr. 20, 1873, p. 241; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 185; Bolle in Engl. et Prantl, l.c. (= var. *trigyna*).
- R. gayana* Boiss. subsp. *trigyna* Batt. in Bull. Soc. Hist. Nat. Afr. Nord 12, 1921, p. 7 (= var. *trigyna*).
- R. myriosperma* Murb. in Lunds Univ. Årsskr. N.S. 2, 18(3), 1922, p. 47, tab. 6; Bolle in Engl. et Prantl, l.c. (= var. *myriosperma*).
- Tereianthes alba* Rafin., Fl. Tellur. 3, 1837 (1836), p. 72; Merr., Ind. Rafin. 1949, p. 132 (= var. *alba*).
- Terianthus suffruticulosus* (L.) Fourr. in Ann. Soc. Linn. Lyon N.S. 16, 1868, p. 342, '*suffruticosus*' (= var. *alba*).
- Eresda alba* Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 102 (= var. *alba*).

Annual, rarely perennial, erect or ascending, often somewhat glaucous herb, often stem(s) rising from a rosetted base, 30–75 (–100, rarely –200) cm tall; taproot heavy, sometimes lignescent.

Stems usually branching, leafy, ribbed, glabrous, occasionally with few deltoid papillae; pith disintegrating.

Leaves pinnatifid or -sect, narrowly ovate to ovate-oblong in outline, 5–15 (–30) cm long, 3–5 (–9) cm wide; lobes numerous, (4–)15 (–more) on each side, \pm equal (occasionally the terminal lobe larger than the lateral), subopposite to alternate, narrowly ovate-elliptic or -oblong, 2–3 (–5) cm long, 5 (–15) mm wide, sometimes \pm acuminate or mucronate (and the apex curving); margins pallid-edged, flat to crisped, entire, sometimes minutely scabridulous.

Flowers white, sometimes creamy, on erect to spreading pedicels, sometimes subsessile. Raceme erect, 20 (–40–50–75) cm long towards maturity. Bracts persistent, forming a tuft at the top of the raceme, glabrous, linear, 3–5 mm long, $\frac{1}{2}$ –1 mm wide, often equalling the pedicel of the fruit; margin widely hyaline (bract sometimes chaffy), entire, sometimes scabridulous. Pedicels often slender, strongly ribbed, ribs scaberulous, ($\frac{1}{2}$ –) 4–5 (–6) mm long in flower, usually slightly longer in fruit.

Sepals 5 (–6), persistent, glabrous, (narrowly) ovate, $2\frac{1}{2}$ –3 (–4) mm long, $\frac{1}{2}$ mm wide, obtuse to acutish; margin hyaline, entire or minutely scabridulous.

Petals (3–) 6 (–7) mm long, equalling or up to twice as long as sepals, claw of all or at least the 2 superior distinctly auricled, or claw scarcely winged, limb of superior petal obovate, cuneate, 3-lobed, 3–4 times as long as the claw; incisions irregular, usually $\frac{1}{3}$ – $\frac{1}{2}$ down. Lobes (narrowly) oblong, obtuse, sometimes incised; central lobe as a rule equally wide and as long as or slightly longer than the lateral; claw obovate to roundish, $1\frac{1}{2}$ mm long, auricles not connected by a transverse rim in front of the base of the limb; edge of auricles often papillose-ciliate. Lateral and anterior petals similar to superior but more and more reduced.

Disc 1 mm high, $2\frac{1}{2}$ mm wide, lacerate, papillose-hirtellous, or also disc reduced.

Stamens (7–) 10–13 (–14). Filaments persistent, (2–) 3–4 (–5) mm long; anthers oblong-ellipsoid, 2 mm long (rarely 1 mm long or shorter).

Ovary ellipsoid, glabrous, rarely scaberulous, (ribs minutely denticulate), (3–)4–5-toothed. Ovules ca. 10 (6–40) on each placenta, as a rule in 2 rows.

Capsules erect, sometimes finally patent or almost nodding, stipitate, ellipsoid-cylindrical, rarely obovoid, (4–) 6–13 (–20) mm long, 4–6 mm wide, glabrous, acutely 4-angled (edges sometimes scaberulous), side-walls \pm sulcate; mouth often constricted beneath the teeth, narrowly gaping, or truncate.

Seeds reddish dark brown to black, dull, \pm obliquely reniform, (0.7–) $1-1\frac{1}{4}$ mm long, ca. 1 mm wide, sinus almost closed. Testa regularly papillose, the rows of papillae following the contour of the seed, papillae usually broadly rounded on top, contiguous (testa scrobiculate) or not.

Caryology: KAERCHER et VALDES-BERMEJO (Anal. Inst. Bot. Cavanilles 32(2), 1975, p. 165–174) reported $2n = 40$; $n = 20$, and declared *R. alba* to be

tetraploid. This contradicts, it would seem TISCHLER, Tab. biol. per. I, 1931, p. 141 (OKSIJUK 1929, 1935, EIGSTI 1936, GORI 1957; cf LÖVE et al., Chrom. numb. Central NW. Eur. Pl. Sp., Op. Bot. 5, 1951, p. 190). In the absence of preserved herbarium specimens this point will never be explained.

Type: '*alba*' (LINN 629.14; holotype).

Distribution: World-wide in the subtropical and temperate zone; of mediterranean origin, wide-spread as a weed but only rarely quite naturalized.

Key to the infraspecific taxa

1. Disc poorly developed to almost wanting. Claw usually not or scarcely auriculate. **b. ssp. decursiva**
2. Inflorescence longer than supporting stem. Capsules (sub)sessile. **b1. var. decursiva**
2. Inflorescence shorter than supporting stem. Capsules (short) pedicelled. **b2. var. propinqua**
1. Disc well-developed, extended posteriorly. Claw distinctly auriculate. **a. ssp. alba**
3. Capsule 3-dentate. **a3. var. trigyna**
3. Capsule 4-dentate.
4. Seeds large ($1-1\frac{1}{4}$ mm long). **a1. var. alba**
4. Seeds small (ca. 0.7 mm long); ovules up to ca. 100 per placenta. **a2. var. myriosperma**

a. subsp. alba

Claw of petals distinctly auricled (winged). Disc fully developed, with a posterior falcate extension. Stamens ca. 12. Capsule 8-13 (-15) mm long, frequently constricted at base of teeth.

a1. var. alba

Seeds $1-1\frac{1}{4}$ mm long, up to ca. 40 per capsule. Ovules in 2(-3) rows. Ovary and capsule usually 4-dentate.

Distribution: Area of the species.

a2. var. myriosperma (MURB.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda myriosperma* Murbeck in Lunds Univ. Årsskrift N.S. 2, 18(3), 1922, p. 47, tab. 6.

Seeds ca. 0.7 mm long, up to ca. 100 per capsule. Ovules in 3–4 rows on each placenta. Ovary and capsule 4-dentate.

Type: S. MURBECK 'Iter Maroccanum, 1921', environs de Marakech, dans la palmeraie, 1. IV. (holotype: LD).

Distribution: Known from the type locality only.

a3. var. trigyna (BATT.) MAIRE in Bull. Soc. Hist. Nat. Afr. Nord 26, 1935, p. 188.

Seeds ca. 0.7 mm long, up to ca. 50 per capsule. Ovules in 2–3 rows. Ovary and capsule 3-dentate.

Type: Not traced.

Distribution: W. and SW. Morocco (occasionally introduced in USA, France, Germany, Netherlands).

b. subsp. decursiva (FORSK.) MAIRE in JAHANDIEZ et MAIRE, Cat. Pl. Maroc 2, 1932, p. 315.

Claw of petals not or very slightly winged. Disc if present very poorly developed. Stamens ca. 10. Capsules 4–6(–8) mm long, usually not constricted above, with truncate teeth.

Type: Herb. FORSKÅLII no. 610 (C).

Distribution: N. Africa, E. Mediterranean, up to Persia (including Jordan, Iraq, and southern Asia minor. SE. Turkey towards the Persian Gulf and S. of the Caspian Sea.

b1. var. decursiva

Flowers (sub)sessile. Petals equalling or slightly exceeding sepals. Capsules (sub)sessile; sepals longer than pedicels. Inflorescence decidedly longer than the supporting stem.

Distribution: Area of the subspecies.

b2. var. propinqua (R. BR.) MAIRE in EMB. et MAIRE, Cat. Pl. Mar. 4, 1941, p. 1016 (by inference).

Flowers short pedicelled. Petals ca. twice as long as the sepals. Capsules pedicelled (pedicels 3–5 mm long). Inflorescences often shorter than the supporting stem.

Type: OUDNEY 3, between Tripoli and Mourzuk (BM).

Distribution: Area of the subspecies.

Taxonomical notes. When MUELL. ARG. started revising *Reseda* in the 1850's he was immediately confronted with the difficulty that *R. alba* L. represented a heterogeneous taxon which had puzzled LINNAEUS (see p. 6 (1st inst. of rev.)) and, in fact, it appeared that the Linnean specimens and publications failed to convey clearly in which way LINNAEUS wanted to delimit *R. alba*.

This led to MUELLER's publication of '*R. alba* Nob.' (Mon. Rés. 1857, p. 100) which included an unsatisfactory author's quotation; this he changed to '*R. alba* L. char. emend.' later (in DC., Prodr. 16(2), 1868, p. 557). He confessed on that occasion that *R. alba* was a 'Species valde ludibunda ... a variis auctoribus varie interpretata varioque sensu admissa, unde synonymia varietatum inextricabile chaos'.

In the century that followed nothing was achieved to unravel the chaos, on the contrary, the present mess of half-baked names and publications is such as to raise the question whether it is really worth while to spend so much thought and time to try to unravel what cannot be unravelled because in many cases the publishing authors themselves were blithely unaware of the implications of their statements or refused to be bothered.

It is not for a moment assumed that by this publication the nomenclatural problems connected with the synonymy of infraspecific taxa in *R. alba* L. are solved although the type method is a powerful modern means to obtain stability. The lack of an 'Index Kewensis' dealing with published infraspecific names prevents a reasonable certainty in matters of priority; in fact, this study of infraspecific taxa demonstrates clearly that the impossibility of establishing a fixed rank for infraspecific names in numerous cases also makes an infraspecific 'Index Kewensis' an unattainable, though essentially indispensable, list.

In the following notes the names listed here in synonymy are discussed (see for the rank of MUELL. ARG.'s infraspecific taxa the comment made on p. 2 and 3 (Introduction) of the present revision).

Reseda alba, and what was accepted as *R. decursiva*, and *R. undata* are very closely allied; there exists no single constant character to distinguish them. The

slender (long) pedicels and large (2 mm long) anthers which are nearly always seen in specimens of *R. alba* north of the Mediterranean, often are south and east of the Mediterranean thick and shorter (the length of the anther in many specimens being ca. 1 mm). These characters occur very frequently in *R. decursiva* (= *R. alba* subsp. *decursiva*).

On the other hand, the central lobe of the limb of a superior petal is narrower than the lateral in '*R. decursiva*', but there are many exceptions, when the limb is similar (equally wide) to that in *R. alba*; the claw, usually tapering in '*R. decursiva*' may resemble that of some specimens of *R. alba*, in case the auricles appear to be a little developed. The same can be said concerning several other characters. These are grounds for the view that *R. alba* ought to be adopted as a polymorphic species, in which an infraspecific taxon is '*R. decursiva*', but a different opinion, leading to another segregation while stressing natural relationship, is also conceivable. Experimental work (including genetics and field observations) is required for a better insight into the complex taxonomy of *Reseda alba* sensu lat.

At present *R. alba* and *R. decursiva* are accepted as one single species under the common specific name *R. alba* L. *R. undata* L. is for the time being maintained as a distinct species. In naming specimens the appearance of the testa of the ripe seed, in correlation with the size of the seed, the size and shape of the superior petal (and anthers), the development of the disc, and the number of stamens are, first of all, to be considered; additional characters are e.g. in the shape of the capsule, and the relative length of the filaments.

Reseda alba was published by LINNAEUS in 1753 (Sp. Pl. ed. 1, 1, p. 449). It was numbered '6', and LINNAEUS quoted two of his earlier publications for descriptive data (Hortus Upsaliensis 1748, p. 149 and Hortus Cliffortianus 1738 (1737), p. 212).

LINNAEUS was aware of variability in *R. alba*. In Hort. Ups. (l.c.) he noted: 'haec variat. foliis undulatis et crispis evadit', and in Hort. Cliff. he included (l.c.) a variety (' α ') based on '*Reseda minor alba, foliis dentatis* BARR. rar. 78. t. 588'. In Sp. Pl. ed. 1, he maintained this variety by means of exactly the same citation (' β ', l.c.; see also notes below).

In the Linnean Herbarium are two specimens: 629.14, and 629.15. To specimen 629.14 is added '6' and '*alba*', written on the sheet. The other specimen (629.15) has almost no additional data (cf. also SAVAGE, Cat. Linn. Herb. 1945, p. 85). Specimen 629.14 accordingly is accepted as the type specimen. It seems doubtful whether it served for the descriptive phrases either in Hort. Cliff. or in Hort. Ups., and as Species Plantarum (ed. 1) contains no other descriptive data (because there LINNAEUS only referred to his earlier publications), it may be believed that the specimen in the Linnean Herbarium was only an identification by LINNAEUS, made on occasion of his writing Species Plantarum. It seems safest to accept the specimen '6', '*alba*' (629.14, LINN) as the type without further precision.

To 629.14 was pinned 629.15, having '8' as the msc. and this corresponds with the running number of *R. alba* in Sp. Pl. ed. 2, 1, 1762, p. 645. The specimen

629.15 is also *R. alba* L.

MUELL. ARG. referred (Mon. Rés. 1857, p. 100) to *R. alba* J. BAUHIN, who first used the name *Reseda alba* (Hist. Pl. Univ. 3, 1651, p. 467) for *R. alba* L. Later on, MORISON (Plant. Hist. III, 1699, p. 615) also adopted the name *R. alba*, and many others until it was validated by LINNAEUS.

In *R. alba* L. were segregated α and β as infraspecific taxa by LINNAEUS (Sp. Pl. 1, 1753, p. 449). For a description of β , LINNAEUS only repeated '*Reseda minor alba, foliis dentatis*. BARR. rar. 78, t. 588'. LINNAEUS published *R. undata* in 1759 under (6B) in Syst. nat. ed. 10, vol. 2, p. 1046, and gave a new descriptive phrase. He gave a detailed description in 1762 and added as a literature reference '*Reseda minor, foliis incisib*. BARR. rar. 78, t. 588', adding this as his only literature reference. BARRELIER's taxon is not identifiable with certainty. See also notes on typification of *R. alba* L. (above), *R. fruticulosa* L. and *R. undata*.

Reseda alba L. sensu MUELL. ARG. ' α *laetevirens*' MUELL. ARG. was published in Mon. Rés. 1857, p. 101 and described. The taxon *laetevirens* also contains, according to MUELL. ARG., the taxon '*vulgaris*'. It was decided for the purpose of the present revision, to reduce this, including the taxa segregated within ' α *laetevirens*' by MUELL. ARG., to *R. alba* var. *alba*.

R. alba L. sensu MUELL. ARG. '*cc. abortiva*' (Mon Rés. 1857, p. 104) was segregated in *R. alba* α *laetevirens* c. *vulgaris* MUELL. ARG., and based on cultivated specimens preserved in the DC. Herbarium and also on GAILLARDOT in Hb. BOISSIER, 'prope Saida Syriae'. The latter specimen was present in W (duplicate). In the present study '*cc. abortiva*' MUELL. ARG. is not maintained and reduced to *R. alba*; probably the protologue refers partly to subsp. *alba* and partly to subsp. *decursiva*.

Reseda alba L. sensu MUELL. ARG. ' β *firma*' MUELL. ARG. when published in Mon. Rés. 1857, p. 104 was at the same time divided into '*a. major*' and '*b. minor*'. Numerous citations of literature were added and many specimens quoted (l.c., p. 104, 105). It would seem that MUELLER wished to segregate a taxon in *R. alba* distinguished by its strict habit, ashy green colour and some other minor points. It is here claimed that these specimens are unstable, phenotypically different plants and so the names cited above were reduced to *R. alba* var. *alba*.

It is to be noted that the first specimen cited by MUELL. ARG. as representing *R. alba* L. γ *maritima* MUELL. ARG.: 'In insula Tostat Sinus Arabici (G. EHRENBURG in hb. Reg. Berol.)' (Mon. Rés., p. 106), proves to be wrongly located. The EHRENBURG specimen at B bearing MUELL. ARG.'s label designating it as ' γ *maritima*', has an original label which ought to be read 'Fostat', which is now a part of Old Cairo. Added is also the word '*culta*'. The specimen has 3-teethed ovaries, which suggest to be developing into obovoid capsules. Actually the specimen belongs in subsp. *decursiva*. To this syntype a second label was added, presumably afterwards, reading 'G. CH. EHRENBURG, Iter Orientale, Syria, Ad Beirut 18.V.1824'.

No real purpose is served to investigate the real status and full delimitation of the name ' γ *maritima* MUELL. ARG.'; seaside specimens sometimes show smaller anthers, unusually shaped capsules etc.; in doubtful cases the auricled

petal, the presence of the disc and the appearance of the testa are accepted as decisive (e.g. ANDREÁNSZKY s.n.; BP 179480). *γ maritima* is a heterogeneous taxon and best reduced to *R. alba* var. *alba*.

Reseda alba L. sensu MUELL. ARG. forma *brevipes* (DC., Prodr. 16(2), 1868, p. 558) was based on a single specimen: BRUNI s.n., in Italia inferiore, near Barletta. The type was not seen, and is said to be conserved in Hb. DC. (G). Forma '*brevipes*' is here reduced to *R. alba* L. var. *alba*.

R. alba β undata DC. (Fl. Fr. 5, Suppl. ('vol. 6') 1815, p. 599) was not really proposed by DC., who only wanted to indicate (with doubt) a 'légère variété' in *R. alba*, which might be supposed to be identical, DC. declared, with *R. undata* L. DC. only indicated the variety as *β* (see also LAM. et DC., Fl. Fr. ed. 3, 4, 1805, p. 726, where *R. undata* L. (1762) and *R. decursiva* FORSKÅL ('*decussiva*') are considered identical), and DC. added no varietal epithet.

'*R. alba* L. ssp. *maritima* MILL' is cited (and accepted) as a subspecies (in Nouv. Fl. Alg. 1, 1962, p. 438) by QUÉZEL and SANTA. Its original place of publication (by 'MILL.', meaning MILLER or MUELLER) remained obscure. The data given by QUÉZEL and SANTA are insufficient to segregate *R. alba* subsp. *maritima* whatever may be meant.

Reseda alba subsp. *angustifolia* FORMÁNEK (in Verh. Naturf. Ver. Brünn 34, 1896, p. 333 (cf. ibid. 35, 1897, p. 190) was based on 'Koryza pr. Volo in Th.'. The type was not seen by us, but in the Lund Herbarium is preserved a specimen collected in the type region (P. SINTENIS, Iter Thessalicum 1896, no. 141, Vole: Tersano in Collibus 26/4). This is taken to represent FORMÁNEK's proposed subspecies and here reduced to *R. alba* var. *alba*; the differences noted by FORMÁNEK are not recognized in the present revision. VANDAS (Rel. Formánek, 1909, p. 45) found *R. alba* subsp. *angustifolia* identical with *R. alba* var. *hookeri* (GUSS.) ARC. which is in accordance with the conclusion made here.

Reseda alba L. ssp. *myriosperma* (MURB.) MAIRE was published by MAIRE (Cat. Pl. Maroc. 2, 1932, p. 315). The combination rests on *R. myriosperma* MURBECK (Lunds Univ. Årsskr. N.S. 2, 18(3), 1922, p. 47, tab. 6). MURBECK based *R. myriosperma* on a specimen collected near Marrakech, 'dans les palmeraies'. This holotype (MURBECK, Iter Maroccanum 1921, 1/IV; LD) was described and discussed by MURBECK in detail. It proved to belong in *R. alba* L., but is distinguished by more numerous and smaller seeds than usual. For this reason *R. myriosperma* MURBECK was adopted in the present revision as a variety: *R. alba* L. subsp. *alba* var. *myriosperma* (MURB.) ABDALLAH et DE WIT, nov. comb. et stat. (= *R. alba* ssp. *myriosperma* MAIRE).

Reseda alba var. *incisa* TEN. forma *micrantha* FAURE et MAIRE. On some herbarium sheets belonging in *Reseda alba* is found, written or printed, the additional name 'var. *incisa* TEN. fa *micrantha* FAURE et MAIRE' (e.g. Oran, à Santa-Cruz, lieux rocaillieux 1, 6, 1930, leg. A. FAURE; LD). However, MAIRE published (Bull. Soc. Hist. Nat. Afr. Nord 22, 1931, p. 278) *R. alba* L. forma *micrantha* FAURE et MAIRE. In JAHANDIEZ et MAIRE, Cat. Pl. Maroc 2, 1932, p. 315, this taxon is correctly referred to 'MAIRE Contr. no. 958' but placed in 'ssp. *eu-alba* MAIRE'; in published literature by MAIRE no mention is made of

'var. *incisa* TEN.'. The specimens belong in *R. alba* var. *alba*.

Reseda alba L. var. *subtrimera* MAIRE et SAMUELSSON (in Ark. Bot. Stockh. 29A, 2, 1939, p. 15). A new variety, *R. alba* L. var. *subtrimera*, was based on a specimen collected on a roadside, at ca. 550 m alt., east of Taza, at Aghbal in Morocco (not seen by us). It was abundant in the region. The flowers of all specimens were stated to be tricarpellate although the authors observe that some flowers, occasionally, had tetracarpellate ovaries, as in '*R. alba* typique'. They further declared that the plants were in all other characters exactly equal to *R. alba* and they found it impossible to refer the variety to '*Reseda tricuspis* COSSON'. They had no doubt that the variety is a genetically stable taxon. In the present revision *R. alba* var. *subtrimera* MAIRE et SAMUELSSON (= *R. alba* ssp. *eu-alba* MAIRE var. *subtrimera* MAIRE et SAMUELSSON) is not segregated but reduced to *R. alba* var. *alba*.

Both MAIRE's *R. alba* L. ssp. *gayana* (BOISS.) MAIRE forma *trigyna* (BATT.) MAIRE (JAH. et MAIRE, Cat. Pl. Maroc 2, 1932, p. 315) which equals *R. alba* L. ssp. *tricuspis* (COSS.) MAIRE var. *trigyna* (BATT.) MAIRE (in Bull. Soc. Hist. Nat. Afr. Nord 26, 1935, p. 188) are here united as *R. alba* var. *trigyna*.

Reseda suffruticulosa L. (Sp. Pl. ed. 2, 1762, p. 645). LINNAEUS described *R. suffruticulosa* (l.c.), and added as growing locality 'Hispania'. He further judged it to be intermediate between ('quasi media inter') *R. undata* and *R. alba*. There is no specimen of *R. suffruticulosa* extant in the Linnean Herbarium but it seems most probable that LINNAEUS described a plant collected by LOEFLING in Spain. MUELL. ARG. (Mon. Rés. 1857, p. 102) reduced *R. suffruticulosa* L. to a synonym of *R. alba* L. '*a laetevirens* c. *vulgaris*'. It appears that in the Linnean description no character is mentioned which indicates a specific difference from *R. alba* L. All specimens of Spanish origin, which were in accordance with the descriptive data of *R. suffruticulosa* L. provided by LINNAEUS, proved to be *R. alba* and so *R. suffruticulosa* L. is reduced to the synonymy of *R. alba* L., as was already done by MUELL. ARG.

As the neotype of *R. suffruticulosa* the specimen of E. REVERCHON, Plantes d'Espagne 1891, Sierra de la Cueva-Santa, dans les maquis rocheux, sur le calcaire Jurassique, 700 mètres, Juin (NY), is designated (cf. *R. fruticulosa*).

FORSKÅL enumerated *R. decursiva* (no. 250) in the chapter on *Dodecandria* of 'Flora Aegyptiaca'. He found it as a spontaneous plant near Alexandria and described it 'foliis decursive-pinnatis; foliolis subaequalibus; floribus trigynis'. In the Copenhagen Herbarium are preserved 2 specimens, viz. Herb. Forskålii 606 and Herb. Forskålii 610, collected by FORSKÅL near Alexandria, on April 1st, 1762. Of these no. 606, a flowering specimen, was identified in 1881 by P. ASCHERSON as *R. decursiva* FORSKÅL. Although FORSKÅL described the flowers as 'trigynis', the ovaries of no. 606 are actually all 4-dentate. It may be mentioned that FORSKÅL's other specimen (no. 610), carries a nearly full-grown fruit, which is tri-dentate ('trigynis'). For this reason it is designated as the type of *R. decursiva*, although it is an extremely poorly developed plant, and no. 606 is more acceptable as to its general appearance.

From its description *R. tetragyna* FORSKÅL cannot be identified with cer-

tainty (see also MUELLER, Mon. Rés. 1857, p. 124). VAHL (Symb. 2, 1791, p. 53), referred it to *Reseda mediterranea* L. ('S.V. p. 448'). VAHL's citation 'S.V. p. 448' refers to MURRAY's edition of LINN., Syst. Veg. ed. 14, 1784, p. 448.

In the Copenhagen Herbarium are 13 sheets, carrying Resedaceous specimens. It is to be considered that these may or may not be type-specimens to the new names published in Flora Aegyptiaco-Arabica edited by NIEBUHR c.s. (1775, cf. Dansk Bot. Ark. 4(3), 1922, p. 3). The sad account of the history of FORSKÅL's specimens clearly shows that they can never be accepted without further research and only after a careful checking with FORSKÅL's descriptive notes, as published.

FORSKÅL described as new: *Reseda decursiva* (Fl. Aegypt.-Arab. 1775, p. LXVI, no. 250), *Reseda hexagyna* (l.c., p. LXVII, no. 253), and *Reseda tetragyna* (l.c., p. LXVII, no. 254).

He also referred to *Reseda phyteuma* (l.c., p. LXVII, no. 252), probably only intending to cite *Reseda phyteuma* L. However this may be, as he added no descriptive data to '*Reseda phyteuma*' the name '*Reseda phyteuma* FORSK.' has no standing in nomenclature (cited in Index Kewensis 2, 1895, p. 697).

As regards *Reseda hexagyna* there are in the FORSKÅL Herbarium three sheets carrying specimens which are hexagynous, and unmistakably belong in what eventually became *Caylusea* (see pp. 44, 45, 47 of this revision). These specimens are accepted as the type of *R. hexagyna*; one has in verso 'Herb. HORN. e collect. FORSK.'. On the second sheet in verso is found 'HB Vahl, *Reseda hexagyna* forskalei descript. plant. pag. 92' and this is selected as the lectotype (see pp. 44, 45). The third sheet has in verso, 'HB SCHUM. *Reseda canescens*'.

On the remaining 10 sheets, one specimen agreed with the description of *Reseda decursiva*; although the specimen itself is extremely poor it was accordingly designated as the type-specimen of *Reseda decursiva* (Herb. FORSKÅLII no. 610; C). The sheet was marked in verso '*Reseda decursiva* F' and 'Hb. hort. bot. Hafn.' (see also above).

Reseda tetragyna was, according to the published list, not found in FORSKÅL's own herbarium (cf. CHRISTENSEN in Dansk Bot. Ark. 4(3), 1922, p. 19). When trying to match FORSKÅL's description with a specimen found on the remaining 9 sheets, it was necessary to select specimens with a 4-dentate ovary. Of these are present 7 sheets. In FORSKÅL's description the flowers are described as 'alba', this excludes 3 sheets (carrying specimens of *R. luteola* L.). Of these 3 excluded sheets, the first, no. 608 was identified by P. ASCHERSON, 1881, as *Reseda luteola*, msc. in C, 'FORSKÅL, Fl. Aeg.-Arab. p. LXVI, no. 251, Kahirae hortensis, hodie *Luteola tinctoria* WEBB'. On the reverse of this sheet is written '*Reseda tetragyna* FORSK. Cent. 3, no. 83' and the sheet is further marked 'Hb. Hort. bot. Hafn.' and 'FORSK.'. The notes on the back of the sheet were written by somebody unknown, certainly not by FORSKÅL. The specimen is certainly not the type of *R. tetragyna* FORSK., having 3-dentate ovaries and entire leaves. It belongs in *R. luteola* L. The second sheet in the Forskål Herbarium, no. 612, bears on the reverse 'FORSKÅL circa Cairo', and was further

marked 'Hb. Hort. bot. Hafn.'. The specimens strongly resemble the specimen on the first mentioned sheet, and also belong in *R. luteola* L. The third sheet carries another specimen of *R. luteola* and has nothing to make it eligible as type material of *R. tetragyna*.

Four sheets are left; together these carry 6 specimens with a 4-dentate ovary. FORSKÅL described the leaves as follows: 'foliolis lanceolatis, repandis; interdum basi pinnatim incisiss'. This calls for leaves which appear to be compound ('foliolis') and of which sometimes the base of the lobes are pinnately incised. It could be suggested that FORSKÅL wrote by a lapsus calami 'folioli', meaning 'folii' and although this can never be proved, it seems that no error was committed because FORSKÅL was well aware of the compound appearance of the leaves of *Reseda*, as follows from his description of *R. decursiva*. FORSKÅL's description, therefore, ought to be accepted as it stands. On one sheet is written in verso 'HB. Horn., Museum Botanicum Hafniense', and '*Reseda undata* LINN.', and '1. in campis Estramadura leg. L...nsb., 2. e collect. Forskålîi, 3. ex Hort. Hafn.'. This refers to the 3 specimens mounted on the sheet. If the written data are correct, only no. 2 has to be considered among FORSKÅL's original specimens. There is some probability that the written notes are correct because no. 1 actually is a Spanish *Reseda* and the 3rd also must be of Spanish origin (though cultivated, apparently, at Copenhagen). Specimen no. 2 may have been collected in Egypt by FORSKÅL, and so the statements on the back of the sheets contain nothing to justify doubt.

This leaves 4 specimens (one on each of the remaining sheets, one on the sheet just discussed) to be considered as possibilities, when typifying *Reseda tetragyna* FORSKÅL. Three of these 4 specimens are closely allied, are one taxon, and the 4th is different; this represents *Reseda alba* L. var. *alba*. On the back of this latter sheet is written 'in Ins. Tenedos leg. FORSKÅL'. Now, whether this statement is correct or not, it does not coincide with the type locality for *R. tetragyna* cited in Flora Aeg.-Arab. (l.c.) which is Alexandria. Moreover, hundreds of specimens of *R. alba* var. *alba* were examined in the course of the present study and not a single specimen was seen in which lobes of the leaves were pinnately incised at base. For this reason the specimen representing *R. alba* var. *alba* is rejected as a possible model for FORSKÅL's description.

The remaining three specimens agree in all characters with FORSKÅL's description of *R. tetragyna* but it is to be observed that the pinnately incised leaf-lobes are not present; those leaves may have been lost in the course of time. FORSKÅL's specimens severely suffered. Whether these specimens are accepted as FORSKÅL's type-specimens or not, or whether they represent only a part of his type material, is taxonomically not important. They belong in var. *decursiva*, and stay within the (wide) variability of that variety. It follows, that *R. tetragyna* is reduced to synonymy. In view of the unsatisfactory circumstances accompanying the three specimens assigned to *R. tetragyna* in the FORSKÅL Herbarium a neotype is appointed.

As a neotype of *R. tetragyna* Forsk., E. GAUBA no. 166 p.p. (à 1952 no. 1277; W), is designated. This specimen actually belongs in var. *decursiva* and carries

± incised leaflets, and tetragynous flowers, which match FORSKÅL's description.

The name *R. alba* L. ssp. *decursiva* (FORSK.) MAIRE var. *eremophila* (BOISS.) MAIRE subvar. *tetragyna* MAIRE et WEILLER was attached (Bull. Soc. Hist. Nat. Afr. Nord 30, 1939, p. 261) to a specimen from Tripolitania (no. 134, gravelpits at Wadi Sofedjan). The descriptive data only state that the gynaecium was tetramerous, otherwise, the authors declared, it was not different from the Forskålian type. It follows that this belongs in var. *decursiva*; the type was not seen, and the taxon is here not segregated.

R. alba L. ssp. *decursiva* (FORSK.) MAIRE (var. *propinqua* (R. BR.) MAIRE) forma *ochroleuca* Maire was published in 1925 (Mém. Soc. Sc. Nat. Mar. 7, p. 167; also Cat. Pl. Maroc 4, 1941, p. 1016). MAIRE wished to segregate specimens of *R. alba* (or eventually *R. decursiva*) with yellow-tinged flowers as a forma, but there is no taxonomic need to do so.

R. alba L. ssp. *decursiva* (FORSK.) MAIRE is stated by MAIRE himself to be identical with '*R. decursiva* FORSK. s. stricto' especially as regards the variety: 'var. *eremophila* (BOISS.) MAIRE' (Cat. Pl. Maroc. 4, 1941, p. 1016). It follows that var. *eremophila* is also here reduced to *R. alba* var. *decursiva*.

R. alba ssp. *decursiva* var. *trimera* MAIRE et SENNEN (l.c. 1932, p. 166), is declared to be identical with '*R. decursiva* FORSK. s. stricto'. Its type specimen(s) (SENNEN et MAURICIO 7516, 5.VII.1930, El Zaio près du Muluya, RAB 14232, 14233), belong(s) in var. *trigyna* (BATT.) MAIRE and accordingly it is reduced in the present study to var. *trigyna*.

Reseda myriophylla TENORE (Fl. Nap. 1, Prodr. 1823, p. XXVIII). In Fl. Napol. 4, 1830, p. 258 TENORE returned to *Reseda myriophylla* ('*Reseda a mille foglie*') giving a diagnosis and a description. TENORE stressed as a differential character the presence of 4 calyx-lobes only and the narrow, few-flowered inflorescence. It was collected by Sign. MARINOSCI in the province of Lecce. MUELLER (1857, p. 106 and 1868, p. 557), reduced *R. myriophylla* TENORE to *R. alba* L., a variety or 'forma peculiaris' which he was unacquainted with. There is no reason not to follow MUELLER ARG.'s decision.

R. propinqua was based by R. BROWN (in DENH. et CLAPP., Narr. Trav. N.C. Afr. App. 1826, p. 227) on a specimen collected by RITCHIE near Tripoli, and another specimen collected by OUDNEY between Tripoli and Mourzuk. He stressed affinity to '*R. suffruticulosa* and *R. undata* L.' but wished to propose *R. propinqua* as a new species because of 'having the ungues of all the petals simple; that is neither dilated, thickened, nor having process or appendage at the point of union with the trifid lamina, into which they gradually pass'.

R. propinqua was afterwards maintained (pictured and described in more detail) by MUELL. ARG. (1857, p. 114, tab. 6, fig. 90, and in DC., Prodr. 16(2), 1868, p. 559). On the other hand, in Ind. Kew. 2, 1895, p. 697, it was reduced to *R. decursiva* FORSK., which was e.g. followed by BORN MUELLER (in Centralb. 28(2), 1911, p. 129) and by TÄCKHOLM (Stud. Fl. Egypt 1956, p. 332). This view is also followed here; *R. propinqua* represents a variety in ssp. *decursiva*.

R. eremophila BOISSIER (Diag. Pl. Or. Nov. Ser. 1, 2(8), 1849, p. 54) was based

on (a) specimen(s) collected in desert sands near Cairo, by BOISSIER. In the protologue he added 'and in the Arabian Desert up to the frontier of Palestine' (transl.), as a habitat of this species. An examination of the isotypes showed that *R. eremophila* belongs in var. *decursiva*. There are no characters justifying a segregation of *R. eremophila* BOISS.

Reseda hookeri GUSSONE (Enum. Pl. Vasc. Ins. Inar. 1854, p. 28). GUSSONE, (l.c.) referred in the protologue to '*R. undata* TEN. Fl. nap. 4, p. 527, ex descriptione!'. Actually he intended to refer to TENORE, Fl. Nap. 4, 1830, p. 257, where TENORE treated *Reseda undata* L. and cited as literature references 'LIN. sp. 644. WILLD. 2, 879. *R. minor alba dentatis foliis* BAR. ic. 588'. GUSSONE, however, stated that he referred to TENORE's description (or plant) only, and so not to LINNAEUS's *R. undata*, as implied by TENORE's literature references. *Reseda hookeri* Guss. is a legitimate new name. GUSSONE also referred to '*R. fruticulosa* HOOK. in herb. LIN.'. This, therefore, is a reference to a herbarium or msc. name and explains GUSSONE's choice of the epithet '*hookeri*'. Finally he referred to '*R. fruticulosa* b. GUSS. Syn. 1, p. 530'. *R. hookeri* GUSS. is here reduced to *R. alba* var. *alba*. MUELL. ARG. reduced *R. hookeri* GUSS. to *R. alba* var. γ *maritima* MUELL. ARG. (Mon. Rés. 1857, p. 106 and in DC., Prodr. 16(2), 1868, p. 557). MUELLER ARG.'s view is accepted insofar as that *R. hookeri* GUSS. belongs in *R. alba* L.

Reseda kurdica BOISSIER et NOË (in BOISS., Fl. Or. 1, 1867, p. 426) was based on NOË 1166, Kurdistania, pr. Mendeli V.1850; a specimen of this number was studied (DR). Similar specimens were seen from Iran (BENT & WRIGHT 426-212, distr. Khuzestan, E. Andimeshk), Iraq (F. A. & D. BARKLEY 4125, Abu Gharib, Al Jezira desert, ruins of Hadre), Jordan (MEYERS & DINSMORE 3431B, Tel-es-Sarim), and Syria (HARADJAN 1984, between Hammah et Alp; EL-HILALY et KHATTAB 352, road between el-Hammah and el-Battecha). They represent poorly developed desert forms of *R. alba* subsp. *decursiva* var. *propinqua*.

R. tricuspis COSSON (in Bull. Soc. Bot. Fr. 20, 1873, p. 241) was recognized as a species closely allied to both *R. alba* and '*R. decursiva*'. *R. tricuspis* was also treated as an infraspecific taxon either in *R. alba* or in '*R. decursiva*'. The type consists of BALANSA, Pl. Mar., in 1867; cultivated and uncultivated areas near Mazagan, and Schousboe, near Maroe City.

'*R. tricuspis*' resembles, first of all, subsp. *alba* and subsp. *decursiva* by the petals, of which the limb is not peltately attached to the appendage (claw auricled), the shape of the limb-lobes, and the 3-lobed anterior petal; the habit and the pinnatisect leaves are other characters they have in common.

On the other hand '*R. tricuspis*' is readily distinguishable from *R. alba* var. *alba* by its 3-toothed ovary and fruit; a 3-carpellate ovary is very rarely seen among many 4-carpellate ovaries in an inflorescence of *R. alba*. In addition the seed of *R. tricuspis* is significantly smaller than the seed of *R. alba* var. *alba*.

It appears that '*R. tricuspis*' is also very closely allied to subsp. *decursiva*. Although the majority of N. African, Egyptian and Near East specimens of subsp. *decursiva* have 4-carpellate ovaries, 3-carpellate ovaries occur (as well as

5-carpellate) and it is to be noted that the type of '*R. decursiva*' (from Egypt) has 3-carpellate ovaries (see notes above).

The taxon '*R. tricuspis*' finds its natural position between var. *myriosperma* and var. *alba*, and at the same time is in some respects intermediate to subsp. *decursiva*. On account of priority its varietal name must be '*trigyna*' (see synonymy quoted to the specific name *R. alba*). *R. tricuspis* is endemic in W. and SW. Morocco. Some specimens are known far outside this area e.g. Arkansas (USA), Dunkerque (France), and Nijmegen (Netherlands), no doubt occurring there as an introduced 'weed'.

Tereianthus suffruticulosus (L.) FOURREAU in Ann. Soc. Linn. Lyon N.S. 16, 1868, p. 342. FOURREAU cited in his 'Catalogue des Plantes qui croissent spontanément le long du cours du Rhône' the specimen of Gard '*Tereianthus suffruticulosus* (L.) growing in 'Aigues-Mortes (Gard)'. FOURREAU did not accept LINNAEUS's name (*Reseda suffruticulosa* L., Sp. Pl. ed. 2, 1, 1762, p. 645) and made a new combination *Tereianthus suffruticulosus*. He is of the opinion that the genera *Reseda* and *Tereianthus* are different; and the latter is equivalent to *Eresda* SPACH. One species *T. suffruticulosus* (L.) FOURR. (l.c.) is cited under *Tereianthus*; no descriptive data are given. In the present study *Reseda suffruticulosa* L. (Sp. pl. ed. 2, 1, 1762, p. 645) was reduced to *R. alba* L., which implies the reduction of *T. suffruticulosus* (L.) FOURR. to the same synonymy.

Ecological notes:

Ssp. *alba*.

R. alba most probably originated in the Mediterranean region. It is to be observed that it was collected in a seemingly wild state on practically all Mediterranean islands. As a cultivated plant or as a weed it advanced into Central and Northern Europe, through the United States of America and parts of Canada, and even into South Africa and India. From numerous ecological records a few are quoted:

Algeria. ANDREÁNSZKY collected *R. alba* near Boghariet Djelfa, in steppe, at 900 m alt., 20.IV.1927 (BP).

Egypt. On calcareous sands near the sea near Alexandria collected by MAIRE (s.n., 4.II.1909 (CAI)), while SA'AD collected it from sandy fields, flowering and fruiting, in April (nr. 387; CAIM).

France. At St. Cyprien (nr Perpignan) it grew on a sandy bank of a lake (SE-GAL; AMD 54810). LANGE collected it on the beach near Arcachon and near Sète (C). On Corsica it occurred in the 'garigue' near Bonifacio, on a miocene calcareous plateau (STUD. BIOL. RHENO-TRAI. in 1961, nr. 96; U).

Greece. SIRJAEV collected *R. alba* on slopes along roads in Attica, Lycabettus (BRNU). Both AMSHOFF and DE WIT collected it in the Parthenon (WAG). DE HELDREICH found it flowering on the hills near the sea in Piraeus in March 1892.

Italy. A common, frequently collected weed on ruins from antiquity (Collo-seum; Circus of Romulus). KRAMER (nr. 193; U) collected it near Ravenna

(Emilia) on a plant-covered sandy coast, more or less as a weed, but not common, flowers dirty white. LARSEN (nr. 32; C) found it at Sorrento, 'in *Quercus ilex*-*Pistacia* shrub in Valle d. Sambuco, alt. 500 m', flowering in June.

Morocco. FONT QUER collected it in waste fields near Agadir; BALLS collected it at Tizi n'Tlata at 7.900 ft (Djebel Amezdour), on granite slopes, leaves glossy, grey, much waved at edges.

Netherlands. Miss KOSTER (nr. 3794; L) judged the white flower to be fragrant of a specimen collected at Hattem in July 1933. In the Amsterdam Botanic Garden a monstrosity (fasciated) was grown in 1916 (DANSER 2962; GRO). VAN OOSTSTROOM (nr. 5991; L) collected a six-topped inflorescence in the botanical garden at Leyden. Cultivated specimens at Wageningen bore leaves in various shades of green, bright or dull or even subglaucous; the inflorescence before flowering may be 'orange brown'.

Palestine. *R. alba* is a weedy, though uncommon plant in Palestine. It is mostly found on walls and roofs, especially in the mountain district (ZOHARY & AMDURSKY 55; AMD).

S. Africa. GUTHRIE (nr. 1433; BOL) collected it near Kalk Bay in flower in December 1894 and he noted 'flowers green' for a specimen collected at Muizenberg.

Spain. It was found on a 'gipssteppe' near Saragossa, Aragon (STUD. BIOL. RHENO-TRAI. (1951) 1520; U), on granite at 900-1300 m alt. near Aquila, above Segre (RUTTEN-PEKELHARING 87; U). Near Ronda (Spain) BOISSIER found it at \pm 1000 m alt. On the Balearic Islands it grows in full sun on calcareous sands (L. H. KNOCKE 2685; DS). KNOCKE found *R. alba* on Majorca and Ibiza abundant on calcareous soils, in sunny places flowering in April and May.

USA. Roadsides in S. California (PARISH 15.V.1891; DS); near Monterey well established in vacant lots (C. B. WOLF 3764; DS). RAVEN (nr. 14004; RSA) found it up to 2 m tall, a common weed in willow-filled flat just behind dunes near city dumps (Ventura County); on muddy shores of Green Lake Seattle (J. W. THOMPSON 9618; POM). In California (as a weed?) in the sand dunes region near Monterey (DEMAREE 7273; GH).

Yugoslavia. It was collected on rocky places near the sea, Split (F. HILLENTIUS; AMD 57632); it is a common weed on sunny places, on walls, along roads etc. (RADERMACHER 346; L). On waste places near railroad in Dalmatia (PICHLER 571; L). PETTER found it as a littoral plant, everywhere on grassy slopes in the Spalato (Split) region (W). KELLER noticed it growing on calcareous soils (Lesina Island, Dalmatia).

Ssp. decursiva.

Algeria. FAURE collected it on sandy grassy fields near the Oued, at 1100 m alt. (UC).

Egypt. TADROS collected it in barely fields and waste lands in NW. desert (UC). SA'AD 101 (CAIM) was collected flowering and fruiting mid March, from sandy fields at Burg El Arab. DINSMORE collected it in Sinai (Arabia Petraea) medio April 1935 in flower and fruit at 970 m alt. (nr. 12056, S).

Iraq. In the Amara district, RECHINGER collected it on sandy, loamy hills (Shatt-at-Tib'), fl. and fr. in March (nr. 8878, W) and in the southern desert, near As-Salman, in a stony wadi (nr. 13888; W.), or in sandy loams, Diyilla, or Persian border (9670, W); in SE. Iraq, RECHINGER found it many times, up to 600 m alt.

Lebanon. Flowering specimens were collected in February near Tripoli by HOLLEMAN-HAYE (nrs. 33, 83; U).

Libya. VACCARI found it on sandy areas near the sea at Tolmeta (Porto Romano), fl. and fr. in March (nrs. 76, 160; G, H, PAD, US).

Morocco. At Chichaoua, JAHANDIEZ observed *R. decursiva* on arid, calcareous slopes (s.n., 2.IV.1920; AMD).

Palestine. YAFFE collected it in a narrow wadi, covered with loess in the Negev, south of Beersheba, flowering in May 1949 (s.n., 2.V.1949; C); J. D'ANGELIS also found it in the Negev on a loess hill, fl. March (nr. 523; BRNU, C, HUG, K, L, LD, PRC, V, US, UPS, W, WAG, WU). SAMUELSSON collected it in the desert between Jerusalem and Jericho, in a rocky valley at 80–150 m alt. (nr. 2665; W), DINSMORE on dry hill-sides at 270 m alt., at Good Samaritan's Inn (nr. 3512; GRO).

Syria. At 500 m alt., near Ain el Beida, Ochenwadi, ERICK WALL collected flowering and fruiting specimens medio April (s.n., 18.IV.33; S), and SAMUELSSON at 325 m alt., between Aleppo and the Euphrate in calcareous valleys (nr. 3838; S).

Tunisia. PITARD collected it in desert sands, Oudref, March, in flower and fruit (s.n., III 1907; AMD); H. KNOCHE near Matmata in a creek bed, and on lime-soils at Djebel Gafsa (s.n., 8.IV.1909; DS); MURBECK found it near Gabes, towards Ouzereg (s.n., 26.III.1896; S).

Two specimens came to hand allegedly originating from Yugoslavia and from Spain. The first is in Herb. Hasskarl (L). The sheets carry one label on which msc. writing of HASSKARL's (names and synonyms only) and on that same label a smaller label is glued stating '312. FR. PETTER Flora dalmatica exsiccata' (obtained through the Botanischer Tauschverein in Wien). Printed on this subsidiary label is '*Reseda undata* L. etc.', and it alludes to a plant occurring round Spalato (Yugoslavia). The sheet in the Hasskarl Herbarium carries 6 specimens. One is a flowering branch of *R. alba* L. ssp. *alba*. The other 5 specimens are *R. alba* ssp. *decursiva*. This evidence is not accepted as a proof for the occurrence of ssp. *decursiva* in the western part of the northern shore of the Mediterranean. Possibly the plant collected by PETTER is the *R. alba* ssp. *alba* specimen. The ssp. *decursiva* specimens then are of unknown origin. The second specimen, however, is HJALMAR NILSSON s.n. Iter Hispanicum 26.IV.1883; 'La Roqueta'. Having no evidence to the contrary, NILSSON's plant may be accepted as being collected at or near Gibraltar. It is most remarkable that two taxa, each as a single specimen, which are known only from N. Africa (the opposite coast) were collected by NILSSON (*R. phyteuma* ssp. *collina* and *R. alba* ssp. *decursiva*) and that these finds were never repeated.

Ssp. alba var. *trigyna*.

Its natural distribution is part of Atlantic Morocco but it may be met with far outside that area, as an introduced weed (see above).

METRO and SAUVAGE (nr. 14193, RAB) collected it at 850 m alt. in *Quercus suber*-forest near Timeksaouin, flowering in March. SAUVAGE remarked that '*ssp. tricuspis*' grows mainly in loamy soil and favours calcareous grounds; it is shrubby and found in subhumid bioclimates (lower mountainous regions in Zaïane, Maroc, a rare species in *Quercus suber*-forests; Fl. Subér. Mar. 1961, p. 76). At Fedala, SAUVAGE (nr. 14197; RAB) found it in fruit medio February. Near Rabat it grows not far from the coast on sands, or e.g. in the dunes at Cap Ghir (GATTEFOSSÉ s.n., 24.IV.1936; AMD, PR). Near Bekane, at 200 m alt., it occurs in grassy stony spots (hill of Taghit, FAURE s.n., May 1933; B). MAIRE found it in calcareous soil near Saffi, fruiting in April (UC 010073).

It was collected along roads at 550 m alt. in Morocco (SAMUELSSON 7129; B, GH, K), flowering and fruiting at the end of April.

Biological notes: *Reseda alba* is an erect herb flowering in the first year and, if the environment is suitable, it may become a perennial, sometimes woody at base and sometimes more or less prostrate and much branching (flowering stems rising from the nodes). The plants appear not to survive frost but the seeds may remain viable in frozen earth, though their resistance is decidedly limited.

The petals are white, often with a slight reddish hue, the anthers brown and massed as the flower opens. In a few days they turn very light yellow and the filaments, curved downwards at first, gradually, one after another, starting from the posterior side, straighten and become directed upwards. Now the anthers open.

The flowers are weakly scented, characteristic, somewhat sweet but not pleasant. They contain nectar and are visited by bees.

R. alba behaves like a moderately aggressive weed, in Europe often passing 30° lat. and penetrating sometimes into the Netherlands, Great Britain, or Scandinavia. It usually proves to be unable to survive a northern winter.

It is interesting to note that collectors remarked (both in the United States and in northern Europe) that the plant occurred as a weed, but that it was apparently not an escape from plants cultivated in the region. It flowers in summer (N. of the Mediterranean) or in spring (S. and E. of the Mediterranean). We believe that *R. alba* prefers the littoral or coastal belt.

Vernacular names: Egypt: var. *alba*: *dzail-el-kharouf* ('sheep's tail'; near Abusir, teste KHATTAB); ssp. *decursiva*: *denibân* (near Ein el Gederat, teste SHABETAI); *khirfeysh* (near Amriah, teste BOLLAND); *romaejh* (Arabic; teste FORSKÅL); France: *réséda blanc* (LAM. et DC., Fl. Fr. ed. 3, 4, 1805, p. 726); Great Britain: *wild mignonette* (GREENWAY); Netherlands: *witte reseda*

(Terheide, teste H. DE BRUYN); *witte wouw* (Nijmegen, teste ABELEVEN); Palestine: *khuzan* (near Jerusalem, teste F. S. MEYERS); Spain: *enturio* (Catalan; COLMEIRO, Cat. Met. P. Cataliña, 1846, p. 18); USA: *white mignonette* (Pasadena; GRANT); *Mignonette* (St. Louis; SHERFF).

Specimens examined:

Subsp. *alba*

Var. *alba*

Algeria. Andreánszky s.n., 18. IV. 1927, Alger, inter pagos Bouzarréa et El Biar; id. s.n., 19. IV. 1927, Fort de l'Eau, prope Alger; Chevallier s.n., 14. III. 1893, Birmaudreis; Faure s.n., 4. IV. 1931, Oran à Santa-Cruz; id. s.n., 25. IV. 1934, La Macta, près Mostaganen; id. s.n., 2. V. 1935, environs d'Oran; Luizet s.n., X. 1886, Alger, coteaux de Mustapha; Poulsen s.n., II. 1870, Roubba; Romain 827, Alger city walls; Ruijs s.n., 29. III. 1921, Hussein Dey; Welczke 74, Ani Taya, prope Kosium.

Balearic Isls. Gandoger s.n., V. 1899, Ibiza Isl; L. H. Knoche hb. 1489, Majorca Isl.

Bermuda. Brown c.s. 2074, St. George Hotel.

Canada. Macoun s.n., 3. VII. 1889, Sycamores BC.

Corsica Isl. Kralik 487, Bonifacio; Stefani s.n., 8. V. 1902, près de St. Julien, environs de Bonifacio; Stephani & Jaquemet 507, champs à Sancta-Manza, près de Bonifacio; Stud. Biol. Rheno-Trai. 96 (1961), near Bonifacio (garigue).

Creta Isl. Bickerich 15314, Chania; Nabèlek s.n., IV. 1914, Canea; Van Soest 127 et 136, Heraklion.

Cyprus Isl. Kotschy 57 & 256, Larnaca.

Denmark. Wiinstedt, 18. VIII. 1945, Nicobig.

Egypt. Coquebert de Montbret s.n., à 1831, Hte Egypt; Sa'ad 387, Burg El Arab; Shabetai Z 3375, Wadi el Ramla, Sellum; id. Z 5272, Abu Sir, Burg El Arab.

France. Conill s.n., 24. VI. 1904, Pyr. Or., Plage d'Argelés; Dorgelo et De Wilde s.n., 29. VI. 1959, NE. Perpignan, dép. Aude, Etang de Sales; Jeanpert s.n., 21. VII. 1918, Paris, Issy; id. s.n., 13. V. 1920, environs de Paris, Villeneuve-le-Roi, Décombres; Kühlewein hb. s.n., s.d., Montpellier; Lardièrre s.n., VIII. 1894, Lyon; Neyra 4 et 205, Hérault, Cette; Paur s.n., 20. VI. 1885, Narbonne; Pons s.n., 22. VI. 1885, Ile Sta Lucia, près Narbonne; Segal 339, Pyr. B., Etang de St. Cyprien.

Germany. Leonhardt s.n., VI. 1893, Sachsen.

Gibraltar. Willkomm 613; Winkler s.n., 5. V. 1873.

Great Britain. Bailey 156, N. Devonshire; Smith s.n., X. '21, S. Wales; (not indigenous).

Greece. E. Bourgeau 6, Rhodos; Haussknecht s.n., IV. 1885, ad radicem Akrokorinthis; Heldreich s.n., IV. 1850(?52), Salamis Isl.; id. 13. IV. 1885, Attica ad Phalereum; id. 170, Mt. Lycabetto, pr. Athenas; id. 11, 11a, in collibus maritimis Piraei; St. Lager s.n., 14. VI. 1896, Corinthe; Rechinger 16178, Euboea Isl., Karytos; K.H. & F. Rechinger 4589, Phurni Isl., ad portum Kampos; id. 8228, Karpathos Isl. inter Pigadia et Vrondi.

India. Wight 955, Pen. Ind. orient.

Iran. Kõie 1482, Baradschan, Buschir, Daleki.

Italy. Ball s.n., IV. 1841, Sorrento, near Neapoli; Boom hb. 3204, Roma, Colosseum; Camura s.n., 17. II. 1892, *ibid.*; Heldreich hb. s.n., 2-8. V. 1840, Napoli; Kramer 193, Adriatic coast, Marina di Ravenna.

Jordan. Kasaplighil 1971, Irbid, Minara, Ibdar forest.

Lebanon. Post 535, Beirut,

Libya. Schweinfurth s.n., IV. 1883, Mirsa Tobrouk.

Malta Isl. Kralik s.n., 25. II. 1847, s.l.

Morocco. Gandoger s.n., à 1896, Wadjaga; Gerbinat et al. 1303, Cuvette de Guenfouda; Hooker s.n., IV. 1871, Casablanca.

Netherlands. Backer s.n., VII. 1945, prov. N. Holland; Gorter 202, Heelsum; Koster 3794, Hattem.

Palestine. Dinsmore 8056, Haifa; Field & Lazar 329, Megiddo; Jouannet-Maire s.n., III. 1889, Mt. Sion; Meyers 56, Jerusalem; Meyers & Dinsmore 6056, Mt. Carmel; Zohary & Amdursky 55, Jerusalem, Mt. Scopus.

Poland. Rostanski s.n., 30. V. 1958, Silesia, Wroclaw.

Portugal. Palhinha s.n., IV. 1914, Troia; Rainha 2403, Setubal; Welwitsch 18, s.l.

Sardinia. Reverchon 160 (1881), Santa Teresa Gallura.

Sicily. Andréanszky s.n., 2. V. 1926, Palermo, Mt. Pellegrino; E. & A. Huet du Pavillon s.n., 31. III. 1855, S. Martino prope Panormum; Kirkegaard s.n., III. 1871, Catania; Ross s.n., III. 1894, Palermo; Todaro 1078, Junio, Palermo.

S. Africa. Guthrie 1433, Muizenberg; Wright s.n., 1853-56, Simons Bay.

Spain. Cabrera s.n., s.d., Malaga et Pades; Reijnders 3180, Campanillas, W.NW. Malaga.

Sweden. Turesson s.n., VIII. 1909, Malmö.

Syria. Gaillardot s.n., - V. -, pr. Sidonen (Saïda); Holleman-Haye s.n., 1/2 III. 1936, in the desert; Lowne s.n., à 1863-4, Galilea prov.

Tunisia. Andréanszky s.n., 15. IV. 1938, Gafsa, Talla; Bisseling s.n., IV. 1951, vicinity of Kheredinne; Chevalier s.n., 3. V. 1893, prope Tebourba; Kralik 14, Gabes; Raunkiaer s.n., 12. II. 1910, Lydirt pr. Hamman; id., 14. II. 1910, Monouba; id., 1. III. 1910, Belvédère.

Turkey. S. H. Harlow s.n., 29. IV. 1894, Asia Minor, Ephesus; Schwartz 290, Smyrna.

USA. Eyerdam s.n., 17. VI. 1934, Washington, Port Blakely; Howell 12577, San Francisco; Nelson 2120, Oregon, Salem; Pollard s.n., 7. III. 1948, California, East beach Ventura; Stokes s.n., 16. VI. 1895, San Diego.

Yugoslavia. Andreas & Schotsman s.n., V. 1956, Split; Behrendsen s.n., 23.V.05, Ragusa, near Gravosa; Florschütz s.n., V. 1937, Dubrovnik, vicinity of Victoria; Gugler s.n., 10. VI. 1902, Spalato, Mt. Marian; Keller s.n., 17.IV.1910, Dalmatia; Pichler 571, *ibid*.

Var. myriosperma

Morocco. Murbeck s.n., 1.IV.1921, vicinity of Marrakech.

Var. trigyna

France. Lesdain s.n., 17. IX. 1929, Dunkerque, près des Chantie de France.

Germany. Hupke s.n., 21. VI.1930, Rhein prov., Köln....

Morocco. Askenasy s.n., Mogador; Brettes c.s. (Sauvage hb. 5032), 7.II.1947, Région de Goulimine, SW. Kasaba Ovalidia; Faure s.n., 17.V.1933, Berkana, colline de Taghit; Gattefossé s.n., 24.IV.1936, Cap Ghir; Ibrahim s.n., 23.V.1889, Tiferdin; id. 28.V.1889, Arbalah; Jahandiez 116, Kasaba Tadla (Tadla); id. 154, Tanant (Entifa); id. 1030bis, Bir Abdallah des Ait Attaf (Azilal); id. 1338, Séfrou; Lindberg 1851, Safi, Cap Safi; id. 2138, prope opp. Mogador; Maire s.n., 26. III. 1923, Mt. Djebel Zerhoun à Moulay Idris; id. 17.IV.1924, prope urbem Saffi; Mardochée s.n., à 1875, Imeoghuemmi; id. à 1876, Ida Oubouzia, Takoust et Ait Zelten; id. à 1876, Oliferniat; Mellerio s.n., 14.IV.1897, Casablanca; Metro et Sauvage (Sauvage hb. 3479), Forêt de Chêne - Liege de Timeksaouin, N. Grand Timeksaout; Nègre 1314, Ben Gnou, Mazagan; id. 1359 (1997), NE. du signal Halba 508; id. 13. XI. 1950, Jachéra près de Doc Rouaza; Pailer s.n., III. 1949, Agadir; Paulsen s.n., 4.IV.1936, St. Hubert, 53 km S. Casablanca; Samuelsson 7129, Aghbat; Sauvage 208, Fertasse; id. 321, Fedala; Sennen et Mauricio 8347, Kebdana à Zaïo; Vindt 1112, Bord Segouia près Gerun ben Nateur; id. 6028, Rég. Rabat, près de Miromai; De Wilde c.s. 1774, Atlantic Coast, S. Safi.

Netherlands. Kern et Reichgelt 19426, prov. Gelderland, Nijmegen, Gentstreet.

USA. Anonymous (Mrs ?Wz.) s.n., s.d., near Eureka Springs, Arkansas.

Subsp. *decursiva*

Var. decursiva

Algeria. Balansa 876, Oued-Biskra; Choulette 411, El-Outia; Murbeck s.n.. 4.IV.1903, Fontaine Chaude, prope Biskra; Stomps s.n., 19.IV.1936, bet. Beni Ounif & Aïn Sefra;

Wall s.n., 19.IV.1936, Djenien Bon. Rezg.

Egypt. Boulos s.n., 23.IV.1959, W. El-Maghara, N. Sinai; Drar 572D, Eyun Mousa, Gebel Ahmer, Mokattam hills; id. s.n., 23.IV.1929, El-Burg, Maruit; id. 82B, Wadi Gedirat, NE. Sinai; id. 26.V.1935, El-Sallum; id. 4.IV.1939, Wadi Heridin, S. El-Arish, N. Sinai; Ehrenberg s.n., à 1824, Alexandria; Forskål 606 & 610, *ibid.*; Gauba 166, El-Omaied, Marmarica; Kotschy 534, bet. Cairo & El-Arysch; Letourneux 20, Ramlé; Muschler 2063, near Heluan; Norinder s.n., 10.III.1938, Wadi Natrun, 50 km SW. Alexandria; Sa'ad 101, Burg El Arab; id. 451, El-Alamein; Schweinfurth 213, bet. Cairo & Gebd El Haschab; id. 236, Cairo-Suez road, near Qubbah; Shabetai Z994, Ain Gederat, N. Sinai; id. Z4382, Gebel Lehfen; Simpson 943, Wadi Ain Mûsa; id. 5784, El-Salhiya; G. Täckholm s.n., 22.I.1928, Ikingi-Mariut; id. 21.III.1928, Bir Lehfen, S. El-Arish; Volkens s.n., 7.IV.1885, Cairo, Gebel Ahmar.

Iran. Behbudi 281, prov. Luritan, Pucht-i-Kuls, Melsrau; Kõie 1482, Borasdschan (Buschier-Daleki); Oosten 1325, Khuzestan, Ram Normaz.

Iraq. Barkley & Brahum 485, Al-Jezira desert, SW. Hadra; Bornmueller 944, Kirkuk; Funck 137, Wadi Hauran, supra Hit ad Euphratum; Gillett & Rawi 6245, Shabicha; Geant 15656, Ramadi Luva, E. Falkija; Haines s.n., 14.V.55, Falkija Desert; Maresch 58, Mesopotamia, Kalaat Schergat; Rawi 30817, Karbala; id. 20696, Mandali; id. 20332, Samarra; Rechanger 8754, distr. Basra, 65 km SW. Basra; id. 8866, distr. Amara, 60 km N. Amara; id. 8876, distr. Amara, 70 km N. Amara; id. 9545, distr. Baghdad, Jabal Hairin, E. Samara; id. 9657 & 12786, distr. Diyalla, Mandali; id. 9670, distr. Diyalla, bet. Mandali & Badra; id. 9868 & 9902, W. Desert, bet. Rutba & Ramadi; id. 13402 & 13465, distr. Baghdad, bet. Tigris & Jabal Hamrin; id. 13622, S. Desert, distr. Diwaniya, SE. Ashwriya, 15 & 50 km WNW. Shabicha; id. 13888, distr. Diwaniya, near As-Salam; id. 13951, distr. Kut Al-Imare, 16 km SE. Badra; id. 14230, distr. Diyalla, Jabal Hamrin, bet. Sharaban & Jalava.

Jordan. Field & Lazar 154, Jebel Ashgaf; Kazapligil 2156, Tafile, Wadi Um-Fanajeen; Rechanger 12940, Syrian Desert, bet. Amman & Rutba.

Lebanon. Ehrenberg s.n., 18.V.1824, Berût.

Libya. Bornmueller 591, Tripolitania, Garian.

Morocco. Emberger s.n., 25.IV.1934, Auti-Akar. occ., Faetes D'Aganie, près Grigine; Brettes, Panouse et Sauvage s.n., 20.I.1947, reg. Goulimine, Kheney El Adam, près Ayoun; Nègre 213, Croup à l'O. de Mzoudia.

Palestine. Angelis 523, Negev, Revivim; Boissier s.n., III. 1846, Palestine & Arabia petraea; Meyers & Dinsmore 5341, Khan Khadrur, Jerusalem; id. 5431b, Dead Sea, Jericho; Samuelsson 2665, bet. Jerusalem & Jericho, infra Khan Hatrur; id. 2682, Wadi Himrin, bet. River Jordan & Tell Himrin; id. 2731, Syrian Desert, near Kalt Es-Zerka; Yaffe s.n., 2.V.1949, Negev, S. Beersheba; Zohary s.n., 6.IV.1941, Judean desert, 26 km Jerusalem-Jericho road.

Syria. Boissier s.n., à 1851, s.l.; Field & Lazar 678, Tell Frak; Handel-Mazzetti 372, Meaken; id. 477, bet. Meaken & Der Es-Sor, near El-Hammam; Haradjian 1984, Abou-Douhour, bet. Hammah & Alep; Samuelsson 3517, Syrian Desert; id. 3581, *ibid.*, Mt. Djebel El-Abiad, 15 km NW. Ain El-Beida; id. 3838, Meaken, bet. Aleppo & River Euphrat; Wall s.n., 18.IV.33, Ohen Wadi, Ain El-Beida.

Tunisia. Andreánszky s.n., 10.III.1928, Dj. Orbata near El-Guetar; id. 15.IV.1938, Lalla; Kralik 14, Gabes; Murbeck s.n., 4.IV.1903, Fontaine Chaude prope Biskra.

Yugoslavia. Petter 312, Spalato.

Var. *propinqua*

Algeria. Chevallier 159, Laghouat ad Dj. Miloch; Faure s.n., 11.V.1938, sud Oranais, env. d'Aïn-Sefra; Raunkiaer s.n., 7.III.1910, Biskra-Oued.

Egypt. Ball s.n., 23.III.1877, juxta Ramle, prope Alexandria, p.p.; Bornmüller 10374, Mariotici, prope Amria; id. 10375, Cairo, prope Abbasiya; Eggers s.n., 10.III.1899, Mosesquelle; Letourneux s.n., IV.1876 et II.1877, Ramle; Maire s.n., 11.II.1909, Dekella, near Alexandria; id. s.n., 16.V.1909, Aboukir, near Alexandria; El Musil s.n., end II.1896, Sinai, W. Firan; Schweinfurth s.n., à 1880, Cairo; id. s.n., III.1884, W. Dugla, bet. Cairo and Suez.

Iran. A. Bent et H. E. Wright 426-212, distr. Khuzestan, E. Andimeshk.

Iraq. E. D. & F. A. Barkley 6575, Old Hatra, Al-Gezira Desert?; Bayliss 70, Qaiyarah Mosul; Chakravarty c.s. 31719, 12 km NT, road to Husabah; Guest 1333, Mosul; Haines 1876 & 1896, Kharagin; Watson s.n. (comm. A. Sharples 23.VIII.1919), Mesopotamia, Karun.

Jordan. Meyers et Dinsmore 3431b, Tell es-Sarin.

Lebanon. Holleman-Hayne 33, Tripoli.

Libya. Brongersma 185, vicinity of Garian; Marcello s.n., 18.III.1931, Spiaggid di Homs; id. s.n., 26.III.1931, Fonduc Ben Gashir; id. s.n., 6.IV.1931, Garian tegrinna; id. s.n., 11.IV.1931, Giose, Pampanini 3220, Cerenaiqa, fra Tocra e Tolmeta; Pampanini et Pichi-Sermolli 3222, *ibid.*, ridatta Telger de Agedaba; Ruhmer 31, *ibid.*, Benghasi; Vaccari 76 et 160, *ibid.*, Tolmeta.

Morocco. Grant s.n., VII.1888, Kasr Pharaon; Hooker s.n., V. 1871, Shedma; Jahandiez s.n., 2.IV.1920, Chichaoua; Sennen et Mauricio 7516, El Zaio, près de Muluya.

Palestine. Aaronsohn 3537, Maris Mortui?; Ball s.n., IV.1877, Khan El-Hammar, prope Hierosolymam; Dinsmore 3512, Good Samaritan's Inn, Khan Khadrur; Kotschy 648, prope Hebron; Mayers 5431, Good Samaritan's Inn; Radowilsky et Roubinowitsch 188, Jericho.

Syria. Wall s.n., 22.IV.33, Maskéné, near Euphrat.

Tunisia. Ginzberger s.n., 14.IV.1913, Ain Charsesia; Knoche s.n., 8.IV.1909, near Matmata; id. s.n., 19.IV.1909, Dj. Gafsa; Murbeck s.n., 26.III.1896, Gabes versus Ouzereg; id. s.n., 11.V.1896, Sousse; Pitard s.n., III.1907, Oudref; id. s.n., IV.1909, Gabes; Vierhapper s.n., 14.IV.1913, Kairouan.

2. *Reseda alopecuroides* BOISSIER

Fig. 22

In *Diag. Pl. Or. Nov. Ser. 1*, 2(8), 1849, p. 55; *Muell. Arg., Mon. Rés. 1857*, p. 121, tab. 6, fig. 91 (et in *Neue Denkschr. Schw. Ges. Zuer. 16*, 1858); *Boiss., Fl. Or. 1*, 1867, p. 426; *Muell. Arg. in DC., Prodr. 16(2)*, 1868, p. 561; *Post, Fl. Syr. Palest. Sin. 1896*, p. 112; *Dinsmore in Post, l.c. ed. 2, 1*, 1932, p. 138; *Zohary, Fl. Palaest. 1*, 1966, p. 334, tab. 486.

Annual, erect, sometimes ascending herb, 30–70 cm (sometimes over 1 m) tall.

Stems solitary or few, frequently woody at base, often branching, \pm densely leafy, hirsute (hairs ca. 2 mm long, white, more or less papilliform, lumen wide), ribbed; pith disintegrating (internodes rather widely tubular).

Leaves membranous, laxly hirsute, basal entire, upper 3-partite, digitate, or irregularly pinnatifid. Basal leaves often rosetted, narrowly ovate, 4–6 (–10) cm long, 1–1½ (–2) cm wide, top rounded, margin often undulate, (edge pallid), stem-leaves 6–8 (–12) cm long, terminal lobe larger and longer (sometimes twice as long) than lateral ones (if trifid); lobes unequal, linear to narrowly ovate to -elliptic; margins wavy, finely scabrid.

Flowers whitish (in dried specimens \pm yellow), erect to spreading. Raceme at first ovoid-cylindric, acute, dense, up to 45 cm long when fruiting; peduncle strongly ribbed, hirsute. Bracts mostly persistent, comose at the top of the raceme, scabrous, linear, in flowers 3–4 mm long, ½ mm wide (in fruit slightly

longer), \pm acute, margin widely hyaline, papillose-scabrid. Pedicels sulcate, hispid, in flower 6(–10) mm long (slightly longer in fruit), erect-spreading, gradually becoming horizontal and frequently curved downwards in fruit, $\frac{2}{3}$ as long as the capsule.

Sepals 6(–7), persistent, spreading in flower, scabrous, narrowly linear-spathulate, reflexed and slightly increased in fruit, in flower 5–6 mm long, \pm 1 mm wide, obtuse, margins narrowly pallid, scabrid.

Petals 5–6 mm long, slightly shorter than sepals. Limb of superior petal apparently multipartite (3-sect and lateral lobes multipartite), twice as long as appendage, central lobe linear, slightly widened towards the top, $\frac{1}{2}$ – $\frac{2}{3}$ as long as the lateral lobes, lateral lobes incised $\frac{3}{4}$ way down, (5–)6–9-partite. Laciniae linear, appendage obovate, 2 mm long, slightly less wide, widely attached to limb-base, free transverse rim continuous in front of limb, $\frac{1}{3}$ as long as the whole appendage, margins densely ciliate (hairs sometimes papillose). Lateral petals smaller (anterior lobe generally wanting), laciniae similar to those of superior petal. Anterior petal smallest; limb simple (lateral lobes wanting), linear-spathulate.

Disc $1\frac{3}{4}$ mm high, 2 mm wide, dense and long papillose, margin recurved, papillose.

Stamens 18–20, almost exceeding the petals. Filaments (tardily) deciduous to persistent, hardly dilated beneath connective, 3–5 mm long. Anthers oblong-ellipsoid, $1\frac{1}{2}$ mm long.

Ovary obovoid, short stipitate, obtusely 3-angled (ribs minutely papillose-hirsute), 3-toothed, teeth $\frac{1}{3}$ – $\frac{1}{2}$ as long as the ovary. Ovules 5–7 on each placenta in 2–3 rows, \pm opposite.

Capsule (sub)pendulous, stipitate, obovoid-globose (inflated, but slightly contracted beneath the mouth), short and abruptly attenuate (in dry specimens) at base, 10–15 mm long, 10–12 mm wide, ribs papillose-scabrid, mouth widely gaping, teeth short.

Seeds ochre to greyish, dull, reniform, $(1\frac{1}{2}$ –) $2\frac{1}{2}$ –3 mm long. Sinus wide, filled with carunculoid tissue. Testa transversely undulate-rugose (wrinkles sharp), irregular in size; the outer integument membranous, subhyaline, tardily detached.

Type: BOISSIER s.n., April 1846, Palestine, Gaza, Naplouse (holotype: G; isotypes: GOET, W).

Distribution: SE. coast of the Mediterranean (Palestine, Syria and N. Jordan).

Taxonomical notes: BOISSIER declared that *R. alopecuros* BOISS. was allied to *R. phyteuma* and *R. odorata* but of all species it was different by its long thick stems, by its yellowish white petals and very large capsules. He described the seeds as glossy ('nitidis') but we found them (in the isotypes) without gloss.

dull; the holotype was not seen by us.

In the protologue he mentioned nothing about the filaments of *R. alopecuros* (cf. Diag., l.c.) but later stated that the filaments are early deciduous (cf. Fl. Or. 1, 1867, pp. 424, 426). MUELLER (Mon. Rés. 1857, p. 121, fig. 91 and in DC., Prodr. 16(2), 1868, p. 561) and DINSMORE (in POST, Fl. Syr. Palest. Sin. 1896, p. 112 and ed. 2, 1, 1932, p. 138) also ascribed deciduous filaments to *R. alopecuros*.

The duration of the filaments in *R. alopecuros* shows variability, i.e. the isotype (309729, W) has clearly persistent filaments, and this is also seen in a specimen of ZOHARY, FEINBRUN and Students (nr. 633; PRS). The specimens of ALONZO (nr. 184, S) and MEYERS & DINSMORE (nr. G1767, LD), have a few filaments still sticking to the mature capsules.

Some of the specimens studied, however, have certainly deciduous filaments. By the more or less persistent filaments *R. alopecuros* suggests affinity to *R. arabica* BOISS.

G. SAMUELSSON 3193 (LD) shows unusually large leaves ($20 \times 7\frac{1}{2}$ cm).

A specimen preserved in the DUDLEY Herbarium (Nat. Hist. Mus. Stanf. Univ. Calif., sheet 44695), originating from cultivation, shows some variability in the indumentum. The inflorescence is scabrid-papillose and stems and leaves are provided with short papillae; the flowers match those of *R. alopecuros*. This variation may be attributed to cultivation and new environmental conditions.

By the shape of the fruit *R. alopecuros* is allied to *R. armena*, *R. balansae*, and *R. tymphaea* from which it is easily distinguished at first sight by the indumentum.

Ecological notes. Palestine. ZOHARY, FEINBRUN and Students collected it in the upper Jordan valley on slopes, where it was in full flower medio March. At the end of March, it bore fruit near Tiberias (MEYERS 3767). G. SAMUELSSON collected fruiting specimens 11 April at 50 m alt., on a grassy calcareous hill near Lake Hula, in upper Galilea.

In Jordan, MEYERS and DINSMORE (G1767) found 1 m tall plants near Irbid, at 530 m alt., fruiting in May.

Specimens examined:

Jordan. Meyers & Dinsmore G1767, Irbid.

Palestine. Aaronsohn & Laurent-Täckholm 172, Zik(h)ron Ya'agov; Alonzo 184, Nazareth; Boissier s.n., III-IV. 1846, Arabia petraea; id. IV. 1846, Gaza, Nablus (Naplous); Eig s.n., 3.4.1923, Tiberias (Upper Jordan Valley); Ginsberg s.n., 5.IV.1956, upper Galilea, Ayeleth-Hashahar; Meyers 3767, Tiberias; Samuelsson 3193, Galilea, Ain el Malha, near Bahr El Huleh; Sterneck s.n., 8.IV.1907, Sea Genezareth; Zohary s.n., 18.IV.1949, Judean Mts., between Hartuv and Hulda.

Syria. Lowne s.n., 1863-64, S. Syria, Magdara; Neergaard s.n., vere 1868, s.l.

In Bot. Zeit. 14, 1856, p. 35; id., Mon. Rés. 1857, p. 144, tab. 7, fig. 102 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 579; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 180; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 86; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 276, f. 84; Quézel et Santa, Nouv. Fl. Alg. 1, 1962, p. 440, t. 38, f. 1223.

R. a. subsp. *barbuti* Leredde in Bull. Soc. Hist. Nat. Afr. Nord 44 (7-8), 1953, p. 253 et in (extr.) Trav. Inst. Rech. Sah., Série Tassili 2, 1957, p. 311 and Trav. Lab. For. Toulouse tome 5(3), vol. 3, 1957, p. 311; Ozenda, l.c.

Annual to biennial, erect, pale green herb, 50-100 cm tall, sometimes branching and ascending from an often lignescent taproot.

Stems few (sometimes solitary), densely leafy, slightly ribbed, very rarely scabrid; pith persistent or sometimes disintegrating (and the internodes narrowly tubular).

Leaves all entire, or rarely trisect, subpetiolate (petiole up to $1\frac{1}{2}$ cm long), rarely petioles and veins \pm scabridulous, narrowly ovate or rarely (the basal leaves) elliptic or spatulate, 5-7 cm long, $1-1\frac{1}{2}$ cm wide, attenuate at base, terminal lobe (if trisect) longer than laterals, top obtuse or acute, margin pallid, smooth to \pm crenate.

Flowers ochraceous, large, on long, erect to spreading pedicels. Raceme erect, densely flowered, up to 50 (-more) cm long, $1\frac{1}{2}$ -2 cm wide when fruiting; peduncle distinctly ribbed. Bracts deciduous, long exerted at the comose raceme-top, pale yellow, linear-oblong, 4-5 mm long, 1 mm wide, acuminate, margins widely hyaline, sparsely scabridulous. Pedicels slender, sulcate, in flower 5-6 mm long, about twice as long as sepals, in fruit appressed to the rhachis.

Sepals 6, deciduous, all almost equal, membranous, pale yellow, rarely herbaceous, glabrous or \pm scabrid, narrowly oblong, $3\frac{1}{2}$ mm long, 1 (-less) mm wide, obtuse or acute, margin very widely pallid.

Petals 3- $3\frac{1}{2}$ mm long, hardly exceeding the sepals. Limb of superior petal 3-partite or very rarely palmately multipartite (incisions up to $\frac{4}{5}$ down), flabellate, $1-1\frac{1}{2}$ as long as appendage, lobes linear-spathulate, obtuse; appendage obovate, 1 mm long, $1\frac{1}{2}$ mm wide, widely attached to and narrowly produced in front of the limb-base (broadly auriculate); papillose(-ciliate) on its margin. Lateral petals often the longest, central lobe longer than lateral. Anterior petals smaller, either trifid or bifid.

Disc 1 mm high, $1\frac{3}{4}$ mm wide, papillose, margin recurved, coarsely papillose-ciliate.

Stamens (12-)16-18(-20), longer than the petals. Filaments deciduous, 3 mm long. Anthers (oblong-)ellipsoid, $1\frac{1}{2}$ mm long.

Ovary ellipsoid-(ob)ovate, glabrous, very turgid, obtusely 3-angled, mouth

strongly contracted, 3-toothed, teeth up to $\frac{1}{4}$ as long as the ovary. Ovules ca. 25 (sometimes less) per placenta, in 4(3–5) rows, imbricate.

Capsule erect, ellipsoid to (ob)ovoid, 5–8(–10) mm long, 4–5 mm wide, glabrous, obtusely 3-angled (side-walls shallowly depressed to sulcate); contracted beneath the widely opened mouth, teeth bluntly triangular.

Seeds greenish brown-black, dullish, \pm globular hippocrepiform, 1 mm long. Sinus very narrow. Testa papillose-muricate (papillae in rows following the contour, rather widely spaced).

Type: B. BALANSA 875, 'Pl. exs. d'Algérie, 1853', sub *R. atriplicifolia* J. GAY, Graviers de l'Oued-Biskra, à Biskra, 14 mars, 1853 (holotype: C; isotypes: GOET, WAG).

Distribution: Algeria and Tunisia.

Key to the subspecies and varieties

1. Limb of superior petal deeply 3-partite. Leaves very rarely 3-sect. **a. ssp. alphonssi**
1. Limb of superior petal (shallowly) multipartite. **b. ssp. barbuti**
2. Sepals, pedicels and leaves glabrous. Leaves usually 3-sect. **b1. var. barbuti**
2. Sepals, pedicels (and leaves) \pm scabrid. Leaves usually entire. **b2. var. scabridula**

a. subsp. alphonssi

Glabrous herbs. Leaves entire, very rarely one or two of superior ones trisect. Limb of superior petal deeply 3-partite or -sect.

Distribution: Area of the species

b. subsp. barbuti LEREDDE in Bull. Soc. Hist. Nat. Afr. Nord. 44 (7–8), 1953, p. 253.

'Valde affinis *R. alphonssi* typo, foliis glabris, capsulisque plerumque tri-carpellatis, staminibus paucis (12–20) [seminibus] obtuse rugulosis. Ab eo differt petalis superioribus laciniatis (nec trifidis) praesertimque foliis trisectis'.

Type: LEREDDE, Tassili n'Ajjer, Oued Samen, Algeria (G).

Distribution: Only known from type locality.

b1. var. barbuti

Entirely glabrous herbs. Leaves trisect.

Distribution: Area of the subspecies.

b2. var. scabridula ABDALLAH et DE WIT, *nov. var.*

Sepala, petioli et interdum folia plus minusve scabrida. Sepala herbacea, latu albido-marginata. Folia raro trisecta.

Type: Sv. MURBECK 'Iter Algeriensi-Tunetanum, 1908', Tunetia merid.: Les Gorges de la Seldja pr. Metlaoui, 18.2. (holotype: LD).

Distribution: Known from type locality.

Taxonomical notes: MUELLER (l.c.) stated that *R. alphonsi* MUELL. ARG. grew at 'Oued-Biskra' near Biskra. He based the description on specimens collected by 'B. BALANSA Pl. exs. d'Algérie, 1853, No. 875 (in hb. DC. et BOISS.)', which were distributed in BALANSA sets as '*R. atriplicifolia* J. GAY'.

MUELLER declared that *R. alphonsi* was a beautiful plant and named the species after ALPHONSUS DE CANDOLLE, adding that '*R. atriplicifolia* J. GAY' was a different species and giving as the date for BALANSA's specimen '1854', probably the year in which BALANSA's set was acquired.

R. atriplicifolia J. GAY ex MUELL. ARG. was referred to by MUELL. ARG. (Mon. Rés. 1857, p. 146; cf. Index Kew. 2, 1895, p. 696). He reported it as a msc. name, being quoted by BALANSA on the label (to *R. alphonsi* MUELL. ARG.). *R. atriplicifolia* J. GAY has no status under the Code.

COSSON named BALANSA 875 and added on the label *R. aucheri* BOISS. as a synonym. MUELL. ARG. adopting this specimen as the type of *R. alphonsi* remarked that *R. atriplicifolia* J. GAY, a msc. name, was indeed the same as *R. aucheri* BOISS. (cf. l.c., p. 146) but that BALANSA 875 was not the latter species. COSSON was right in his proposed synonym but erred in the identification of BALANSA 875 (cf. l.c., p. 147).

MUELL. ARG. (in DC., Prodr. 16(2), 1868, p. 579) slightly emended the original description of the leaf-characters of *R. alphonsi* by stating that one or two superior leaves may be trisect. One specimen which shows this character was seen by us (MURBECK et OLIN s.n., l.III.1896, Algeria, between El-Kantara and Fontaine in Gazelles (LD)). In var. *barbuti*, the leaves are usually trisect.

LEREDDE (in Bull. Soc. Hist. Nat. Afr. Nord 44, 1953, p. 253), described the subsp. *barbuti* in *R. alphonsi*. He stated that it was different from *R. alphonsi* (typo) by the superior petal which was laciniate ('nec trifidis') and especially by the trisect leaves. From *R. villosa* COSS. 'ejusque varietates', subsp. *barbuti*

differed, he declared, by its glabrous leaves and the number of stamens. From *R. pruinosa* DEL. 'ejusque subspecies', subsp. *barbuti* differed by the stamens and the seeds.

LEREDDE added that subsp. *barbuti* was a transition between *R. alphonisi* and *R. villosa*, and particularly allied to var. *glabrescens* MAIRE in *R. villosa*. He pointed out that subsp. *barbuti* was as abundant as *R. villosa* in 'Tassili de Ajjer'. As a finding locality he stated 'Oued Samen' in Tassili n'Ajjer. The name of LEREDDE's subspecies commemorates M. BARBUT, General Inspector of Agriculture.

In case LEREDDE correctly placed his specimen in *R. alphonisi*, subsp. *barbuti* is sufficiently distinguished. Having seen no type it is desirable to accept LEREDDE's data. Its affinity to *R. villosa* var. *glabrescens* MAIRE (type not seen), is in accordance with LEREDDE's statements.

In the absence of LEREDDE's type of *R. alphonisi* subsp. *barbuti*, we were unable to verify the character 'foliis glabris' and the incisions of its leaves. If LEREDDE described the leaves correctly, the present classification is justified, if not, the variety *scabridula* ABDALLAH et DE WIT may prove to be identical with var. *barbuti* (see also below).

The word 'seminibus' was added in 1957 (l.c.) to the protologue when LEREDDE repeated the original description (of 1953) in which 'seminibus' was omitted by perhaps a printer's error. We have not seen any specimen but LEREDDE's data warrant segregation as a subspecies.

Ecological notes: The type of *R. alphonisi* was collected on gravel soils at Oued-Biskra at Biskra where it flowered and fruited medio March. BALL found it in stony and sandy localities near Biskra; E. G. PARIS collected it at El Kantara at about 550 m alt., along the road among weathered rocks flowering in May 1870. In Tunisia LETOURNEUX collected it on gypsaceous-calcareous soils at K(e)riz (Djerid) flowering at the end of April 1887.

Specimens examined:

Subsp. *alphonisi*

Algeria. Balansa 875, Graviers de l'Oued-Biskra, à Biskra; Ball s.n., II.1880, Sahara Algeriensis, prope Biskra; Battandier & Trabut 118, Oued-Biskra; Chevallier 15 & 15bis, Sahara Algeriensis, Biskra; id. s.n., 20.IV.1892, Oued-Biskra; id. 23.IV.1892, El Outaia; Cosson s.n., 26.V.18(59), El Kantara, près Biskra; C. de Geer s.n., V.1891, El Kantara; Murbeck s.n., 4.IV. 1903, Fontaine Chaude prope Biskra; Paris 423, El Kantara 35° 14'N., 3° E.; Schmitt 20, lit de l'Oued-Biskra à Biskra.

Tunisia. Letourneux s.n., 30.V.1884, Djebel Nefzuvua, prope ?Kebidli; id. 30.IV.1887, Keriz (Djerid); Pitard 661, Gafsa; id. s.n., III.1909, Gafsa.

Subsp. *barbuti*

Var. *barbuti*

Algeria. Leredde s.n., Tassili n' Ajjer, Oued, Samen.

Var. *scabridula*

Tunisia. Murbeck s.n., 18.II.1908, les Gorges de la Seldja, pr. Metlaoui.

4. *Reseda amblycarpa* FRESENIUS

Fig. 24, 25

In Mus. Senckenberg. 2, 1837, p. 108; Walp., Rep. 2, 1843, p. 753; A. Rich., Tent. Fl. Abyss. 1, 1847, p. 13; Muell. Arg., Mon. Rés. 1857, p. 151 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Anderson, Fl. Aden. in Journ. Proc. Linn. Soc. London 5, Suppl., 1860, p. 6; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 580; Oliver, Fl. Trop. Afr. 1, 1868, p. 103; Baker. f. in Kew Bull. 1894, p. 329; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 180; Pirotta, Fl. Col. Eritr. in Ann. R. Ist. Bot. Rom. 8(2), 1904, p. 259; Perk. in Engl., Bot. Jahrb. 43, 1909, p. 417; Blatter, Fl. Aden in Rec. Bot. Surv. India 7, 1914-16, p. 110; id., Fl. Arab. in l.c. 8(1), 1919, p. 46; Chiov., Fl. Somala 1, 1929, p. 88; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689.

R. a. var. *typica* Perk. in Engl., Bot. Jahrb. 43, 1909, p. 417 (= var. *amblycarpa*).

R. a. var. *adenensis* Perk., l.c., p. 418.

R. a. var. *eritreae* Perk., l.c.; Cufod. in Bull. Jard. Bot. Brux. 24, Suppl., 1954, p. 159 (= var. *amblycarpa*).

R. a. var. *somala* Chiov., Fl. Som. 1, 1929, p. 88; Cufod., l.c.

R. quartiniana A. Rich., Tent. Fl. Abyss. 1, 1847, p. 13; Muell. Arg., Mon. Rés. 1857 & Neue Denkschr. Schw. Ges. Zuer. 1858, ll.cc. (= var. *amblycarpa*).

R. lurida Muell. Arg., Mon. Rés. 1857, p. 152, tab. 7, fig. 106 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858) (= var. *amblycarpa*).

R. pruinosa Del. var. *amblycarpa* Baker in Kew Bull. 1891, p. 329 (= var. *amblycarpa*).

R. p. ssp. *amblycarpa* (Fres.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 20, 1929, p. 14 (= var. *amblycarpa*).

Glaucous or greyish-green, 50-100(-150) cm tall (sub)shrub or herb, taproot usually woody.

Stem woody at base (cortex pale brown with paler furrows), closely and diffusely branching above, branches erect, stiff, leafy up to the racemes, papillose-puberulous or glabrous, (papillae conical, and wide at base), finely ribbed; pith solid.

Leaves all entire, or partly 3-partite, (ob)ovate to elliptic or oblong (base long attenuate), 2-10 cm long, ($1/2$ -)1-2 cm wide, \pm papillose-puberulous (especially veins and margins) or glabrous, sometimes fleshy and rigid; lobes of ternate

leaves narrowly ovate to -elliptic, terminal lobe longer than the (subopposite) laterals, margin a narrow pallid line; if leaves entire axillary buds develop into densely leafy short branchlets (see fig. 24).

Flowers white (often yellow in dry specimens), small, on short, erect pedicels, in terminal spike-like racemes. Raceme erect, narrow, dense, rather rigid, 15–25(–35) cm long and $1\frac{1}{2}$ cm wide in fruiting, fruits erect; peduncle papillose-puberulous to glabrous. Bracts deciduous, forming a tuft at the top of the young raceme, linear to narrowly ovate, 5 mm long, $\frac{1}{2}$ mm wide, acute, pale green to yellow-hyaline except the dorsal nerve, margin sometimes minutely scabrid. Pedicels rigid, papillose-tomentellous to glabrous, $1\frac{1}{2}$ –2 mm long in flower, up to 4 mm (but shorter than the capsule) in fruit, occasionally appressed to the rhachis.

Sepals 6, deciduous, rarely minutely papillose, linear to narrowly obovate, $2\frac{1}{2}$ mm long, $\frac{1}{2}$ mm wide, obtuse, margins narrowly hyaline, sometimes minutely scabridulous.

Petals $2\frac{1}{2}$ – $4\frac{1}{2}$ mm long, usually exceeding the sepals. Limb of superior petal 5–9-palmately partite, incisions $\frac{2}{3}$ – $\frac{3}{4}$ way down, central lobe exceeding the other, as long as or shorter than appendage; lobes narrowly ligulate, often slightly widening at apex, obtuse; appendage rectangular-obovate, ca. $1\frac{1}{2}$ mm, widely attached to limb base, apical transverse rim continuous or \pm interrupted in front of limb-base, very narrow, densely papillose-ciliate. Lateral petals smaller, laciniae similar to superior petal. Anterior petal smallest, limb usually entire, linear-spathulate.

Disc $\frac{1}{2}$ mm high, ca. $1\frac{1}{2}$ mm wide, margin recurved, papillose.

Stamens ca. 20, longer than petals. Filaments deciduous, subulate, $2\frac{1}{2}$ – $3\frac{1}{2}$ mm long. Anthers oblong-ellipsoid, 1 mm long.

Ovary (ob)ovoid to ellipsoid, attenuate at base, stipitate, glabrous, obtusely 3-angled, 3-toothed; teeth ca. $\frac{1}{5}$ as long as the ovary. Ovules numerous, 35–40 on each placenta, imbricate, in 4(–more) rows.

Capsule erect, stipitate, obovoid-fusiform, narrowed at both ends, 5–6 (–7) mm long, 3 mm wide, glabrous, obtusely 3-angled (side-walls shallowly grooved), 3-toothed; capsules numerous, imbricate on the raceme.

Seeds black, glossy, kidney-shaped, ca. $\frac{2}{3}$ mm long. Sinus narrow. Testa finely tubercled-muricate (papillae in rows following the contour).

Type: RÜPPELL (n.v.).

Distribution: Ethiopia (Eritrea), Djibouti, Somalia, Aden, and Perim Island.

Key to the varieties

1. Stems and leaves entirely glabrous. Leaves often fleshy. . . . **c. var. somala**
1. Stems and leaves \pm papillose-puberulous or scabrid. Leaves usually chartaceous.
 2. Leaves small, up to 5 cm long, crowded along stems, usually entire. . . . **b. var. adenensis**
 2. Leaves large, up to 10 cm long, mostly 3-sect. . . . **a. var. amblycarpa**

a. var. amblycarpa

Mostly \pm papillose-puberulous subshrubs. Leaves large, 5–10 cm long, partly 3-sect (lobes wide), laxly disposed along the stems, chartaceous.

Distribution: Ethiopia (Eritrea), and Somalia.

b. var. adenensis PERK. in ENGL., Bot. Jahrb. 43, 1909, p. 418.

Papillose-puberulous herbs or subshrubs. Leaves small, 2–5 cm long, some upper leaves very rarely 3-sect, densely massed along the stems, usually chartaceous. Axillary buds developing into densely leafy branchlets.

Type: SCHWEINFURTH 4, Arabia Felix, Aden, 'aller Orten', Dec. 1888 (holotype: BM; isotypes: C, GH, WU).

Distribution: Aden.

c. var. somala CHIOV., Fl. Som. 1, 1929, p. 88.

Entirely glabrous, sturdy herbs. Leaves 4–6(–8) cm long, often upper leaves deeply trisect, sometimes fleshy and rigid.

Type: STEFANINI et PUCCIONI 854, Somalia Sett., Bacino del Nogal ad Ehil, 19.VI.; id. 649, Somalia Sett., Costa dei Migiurtini, presso Uanane sull'altipiano, 30.V.; id. 728, Somalia Sett., tra Chunded e il pozzo di Hongoló, 10.VI. (n.v.). See also CUF. in Bull. Jard. Bot. Brux. 24, Suppl., 1954, p. 159.

Distribution: N. Somalia.

Taxonomical notes: *Reseda amblycarpa* FRES. was based on a specimen collected by Dr. E. RÜPPELL in Ethiopia. When publishing this new species

FRESENIUS cited no collector's number nor a finding locality. This holotype was not seen by us.

Index Kewensis (2, 1895, p. 696) entered the name as '*Reseda amblycarpa*' but this spelling was not used by FRESENIUS, though adopted in numerous publications. The original spelling is used in the present study.

PERKINS (in Engl., Bot. Jahrb. 43, 1909, p. 417-418) was the first to distinguish varieties in *R. amblycarpa* (vars. *typica*, *adenensis* and *eritreae*). CHIOVENDA (Fl. Somala 1, 1929, p. 88) distinguished another variety (var. *somala*). The varietal name *typica* PERK. is changed to 'var. *amblycarpa*'. Synonymous to this is 'var. *eritreae* PERK.', for morphological reasons. The type was not seen but the protologue contains no sufficient evidence to justify the segregation of var. *eritreae*. The other varieties are recognized in the present study (var. *adenensis* PERK. and var. *somala* CHIOV.).

The type of var. *adenensis* PERKINS was studied. No type material was seen of var. *somala* CHIOV. The descriptive data warrant adoption of var. *somala* CHIOV.

A number of specimens identified as '*Reseda amblycarpa* FRESEN. var. *somala* CHIOV.' were received from the Florence Herbarium. The distinguishing character is complete glabrousness; the leaves vary between subsucculent to chartaceous, and may be entire or tri-lobed.

MUELLER ARG. (l.c.), based *Reseda lurida* on SCHIMPER nr. 1448. The specimen was collected in Abyssinia, Dscha-Dscha region, in the valley 'Zaccaze superiore'. It is present in Herb. DC. and BOISS. and was originally named '*R. Quartiniana*? BUCHING.'.

Reseda quartiniana? BUCHING. ex MUELL. ARG. (Mon. Rés. 1857, p. 152) was cited in Index Kewensis (2, 1895, p. 697). It appears that MUELL. ARG. only referred to a herbarium name accompanying SCHIMPER, Pl. exs. Abyss. No. 1448 (1855), adding that the specimen was not identical with *R. quartiniana* A. RICH. BUCHINGER's name was cited in synonymy, under *R. lurida* MUELL. ARG. as a reference to the suggested identification (by BUCHINGER) and has no status nomenclaturally. MUELL. ARG. made SCHIMPER 1448 to the holotype of *R. lurida* MUELL. ARG. Finally MUELLER ARG. himself (in DC., Prodr. 16(2), 1868, p. 580), reduced '*R. lurida*' to *R. amblycarpa* FRESEN. This view is accepted here.

Reseda quartiniana A. RICH. was described by A. RICHARD (Tent. Fl. Abyss. 1, 1847, p. 13) and based on a specimen collected by QUARTIN DILLON, between Massouah and Adoua. RICHARD did not refer the specimen to *R. amblycarpa* FRESEN. because, he declared, he knew that species only by the description published by FRESENIUS. The present plant (or species), he stated, seemed different by its rough stem, which is entirely covered by very minute tubercles, and by its leaves which are partly entire and partly incised up to their base, becoming 3-lobed (lobes lanceolate) and not simply trifid, like in *R. amblycarpa*.

MUELL. ARG. (Mon. Rés. 1857, p. 151), was unable to trace the type of *R. quartiniana* A. RICH. He (l.c.) first kept *R. quartiniana* as a species, but

finally (in DC., Prodr. 16(2), 1868, p. 580), reduced it, with some doubt, to *R. amblycarpa* FRESEN.

In Index Kewensis (2, 1895, p. 697) *R. quartiniana* was reduced to '*R. pruinosa*', a view which is not in agreement with this study. *R. quartiniana* A. RICH. is again reduced here to the synonymy of *R. amblycarpa* FRESEN. The entry in Index Kewensis reflects the erroneous statements of OLIVER's (Fl. Trop. Afr. 1, 1868, p. 103), who declared that *R. pruinosa* DEL. was the earliest name for *R. amblycarpa* FRES. (cf. also BLATTER, and ANDERSON, ll.cc.). OLIVER regarded *R. amblycarpa* and *R. quartiniana* as identical and as a variety in *R. pruinosa* but did not publish a varietal name.

Ecological notes: *R. amblycarpa* is very common on sands or basaltic rocks in the Aden region (LAM: bare rocks near Main Pass, var. *adenensis*). At Azzan, PAULAY found it on rocky fortresses. SIMONY observed it scattered between rocks on all parts of the ancient craterwalls of Gabal Samson on slopes facing the sea, most frequently next to the Ma'alla Flat. It occurs also at considerable altitudes in Ethiopia (e.g. SCHIMPER 2257, at \pm 1200 m). MERLA, AZZAROLI and FOIS collected it on the bank of Gumaio river (Somalia), and PAPPI on the bank of Haddas river in Eritrea. It flowers from November to March. SCHWEINFURTH stated that flowers and fruits occur from March to December. P. VAN ROYEN found it to be almost the only species in a dry wadi, on stony slopes at 120 m alt., as a woody herb, 70 cm tall, fruiting in March at road from Aden Harbour to Aden Town. The leaves were grey-green, leathery, flowers greenish, anthers yellow, filaments pale green, fruits light brown.

Specimens examined:

Var. amblycarpa

Eritrea. Pappi 2672, Assaorte, lungo il torrente Haddas.

Ethiopia. Schimper 1448, in regione Dscha-Dscha, valle Zaccaze superiore; id. 2257, terr. Agow, prope Pageros.

Var. adenensis

Aden. Ackland 1372; Anderson s.n., V.1859; de Beck s.n., 1886; Deflers 524; Harland 1360; Hildebrandt 779 (1872), 779 (1873); Kunze s.n., 9.I.1876; Lam 7330, nr. Main Pass; Marcheret (?) s.n., X.1880; Meebold 9003, 17476; Oliver et Cleame s.n., 25.I.63; Paulay s.n., 8.XII.98, Azzan; Rauh HEID. 13127, S. Arabia (Little Aden), rocky desert, fl. and fr., 10.III.1964; P. van Royen 5569, road from Aden Harbour to Aden Town; Schweinfurth 4 aller Orten; Simony s.n., 20.XI.1898, Gabal Samson; Swinhoe 1360; Wall s.n., 29.I.26. Perim Isl.: Blaauw s.n., 1911, str. Bab-el-Mandeb; id. s.n., III.1912, ibid.; Børgesen s.n., 6.XII.1927; Rainer-Kesslitz s.n., XI.84.

Djibouti. Chedeville 1840, Randa.

Var. somala

Djibouti. Chedeville 1384, Kusur-Buyyi; id. 1412, Gontoy.

Somalia. Merla, Azzaroli et Fois s.n., 30.I.1954, Migiurtinia altipiano presso Culue (a

Sud di Bender Beila); id. s.n., 15.II.1954, Uadi Haorseil; id. s.n., 20.II.1954, Bur Dofra; id. s.n., 21.III.1954, altipiano del Gumaio (Sud ouest di Bargal), valletta presso Bur Odad; Scortecchi s.n., 28.IX.1957, Migiurtinia sett., regione di Abal.

5. *Reseda arabica* BOISSIER

Fig. 26, 27

In Diag. Pl. Or. Nov. Ser. 1, 1(1), 1842, p. 6; Walp., Rep. 2, 1843, p. 754; Muell. Arg., Mon. Rés. 1857, p. 124, tab. 6, fig. 93 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 426; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 560; Battandier in Batt. et Trab., Fl. Alg. 1888-90, p. 84; Post, Fl. Syr. Palest. Sin. 1896, p. 111; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 181; Muschler, Man. Fl. Egypt 1, 1912, p. 440; Blatt., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 47; Ramis, Bestimm. Fl. Aeg. 1929, p. 98; Dinsmore in Post, l.c. ed. 2, 1, 1932, p. 137; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 316; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689; Burt et Lewis, Fl. Kuwait in Kew Bull. 1949, p. 303; Täckh., Stud. Fl. Egypt 1956, p. 332; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 276, fig. 84; Quézel et Santa, Nouv. Fl. Alg. 1, 1962, p. 441, tab. 20, fig. 1227; Rech. f., Fl. Lowl. Iraq 1964, p. 326; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 349; Zohary, Fl. Palaest. 1, 1966, p. 333, tab. 485.

R. a. β stricta Muell. Arg., Mon. Rés. 1857, p. 126 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Dur. et Schinz, l.c.

R. a. γ glabrescens Muell. Arg., ll.cc.; Dur. et Schinz, l.c.

R. praetervisa Muell. Arg., Mon. Rés. 1857, p. 232.

Annual, ascending, rarely erect, glaucescent herb, 10-40(-50) cm tall, branching at base from a rosette; taproot rarely lignescent.

Stems numerous (rarely few), leafy, almost terete, slender, ribbed, glabrous to sparingly muricate; pith disintegrating (internodes widely tubular).

Leaves glaucescent, often midrib and side-nerves scabrid-papillose. Basal leaves entire, narrowly oblong to -elliptic and attenuate at base, 5 cm long, 1 cm wide, obtuse. Upper leaves 3-partite, sometimes up to 5-partite (\pm palmate), lobes linear to -oblong (terminal lobe longer), margins sometimes wavy, often serrulate-scabrid.

Flowers white or pale ochraceous, on erect to spreading pedicels. Raceme erect, narrowly ovoid when young, in fruit up to 20(-more) cm long, 2 cm wide, sometimes occupying more than two thirds of the stem; peduncle markedly ribbed and more scabrid than the lower stem. Bracts mostly persistent, not exceeding flower-buds, linear, 2-3(-4) mm long, 1 mm wide, usually acute, margins narrowly pallid, sometimes serrulate. Pedicels ribbed, scabrid, in flower 3-4 mm long, in fruit 6(-more) mm long, sometimes longer than the capsule and curving downwards.

Sepals 6, persistent, glabrous to scabrid, oblong(-spathulate), top broadly rounded, 2–3 mm long, 1 mm wide, slightly increasing in fruit, margin narrowly hyaline, entire to minutely scabrid.

Petals 2–3 mm long, ca. equalling the sepals. Limb of superior petal 3-lobed, (central lobe simple, lateral lobes multipartite), central lobe shorter than lateral lobes; limb ca. as long as the appendage; central lobe narrowly spathulate, ca. half as long as lateral lobe, incisions of lateral lobes shallow, usually \pm down to the middle or slightly deeper and laciniae usually spathulate, broadly obtuse; appendage rectangular-ovate, 2 mm long, 1½ mm wide, widely attached to limb-base, transverse rim continuous in front of limb, ½ mm wide; margins papillose(-ciliate). Lateral petals smaller, one lateral (anterior) lobe usually wanting. Anterior petal smallest, limb simple.

Disc 1 mm high, 2 mm wide, \pm papillose, margin recurved, papillose.

Stamens 17–20(–22), slightly longer than petals. Filaments persistent, slightly dilated above, 3 mm long. Anthers ellipsoid, 3 mm long, minutely asperulous.

Ovary sessile on receptacle, ovoid, acutely 3-angled (ribs minutely scabrid), (2–)3(–4)-toothed, teeth inflated, very long and conspicuous (ca. ½ as long as ovary). Ovules 6–9 on each placenta, in 3 rows, subopposite.

Capsule pendulous, sessile on the disc, subglobose, (6–)8(–12) mm in diam., broadly rounded at base, 6-angled (ribs \pm coarsely scabrid); mouth widely gaping, (2–)3(–4)-toothed.

Seeds (dark) brown, dullish, reniform, 2 mm long. Sinus wide, filled with carunculoid tissue. Testa transversely undulate-rugose, outer layer tardily detached.

Type: Dr. A. WIEST, 1835, '*R. odorata* L.', in *Aegypto inferiori* = SCHIMPER Un. itin. No. 506 (lectotype: L; isotypes: W, WRSL, WU).

Distribution: Africa, north of the Sahara (preferring the proximity of the Mediterranean), Egypt, Palestine, Syria and up to the Persian Gulf. Recorded also from Crete by SIEBER.

Key to the infraspecific taxa

1. Stamens persistent. Flowers white. **a. ssp. arabica**
2. Leaves partly 3-partite. **a1. var. arabica**
2. Leaves all entire. **a2. var. integrifolia**
1. Stamens deciduous. Flowers cream. **b. ssp. moroccana**

a. ssp. arabica

Stamens persistent.

Distribution: Area of the species, excluding Morocco.

a1. var. arabica

Leaves partly 3-partite.

Distribution: Area of the subspecies.

a2. var. integrifolia ABDALLAH et DE WIT, *nov. var.*

Foliis omnibus integris.

Holotype: P. & J. DAVIS, D49169, Morocco: ED, few km S. of Erfoud, 800 m., subsaline desert, 6.IV.1969, fl. & fr. (E).

All leaves entire. Weak plants.

Distribution: Morocco; only the type is known.

b. ssp. moroccana ABDALLAH et DE WIT, *nov. subsp.*

Staminibus deciduis, sepalis pauce accrescentibus ad maturitatem capsulae facile distinguenda. Folia sparsiter papillose-pilosa (pilis sparsis longis albidis). Flores leviter flavescentes.

Holotype: P. & J. DAVIS, D49352, Morocco: H, 20–30 km N. of Marrakech in Jbilet-hills, 500 m, dry grassy slopes (non-calcareous), 13.IV.1969, fl. & fr. (E).

Distinguished by deciduous stamens, slightly increasing sepals towards maturity of the capsules. Leaves sparsely papillose-pilose (some long, white flabby hairs). Flowers creamy white.

Distribution: Morocco; known only from the type.

Taxonomical notes: *R. arabica* BOISS. (l.c.) was based on AUCHER 'absque numero' and on SCHIMPER 'Un. itin. No. 506'. AUCHER collected his specimen(s) on Mt. Sinai and SCHIMPER's specimen originates from Lower Egypt, without further locality (Dr. WIEST; lectotype).

MUELL. ARG. described two varieties in *R. arabica*, viz. var. *stricta* ('β') and var. *glabrescens* ('γ') (Mon. Rés. 1857, p. 126). In 1868 (in DC., Prodr. 16(2), p.

560) he apparently withdrew both these varieties.

Variety (β) *stricta* was based on a single specimen distributed in SCHIMPER's set Pl. exs. aeg. No. 506, collected by Dr. A. WIEST in Lower Egypt (l.c., p. 126). The holotype is in Herb. DC., isotypes at L, W, WRSL, WU. Originally the specimen had been identified as *Reseda odorata* L.

Variety (γ) *glabrescens* was based on TH. KOTSCHY, Pl. exs. No. 127 in Herb. DC. et Boiss. Duplicates of it are preserved in C, GOET, PRC, UPS, W, WAG, and WRSL.

A study of the type material of both varieties demonstrated that no distinguishing characters make it possible to adopt these varieties and they are therefore reduced to synonymy.

MUELL. ARG. based *R. praetervisa* (Mon. Rés. 1857, p. 232) on three specimens, collected by KRALIK in N. Africa (Tunis, in fallow areas). The first specimen (nr. 36) was collected on 3.VI.1854 and named by KRALIK *R. phyteuma* (see p. 384), and the second specimen (nr. 371) was collected on 14.V.1854 and named by him *R. arabica*; both are present in Herb. DC. and Boiss. The third specimen was cultivated in Genova Botanic Garden (1857).

MUELL. ARG. declared that *R. praetervisa* was very distinct, and allied to *R. arabica* by the sessile ovaries and the persistent filaments, but differed from it, among other things ('aliisque') by the shape of petals and the habit.

It is to be noted that MUELL. ARG. made no reference to his previous identification of KRALIK's nrs. 371 and 36, as *R. arabica* BOISS. (Mon. Rés. 1857, p. 126), when he proposed '*Reseda praetervisa* MUELL. ARG.' as a new species (l.c., p. 232). In the present revision '*R. praetervisa* MUELL. ARG.' is reduced to the synonymy of *R. arabica* BOISS., a view afterwards also shared by MUELL. ARG. (in DC., Prodr. 16(2), 1868, p. 560) himself.

For *R. affinis* KOTSCHY ex MUELL. ARG., for *R. phyteuma* FORSK., and for *R. phyteuma* KRALIK ex MUELL. ARG., see Taxa et nomina rejicienda vel dubia.

Ecological notes: Algeria. It grew at 880 m alt., in the Ahagger Mts., in a rather rocky desert, flowering in early April (ANDREÁNSZKY, It. Bor. Afr. II, 1928; BP). At Ain Sefra it flowered medio April at 1100 m alt., on the lower slopes of Djebel Mekter, on gravelly soil (ANDREÁNSZKY, It. Bor. Afr. II, 1928; BP).

Egypt. F. SA'AD (55,700; CAIM) collected it near Abou Rowash Pyramids, in sand, flowering and fruiting. G. TÄCKHOLM collected it in sandy fields at Giza, near Pyramids, flowering and fruiting in March (CAI).

Iran. RECHINGER and KOTSCHY found it on the spurs of the mountains near Buschir (Fl. Pers. austr. Ed. HOHENACKER 1272; C).

Iraq. RECHINGER collected *R. arabica* repeatedly on desert sands or on sandy loams and gravels, up to 700 m alt., in various localities, flowering and fruiting in March.

Libya (SW. Tripolitania). ANDREÁNSZKY collected it at 600 m alt. on calcareous rocks near Jefren, flowering at the end of February (BP).

Tunisia. PITARD observed it on desert sands near Gabes (Gafsa) (1907; AMD). MAIRE collected specimens with ripe fruits near Amgid, at 700 m alt., on sands at the end of April.

Specimens examined:

Ssp. arabica

Var. arabica

Algeria. Andreánszky s.n., 1.IV.1928, Guerrara; id. 4.IV.1928, Tadjmout, Laghouat; id. 19.IV.1928, Ain Sefra, Mt. Dj. Mekter; Ball s.n., II. 1880, prope Biskra; Battandier & Trabut 414, S. Oran, Ain Sefra; Chevallier 160, Ghardaia; id. 160bis, El-Goléa, 'Tadmait'; id. s.n., 17.IV.1902, inter El-Goléa et Jnifel ad Daia Saret; id. 540, El-Goléa; Cosson s.n., 14.V.1858, S. prov. Alger, entre Metlili et Ghardaia; id. s.n., 23.V.1858, *ibid.*, Gueirara Dam el Mزاب; Désiré 64, Hamada du Dra "O. Oun el Assel"; Faure s.n., 29.V.1934, Ain Sefra; Kralik 19a, Oued en Nsa, infra Berrian, ditone Mزاب; id. 19b, Berrian, ditone Mزاب; Letourneux s.n., IV.1883, prope Laghouat; Maire 189, Amgid; Paris 2b, Sid el Hadj ed Din "Ouled Sidi Cheikh"; Pichaud s.n., à 1865, S. prov. Constantine, Bou Saada.

Créta Isl. Sieber s.n., à 1817, s.l. (fide Dr. F. A. Stafleu).

Egypt. Bormmüller 10379, Cairo, ad pyramides; Drar s.n., 7.IV.1939, N. Sinai, Wadi el Hosani near El Qosseima; id. "3", 29.IV.1939, Cairo-Suez Road; Forskål 609, circa Cairo; id. s.n., à 1762, desertis Cairi; El-Hadidi & El-Batanony s.n., 2.III.1956, Suez Road; Imam s.n., 16.III.1956, Wadi Anqabia; Khattab 1, between Amreya and Rest House; Kotschy 31, ad pyramides "Dschizeh" prope Cahiram; Muschler 336, Pyramids von Saqqarah; Sa'ad 55.700, Abou Rowash Pyramids; Schweinfurth 163, bei Qubba nahe Cairo, am Wege nach Suez; id. 238, *ibid.*; Shabetai s.n., V.1921, Wadi Hof, near Helwan; id. 17.III.28, Gebel Lehfen; id. Z4164, Wadi el Humur, El Ramla, S. Sinai; Simpson 690, Wadi Rishrash, El Saff; id. 877, Abou Roash; G. Täckholm s.n., 7.III.1927, Giza, behind Mena House; id. 21.III.1928, Sinai, Bir Lehfen. S. El-Arish; Wiest 506, in Aegyptio inferiori (type!).

Iran. Haussknecht s.n., IV.1868, Buschir; Kóie 184, *ibid.*; Kotschy 127, distr. Abuschir, ad radices montium prope Radar.

Iraq. Lazar 48, Rustam Farm, near Bagdad; Rechinger f. 8755, distr. Basra (Southern desert), S. W. Basra, Haswa; id. 8934, distr. Amara (Mesopotamia), Shatt at Tib; id. 9844, 12822, Western Desert, inter Ramadi et Rutba.

Libya. Marcello s.n., 11.IV.1931, Tripolotania, Gars el Hag; Pampanini 3171, Cirenaica, Uadi Faregh Maaten Giofer a sud di el-Agheila.

Morocco. Humbert s.n., IV.1927, Kasr es-Soak; Maire & Wilczek s.n., 15.IV.1933, Zerzef, inter Erfoud et Bon-Denib; Samuelsson 6895, Mt. Djebel El Maiz.

Palestine. Kotschy 1316, s.l.

Tunisia. Andreánszky s.n., 13.III.1928, Tozeur; Humbert s.n., 2.IV.1912, Dj. Toul, S. Gabès; Kralik 371, Beni-Zid, prope Gabès; Murbeck s.n., 29.III.1896, Gabès; id. 3.V.1896, Dj. Regouba pr. El Hamma; Pitard 50, Gabès; id. 337, Gafsa; Rolland s.n., II.1935, El Hank, Ain Chegga.

Var. integrifolia

Morocco. P. & J. Davis D49169, few km S. of Erfoud, 800 m, subsaline desert.

Ssp. moroccana

Morocco. P. & J. Davis, D49352, 20–30 km N. of Marrakech in Jbilet-hills, 500 m, dry grassy slopes (non-calcareous).

In Diag. Pl. Or. Nov. Ser. 1, 1(1), 1842, p. 5; Walp., Rep. 2, 1843, p. 754; Muell. Arg., Mon. Rés. 1857, p. 123, tab. 6, fig. 92 (et in Neue Denkschr. Schw. Ges. Zuer. 46, 1858); Boiss., Fl. Or. 1, 1867, p. 427; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 561; Coode in Davis, Fl. Turk. 1, 1965, p. 500, f. 20(6).

R. coodei Hub.-Mor. in Bauhinia 3(2), 1967, p. 312 (= var. *scabridula*).

Annual or perennial, ascending, divaricately branching, pale green, rarely glaucous herb, 30 cm tall; taproot often lignescent.

Stems densely leafy, slender, glabrous or very rarely scabrid, ribbed; pith disintegrating (internodes widely tubular).

Leaves fleshy, all entire (petiole indistinct because of the long, very narrowly decurrent lamina, up to $2\frac{1}{2}$ cm long), ovate-oblong, 4–6(–10) cm long, 8(–20) mm wide, glabrous or rarely scabrid, obtuse; margins slightly pallid, sometimes minutely denticulate.

Flowers white (rarely yellow), on erect to spreading pedicels, laxly disposed. Raceme erect, slender, rather dense when young, up to 15 cm long in fruit, peduncle markedly ribbed, sometimes scabrid. Bracts persistent, not exerted at raceme-tip, often scabrid, ovate to oblong, 2 mm long, $\frac{3}{4}$ mm wide, ca. $\frac{1}{2}$ as long as the pedicel, acutish; margins narrowly pallid. Pedicels strongly sulcate (ribs finely scabrid), in flower $2\frac{1}{2}$ mm long, in fruit patent to curving downwards, up to twice as long.

Sepals 6, persistent, reflexed in fruit, scabrid, linear-spathulate, $3\frac{1}{2}$ mm long, $\frac{1}{2}$ mm wide, obtuse, margin narrowly pallid, minutely denticulate.

Petals $3\frac{1}{2}$ mm long, appearing slightly longer than sepals. Limb of superior petal 3-lobed and multipartite (main incisions not to the base), lateral lobes multipartite (7–10 laciniae). Central lobe shorter than the lateral. Appendage shorter than the limb. Central lobe with a linear-spathulate but apically distinctly dilated central lacinia, $1\frac{1}{2}$ mm long ($\pm \frac{3}{4}$ as long as the adjacent lacinia); laciniae of lateral lobe linear, not (or slightly) dilated above, progressively shorter; appendage rectangular-ovate, ± 1 mm long, narrowly attached to limb-base, free upper rim continuous in front of limb-base, narrow, $\frac{1}{4}$ mm wide, entire. Margins minutely papillose. Lateral petal smaller, anterior lobe wanting; central lacinia as long as or slightly shorter than the adjacent laciniae, linear-spathulate. Anterior petal smallest, limb entire, linear-spathulate, 2 mm long, lateral lobes usually wanting.

Disc $\frac{1}{2}$ mm high, $1\frac{1}{2}$ mm wide, oblique, glabrous, margin recurved, papillulose.

Stamens 20, longer than petals. Filaments deciduous, capillary, minutely rough towards the apex, 2 mm long. Anthers broadly ellipsoid, ± 1 mm long, obscurely asperulous.

Ovary ovoid-cylindric, stipitate, glabrous, obtusely 3-angled, 3-toothed;

teeth $\frac{1}{3}$ as long as ovary, erect, obtuse. Ovules 6–9 on each placenta, in 3 rows.

Capsule pendulous, long stipitate above the disc, stipe $1\frac{1}{2}$ –2 mm long, broadly campanulate and abruptly attenuate at base, $1\frac{1}{2}$ cm long, over 1 cm wide, glabrous, obtusely 6-angled, mouth 3-toothed, widely gaping, teeth short, two-tipped, acute, not divergent.

Seeds yellow brown, subglossy, reniform, 3– $3\frac{1}{2}$ mm long. Sinus wide, filled with carunculoid tissue. Testa transversely undulate-rugose, outer layer gradually detached (immature).

Type: AUCHER pl. exs. no. 2616 (lectotype), 2376 (n.v.), in Armenia (Herb. BOISS. et DC.).

Distribution: Known from Armenia and Anatolia (Turkey).

Key to the varieties

Leaves and stems glabrous. **a. var. armena**
Leaves and stems scabrid. **b. var. scabridula**

a. var. armena

Leaves and stems glabrous. Flowers white.

Distribution: Armenia.

b. var. scabridula ABDALLAH et DE WIT, *nov. var.*

Foliis et caulis \pm scabridis, flore flava.

Type: HUBER & SIMON s.n., 16.VII.1958, Anatolia, Kalkgeröll, Vil. Erzurum. Am untern Ende des Tortum Göl, 1100 m (holotype: Herb. SIMON, BAS).

Distribution: Known from the type locality.

Taxonomical notes: *Reseda armena* was based on 'AUCHER pl. exs. No 2616 et 2376'. AUCHER collected his specimens in Armenia, without any further locality.

The seed of *R. phyteuma* is of the same shape and appearance as the seed of *R. armena* but only half its size.

R. coodei (l.c.) was described and an analysis presented showing the differential characters with some related taxa. Specimens cited were HUBER-MORATH

17018 (holotype) and FR. SORGER 66-23-3, and id. 66-33-1. The material originated from SW. Anatolia, prov. Burdur and prov. Içel, and was collected between 950 m–290 m alt. A request to forward the specimens for examination being unsuccessful it became necessary to judge the status of *R. coodei* from the published data. It seems certain that *R. coodei* should be reduced to *R. armena* var. *scabridula*.

Ecological notes: *Reseda armena* is an endemic species in eastern Turkey, apparently a rare pallid green herb, growing on bare hills, up to 1100 m alt., flowering and fruiting in June-July.

Specimens examined:

Var. *armena*

Aucher 2616 (lectotype; G); Bornmüller 3266, Armenia minor, opp. Divriki; Coquebert de Montbret s.n., s.d., Cappad. or.; Sintenis 2735, Armenia turcica, Egin, Salachlü.

Var. *scabridula*

Huber & Simon s.n., 16.VII.1958, Vil. Erzurum.

7. *Reseda aucheri* BOISSIER

Fig. 29

In Diag. Pl. Or. Nov. Ser. 1, 1(1), 1842, p. 5; Walp., Rep. 2, 1843, p. 754; Muell. Arg., Mon. Rés. 1857, p. 146, tab. 7, fig. 103 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 434; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 577; Blatt., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 48; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689; Czerniak. in Komarov, Fl. URSS 8, 1939, p. 612; Rech. f., Fl. Lowl. Iraq 1964, p. 327.

R. a. β rotundifolia Kotschy ex Muell. Arg., Mon. Rés. 1857, p. 147 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr., l.c. (= var. *aucheri*).

R. a. β asperula Boiss., Fl. Or. 1, 1867, p. 434; Muell. Arg. in DC., Prodr., l.c., 'γ' (= var. *aucheri*).

R. a. f. oblongifolia Bornmüller in Beih. Bot. Centralbl. 28(2), 1911, p. 130 (= var. *aucheri*).

R. a. f. rotundifolia (Kotschy ex Muell. Arg.) Bornmüller, l.c. (= var. *rotundifolia*).

R. bracteata Boiss., Diag. Pl. Or. Nov. Ser. 1, 1(6), 1845, p. 22; Muell. Arg., Mon. Rés. 1857, p. 154, tab. 7, fig. 107 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 433; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 574; Hand.-Mazz. in Ann. K. K. Naturh. Hofmus. 27, 1913, p. 56; Cuf. in Bull. Jard. Bot. Brux. 24, Suppl., 1954, p. 159; Rech. f., Fl. Lowl. Iraq 1964,

p. 327 (= var. *bracteata*).

R. b. β elatior Muell. Arg., Mon. Rés. 1857, p. 155 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in Buhse, Aufzählung ges. Pflz. 1860, p. 32; id. in DC., Prodr., l.c. (= var. *bracteata*).

R. b. β chabbisea Boiss., Fl. Or., l.c. (= var. *bracteata*).

R. b. var. leptostachya Bornmüller in Beih. Bot. Centralbl. 28(2), 1911, p. 130 (= var. *bracteata*).

R. bucharica Litw. in Trav. Mus. Bot. Ac. Sc. Petersb. 1, 1902, p. 15; Czernjak. in Komarov, Fl. URSS 8, 1939, p. 612, t. 34, f. 4 (= var. *aucheri*).

Annual to perennial, (sub)erect, glaucescent herb, 30–60 cm tall, often branching at base; taproot lignescent, sometimes digitate.

Stems usually branching, (densely) leafy, finely ribbed, glabrous to scabrid, or -papillose; pith solid or disintegrating and the internodes narrowly tubular.

Leaves all entire or, very often, upper leaves ternately dissected, petiolate (petioles up to $2\frac{1}{2}$ cm long) or blade narrowly decurrent, glabrous to scabrid (-papillose), rotundate to narrow-(ob)ovate or oblong-spathulate, often rhomboid, 3–7 cm long, 1–5 cm wide, broadly obtuse to acuminate; margins entire or denticulate; rounded leaves usually 3-nerved; lobes of dissected leaves narrow, almost linear, central lobe longer than the laterals.

Flowers yellow to white, small. Raceme erect, slender, dense or open, comose at top, 10–30(–more) cm long in fruit; capsules erect, imbricate. Peduncle often scabrid. Bracts (tardily) deciduous, linear-ovate, (2–)4–5 mm long, ca. $\frac{1}{3}$ mm wide, acuminate, margin pallid, often scabridulous. Pedicels finely ribbed, glabrous to scabridulous, in flower $\frac{1}{2}$ – $1\frac{1}{2}$ mm long, in fruit up to 3 mm long.

Sepals 6–7(–8), (tardily) deciduous, glabrous to scabridulous, oblong-(ob)ovate, 2 mm long, $\frac{1}{2}$ mm wide, obtuse to acutish, margins (broadly) pallid, often scabridulous.

Petals 3–4 mm long, exceeding the sepals. Limb of superior petal 5–11-palmatipartite (very rarely 3-partite; incisions ca. $\frac{3}{4}$ way down), \pm flabellate, up to twice as long as the appendage, lobes linear (to rounded); appendage obovate to -oblong, $1\frac{1}{2}$ –2 mm long, 1 mm wide, narrowly attached, transverse rim continuous, $\frac{1}{4}$ mm wide, margins papillose(-ciliate) to glabrous. Lateral petals somewhat smaller, anterior lobe missing. Anterior petal smallest, limb entire or 2-partite, linear-spathulate, obtuse.

Disc ca. 1 mm high, $1\frac{1}{2}$ mm wide, fleshy, glabrous; margin recurved, crenulate.

Stamens ca. 15, usually exceeding the petals. Filaments (tardily) deciduous, glabrous, subulate, 2–3 mm long. Anthers ellipsoid to oblong, $\frac{2}{3}$ –1 mm long.

Ovary ellipsoid-obovoid, attenuate at base, stipitate, often (esp. the ribs) scabrid-papillose, obtusely 3-angled (side-walls sulcate), 3-toothed, teeth ca. $\frac{1}{5}$ as long as ovary. Ovules 10–20(–24) on each placenta in 3(–4) irregular rows.

Capsules erect, short-stipitate, clavate to obovoid and narrower towards the

base, 5–7 mm long, 4 mm wide, glabrous or muricate, edges rounded, side-walls shallowly sulcate, edge of mouth contracted.

Seeds (greenish) dark brown, glossy, almost globular or reniform, $\frac{2}{3}$ –1 mm long, with a minute protuberance near the sinus opposite the bulge of the radicle. Sinus narrow. Testa smooth (extremely delicately rugulose under high magnification).

Type: AUCHER-ELOY, Pl. exs. no. 2624, 2754 et 4173; in Mesopotamia prope Mossul, et in Persia. AUCHER 2624 and 4173 seen.

Distribution: Iraq to West Pakistan and S. Russia.

Key to the varieties

1. (Densely) papillose herbs. Leaves partly 3-sect. **b. var. bracteata**
1. Glabrous or slightly and minutely muricate herbs; indumentum not papillose. Leaves entire.
2. Inflorescence (very) lax and open. Flowers white. **c. var. rechingeri**
2. Inflorescence dense. Flowers yellowish.
3. Leaves narrow-ovate to -oblong, ca. $1\frac{1}{2}$ cm wide. **a. var. aucheri**
3. Leaves obovate or rotundate, often up to 3–5 cm wide.
. **d. var. rotundifolia**

a. var. aucheri

Entirely glabrous or rarely minutely asperulous herbs. Stems much branching from base. Leaves entire or very rarely one or few upper leaves trisect, petiolate (petiole up to over 1 cm long), narrow-ovate or -oblong, ca. $1\frac{1}{2}$ cm wide. Inflorescence (very) dense, flowers white-ochraceous or yellowish, pedicels $1\frac{1}{2}$ –2 mm long, anthers exceeding the petals. Capsules clavate-obovate or -oblong, 5–7 mm long, on up to 3 mm long pedicels. Seeds ca. 1 mm long, dark-brown.

Distribution: Coinciding with the species.

b. var. bracteata (BOISS.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda bracteata* Boiss., *Diag. Pl. Or. Nov. Ser. 1*, 1(6), 1845, p. 22.

Scabrid-papillose, rarely glabrate herbs. Stems much branching from base. Lower leaves (partly) entire, attenuate towards base, all or lowermost oblong-

spathulate, sometimes rhomboid, occasionally irregularly toothed, up to $1\frac{1}{2}$ cm wide, upper leaves trisect, lobes linear. Flowers yellow(ish), usually (sub)sessile, anthers almost as long as the petals. Capsules obovate, $3\frac{1}{2}$ –5 mm long, usually scabrid, rarely distinctly pedicellate. Seeds ca. $\frac{3}{4}$ mm long, greenish brown.

Type: KOTSCHY 144 in Persia australi prope Kaseroun (BOISS. herb., G, type; C, GOET, PR, PRC, UPS, W, WAG, WRSL = isotypes).

Distribution: Iraq to W. Pakistan.

c. var. rechingeri ABDALLAH et DE WIT, *nov. var.*

Varietas nova, *Reseda aucheri* var. *rechingeri*, inflorescentiis laxis, floribus albis, foliis angustis distinguenda.

Type: K. H. RECHINGER, Iter orientale 1967, no. 35524 (W 14860) E. Afghanistan, Khost, $33^{\circ} 22'N.$, $70^{\circ} 01'E.$, in collibus saxosis, 1200 m. Collected 4.VI.

Allied to var. *aucheri*, but different by its open inflorescence and white flowers. The leaves are narrow and the densely leafy stems branch frequently.

Distribution: E. and NE. Afghanistan, region of Khost and of Kataghan.

d. var. rotundifolia KOTSCHY ex MUELL. ARG., Mon. Rés. 1857, p. 147.

Differs from var. *aucheri* by its leaves. Leaves (ob)ovate-rotundate, petiolate (petioles up to $2\frac{1}{2}$ cm long), up to 3–5 cm wide, usually obtuse.

Type: KOTSCHY, Pl. exs. Mossul no. 452 (?652), (G).

Distribution: Iraq and Iran.

Taxonomical notes: *Reseda aucheri* BOISS. (l.c.) was based on 'AUCHER pl. exs. No 2624, 2754, 4173'. AUCHER collected his specimens in 'Mesopotamiâ propè Mossul, et in Persiâ'. AUCHER-ELOY, Herbier d'Orient No. 4173 (BOISSIER herb., G) is here designated as the lectotype.

BOISSIER described the seeds as white ('albidis') but in one of the type specimens having seeds (AUCHER-ELOY, Herbier d'Orient no. 4173; W), they are dark brown.

Reseda rotundifolia KOTSCHY ex MUELL. ARG. is cited in Ind. Kew. (vol. 2, 1895, p. 697). Actually, MUELL. ARG. cited *R. rotundifolia* KOTSCHY when

describing variety β *rotundifolia* in *R. aucheri* BOISS. (Mon. Rés. 1857, p. 147). The specimen he referred to was KOTSCHY, Pl. exs. Mossul no. 452 (or 7652). BOISSIER rejected the variety (cf. Fl. Or. 1, 1867, p. 434). MUELL. ARG., however, maintained ' β *rotundifolia*' in his treatment of *Reseda* (in DC., Prodr. 16(2), 1868, p. 577).

BOISSIER proposed another variety ' β *asperula*' in 1867 (Fl. Or. 1, p. 434), basing it on specimens collected by BUHSE and by BUNGE in eastern Persia, between Ispahan and Teheran.

This type material was untraceable. The specimens collected by BUHSE cited below may belong to it (K). From the protologue it appears that BOISSIER wanted to segregate specimens with slightly rough stems as a variety '*asperula*'. This variety is not adopted here (see below: '*R. bucharica*').

BORNMUELLER's forma *oblongifolia* (l.c.) is reduced to var. *aucheri*. The type material was collected near Mossul, on barren slopes, not far from hot sources.

BOISSIER based *R. bracteata* BOISS. on KOTSCHY no. 144 and 214a. These specimens were collected in South Persia, near Dalechi and Kaseroun (Diagn. 1(6), 1845, p. 22). He stated (transl.): 'This plant has at base prostrate stems and is $\frac{1}{2}$ foot high and the inflorescence is 2 inches long, when in fruit 3 inches. The flowers are nearly as small as the very small flowers of *Resedella glaucescens*.' It is above all allied to '*R. globosa* F. et M.' by the size of its capsule and to *R. stenostachya* BOISS. by its narrow inflorescence. The latter species, i.e. *R. stenostachya*, is different from this Persian plant by the linear or bristle-like lobes of the leaves, by short bracts which are not bristly and not longer than the bud. Its calyx and ovary are papillose-pruinose and its cylindrical capsules are truncate on the top and not narrowed (as in *R. bracteata*) (teste BOISSIER).

It seems that BOISSIER wished to refer to *R. globulosa* FISCH. et MEY. (Ind. Sem. Hort. Petrop. 4, 1837(?), p. 45) when discussing the affinities of *R. bracteata*. By citing '*globosa*', he may possibly be referring to printed duplicate-labels which actually have the spelling '*globosa*'.

BOISSIER, when redescribing and amending *R. bracteata* BOISS., noted that the stamens were early deciduous (Fl. Or. 1, 1867, p. 424, 432, 434). MUELLER ARG. also observed deciduous stamens (Mon. Rés. 1857, p. 155 et in DC., Prodr. 16(2), 1868, p. 574).

A specimen collected by K. H. et F. RECHINGER (It. Iran. II, 1948, no. 3971, in Baluchistan prov., Inter Khash (Vasht) et Iranshahr (Bampur), Montes Karvandar, ca. 1500–1600 m; US) is agreeing in all characters with *R. bracteata* but the stamens are (partly) present under fully mature capsules.

In fact, when examining the wide range of specimens now at our disposal, it appears that no single character is stable. The presence or absence of a pedicel, the contracted mouth of the capsule (type material of *R. aucheri* shows a contracted mouth to the capsule although BOISSIER stated to the contrary (l.c., p. 434)), the varying shape of the capsule, the leaves being partly incised or not, the papillae or roughnesses on the plant, which may be absent, in brief, all vary independently of each other and *R. aucheri* and *R. bracteata* cannot be segregated specifically. It is barely possible to segregate the narrowly ternate-

leaved specimens of *R. aucheri* as a variety, *R. aucheri* BOISS. var. *bracteata* (BOISS.) ABDALLAH et DE WIT, nov. comb. et stat.

MUELL. ARG. segregated β *elatior* in *R. bracteata* (Mon. Rés. 1857, p. 155). This taxon is based on specimens collected by STOCKS (nrs. 585 and 587 in Herb. BOISS.) from lower 'Beloachistan', by GRIFFITH (nr. 1435) from Afghanistan, by Col. CHESNEY (nrs. 193, 110) possibly from the Euphrates basin, and by BUHSE (nr. 982/1) from S. Persia. MUELL. ARG. wished to distinguish this taxon on account of its taller stems, longer leaves, and slightly larger flowers. We were able to examine a STOCKS specimen which is probably a duplicate. This and the descriptive data indicate that β *elatior* MUELL. ARG. is better reduced to synonymy.

BOISSIER correctly stated to have seen specimens of *R. bracteata* from SW. Afghanistan in which the superior petal was 3-partite. We saw a specimen collected by BUNGE 'prope Chabbis in palmetis', which may very well be believed to belong in BOISSIER's type material of *R. bracteata* β *chabbisea* (Fl. Or. 1, 1867, p. 434). There are, however, many intermediate shapes, even on one inflorescence (in other specimens from SW. Afghanistan) and for this reason BOISSIER's taxon is better reduced.

Reseda bucharica LITW. (in Trav. Mus. Bot. Acad. Sci. Petersb. 1, 1902, p. 15) was accepted as a species in Flora URSS 8, 1939, p. 612, tab. 34, fig. 4. There it was recognized that the taxon had been described before as *R. aucheri* β *asperula* BOISSIER (Fl. Or. 1, 1867, p. 434). The type specimen of *R. bucharica* LITW. (KORSHINSKY, May 7, 1897, prope Bish-Kent, in rupestribus montium Kajkitan, distr. Dabadian) was not at our disposal but we examined NIKITIN 244 and BOJANIEF C.S. 1162 (LE).

LITWINOW indicated some differences between *R. bucharica* and *R. aucheri*, among which the main character would seem the persistence of the stamens. It appears, however, that the stamens in *R. aucheri* are deciduous, perhaps somewhat tardily deciduous, but not long persistent as described by BOISSIER (l.c.). This means that *R. bucharica* and *R. aucheri* are not different by any significant character and so *R. bucharica* is reduced to the synonymy of *R. aucheri*.

Ecological notes: In Afghanistan, KÖIE found it at Ghorband (near Kabul) at 1600 m alt. (nr. 2904), and at Asasaïd, at 1650 m, EDELBERG secured it (nr. 2175). GILLI (nr. 1215) found it at 2400 m alt., near Bulola (Kabul region) on calcareous slopes where it was rather common. RECHINGER found it between 1200–1800 m on rocky hills (nr. 35524), also in a river valley, flowering June and July.

Surgeon-Major J. E. T. AITCHINSON collected *R. aucheri* (nr. 420) in 1885 (April and May) in the Hari-Rud Valley (Iran-Afghanistan border) and found it common in stony ground and amongst shingle, a tall handsome perennial (DD). It is a widespread herb, growing on desert soils and slopes, up to 1900 m alt. In Pakistan (Sindh Prov.) it occurs in the region of the hot springs at Lakki (Manvat), West of the Indus.

In Iraq it flowered in March (POLUNIN 55) on cultivated fields and along roadsides. At Kirkuk it was observed in the desert (at 400 m alt.; BORNMÜLLER 948). GILLET and RAWI (nr. 6772) recorded it 15 km West of Ramadi, at 120 m alt., where it occurred on gypsaceous soils with drifting dust, in subdesert accompanied by *Ephedra*; petals cream, anthers brownish (24th March).

In Iran the type was collected in a mountainous region near Kazerun. At Shahdab (Khabis) it grew in palm groves (BUNGE, April 1859). At Hajjiabad (Tarom) it was collected at 900 m alt. (RECHINGER 3269). Near Iranshahr (Bampur), RECHINGER collected it at 1500–1600 m in the Karvandar mountains (nr. 3971).

KOELZ (nr. 14226) noted: 'flowers white, salmon anthers, fragrant', when he observed it in the desert near Kirman where it flowered and fruited in December. STAPF found it in flower near Bushehr (nr. 111).

Vernacular name: Iraq: *Thi-Ekh*.

Note: RECHINGER collected a specimen in Iraq, distr. Diyala, near the town of Mandali, 10 km east, ca. 33° 40' N., 45° 40' E., on conglomerate hills on the left riverbank (nr. 9617). It is aberrant in being smooth (var. *bracteata* being normally muricate, scabrid), having all petals with a single lobe to the limb, an almost symmetrical disc, and in part reduced anthers. There is a possibility that it is a hybrid between *R. aucheri* var. *bracteata* and *R. microcarpa*.

Specimens examined:

Var. *aucheri*

Afghanistan. Aitchinson 291 and 420, Hari-rud Valley; Koelz 12338, Gandachesma; id. 12886, Jurm; Köie 4341, Herat; Lindberg 319, Panjshir; Rechinger 16302, prov. Mazar-i-Sharif, Balkh supra Aq Kupruk; id. 16356, *ibid.*, SE. Taschkurgan towards Haibak; id. 31750, Valley Andarab; id. 34800, Kandahar (80 km W.), 31° 36' N., 65° 47' E., versus Girishk (1100 m); id. 36878, Ghorband.

Iran. Aucher-Eloy 4173, s.l.; Buhse s.n., à 1849, s.l.; Bunge s.n., III.1859, Sser-Tschah; Field & Lazar 1032, Nagharan, near Rayy; Paulsen 2210, Mt. near Teheran; Rechinger 14597, prov. Kermanshah, between Qasr Shirin & Kermanshah, near Sar-e-Pol (poor specimen); Rechinger fil. 1941, prov. Khorasan, between Sharud & Damghan; K. H. & F. Rechinger 354, prov. Kerman, Tahrud, between Kerman & Bam; id. 2888, prov. Yezd & Kerman, between Yezd & Kerman, between Anar & Bahramabad (Rafsindjan); id. 4178, prov. Khorasan, between Birdjand & Kain (Gaen); id. 4197, *ibid.*, prope Gunabad between Kain (Gaen) & Turbat-e-Haidari; id. 5798, prov. Kaswin, viae ferrae Pel, between Teheran & Kum; Ruttner 400, prov. Khorasan, Kawir, Ozbah-Kuh; Sabeti 295 & 295b, prov. Semum-Damghan, between Sharud & Damghan; Stapf 115, Komaredsch.

Iraq. Field & Lazar 404, Qala Shargat; id. 452, near Mossul; K. H. Rechinger 12783, distr. Diyala, Mandali.

W. Pakistan. K. H. Rechinger 28721, Sind, S. Schwan.

S. Russia. Tadshikistan. Nikitin 244; Bojaneif et Erodova 1162.

Var. bracteata

Afghanistan. Edelberg 2175, Asasaïd; Köie 2904, Ghorband.

Iran. Behboudi 492E, Minab; Bent & Wright 426-202, distr. Khuzestan. E. Andimishk; id. 503-104, *ibid.*, W. Haftkel; Bornmueller 43, Kischm; id. 2041, prov. Yesd; J. & A. Bornmueller 6311, prov. Patschinar, betw. Recht & Kaswin; Bunge N 9, IV.1859, near Chabbis (poor specimen); Furse 1203, Mazjedi-i-Suliman; Gabriel 46, prov. Djandak-Biyabanak, near Costale; Gauba & Sabeti 291, prov. Fars-Lar, betw. Khafr & Djarum; Koelz 14226, Saadatabat, Kirman; id. 14812, Kotali Malu, Fars; Köie 288, Chan-Bozan; Kotschy 144, Mart. 1842, Mt. near Kaseroun (type); Mirdamadi 298, prov. Kerman, betw. Kerman & Bender Abbas; Papov GP 51-155, Karvondarp; K. H. & F. Reching 3268, prov. Lar, Hajjiabad, near Tarom; id. 3971, prov. Baluĉistan, betw. Khash (Vasht) & Iranshahr (Bampur), Mt. Karvandar; Salavakav 488E, Balouĉistan, Sarbaz, Rassak; Scherif 491E, *ibid.*, Iranshahr, Damer (Teld); id. 6273E, *ibid.*, Damer; Stapf 111, Raudd, Maschilan, near Bushir; id. 112, near Daleki; id. 113, Schleht, near Bushir.

Iraq. F. A. & E. E. Barkley & Maki 6836, Abu Gharib, Kirkuk Liwa, Jabal Hamaren, N. Mansuria; Bornmueller 948, Assyria, Kirkuk; Gillet & Rawi 6772, W. Ramadi, on Ritro; Handel-Mazzetti 1009, Tekrit, betw. Baghdad & Mossul; Polunin 55, Diyala Liwa, betw. Suliman Beg & Jalaula; Reching 8631, distr. Basra, Zubair; id. 8935, distr. Amara (Mesopotamia), Shatt-at-Tib; id. 9512, distr. Dulaim (Mesop.), Al-Jazira, betw. Falluja & Wadi Tharthar (Thirhar).

W. Pakistan. Reching 27699, Baluchistan, W. Awaran towards Hoshab; id. 28107, *ibid.*, S. Pantgur; id. 28722, Sind, S. Sehwan; id. 28769, Quetta, infra Mach; id. 29780, *ibid.*, Mts. Sulaiman.

Var. rechingi

NE. Afghanistan. Reching 37040, Kataghan, 11 km S. Khinjan, 35° 35' N., 68° 54' E. E. Afghanistan. Reching 35476, Khost, 60-70 km W.; id. 35524, Khost, at 1200 m; Hager (Reching 37779), Khost.

Var. rotundifolia

Iran. Archibald 2786, Jezd, Kuk Rud, above Taft.

Iraq. Kotschy 452, ad aggeres hort., pr. Mossul (type).

8. *Reseda balansae* MUELLER ARGOVIENSIS

Fig. 30

In Mon. Rés. 1857, p. 119 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 428; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 561; Coode in Davis, Fl. Turk. 1, 1965, p. 500, f. 20(5).

Annual to perennial, erect or ascending herb, 50-100(-more) cm tall; taproot lignescent.

Stems usually branching above, sparsely leafy, glabrous, finely ribbed; pith disintegrating (internodes narrowly tubular).

Leaves narrowly decurrent, submembranous, glabrous. Basal and the majority of stem leaves entire, narrowly oblong to (ob)ovate-spathulate, 5-7 cm long, ca. 1 cm wide, upper leaves deeply ternate to simple pinnatisect (central lobe twice as long and wide as lateral lobe), lateral lobes linear, broadly decurrent along midrib, subopposite, margins narrowly pallid, denticulate or undulate.

Flowers white, gradually patent, laxly disposed in terminal racemes. Raceme erect, up to 40(–more) cm long, $3\frac{1}{2}$ cm wide when fruiting; peduncle ribbed, glabrous. Bracts persistent, shortly exerted at raceme-tip, glabrous, linear to narrowly ovate, 2 mm long, $\frac{1}{2}$ mm wide, up to half as long as the flower-pedicel; margins rather widely membranous and pallid, entire. Pedicels in flower 4(–5) mm long, almost twice as long as the sepals, gradually more patent to curving downwards when fruiting, in fruit (6–)8(–10) mm long, almost half as long as the capsule.

Sepals 5–6, persistent, slightly larger in fruit and then more patent, smooth, narrowly oblong-spathulate, with a slightly dilated apex, $2\frac{1}{2}$ –3 mm long, up to 1 mm wide at rounded top, margins (almost) smooth.

Petals 3 mm long, slightly longer than the sepals. Limb of superior petal 11–13-palmatipartite (incisions not over $\frac{4}{5}$ down), $1\frac{1}{2}$ mm long, as long as or slightly shorter than appendage; central lobe slightly shorter than adjacent ones, linear-spathulate, distinctly dilated above, lateral laciniae linear(-spathulate); appendage white, broadly rectangular to almost orbicular, $\pm 1\frac{1}{2}$ mm long and wide, partly short-papillose adaxially, transverse rim continuous in front of limb-base, crenulate to \pm lacerate, margins papillose. Lateral petal smaller, anterior laciniae missing; anterior petal smallest, limb entire, linear-spathulate, $1\frac{1}{2}$ mm long, broadly obtuse.

Disc $\frac{3}{4}$ mm high, $1\frac{3}{4}$ mm wide, glabrous; margin recurved, entire, \pm papillose.

Stamens (16–)18–20, longer than petals. Filaments (tardily) deciduous, slightly dilated beneath connective, $2\frac{1}{2}$ mm long. Anthers oblong-elliptic, minutely asperulous, 1 mm long.

Ovary obovoid-ellipsoid, subsessile, smooth, obtusely 3-angled, 3-toothed, teeth $\frac{1}{3}$ as long as the ovary. *Ovules* 5–8 per placenta in (2–)3 rows, \pm collateral.

Capsule nodding, stipitate (stipe $1\frac{1}{2}$ –2 mm long, exerted above disc), subglobose, 10–13 mm long, 10 mm wide; mouth widely gaping, slightly constricted beneath the teeth, teeth triangular, ca. 1 mm long.

Seeds greyish brown, dull, reniform, $2\frac{1}{2}$ mm long. Sinus wide, filled with carunculoid tissue. Testa transversely undulate-rugose, outer layer tardily detached.

Type: B. BALANSA 768 ('754'), Pl. d'Orient, 1855, Gorge du Guzel-Déré, en amont de Sédichig, à 3 lieues au NO. de Mersina, Fl. 20 mai – Fr. 7 juin (G = type; C, GOET, TL, US, W, WAG = isotypes; see Taxonomical notes!).

Distribution: Known from the type locality (and Kagiraki); south-eastern Asia Minor.

Taxonomical notes: MUELLER ARG. (Mon. Rés. 1857, p. 119) based the description of '*R. balansae* MUELL. ARG.' on (a) specimen(s) collected by BALANSA (Pl. exs. Asia Minor. N. 754 (1856)), but in DC., Prodr. 16(2), 1868,

p. 562 he quoted '(BALANSA n. 768!)'. The label of the latter sheet carries the same data that MUELLER incorporated in his Mon. Rés. (l.c.). Therefore it seems that the first number-citation is a misprint. COODE (in DAVIS, Fl. Turk. 1, 1965, p. 501) also suggested this misprint, pointing out that BALANSA 754 is a species of *Aegilops*.

MUELLER ARG. (Mon. Rés. 1857, pp. 119, 120) described the petals as white, while W. SIEHE nr. 93 (WRS�) noted on the label of his specimen 'Blütenfarbe röthlich', i.e. pinkish flowers. BOISSIER (Fl. Or. 1, 1867, p. 428) did not describe the colour of the flowers. The flowers are 'circ. 10-andris', MUELLER ARG. noted, when diagnosing the species (p. 119). In the protologue he stated 'stamina circ. 18-20', while in DC., Prodr. 16(2), 1868, p. 562 he noted 'stamina circ. 16-20'.

Ecological notes: The type was collected 3 miles NE. of Mersina, on the slope of Sédichig, in the Gorge du Guzel-Déré; it flowered at the end of May and bore fruits in June. SIEHE (nr. 93) collected it in Cilicia on calcareous slopes (Kagiraki), flowering in May. It is confined to a very restricted area, as far as is known.

Specimens examined:

Turkey. Balansa 768, Gorge du Guzel-Déré, en amont de Sédichig; id. s.n., VII.1857, Garden de Vallyers; Siehe 93 (1895 and 1896), Kagiraki.

9. *Reseda battandieri* PITARD

Fig. 31, 32

In Explor. Sc. Maroc, Bot. 1912, p. 9; id., Contr. Fl. Mar. 1918, p. 4; Jahan-diez et Maire, Cat. Pl. Mar. 2, 1932, p. 318; Emberger et Maire, Cat. Pl. Mar. 4, 1941, p. 1017.

R. b. var. *tuberculata* Batt. et Jah. in Bull. Soc. Hist. Nat. Afr. Nord 12, 1921, p. 27; Maire in Bull. Soc. Hist. Nat. Afr. Nord 28, 1937, p. 338; Maire et Samuelsson in Ark. Bot. Stockh. 29A(11), 1939, p. 19, fig. 4e, g & h; Emb. et Maire, l.c. (sub ssp. *eu-battandieri*).

R. b. subvar. *tuberculata* (Batt. et Jah.) Jah. et Maire, l.c. (= var. *tuberculata*).

R. b. forma *albisperma* Caball. in Trab. Mus. C. N. Madr. 30, 1935, p. 21 (fide Emb. et Maire, l.c. (sub ssp. *eu-battandieri* var. *tuberculata*) (= var. *battandieri*).

R. b. var. *genuina* Maire, l.c. (= var. *battandieri*).

R. b. subvar. *typica* Maire in l.c. 30, 1939, p. 332 (= var. *battandieri*).

R. b. t. forma *latipetala* Maire, l.c.; id. in Emb. et Maire, l.c. p. 1017 (= var. *battandieri*).

R. b. subsp. *eu-battandieri* Maire in Emb. et Maire, l.c. (= var. *battandieri*).

R. b. e. var. *typica* (Maire) Maire in Emb. et Maire, l.c. (= var. *battandieri*).

R. b. e. t. forma *latipetala* Maire, l.c. (= var. *battandieri*).

R. b. subsp. *limicola* (Maire et Samuelsson) Maire in Emb. et Maire, l.c. (= var. *limicola*).

R. limicola Maire et Samuelsson in Ark. Bot. Stockh. 29A(11), 1939, p. 17, fig. 4a, d, e, tab. 2a (= var. *limicola*).

Annual, ascending or erect, green to glaucescent, glabrous herb, (3-)10-40 (-50) cm tall, usually branching from or above a (rosetted) taproot.

Stems few, solitary and strict or sometimes branching, often densely leafy, glabrous, (finely) ribbed; pith disintegrating (internodes tubular).

Leaves delicately decurrent, entire, ascending, green to glaucescent, glabrous, often fasciculate, linear to -ovate, (2-)3-6(-8) cm long, ($\frac{3}{4}$ -)1 $\frac{1}{2}$ -3 mm wide, acute to acuminate, rarely obtuse, usually provided with 1 to 6 pairs of dents, up to above the middle, sometimes a few dents only in lower leaf-half, membranous to herbaceous (upper dents), triangular to subulate, 1-2 $\frac{1}{2}$ mm long, patent to reflexed.

Flowers white, to pale yellow, on (short) pedicels. Raceme erect, narrow-cylindric, acutish, (2-)10-25(-35) cm long, 1 $\frac{1}{2}$ cm wide in fruit, peduncle distinctly ribbed; ribs often asperulous. Bracts persisting, not tufted, pale green, glabrous to slightly asperulous, triangular, in flower 1 $\frac{1}{2}$ -3 $\frac{1}{2}$ mm long, 1 $\frac{1}{4}$ mm wide, \pm equalling to or shorter than the pedicel, in fruit slightly longer, acuminate, margin widely hyaline, denticulate, entire to serrate or dentate. Pedicels often stiff, strongly ribbed, ribs occasionally asperulous, in flower 1 $\frac{1}{2}$ -3 mm long, in fruit to (2-)4(-6) mm long and rather thicker.

Sepals 6(5-7), persistent, glabrous or midrib \pm asperulous, narrow-ovate, 1 $\frac{1}{2}$ -2 mm long, $\frac{1}{2}$ - $\frac{3}{4}$ mm wide, (ca. $\frac{1}{2}$ as long as petals), \pm acuminate, margins (widely) hyaline, often denticulate.

Petals 3 $\frac{1}{2}$ -6 mm long (laterals often the longest), exceeding the sepals. Limb of superior petal 3-5-lobed to -partite, flabellate or central lobe longer, 3(-more) times as long as the appendage. Lobes entire, narrowly triangular or oblong, obtuse or acutish, central lobe wider than lateral lobe; appendage ca. orbicular, ca. 1 mm long and wide, narrowly attached (stipitate) below the upper rim; rim continuous in front of limb, $\frac{1}{4}$ mm wide; margins glabrous or obscurely papillose. Lateral and anterior petal entire, or 3-fid, sometimes one or either lobe-margin once incised or lobed near the middle, limb if entire oblong, abruptly cuneate towards base, claws (almost) absent.

Disc $\frac{2}{3}$ mm long, 1 mm wide (extension often rudimentary), membranous, glabrous, margins usually curved upwards, undulate.

Stamens 10-14, shorter than the petals. Filaments persistent, glabrous, subulate, 1 $\frac{1}{2}$ -2 mm long. Anthers subglobose (oblong), $\frac{1}{2}$ - $\frac{3}{4}$ mm long, asperulous, retuse.

Ovary globular, sessile to distinctly stipitate, \pm tubercled, deeply 4-

sulcate, 4-toothed, teeth cuspidate, almost as long as (–more) the proper ovary, divergent. Placenta forked. Ovules 8–10 per placenta in 2–3 rows, imbricate.

Capsules erect or patent, subsessile to short stipitate over the disc, obovate (–subglobose), $3\frac{1}{2}$ –5 mm long (cusps included), 3–4 mm wide, deeply sulcate between the rows of seeds, ribs (and side walls) \pm tuberculate, mouth contracted, depressed, 4-toothed, teeth cuspidate, 1–1½ mm long, divergent, tip swollen and lacerate.

Seeds brownish-black, slightly dull, globular-reniform, $\frac{2}{3}$ mm long, with a minute protuberance opposite the radicle. Sinus narrow. Testa obscurely rugulose or distinctly laxly tuberculate (tubercles low, rows following the seed contour).

Type: PITARD, Maroc occid., Dar Chafaï, Sidi Feali, Mechra ben Abou. Moissons et steppe aride (n.v.).

Distribution: Morocco.

Key to the varieties

1. Seeds distinctly tuberculate. Fruit-pedice! ca. 2 mm long; 5–12 cm tall herbs. **c. var. tuberculata**
1. Seeds at most obscurely rugulose. Fruit-pedice! 4–6 mm long; 20–40 cm tall herbs.
2. Leaf-dents 0–1(–2) pairs at most, basal membranous. **a. var. battandieri**
2. Leaf-dents 2–6 pairs, up to above the middle, upper ones usually herbaceous. **b. var. limicola**

a. var. battandieri

Leaf-dents 1(–2) pairs, often wanting, basal membranous. Bracts (and sepals) usually entire on edge. Superior petal 3(–5)-lobed. Lateral and anterior petals usually entire, rarely \pm incised. Fruiting pedicels 4–6 mm long. Seeds obscurely rugulose.

Distribution: Morocco.

b. var. limicola (MAIRE et SAMUELSSON) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda limicola* MAIRE et SAMUELSSON in Arkiv. Bot. Stockh. 29A(11), 1939, p. 17, fig. 4a, d, e, tab. 2a.

Leaf-dents 2–6 pairs, up to over the middle, upper ones usually herbaceous. Bracts (and sepals) usually serrulate-papillose on edge. Superior petal or all petals usually 3–5-fid, rarely lateral and anterior petals entire. Fruiting pedicels 4–6 mm long. Seeds obscurely rugulose.

Type: J. GATTEFOSSÉ 368b, 12.4.1937 (lectotype: AMD 038501).

Distribution: Morocco.

c. var. tuberculata BATT. et JAH. in Bull. Soc. Hist. Nat. Afr. Nord 12, 1921, p. 27.

Leaf-dents 1(–2) pairs, often wanting, basal dents membranous. Bracts (and sepals) usually papillose-denticulate on edge. Superior petal 3(–5)-lobed or -fid. Lateral and anterior petal simple, very rarely \pm incised. Fruiting pedicels ca. 2 mm long. Seeds laxly and shortly tuberculate.

Type: Uncertain. Illustrative specimen: DE BRETTE, PANOUSE & SAUVAGE 4858 (S, TL).

Distribution: Known from the type locality.

Taxonomical notes: BATTANDIER and JAHANDIEZ published and described *R. battandieri* PITARD var. *tuberculata* BATT. et JAH. (in Bull. Soc. Hist. Nat. Afr. Nord 12, 1921, p. 27). It was based on a specimen collected by JAHANDIEZ et GATTEFOSSÉ at 'Chichaoua' (Morocco), a locality at Sidi Bou-Otman.

JAHANDIEZ et MAIRE returned to this taxon in 1932 (Cat. Pl. Maroc. 2, p. 318), but quoted it as a 'subvar.' It must be inferred that they desired to change the rank of var. *tuberculata* into a subvariety, and so the author's citation has to be changed, the full citation becoming *R. battandieri* PITARD subvar. *tuberculata* (BATT. et JAH.) JAH. et MAIRE. In 1937 MAIRE again refers to the taxon, now again adopting it as a variety and citing '*Reseda battandieri* PITARD var. *tuberculata* (BATT. et JAH. pro subvar.) MAIRE comb. nov.'

The nomenclatural errors are evident. BATTANDIER et JAHANDIEZ cited it as a variety, not a subvariety, and a new combination in the rank of variety is superfluous. The correct name is *R. battandieri* PITARD var. *tuberculata* BATT. et JAH.

A possibly authentic specimen at AMD was examined (AMD 038493) and, though it had no mature seeds, all petals were often 'trifid' as was remarked by MAIRE (in Bull. Soc. Hist. Afr. Nord 28, 1937, p. 338). The specimen seems partly referable to *R. battandieri* var. *limicola* and partly to *R. b.* var. *battandieri*.

Ultimately, MAIRE and SAMUELSSON referred to the taxon in 1939 (in Ark. Bot. Stockholm 29A, p. 17–19). It is to be noted that in this illustrated article

they picture the seed, but not in a way clearly showing a tuberculate testa, nor do they describe it. In discussing the differences among *R. limicola*, *R. battandieri* and the variety *tuberculata* they mentioned characters of leaves and petals, not of the testa. The illustrative specimen they quote for var. *tuberculata*, SAMUELSSON 6660 (S), has the almost smooth seeds characteristic of *R. battandieri* var. *battandieri* and var. *limicola*.

R. battandieri PITARD subsp. *eu-battandieri* MAIRE var. *tuberculata* (BATT. et JAH. pro subvar.) MAIRE et SAMUELSSON f. *albisperma* CABALL. (in Trab. Mus. C. N. Madrid 30, 1935, p. 21) probably rests on a specimen with immature ('white') seeds. No type was seen. The forma is reduced here to *R. battandieri* var. *battandieri*.

MAIRE stated in the observations of his 'new combination' '*Reseda battandieri* PITARD var. *tuberculata* (BATT. et JAH. pro subvar.) MAIRE' that this var. has all the petals 3-fid like *R. limicola* MAIRE et SAMUELSSON which was not yet published. He also added that *R. limicola* was found in 'les dayas au S.E. de Tiflet' (l.c.).

It can be contended that this constitutes the first valid publication of *R. limicola*, because some descriptive data are added to the name. However, these are extremely scanty and the authors obviously did not wish to publish *R. limicola* at that moment (1937).

They (MAIRE et SAMUELSSON, l.c., 1939) accompanied the description of *R. limicola* by fig. 4a, d, e, tab. 2a also with a comparative figure of almost the same parts of *R. battandieri* PITARD (WALL s.n. in hb. Stockh.) and *R. battandieri* var. *tuberculata* (SAM. nr. 6660).

They declared that *R. limicola* is very closely allied to *R. battandieri* PITARD from which it differs by the leaves which are provided by 2-6 lobes on each side of which the upper ones are elongated, herbaceous and half erect, by petals which are all 3-5-lobed. In *R. battandieri* the leaves are said to be entire or to bear on each side a fringe of small recurved teeth; if it is typical then the anterior petals are almost entire while the posterior petals are 3-lobed (var. *tuberculata*: all petals 3-lobed). Although *R. limicola* MAIRE et SAMUELSSON represents a taxon, it was preferred to adopt it as a variety in *R. battandieri*; the differences suggested by MAIRE and SAMUELSSON are not constant.

Ecological notes: *R. battandieri* subsp. *battandieri* was collected by WALL in the steppe W. of Marrakech, flowering and fruiting in May. SAMUELSSON found it in the same region at 500 m alt. in April. PAULSEN noted a somewhat salty soil. WILCZEK and DUTOIT found it near Marrakech (46 km) on stony siliceous fields, other collectors in the region on calcareous soils.

When publishing *R. limicola*, MAIRE and SAMUELSSON stated (l.c., 1939) that it was found on sandy muds in rivers and inundated ditches in Western Morocco 'sole siliceo', and it flowered in March and June.

Var. *limicola* occurred on black clays near Foucauld (GATTEFOSSÉ 368b). At Oulad Saïd, it grew in sandy soil on the border of swampy areas. In the Douk-

kala region, S. of Casablanca, SAUVAGE collected this on fallow lands, on calcareous, and on silty sandy soils; S. of Tiflet it occurred on usually not flooded areas (SAUVAGE) and on banks of drying pools (SAMUELSSON), at 350 m alt.

MAIRE and SAMUELSSON noticed in '*R. limicola*' a fragrance like honey and prunus; it flowered from March till June.

MAIRE and SAMUELSSON gave the distribution of *R. limicola* in NW. Morocco (occidental septentrional) as follows: 5 km SW. of Tiflet village, along roads opposite Ma(a)ziz; abundant, dry banks of a drying pool associated with *Agrostis salmantica* etc. about 350 m alt. (n. 7298, 3.V.1936; EMBERGER et MAIRE Junio 1936); SW. Maroc near depressions in the quartzitic plain Oulad Saïd, SE. of Casablanca city (MAIRE, WEILLER and WILCZEK 6.IV.1937); on Chaouia in black loams near Foucauld village (J. GATTEFOSSÉ n. 368b, 12.IV.1937, near a ditch).

Specimens examined:

Var. battandieri

Morocco. Giboulet 11, Rehamna, Lalla-Mouchâu; Jahandiez s.n., 19.III.1920, Sidi Bou Othman(e) p.p.; id. 158, Skoura; Maire s.n., 28.III.1922, Chichaoua; Murbeck s.n., 19.III.1921, Ben-Guérir, vicinity Marrakech; id. s.n., 24.IV.1921, Oued Tensift; Paulsen s.n., 10.IV.1936, Mt. Tamillet; Reese s.n., 8.V.1934, Djebilet, NW. Marrakech; Samuelsson 6660, Haouz et Tadla, between Marrakech & Tamlalet el-Djedid; Sauvage 7324, Doukkla to Rehamna; Stomps s.n., 10. IV. 1936, Djebilet; Ugglä s.n., 10.IV.1936, Haouz et Tadlo; Wall s.n., 8.V.1934, 30 km W. Marrakech; Wilczek et Dutoit s.n., 7.IV.1923, km 46 Piste Marrakech-el-Relaa.

Var. limicola

Morocco. Emberger s.n., 13.VI.1936, between Tiflet & Maaziz; Gattefossé 368b, Chaouia, near Foucauld; Jahandiez s.n., 19.III.1920, Sidi Bou Othman(e) p.p.; Maire s.n., 6.IV.1937, Oulad Saïd; Maire, Weiller et Wilczek 3294, dayas des Oulad Saïd; Molinier 7326, Daya, au km 1.400 de la route Tiflet-Maaziz; Samuelsson 7298, near Tiflet; Sauvage 9112 (1986), Zaer, SE. Tiflet; id. 9962, Doukkala, env. de Sidi Bennour près de Douar el Aroun; id. 10003, ibid., Jachien, N. d'El Aite de Aounat; Wall s.n.; 3.V.1936, Vattanpal near Tiflet; Wilczek 477, Bou Koura, prope Aufam.

Var. tuberculata

Morocco. De Brettes, Panouse & Sauvage 4858, Khenej el Adam, près El Ayoun (reg. Goulimine).

10. *Reseda buhseana* MUELLER ARGOVIENSIS (descript. emend.) **Fig. 33, 34**

In Bot. Zeit. 14, 1856, p. 36; id., Mon. Rés. 1857, p. 161, tab. 8, fig. 111 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boissier, Fl. Or. 1, 1867, p. 432; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 579.

R. b. var. *β multicaulis* Muell. Arg. in Bot. Zeit. l.c.; id., Mon. Rés. 1857, p.

163 (et in Neue Denkschr. Schw. Ges. Zuer. 1.c.); id. in Buhse & Boissier, Aufzählung ges. Pflz. 1860, p. 32 (= var. *buhseana*).

R. dshebeli Czerniak. in Komar., Fl. URSS Add. VII, 1939, p. 653: descr.; id., l.c. p. 615 (= var. *dshebeli*).

Annual to perennial, erect, spartioid herb, 30–45 cm tall, usually branching from a ligneous taproot.

Stems many, rarely solitary and strict, branching at base or above, leafy, often finally subaphyllous, glaucous, glabrous to muricate or puberulous, delicately ribbed, pith solid or disintegrating.

Leaves decurrent, all entire or partly 3-partite, glaucous, fleshy, canaliculate, foveolate when dry, glabrous, or minutely muricate or papillose, narrowly (ob)ovate, lobes linear to ovate, or subulate, $1\frac{1}{2}$ –4 cm long, 5(–10) mm wide, upper leaves shorter and narrower, often linear, acute, margins involute, usually muricate.

Flowers white (cream when dry), small. Raceme erect, slender, up to 20 cm long, 1 cm wide in fruiting; peduncle slightly ribbed, ribs muricate. Bracts deciduous, comose at top of raceme, glabrous, linear-subulate or -ovate, 4 mm long, margins widely whitish. Pedicels finely ribbed, ribs asperulous, in flower $1\frac{1}{2}$ –4 mm long (shorter than the flower), 2–3–6 mm long in fruit, half as long as the capsule to equally long.

Sepals 6, deciduous, glabrous, oblong-obovate, 2 mm long, ca. 1 mm wide, obtuse, margin widely whitish, smooth.

Petals $2\frac{1}{2}$ mm long. Limb of superior petal palmately (5–)7–9-partite, flabellate (or central lobe longer), as long as the appendage or slightly longer, lobes linear(-spathulate), top rounded to obtuse, appendage obtriangular, $\frac{2}{3}$ mm long and equally wide or wider, broadly attached, free transverse rim continuous or interrupted, $\frac{1}{2}$ mm wide, usually lacerate, margins glabrous to papillose. Lateral petals variously reduced. Anterior petal smallest, limb simple, broadly spathulate.

Disc excentric-orbiculate, $\frac{3}{4}$ mm high, $1\frac{1}{2}$ mm wide, posterior extension much wider than the anterior extension, subfleshy, glabrous, margin recurved, entire or crenate-papillose.

Stamens ca. 15–17. Filaments deciduous, glabrous, 2–3 mm long. Anthers ellipsoid to oblong, $1-1\frac{1}{2}$ mm long.

Ovary (ob)ovoid, stipitate to sessile, glabrous, obtusely 3-angled (ribs minutely asperulous), 3-toothed, teeth $\frac{1}{4}$ as long as the ovary. Ovules 10–12 per placenta, in 3–4 rows.

Capsules on erect pedicels, (shortly) stipitate above the disc, glabrous, reticulate, ovoid(-globular), 5–6 mm long, 4–5 mm wide, walls usually sulcate, ribs smooth to scaberulous, mouth widely opened, slightly constricted beneath the teeth, 3-toothed, teeth triangular.

Seeds black to greenish dark-brown, glossy, subglobular-reniform, ca. $1-1\frac{1}{2}$ mm long, a minute protuberance opposite the radicle. Sinus narrow.

Testa densely tuberculate-papillose, rows following the seed contour, papillae very close, flat and square; or testa largely smooth with few longitudinal wrinkles, middle layer finely tessellate.

Type: BUHSE 1313, in Persia australi (hb. Boiss., G).

Distribution: Iran and Afghanistan, south and south east of the Caspian Sea.

Key to the varieties

1. Leaves partly trifid. Pedicels about equalling capsule. **c. var. dshebeli**
1. Leaves all entire.
2. Testa without regular rows of papillae, when ripe partly subtly wrinkled (raised irregular veinlets) to almost smooth. Peduncles and pedicels usually smooth. **a. var. buhseana**
2. Testa with regular rows of papillae. Peduncle and pedicels rough, the pedicel shorter than the capsule. **b. var. asperula**

a. var. buhseana

Leaves entire. Superior petal 7-9-laciniate. Seeds smooth, partly subtly rugulose.

Distribution: Afghanistan, Iran.

b. var. asperula ABDALLAH et DE WIT, *nov. var.*

Varietas pedunculo et pedicellis asperis, brevibus, seminibus dense regulariter minute papillatis bene distincta.

Type: BUNGE, April 1859 (GOET).

Leaves entire. Peduncle and pedicel rugose-asperulous. Pedicel short, ca. 2 mm long. Seeds densely regularly papillose (papillae minute).

Distribution: Iran.

c. var. dshebeli (CZERNIAK.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda dshebeli* Czerniak. in Komar., Fl. URSS Add. VII, 1939, p. 653.

Minutely papillose-puberulous herbs. Pedicels almost as long as capsules. Limb of superior petal 5-6-laciniate. Capsule long stipitate, walls sulcate. Seeds 1 mm long.

Type: ANDROSOW, 16.V.1912, Kopet-dagh, Dshebel, in glareosis promontorii (Herb. Ac. Sc. URSS).

Distribution: South and southeast of the Caspian Sea (Turkmenistan).

Taxonomical notes: MUELLER based his description of *R. buhseana* on a specimen collected in S. Persia by BUHSE (nr. 1313), which is deposited in BOISSIER's herbarium (G).

MUELLER cited in synonymy '*R. tripartita* BUHSE ined. in hb. BOISS.' which name he rejected as it was 'entirely unsuitable.' The name *R. tripartita* BUHSE ex MUELL. ARG. has no status under the Code.

MUELLER distinguished a 'var. β *multicaulis*' also based on a specimen collected by BUHSE (in BOISSIER's herb.), collected from the same locality; this variety is not accepted here.

In the protologue (l.c.) MUELLER described the (immature) seeds of BUHSE 1313 as smooth. In 1868 (DC., Prodr. 16(2), p. 579) he appears to have seen a second specimen collected by BUNGE. This had mature seeds and MUELLER found them 'distincte sed minute aspera', and he supposed that the immature, smooth seeds of BUHSE 1313 would have become 'rough' when ripe, as shown in BUNGE's specimen.

It is our considered opinion that *R. buhseana* has almost smooth ripe seeds, slightly rugulose in part as shown in the accompanying drawing (K. H. RECHINGER FIL., 1947, S), whereas the rough (actually densely minutely papillose testa) seed is seen in var. *asperula* (BUNGE, April 1859, GOET).

As regards *R. dshebeli* we have been unable to find any difference from *R. buhseana* in the description (l.c.) or the drawing (in KOMAR., Fl. URSS. Add. VII, tab. XXXIV, no. 1), but its comparatively long pedicels and partly trilobed leaves warrant adoption as a variety.

R. dshebeli alludes by its name to Dzhebel Mt., on the SE. of the Caspian Sea. Authentic specimens, preserved at Leningrad, were examined, but the type specimen was not available.

Ecological notes: KOELZ collected *R. buhseana* at ca. 2500 m alt., at Lorinj in Afghanistan on dry slopes, clumps, 2 ft high.

RECHINGER F. collected *R. dshebeli* at 1600 m alt. in stony deserts (Semnan-Damghan, Iran) on the 2nd of August in fruit. BOBROV collected it at 580 m alt. in fruit in June.

Specimens examined:

Var. *buhseana*

Afghanistan. Koelz 13715, Lorinj; Rechinger 16458, prov. Qataghan (Katagan), in jugo Paigah Kotal inter Haibak et Pul-i-Khmir (Gomri).

Iran. Bekboudi et Aellen 6276E, prov. El-Bourz, Fadoak, Cāshm; Buhse 1313, Taft prope Jezd, Apr. 49 (type); Bunge s.n., VI.1859, inter Kerman et Jesd; Gauba et Mirdamadi 294, prov. Semnan-Damghan, Sorcheh, prope Semnan; Rechinger 27143b, S. Jazd versus Kerman; Rechinger f. 1226, prov. Semnan Damghan, ad Sorcheh (Sürkheh) prope Semnan; id. 1947, *ibid.*, inter Semnan et Damghan.

Var. *asperula*

Iran. Bunge s.n., IV.1859, inter Kerman et Jesd, p.p.; Gabriel 168, Persien.

Var. *dshebeli*

USSR. Androschenko s.n., 29.III.1912; Bobrov 395, S. Turkestan, Turkmenistan, Dsjebelj; Bowles et Scholarship 1574, 20 miles E. Miyaneh; Fedtshenko 395, Turkmenistan.

11. *Reseda bungei* BOISSIER

Fig. 35

Fl. Or. 1, 1867, p. 433; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 575.

Perennial, erect, light green, ca. 45 cm tall herb, often branching; taproot stout, lignescent.

Stems few, branching near the base, leafy, glabrous or rarely scabrid-papillose, delicately ribbed; pith solid.

Leaves light green, fleshy, all entire, more or less petiolate (petioles up to 1 cm long), often punctate, papillose-scabrid, ovate to oblong, base short-attenuate, 2½–3 cm long, 1–1½ cm wide; margin narrowly pallid.

Flowers ?white, small, on slender pedicels. Raceme erect, up to 25 cm tall and 2 cm wide in fruiting; peduncle ribbed. Bracts deciduous, comose and short exserted at raceme-tip, narrow-ovate to subulate, 3½–4 mm long, ¾ mm wide, margins widely pallid, entire. Pedicels slender, in flower ca. 4½ mm long, in fruit up to 8 mm long, often ± curving upwards.

Sepals 7(?–6), deciduous, glabrous or scabrid, (ob)ovate-oblong, 2–2½ mm long, 1¼ mm wide, acutish, margin widely pallid, entire, with 3 longitudinal prominent veins.

Petals 2¼ mm long, not exserted. Limb of superior petal 5–7 palmatipartite (incisions ca. half way down) and central lobe much longer than adjacent, ca. as long as the appendage, lobes linear (top rounded), lateral lobes shorter and narrower; appendage broadly obovate, 1½ mm long, continuous in front of limb base, transverse free rim ¼ mm wide, undulate to erose; margins minutely papillose. Limb of lateral petal without or with 1 or 2 lateral lobes, central lobe

longer and slightly dilated above. Limb of anterior petal not partite, without lateral lobes, linear-spathulate.

Disc orbicular, excentric, $\frac{1}{3}$ mm high, $1\frac{3}{4}$ mm wide, posterior extension almost twice as wide as anterior extension, membranous, minutely papillose; margin recurved, erose.

Stamens ca. 24, exerted. Filaments deciduous, glabrous, 2 mm long. Anthers oblong, 1 mm long, top minutely asperulous.

Ovary obovoid or globular, stipe just emerging above the disc, glabrous or scabrid, obtusely 3-angled, 3-toothed; teeth $\frac{1}{3}$ mm long (ca. $\frac{1}{4}$ as long as the ovary). Ovules 15–20 per placenta in 3–5 irregular rows.

Capsules erect, shortly stipitate above the disc, entirely glabrous, ca. globular, 6 mm long, 6 mm wide, broadly 3-angled, walls (deeply) sulcate, nerves reticulate, mouth gaping but contracted, teeth obscure.

Seeds olive green, sub-glossy, reniform, $1\frac{1}{4}$ mm long. A minute funicular remnant sticking to the hilum. Sinus narrow. Testa smooth (under high magnification very obscurely rugulose).

Type: BUNGE, *Iter persicum*, N 16a, Maj. 1859, Persia inter Ispahan et Teheran (BOISS. hb.; G).

Distribution: Iran.

Key to the varieties

Stems, pedicels, sepals and ovaries glabrous and smooth. **a. var. bungei**
Stems, pedicels, sepals (and ovaries) densely scabrid-papillose.
. **b. var. scabrida**

a. var. bungei

Stems, pedicels, sepals and ovaries glabrous.

Distribution: Iran.

b. var. scabrida ABDALLAH et DE WIT, *nov. var.*

Caulis, pedicellis, sepalis (et ovariis) grosse scabrido-papillosis.

Type: BUNGE, *Iter Persicum*, Ispahan, Maj. 1859 (L, sheet 908.185–96; holotype).

Distribution: Only the type locality.

Taxonomical notes: BOISSIER based *R. bungei* on specimens collected by BUNGE in Persia 'inter Ispahan ad Teheran', and in the mountainous region near 'Sebsewar, prov. Khorassan', now spelt 'Sabzevar'. BUNGE's specimens are mixed and misnumbered, which is demonstrated by the specimens collected by BUNGE and examined for this revision. A type was designated in the BOISSIER herbarium (G) which may well represent the holotype.

Ecological notes: RECHINGER FIL. collected (nr. 999) *R. bungei* in the Elburs mountains near Keredj at \pm 1300 m alt., fl. and fr. in June.

Specimens examined:

Var. bungei

Iran. Bunge s.n., III.1859, Ispahan; id. s.n., III.1859, between Ispahan and Teheran; Furse 1606, E. Saveh, road to Qum; Rechinger f. 999, Mts Elburs centr., opp. Keredi, montibus Halkedar ad Murdabad (Mardabad).

Var. scabrida

Iran. Bunge s.n., V.1859, Ispahan.

12. *Reseda complicata* BORY

Fig. 36

In Ann. Gén. Sc. Phys. (Bruxelles) 3, 1820, p. 13; Webb, Otia Hisp. 1839, p. 19; Boissier, Voy. Bot. Esp. 2, 1839-45, p. 78, tab. 22; Muell. Arg., Mon. Rés. 1857, p. 200, tab. 9, fig. 123 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 581; Lange in Willkomm et Lange, Prodr. Fl. Hisp. 3, 1880, p. 896; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347.

Luteola complicata (Bory) Webb, It. Hisp. 1838, p. 67; id., Otia Hisp. 1839, p. 19.

Perennial, glaucous-green herb, 20-30(-50) cm, rarely over 1 m tall, densely and diffusely branching from a digitate rhizome (the upper part of a woody (much) branching taproot).

Stems usually numerous, main stems slender, densely branching (branches short, erect-divaricate, tips seemingly spinescent), laxly leafy, glabrous, finely ribbed; pith disintegrating (internodes finally tubular).

Leaves delicately decurrent, sessile, all entire, ascending to deflexed, glabrous, linear to -oblong, 1-2(-3) cm long, 1-2 mm wide, acute, usually provided by 1-2 pairs of dents on edge near the base (dents whitish, triangular-subulate, ca.

1 mm long, usually retrorse), midrib and veins obscure.

Flowers white (cream-yellow when dry), on (very) short pedicels. Racemes erect, 10–15 cm long when fruiting and often bare at base, peduncles ribbed, flower more or less patent, fruits more erect. Bracts persistent, pale green, glabrous, boat-shaped to triangular, in flower $1\frac{1}{2}$ –2 mm long, 1 mm wide, up to twice as long as the pedicels, acuminate, margins widely pallid, in fruit slightly longer. Pedicels stout, ribbed, in flower 1– $1\frac{1}{2}$ mm long, in fruit $1\frac{1}{2}$ –2 mm.

Sepals 6, persistent, nearly equal, glabrous, ovate to linear, $1\frac{1}{2}$ –2 mm long, $\pm \frac{1}{2}$ mm wide, \pm acuminate, margins (widely) hyaline, smooth.

Petals $3\frac{1}{2}$ –4 mm long, more than twice as long as sepals. Limb of superior petal with 3–5 incisions nearly half-way down, up to three times as long as the appendage; central lobe generally wider than the others, lacinia linear to narrowly oblong, acutish. Appendage \pm obovate, ca. 1 mm long, broadly attached, rim inflexed, continuous in front of limb-base or sometimes interrupted, $\frac{1}{3}$ mm wide, glabrous. Limbs of lateral and anterior petal undivided, linear, appendage very small to inconspicuous.

Disc $\frac{1}{4}$ mm high, $1\frac{1}{4}$ mm wide, glabrous, margin recurved, crenate.

Stamens ca. 14, shorter than petals. Filaments persistent, glabrous, $1\frac{1}{2}$ mm long. Anthers subglobose to -oblong, $\frac{2}{3}$ mm long.

Ovary ca. globular, (sub)sessile, glabrous, obtusely 4-angled, 4-toothed; teeth less than half as long. Placenta forked. Ovules 9–12 per placenta, imbricate.

Capsules erect, shortly stipitate, obovoid-subglobose, $3\frac{1}{2}$ –4 mm long, 3 mm wide, shallowly grooved between the rows of ovules, mouth contracted, gaping, 4-toothed, teeth cuspidate, $\frac{3}{4}$ mm long, to $\frac{1}{4}$ as long as capsule.

Seeds yellowish-brown, dull, reniform, $\frac{2}{3}$ mm long. A minute protuberance opposite the radicle near the sinus. Sinus narrow. Testa smooth, obscurely webbed (under high magnification).

Type: BOISSIER s.n., Jul.-Aug. 1837, Spain, Sierra Nevada, parte superiori, alt. 4500–9500' (Herb. BOISS.-G = neotype; BRNU, C, DS, GOET, HAL, L, NY, PAD, S, UPS, W = iso-neotype).

Distribution: Spain, Sierra Nevada.

Taxonomical notes: BOISSIER (Voy. Bot. Esp. 1, 1839–45, p. 106) told the story of the discovery of *R. complicata* by BORY DE ST.-VINCENT. This French commander of the garrison at Granada attacked a group of guerilla fighters in the Sierra Nevada, put them to flight, and used the opportunity of collecting plants in the region of Pic de Veleta, among which *R. complicata*. BOISSIER added that this small herbarium served as a basis for a 'florule' by LAGASCA et RODRIGUEZ (Ann. Madrid) but BORY's specimens unfortunately were lost some years later, he declared.

MUELLER ARGOVIENSIS distinguished *R. glauca* from *R. complicata* by a different attachment of the lamina of the superior petal to the claw (appendix) and by a depressed-ovoid capsule. A difference in the way of the laminar fission in the superior petal is suggested by the drawings (cf. MUELL. ARG., Mon. Rés. 1857, tab. IX, fig. 121 and 122) but the size and number of the petal-lobes are not constant; this appears also from MUELL. ARG.'s descriptions (l.c., p. 198, 201). Furthermore, MUELL. ARG. stressed the length of the ovarial teeth ('cusps'), which are in *R. glauca* twice as long. The isolation of *R. glauca* and *R. complicata* occurring at high altitudes and in widely separated mountain ranges (Pyrenees and Sierra Nevada), while no high mountains as possible growing localities are present between, may be a cause for a differentiation in the two populations. The Sierra Nevada specimens are, possibly, often more rigid and denser in habit, the leaves generally somewhat shorter, the calyx-lobes usually relatively shorter (though sometimes this difference is scarcely present), the fruit is perhaps not quite so depressedly-ovoid and less clearly stipitate. All these characters, slight as they are, vary and overlap sometimes even in a single inflorescence (cf. BORDÈRE 225, NY). It could be argued that *R. glauca* and *R. complicata* should be united in one single species, represented by a subspecies in the Pyrenees and a second subspecies in the Sierra Nevada, but, on the other hand, it seems also just possible to accept the taxa as (closely) related species.

WEBB transferred *R. complicata* BORY to the genus *Luteola* WEBB (= *Luteola* [TOURN.] RUPP., Fl. Jen., ed HALLER 1745, p. 290). WEBB had proposed a genus *Luteola* in 1837 (Phyt. Can., p. 104), containing a single species, *Reseda luteola* L. (see there). In 1838 he wished to widen the generic limits so as to admit *R. glauca* L. and *R. complicata* BORY, together forming one group in *Luteola*, and *R. lutea* L. representing another. WEBB's systematy is not followed here, though he was right in accentuating the natural affinity between *R. luteola* and the *R.*-species in the subgenus *Glaucoreseda*.

Ecological notes: BOISSIER observed *R. complicata* on wind-swept ridges at 7470 ft alt. near the Col de Vacares (Xervil valley, l'Alcazaba; l.c., p. 150). He enumerates it among the alpine species of southern Spain (p. 215), as a suffruticose plant (p. 216). It is an endemic species to southern Spain (Granada district; p. 218–219) and occurs in places where some soil is available among the rocks at high altitudes ('region nivale'; p. 225). BOURGÉAU observed *R. complicata* in the snow area of the Sierra Nevada, flowering June 29. BOISSIER collected flowers in July and August. GINZBERGER saw it on south-exposed slopes, between 1700–2200 m alt. on 'Tonglimmerschiefer' (supposedly some clayey schists) in a vegetation of spiny polster-plants. HUTER, PORTA and RIGO found it on schists. It penetrates to 3000 m alt. and often it descends along water courses to much lower altitudes where it may attain over 1 m in height.

Specimens examined:

Spain. Ball s.n., 27.VI.1851, Sierra Nevada, reg. alpina; Boissier s.n., VII-VIII. 1837, Sierra Nevada, parte superiori; Bourgeau 1091, *ibid.*, Barranco de Val del Infierno; Campo, del 12, Cueva de los Panderones; id. 2889, près Grenade; Fritze s.n., 15.VI.1873, valle Genil, Tovo; Funk s.n., VIII.1848, Sierra Nevada, reg. alpinae; Ginzberger s.n., 8.VIII.1924, W. Sierra Nevada; Guirao s.n., VII.1852, *ibid.*; Hackel s.n., 31.VII.1876, Cueva de Panderone; Hegelmaier s.n., 12.VII.1878, Mt. Picacho Veleta; Huter, Porta et Rigo 955, Jenil, ad Peñon de S. Francisco; Jahandiez 135, Sierra Nevada, Capileird, S. of Mulhacen; Jimenez s.n., VIII. 1883, Mulhacen; Lindberg 904, Laguna de las Yeguas; Lomax s.n., 23.VII.1891, valle fluvium Monachil; Muñoz Medina 350, Peñones de San Francisco; Nannfeldt 15153, road Granada-Veleta; Nilsson 1698, Mt. Picacho Veleta; id. 1698b, C. de los Mimbers; Pau 656, Grenade, Sierra Nevada, regione superiori; Porta et Rigo 497, Peñon de San Francisco; Roivainen s.n., 23.VII.1950, *ibid.*; Sennen (Pau) 656, regione superiori; Viciose s.n., 30.VII.1930, Peñon Colorado; Voigt s.n., VI. 1889, S. Geronimo; Willkomm 182, S. Nevada; id. 182 suppl., Coral de Veleta; Winkler s.n., 21.VII.1873, *ibid.*; id. 30.7.1873, Picacho de Veleta; id. 15.VI.1873, Valle fluv. Jenil.

13. *Reseda crystallina* WEBB et BERTHELOT

Fig. 37

Phyt. Can. 1, 1837 (1836-40), p. 102, tab. 9 (1838; fide Muell. Arg.); Walp., Rep. 2, 1843, p. 753; Muell. Arg., Mon. Rés. 1857, p. 179, tab. 8, fig. 118 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 572; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 181; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348.

Annual (or ?perennial), usually ascending, (10-)15-25(-40) cm tall; taproot long, yellowish, often lignescent.

Stems leafy, acutely ribbed, \pm rough, sometimes papillose-scabrid; pith disintegrating.

Leaves decurrent, glabrous, rarely scabridulous. Rosette-leaves entire, narrowly ovate-spathulate, $1\frac{1}{2}$ -3 cm long, $\frac{1}{2}$ cm wide. Stem-leaves 3-partite (lateral lobes sometimes bifid), 4-6(-9) cm long, lobes narrow, obtuse to acutish, side-nerves excentric; terminal lobe wider and longer than lateral, margins denticulate-serrulate.

Flowers deep yellow, on soon spreading pedicels, in short, broad subcorymboid racemes. Raceme in flower 3-4 cm, in fruit 5-15(-25) cm long and erect; peduncle ribbed and more scabrid than stems. Bracts tardily deciduous, not exceeding flower-buds, linear-ovate, 3-4 mm long, less than 1 mm wide, up to $\frac{1}{3}$ as long as flower-pedicel. Pedicels slender, acutely ribbed, glabrous or scaberulous, 4-6(-8) mm long, often patent, in fruit 6-8(-15) mm long, $\frac{1}{3}$ or rarely $\frac{1}{2}$ as long as capsule.

Sepals 6, persistent, linear to spatulate, $1\frac{1}{2}$ -3 mm long in flower, slightly longer in fruit, top rounded, margins narrowly pallid, minutely scabrid to denticulate.

Petals 6, sometimes one or two reduced, 2–3 mm long. Limb of superior petal 3-partite, (lateral lobes half-orbicular), $1\frac{1}{2}$ –2 times as long as the appendage; central lobe ca. 1 mm long (up to $\frac{2}{3}$ as long as lateral), linear-spathulate, entire, obtuse; lateral lobe with entire outer margin, often crenate; appendage broadly obovate, slightly over 1 mm long, transverse rim less than $\frac{1}{2}$ mm wide, obliquely truncate to emarginate; margins ciliate. Lateral petal smaller, anterior lobe usually wanting. Anterior petal smallest, limb usually simple, linear-spathulate, lateral lobes sometimes present as short, linear and acutish lobes.

Disc less than 1 mm high and 1 mm wide, papillose-tomentellous, margin erose and ciliate.

Stamens (12–)14(–17). Filaments (tardily) deciduous, usually papillose-scabrid, dilated gradually above middle, 2(–3) mm long. Anthers scabrid, ellipsoid, 1 mm long.

Ovary cylindrical, base abruptly narrowed into a stipe, obtusely 3-angled, densely papillose, 3-toothed, teeth ca. $\frac{1}{4}$ as long as ovary, ending in 2 caducous, minute, stigmatoid tips. Ovules ca. 22 on each placenta, in 2 rows.

Capsule erect, patent or subpendulous (pedicel appressed), short stipitate, long cylindrical, to narrowly ovoid-cylindrical, side-walls grooved, 15–22 mm long, 5 mm wide, membranous with prominent nerves, somewhat papillose, more scabrid-papillose on ribs; mouth wide-gaping, teeth short, triangular, slightly constricted beneath the mouth.

Seeds greenish dark brown, very glossy, ovoid, just over 1 mm long, obscurely carunculate. Sinus wanting, represented by a shallow groove. Testa smooth, middle layer at high magnification tessellate.

Type: Tab. 9, *Reseda crystallina* Nob., in WEBB et BERTHELOT, Phyt. Can. 1 (1838).

Distribution: Canary Islands.

Taxonomical notes: WEBB (l.c.) did not mention any specimen (in 1837) but he added a drawing (in 1838, l.c., tab. 9; cf. MUELL. ARG., Mon. Rés. 1857, p. 179) of the habit and of several details to the original description. This is designated as the type.

R. crystallina was found on the Canary Islands, WEBB declared, on 'Lancetrotta' between the settlement Haria and an extinct volcano named Corona.

The amount of papillae varies according to the environment. WEBB pictured an extremely papillose plant; a rich soil and moisture may reduce the number and size of the papillae. The large, narrow, grooved fruit, the shape of the (broad) inflorescence, the coarsely erose extension of the disc and the numerous and small seeds are easily observed when separating *R. crystallina* from its closest ally *R. lutea*. *R. crystallina* may be seen as an island population belonging in *R. lutea* in its widest circumscription but it can be maintained as a species.

Near the sea *R. crystallina* becomes some cms high only. These dwarfs were proposed (in herb.) by PITARD (nr. 41) as a variety '*graciosa*' but they are nothing more than a local edaphic form (on Graciosa island).

Index Kewensis (2, 1895, p. 697), listed *R. lancerotae* WEBB ex DEL. Now WEBB (in Phyt. Can. 1, 1837, p. 102) cited '*R. lancerotae* Nob. in litt. DELIL. Sem. h. Monsp. 27.1836' in the protologue of *R. crystallina*. Therefore *R. lancerotae* WEBB ex DEL. has no status nomenclaturally, being a msc. name cited in synonymy, and repeated without description in a seed-list by DELILE.

Ecological notes: On Lanzarote, *R. crystallina* had fully developed fruits in May. On Fuerteventura it is called 'robo de cordero' and grows on arid sites at 300 m alt. where BURCHARD collected it (nr. 282; CAI, F, S). It is a low herb which may become woody, especially its taproot (e.g. LOWE s.n., s.d., on Lanzarote; NY). On Graciosa, PITARD (nr. 41) observed it in sands near the sea (GRO).

Specimens examined:

Can. Isls. Graciosa Isl. Kunze s.n., 22.I.88, s.l.; Pitard 41, in aren. mar. Fuerteventura Isl. Burchard 282, near La Oliva; id. 391, near Punta del Tostón; Fleischer & Fleischer-Haighton 213, Mt. Muda; id. 214, near Oliva; H. Knocke 631, Puerto Cabra. Lanzarote Isl. Boulos s.n., 1.VI.1961, Mozaga; Bourgeau 326, Villa de San Miguel; Koopmans 104, Mt. Corona; Rev. R.T. Lowe s.n.; Murray (hb. Gelert) s.n., 25.V.1892, Haria; Pitard 40, Los Valles.

14. *Reseda diffusa* (BALL) BALL

Fig. 38

In Journ. Linn. Soc. Bot. 16, 1877, p. 339; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 182; Murb. in Lunds Univ. Arsskrift. N.S. 2, 18(3), 1922, p. 48.

R. phyteuma L. subsp. *diffusa* Ball in Journ. of Bot. N.S. 2, 1873, p. 299; H. Lindb. in Act. Soc. Sc. Fenn. N.S. B, 1(2), 1932, p. 68.

Annual, diffuse-erect, (pale) green herb, 10–30(–40) cm tall, branching at base from a slender taproot.

Stems few, often solitary, diffusely branching at base and rarely above, leafy, ± pilose (hairs subulate or cylindric, ca. 1½ mm long, thin walled), ribbed, pith disintegrating.

Leaves delicately decurrent, sparsely papillose, both entire and 3-partite. Entire leaves usually at the base, very often mixed along the stem with the others, oblong-obovate or -elliptic, 2–5 cm long, 5–10 mm wide, obtuse. Tripartite leaves 2–6 cm long, usually incisions 2/3 down, lobes broadly decurrent and

attenuate along midrib, terminal lobe longer and wider than lateral. All margins papillose-scabrid.

Flowers pale yellow at least when dry, on long patent pedicels. Raceme ovoid and \pm laxly flowered when young, 10–20(–30) cm and gradually more open in fruit (carrying fruits for more than half its length), peduncle ribbed. Bracts persistent, not tufted, sparsely asperulous on midrib, linear to -subulate or -obovate, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm long, $\frac{2}{3}$ mm wide in flower ($\frac{1}{2}$ as long as the pedicel), slightly lengthening when fruiting, up to half as long as fruiting pedicel, acute, margin pallid-hyaline, roughish. Pedicels strongly ribbed, scabrid, in flower 5–8(–10) mm long and patent or often curving downwards, in fruit 8–10(–12) mm long, $\frac{1}{2}$ – $\frac{2}{3}$ as long as capsule.

Sepals 6, persistent, accrescent, patent-reflexed in the flower, reflexed in the fruit, minutely and sparsely scabrid on midrib, oblong-spathulate, 3–4 mm long, ca. 1 mm wide, up to twice as long in fruit, rounded-obtuse, margin narrowly pallid, \pm scabrid.

Petals $2\frac{1}{2}$ –3 mm long. Limb of superior petal apparently 11–13-partite (3-sect, lateral lobes multipartite), 1 – $1\frac{1}{2}$ as long as the appendage. Central lobe $\frac{1}{2}$ – $\frac{3}{4}$ as long as and narrower than the adjacent laciniae of lateral lobes, narrowly spathulate; lateral lobe 5–6-partite, laciniae spathulate, top rounded. Appendage ca. rectangular, $1\frac{3}{4}$ –2 mm long, $1\frac{1}{2}$ – $1\frac{3}{4}$ mm wide, attached slightly above the middle, free transverse rim continuous in front of limb-base, margins densely and minutely papillose. Lateral petal smaller, anterior lobe missing, remaining lateral lobe similar to that of superior petal. Anterior petal smallest, limb simple, linear-spathulate.

Disc $\frac{2}{3}$ mm high, $2\frac{1}{2}$ mm wide, velutinous, margin recurved, densely ciliate.

Stamens (20–)25–27, longer than the petals. Filaments deciduous, glabrous, $2\frac{1}{2}$ mm long. Anthers ellipsoid-oblong, 1 mm long.

Ovary obovoid, (long) stipitate, densely scabrid on the ribs, 3-toothed, teeth $\frac{1}{3}$ as long as the ovary. Ovules 8–10 in 2–3 rows.

Capsule nodding, distinctly stipitate over the disc, cylindrical-oblong and short attenuate at the base, 1–2 cm long, 8 mm wide, acutely 6-angled, ribs scabrid, mouth widely gaping.

Seeds reddish gray, subglossy, reniform, $1\frac{1}{2}$ –2 mm long. Sinus wide, filled with carunculoid tissue. Testa transversely and shallowly undulate-rugose, outer layer tardily detached.

Holotype: G. MAW, Maroc merid., in rupibus calcareis ab urbe Marocco septentrionem versus (sub *Reseda phyteuma* L. subsp. *diffusa* BALL; K).

Distribution: Morocco.

Taxonomical notes: BALL published *R. phyteuma* L. subsp. *diffusa* in 1873 (Journ. of Bot. N.S. 2, p. 299). In 1877 he raised this subspecies to the rank of species (Jour. Linn. Soc. Bot. 16, 1877, p. 339). The subspecies was based on

a specimen collected by G. MAW, and occurred N. of the city of Morocco. When raising the subspecies to specific rank he repeated the text of 1873 verbatim.

Ecological notes: In SW. Morocco, *R. diffusa* was found by GATTEFOSSÉ in the *Argania*-vegetation on calcareous soils near the sea. *R. diffusa* flowers and fruits in the Agadir region (at 400 m alt., PAULSEN) in April; it is usually present in the '*Arganietum*' (SAMUELSSON, EMBERGER). On clayey soil at 1000 m alt. EMBERGER collected *R. diffusa* in fruit in May 1934. MAIRE gathered it on calcareous rocks below Ksiba and it seems that *R. diffusa* generally favours lime. Messrs DE WILDE et DORGELO collected it in highly alkaline clayey soil, pH 7, in a 5 year's old *Citrus* plantation, 20 km WSW. of Taroudamut in the Sous-valley on continually irrigated areas, a stout, strongly branching plant, in flower on May 2, 1961.

Specimens examined:

Morocco. Balls B2513, Ich'onkak; Emberger s.n., 25.IV.1934, Tiznit; id. s.n., 1.V.1934, Anti Atlas occ., forêts d'*Argania*, S. Aït Baha; Gattefossé 367, Sud-Ouest Maroc, Nzala Tiguert; Giboulet 3, Haut Atlas centr., Ourika, Dar Ouriki; Jahandiez 534, Grand Atlas, Toufssirme; Maire s.n., 13.IV.1931, Agadir, near Ighir; id. 8.V.1932, Atlanti Majore, Tasserimout; id. 22.VI.1936, Atlantis medii, infra Ksiba; Mardochée s.n., à 1876, Ighirmillul et Djebel Taфраout et Kerkar, montagnes à l'est du distr. Tazeroualt; G. Maw s.n., Maroc merid. (type!); Murbeck s.n., 4 & 10.IV.1921, environs de Marrakech; Paillet s.n., II.1949, Agadir; Panouse 15, env. d'Aouinet-Torkoz; Paulsen s.n., 5.IV.1936, Tigrarin, pr. du Mt. Amsita, bet. Mogador & Agadir; Reese s.n., 10.V.1934, Djebilet, N. Marrakech; Rungs s.n., 10.II.1941, Station Horticole d'Aïn Chaïb; Samuelsson 6436, distr. austr.-occ., Djebel Amsitten; Stomps s.n., 5.IV.1936, bet. Mogador & Agadir; Wall s.n., 5.IV.1934, soder om Mogador, Djeb. Amsitten; De Wilde c.s. 1973, WSW. Taroudamut, Sous Valley.

15. *Reseda duriaea* J. GAY

Fig. 39

Expl. Sc. Alg. Bot. 1846-47, tab. 71, fig. 1; Muell. Arg. in Bot. Zeit. 14, 1856, p. 38; id., Mon. Rés. 1857, p. 171 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 567; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 85; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 182; Bolle in Engl. et Pr., Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 441, t. 38, f. 1228.

R. papillosa Muell. Arg. in Bot. Zeit. 14, 1856, p. 38; id., Mon. Rés. 1857, p. 173, tab. 8, fig. 116 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., l.c., p. 566; Batt. in Batt. et Trab., l.c.; Dur. et Schinz, l.c., p. 184 (= var. *papillosa*).

R. p. var. *duriaea* (Gay) Batt. fide Maire in Bull. Soc. Hist. Nat. Afr. Nord 22, 1931, p. 33 (= var. *duriaea*).

Annual or perennial, ascending, light green, 10–25(–35) cm tall, branching from a sometimes lignescent taproot.

Stems many (rarely solitary and then more erect), densely leafy, glossy, glabrous or sometimes sparsely pilose (or rarely and especially at base papillose-hispidulous), ribbed; pith persistent.

Leaves decurrent, entire, 3-fid (lateral lobes sometimes once incised and so the leaf \pm 'digitate'), glabrous, sometimes slightly pilose, especially on the veins. Basal leaves undivided, narrowly ovate-spathulate, long attenuate towards the base, 4 cm long, 7–10 mm wide (sometimes leaves rosetted, up to 9 cm long and 2 cm wide), top obtuse; the upper leaves $\frac{1}{4}$ – $\frac{1}{2}$ trifid, 6–8 cm long, lobes (narrowly) oblong to (ob)ovate, terminal lobe equalling or larger than the lateral, the basal part narrowly decurrent along the midrib, flat or sometimes slightly undulate, margin sometimes serrulate.

Flowers whitish or mostly ochraceous, on erect or spreading, long pedicels. Raceme erect, 5–15(–20) cm long, 2–3 cm wide in fruiting; peduncle sulcate, sometimes with trichomes. Bracts persistent, shortly comose at top of raceme, glabrous (or with a few trichomes), linear to narrowly ovate, 4–5 mm long, $\frac{1}{2}$ mm wide, half as long as the flower-pedicel or shorter, ca. $\frac{3}{4}$ fruit-pedicel, obtuse; margin pallid (whitish), rarely with a few dents. Pedicels erect or spreading in flower, curved downwards in fruit, sulcate (ribs acute, sometimes scaberulous), in flower 5–8 mm long, lengthening in fruit.

Sepals 6, persistent, linear-spathulate, in flower \pm $2\frac{1}{2}$ mm long, $\frac{1}{2}$ mm wide, in fruit slightly longer, obtuse; margin narrowly pallid, sometimes sparsely denticulate or scabrid.

Petals $3\frac{1}{2}$ –5 mm long, up to twice as long as sepals. Limb of superior petal 3-sect (lateral lobes semilunate), up to twice as long as the appendage; central lobe as long as or shorter than lateral lobes, linear-spathulate, $1\frac{1}{2}$ –2 mm long, obtuse; lateral lobe entire, undulate or crenate. Appendage (ob)ovate, \pm 1 mm long, free transverse rim less than $\frac{1}{2}$ mm wide, lacerate, margins densely papillose-ciliate. Lateral petal smaller and resembling the superior, anterior lateral lobe relatively narrower, sometimes wanting. Anterior petal the smallest, limb with 3 equal lobes or, very rarely, simple.

Disc 1 mm high, 2 mm wide, roughish, margin ciliate-papillose (ciliate hairs \pm capitate).

Stamens 16–18. Filaments deciduous, scaberulous to glabrous, 3 mm long; anthers oblong-ellipsoid, $1\frac{1}{4}$ mm long, minutely asperulous.

Ovary obovoid, narrowing at base to just emerging stipe, obtusely 3-angled, walls glabrous or densely (especially the ribs) papillose, 3-toothed, teeth very turgid, ca. $\frac{1}{5}$ as long as ovary. Ovules 6–8(–12) on each placenta, in 2 rows.

Capsule pendulous, distinctly stipitate, cylindric-urceolate, 7–10 mm long, 4–6 mm wide, walls sparsely papillose to scabrid (ribs coarsely papillose), mouth gaping, slightly contracted below the obsolete teeth.

Seeds few per capsule, reddish brown to blackish, very glossy, obliquely obovoid, ca. $1\frac{3}{4}$ mm long, carunculate. Sinus wanting, represented by a shallow groove. Outer layer of testa smooth, middle layer evanescent, tessellate

under high magnification.

Holotype: Tab. 71, fig. 1, '*R. Duriaeana* GAY'; Expl. Sc. Alg. Bot. 1846-47.

Distribution: Algeria and Tunisia.

Key to the varieties

Central lobe of superior petal as long as lateral lobe. Ovary walls often papillose.

Glabrate herbs. **a. var. duriaeana**

Central lobe of superior petal distinctly shorter than lateral lobe. Ovary walls densely papillose. Hispidulous herbs. **b. var. papillosa**

a. var. duriaeana

Glabrous, pilose or scabrid-papillose herbs. Limb of superior petal flabellate. Lateral lobes entire or crenate. Ovary walls usually glabrous or often papillose. Ovules usually interspaced. Seeds up to 2 mm long.

Distribution: Area of the species.

b. var. papillosa (MUELL. ARG.) ABDALLAH et DE WIT, nov. comb. et stat.

Basionym: *Reseda papillosa* MUELL. ARG. in Bot. Zeit. 14, 1856, p. 38.

Usually papillose-hispidulous herbs. Central lobe of superior petal distinctly shorter than the laterals. Lateral lobes very often incised. Ovary densely papillose-echinate. Seeds 1½ mm long.

Type: SEJOURNÉ, Africa boreali circa 'Constantine' (hb. FAUCHÉ nunc hb. BOISS.).

Distribution: Algeria.

Taxonomical notes: *R. duriaeana* J. GAY (l.c.) is a legitimate name based on a published figure of the plant, accompanied by analytic drawings (cf. Int. Code Bot. Nom. 1972, Art. 44). There is no description and probably the drawing was made from a specimen collected by DURIEUX.

In 1856, MUELLER described *R. duriaeana* (in Bot. Zeit. 14, p. 38) but stated not to have seen a specimen. MUELLER's description is based only on GAY's published figure (l.c.), 'icon pulcherrima'.

MUELLER (l.c.), based *R. papillosa* on a specimen collected by SEJOURNÉ. The specimen was in FAUCHÉ's herbarium, now incorporated in BOISSIER's herbarium. It was collected in N. Africa, 'circa Constantine'. No further data were given by MUELLER.

R. papillosa MUELL. ARG. is treated in this revision as a variety in *R. duriaeana* J. GAY.

Ecological notes: In the Gafsa-Gaber region it grew on calcareous soils (ANDREÁNSZKY); at El Guelat it was found in dry, stony watercourses east of Gafsa on the spurs of Djebel Orbata (ANDREÁNSZKY). On fallow fields it flowered in February (PITARD 51). In Algeria, on sloping schists near Constantine (E. G. PARIS), at Kerrata it was collected on calcareous soil by REVERCHON (302) at 800 m alt., in flower and fruit, in May.

Specimens examined:

Var. *duriaeana*

Algeria. Balansa s.n., à 1853, Batna; id. 7.VII.1853, Bois de Lambèse; Choulette 21, inter Rhummel et road Batna-Constantine; Cosson s.n., 14.V.1853, Constantine; id. 28.V.1880, *ibid.*, Butte du Télégraphe de Sitif; Reboud 689, Constantine; Reverchon 302, Kabylie, Kerrata; Paris 421, Constantine, M. Mansourah.

Tunisia. Andreánszky s.n., 10.III.1928, El Guelat, Mt. Dj. Orbata, prope El Guctayou opp. Gafsa; id. 11.III.1928, Blad Tkala, inter opp. Gafsa et Gabes; Kralik 372, Zaghuan; Letourneux s.n., 20.VI.1884, Sidi Aich ad rujces; Murbeck s.n., 19.IV.1896, Sakket; id. s.n., 12.VI.1896, Maktar; Pitard 51, Matmata (Hadege); id. s.n., III.1909, Gafsa; id. 766, *ibid.*, Kébira.

Var. *papillosa*

Algeria. Alston and Simpson 37364, El Hagag, Aures Mts; Anonymous s.n., 8.III.03, Constantina, Ravin de Siminai(n)r; Cosson s.n., 2.VII.1880, prov. de Constantine, Takitount-Ain Magdamen.

16. *Reseda elata* COSSON ex MUELLER ARGOVIENSIS

Fig. 40

In DC., Prodr. 16(2), 1868, p. 578; Coss. in Bull. Soc. Bot. Fr. 20, 1873, p. 242; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 182; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 317.

R. e. var. *eu-elata* Maire in Jah. et Maire, l.c. (= var. *elata*).

R. e. var. *malvalii* (Maire) Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 317; id., l.c. 3, 1934, p. 888; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016.

R. e. var. *villosa* Maire in Jah. et Maire, l.c. 2, 1932, p. 317 (= var. *elata*).

R. malvalii Maire in Bull. Soc. Hist. Nat. Afr. Nord. 14, 1923, p. 125 (= var. *malvalii*).

A usually perennial, stiffly erect herb, 100(–200–more) cm tall; root not seen.

Stems solitary, rarely branching, densely leafy, glabrous or puberulous especially when young, later glabrate, often very stout, finely ribbed, pith solid.

Leaves bright to (dark) green, puberulous to glabrate, sometimes foveolate, all entire or partly 3-partite. Entire leaves narrowly oblong-(ob)ovate, 5–7 cm long, 1(–1½) cm wide, base narrowly attenuate; tripartite leaves with incisions from lower half, up to over 10 cm long, terminal lobe up to twice as long and wide as the lateral, narrowly oblong-elliptic, 5 cm long, 9 cm wide, lateral lobes ± opposite. Axillary buds sometimes developing into weak branchlets.

Flowers (pale) yellow, on short (spreading) pedicels. Raceme strict, spiciform, cylindrical(-conical), sometimes flowers fasciculate at base, in fruit up to 40 cm long, 2½ cm wide. Bracts deciduous, comose and long exerted at raceme-tip, pale green, puberulous especially on the margins, linear-ovate to subulate, 4½ mm long, ½(–more) mm wide, margins ± crenate, widely whitish-hyaline. Pedicels sulcate, hispidulous, in flower 3–4 mm long, in fruit slightly longer, sometimes up to 5, rarely 6 mm long.

Sepals 6, deciduous, glabrous, (oblong-)ovate, 4–4½ mm long, 2½ mm wide, acutish, margins broadly pallid, ± crenate.

Petals 6–7 mm long, exceeding sepals. Limb of superior petal nearly to base 11–19-multipartite, ± palmately incised, twice(–more) as long as appendage; central lacinia longer and broader than lateral lacinia, linear-obovate, -spatulate, 4 mm long, 1 mm wide, top rounded; lateral laciniae (3–)5–8 (or more), laciniae varying in shape and length, 3 mm long, ¼ mm wide; appendage thick, oblong-elliptic, ca. 2 mm long, 1¼ mm wide, densely ciliate(-papillose) near the margin, transverse free rim ¼(–less) mm wide, crenate to lacerate; margin short, densely ciliate-papillose. Lateral petal shorter, limb entire or rarely 3-partite, if entire then similar to central lobe of superior petal; lateral lobes of 3-partite limb ovate, sometimes notched. Anterior petal smallest, limb entire, similar to central lobe of superior petal. Appendages variously reduced.

Disc ⅓ mm high, 2 mm wide, shortly puberulous-papillose, margin recurved, entire.

Stamens 20–40(–more), in (1–)2 rows (inner row longer), exerted. Filaments deciduous, 4–5½ mm long. Anthers ca. ellipsoid, smooth to minutely asperulous, 1¼ mm long.

Ovary cylindrical, puberulous to short ciliate, especially on placental veins, obtusely 3-angled, 3-toothed, ca. ¼ as long as ovary, top lacerate. Ovules ca. 14–16(–30) in (2–)3–4 irregular rows.

Capsules erect, usually crowded and imbricate (on a much shorter pedicel), short stipitate (stipe included in the disc), long-cylindrical, ca. 1½ cm long, ca. ½ cm wide, walls thick, glabrous, deeply sulcate, mouth gaping, teeth broad-triangular, rather erect, 1½ mm long or less.

Seeds dark brown, dull, obliquely obovoid, 1⅓ mm long. Sinus narrow. Testa densely and shortly papillose-asperulous, papils in rows following seed-contour, often different in length.

Type: BALANSA s.n., pl. Mar. (1867), Africae regione Maroc prope Keira, alt. 3000 ped. (hb. BOISS.) n.v.

Distribution: Morocco.

Key to the varieties

Entirely glabrous herbs at maturity. **b. var. malvalii**
Minutely puberulous herbs. **a. var. elata**

a. var. elata

More or less puberulous herbs. Stamens usually numerous, 30–60, very rarely less than 25.

Distribution: Area of the species.

b. var. malvalii (MAIRE) MAIRE in JAH. et MAIRE, Cat. Pl. Mar. 2, 1932, p. 317.

Entirely glabrous herbs. Stamens often ca. 20.

Type: 'Ad radices maritimas Anti-Atlantis, in rupestribus calcareis supra oppidulum Aglou, ad alt. 100–300 m, ubi aprili floret', in hb. Univ. Algeriensis et in hb. Instit. Imper. Scient. Rabatensis.

Distribution: Area of the species.

Taxonomical notes: *R. elata* COSS. ex MUELL. ARG. (l.c.) was based on a specimen collected by BALANSA in Morocco near Keira at 900 m alt. MUELLER (l.c.) stated that this name was previously given by COSSON to a dried specimen in the sets of BALANSA's Pl. Maroc. (in hb. BOISS.). COSSON's msc. name was not a valid publication.

Later on COSSON (in Bull. Soc. Bot. Fr. 20, 1873, p. 242) gave another full description based on the same specimen, citing as authors, and the year of collection of the specimen 'COSS. et BAL. in BAL. pl. Mar. (1867)'.

It was stated that *R. elata* may have stems measuring 10 cm in diam. (CHADEF. et EMB., *Traité bot.* II, 1960, p. 1278), but this may be a misprint for 10 mm.

MAIRE reported that *R. malvalii* (l.c.) occurs above the little town Aglou ('Gada d'Aglou') in rocky calcareous grounds at the foot of the Anti-Atlas, facing the sea, at alt. 100–300 m, where it flowers in April, occurring in an open association characterized by *Euphorbia echinus* and *Eu. dendroides*.

He declared that the type was present in the herbarium of the University of Algeria and in the herbarium of the Imperial Scientific Institute in Rabat.

MAIRE specified many distinguishing characters between *R. malvalii* and *R. elata*, but on examining a larger range of specimens these appear to be not constant. MAIRE himself later on reduced *R. malvalii* to a variety in *R. elata* (cf. JAH. et MAIRE, l.c.), a conclusion accepted here. The variety is distinguished by its glabrousness. MAIRE named the taxon after Cap. MALVAL who commanded Tiznit and accompanied MAIRE on botanical trips.

Ecological notes: Morocco. GATTEFOSSÉ collected *R. elata* at 900 m alt. among the rocks accompanying *Callitris* at Djebel Amsitten, in full flower (April 13, AMD 038499). MAIRE secured it in the Anti-Atlas, at 950–1800 m, fl. and fr. in May, near Talionine, on stony sandy areas (It. Mar. XXII, 1932).

In the coastal forests of *Argania* (calcareous soil) it was collected (RAB 14287) near Cape Rhir (46 km from Agadir).

Generally, the species occurs between 900 and 1500 m alt., but at Mt. Hadid it grew at 300 m alt. on calcareous soil (MAIRE, It. Mar. XXVII, 1937), accompanied by *Argania*. There seems to be a frequent association between *Argania* and *R. elata*.

Specimens examined:

Var. elata

Morocco. Ball s.n., 26–27.V.1871, supra Seksaoua, alt. 1500 m; id. 28–29.V.1871, ex regione inf., Atlantis Majoris, supra Milhain; Emberger s.n., 24.IV.1934, Grand Atlas occ., forêts d'Arganiers entre Tarnauar et le Cap Ghir, 46 km d'Agadir; id. 1.V.1943, *ibid.*, N. de Souk Djernea du Idaou Gounidil; Gattefossé s.n., V.1934, Djebel Amsitten; id. 13.IV.1935, *ibid.*; Hooker s.n., V.1871, Greater Atlas, Siksoua; Ibrahim s.n., 21.V.1877, Sidi Mousa; id. 26.VI.1884, Dj. Ait Oug-oirt; Lindberg 2363, Atlas Magnum, Mt. Djebel Amsitten, Tio Ravin; Maire s.n., 10.IV.1922, M. Ravin de Tildi près Agadir-n-Ighir; id. 14.IV.1925, Atlantis Majoris, Gounafa, Ait-Ikhia; id. 16.V.1932, Anti-Atlante, Talionine (BRNU); id. 24.III.1937, Mt. Hadid; id. 78. 16.VI.1939 Anti-Atlas, Tizi-n-Tarakatin; Samuelsson 6447, distr. austr.-occ., Cap Ghir; Stomps s.n., 5.IV.1936, Cap Ghir, ts. Mogador et Agadir; Uggle s.n., 5.IV.1936, distr. austr.-occ., Tamri, inter Mogador et Agadir.

Var. malvalii

Morocco. Balls B2491, Belou Schonkah (RAB); Gattefossé 39221, Bou Azida; Maire s.n., 16.V.1932, Anti-Atlante, Talionine (LD, RAB); Reese s.n., 5.V.1934, Grand Atlas, Djebel Amsitten, S. Mogador; Wall s.n., 5.V.1934, Djebel Amsitten inter Mogador et Agadir; De Wilde c.s. 1992, Haut Atlas, road Taroudaut-Asni to Tizi-n-Teste.

17. *Reseda ellenbeckii* PERKINS

Fig. 41

In Engl., Bot. Jahrb. 43, 1909, p. 417; Bolle in Engl. et Pr., Nat. Pflz. fam. ed. 2, 17b, 1936, p. 690, f. 431 E-J; Cuf. in Bull. Jard. Bot. Brux. 24, Suppl., 1954,

p. 160; Elffers et Taylor in Hubb. et Milne-Redh., Fl. Trop. E. Afr. 'Resedaceae' 1958, p. 5, f. 2.

?Perennial, erect, glabrous herb or subshrub, 50–75 cm tall, taproot lignescent.

Stems simple or branching, leafy, finely ribbed, glabrous; pith disintegrating.

Leaves all entire, rarely a few 3-partite, petiolate (petioles $\frac{1}{2}$ –2 cm long), rigidly membranous, entirely glabrous, sometimes veins scabridulous beneath, (narrowly) ovate-obovate, $5\frac{1}{2}$ –14 cm long, $1\frac{1}{2}$ – $5\frac{1}{2}$ cm broad, narrowing into the petiole, shortly acuminate or acute; margins entire, rarely \pm crisped, narrowly pallid.

Flowers white, on patent or curving pedicels. Raceme elongate, 10–35 cm long, peduncles scabridulous-papillose. Bracts deciduous, long comose at raceme-tip, linear, 3–6 mm long. Pedicels slender, ribbed, scabrid-papillose, 3–4 mm long in flower, in fruit up to 6 mm long.

Sepals 5, deciduous, obscurely veined, linear, $1\frac{1}{2}$ –2 mm long, $\frac{1}{2}$ mm wide, acute, margins minutely denticulate.

Petals 2– $2\frac{1}{2}$ mm long. Limb of superior petal 3–6-partite, $\frac{1}{4}$ – $\frac{1}{3}$ as long as the appendage, flabellate; laciniae linear, obtuse, central lacinia wider than the lateral; appendage obovate to oblong, $1\frac{3}{4}$ mm long, ca. 1 mm wide, free transverse rim narrow ($\frac{1}{4}$ mm wide), margins densely papillose. Lateral and anterior petals gradually smaller, lobes usually reduced, anterior petal simple or not.

Disc $\frac{1}{2}$ mm high, $1\frac{1}{4}$ mm wide, glabrous, margin crenulate-papillose.

Stamens ca. 11, much exceeding the petals. Filaments deciduous, glabrous, 3 mm long. Anthers oblong-obovoid, 1 mm long.

Ovary ovoid-cylindric, glabrous, closed, teeth 2, minute. Ovules 12–14 per placenta, in (2–)3 rows.

Capsules pendulous, \pm stipitate, obovoid or ellipsoid, 10–12(–17) mm long, ca. 1 cm wide, glabrous, compressed or inflated, walls membranous, shining, finely reticulate, mouth closed and very shortly bi-mucronate.

Seeds black, glossy, reniform, 1 mm long. Sinus narrow, adjacent to a remnant of the funicle, a small protuberance. Testa minutely papillate-echinate (papillae in rows regularly arranged).

Type: Ethiopia: Juri, Audo Mt., RUSPOLI et RIVA 994 (FI, isosyntype).

Distribution: Ethiopia and Kenya.

Taxonomical notes: See notes sub *Reseda*.

Ecological notes: ELFFERS and TAYLOR (in Fl. Trop. E. Afr. 1958) reported alluvial ground or under trees near watercourses as the growing locality, at alt. 400–660 m. KIRRIKA stated that the flowers are yellow. At Daua Riv. there were flowers and young fruits at the end of June. In Ethiopia it appears to occur above 1.000 m alt. GILG suggested in msc. the name *R. ruspoli*, a name not published here.

Specimens examined:

Ethiopia. Bally 9279, prov. Sidamo-Borana, slopes of scarp W. of Curre Liban, 4330' alt.; Ellis 351, Ogaden, Goddere Area, 44° 00' E., 05° 05' N., 1000 ft alt.; Iecama (Imp. Eth. Coll. Agr. & Mech. Arts) BH-22, Harar prov., 32 km NW. Ferfer; Mooney 5620, Sidamo, 10 miles S. of Neghelli, alt. 4900'; Ruspoli et Riva 994, Juri, Mt. Audo (type).

Kenya. Gillett 13300, K. 1, Lag Hareri, 03° 57' N., 41° 27' E., alt. 1200'; Kirrika 98, Daua River, Murri, 2.000 ft alt. (Malka Murri is also placed in Ethiopia, cf. K).

18. *Reseda fruticulosa* LINNAEUS

Fig. 42, 43

Syst. Nat. ed. 10, 2, 1759, p. 1046; id., l.c. ed. 12, 1767, p. 330; Houtt., Nat. Hist. 2(8), 1777, p. 727; Murray, Syst. Veg. ed. 14, 1784, p. 448; id., l.c. ed. 15, 1798, p. 368; Willd., Sp. Pl. 2(2), 1800 (1799), p. 878; Hornem., Hort. Hafn. 2, 1815, p. 502; Spreng., Syst. Veg. 2, 1825, p. 464; Tenore, Fl. Neapol. 4, 1830, p. 257; Rchb., Fl. Germ. 1830–32, p. 696, excl. loc.; Richt., Cod. Linn. 1835, p. 463; Walp., Repert. 2, 1843, p. 752; Pau in Cavanillesia 4(10), 1931, p. 156; Maire in Bull. Soc. Hist. Nat. Afr. Nord 23, 1932, p. 166; id., l.c. 24, 1933, p. 201; id. in Jahand. et Maire, Cat. Pl. Maroc 3, 1934, p. 888; id. in Emb. et Maire, Cat. Pl. Maroc 4, 1941, p. 1016 (= var. *fruticulosa*).

R. f. var. *barrelieri* (Bertol. ex Muell. Arg.) Pau in Cavanillesia 4(10), 1931, p. 156, '(Bert.)Pau' (= var. *suffruticulosa*).

R. f. var. *baetica* (Gay ex Muell. Arg.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 24, 1933, p. 201, '(Gay in Lange) Maire' (= var. *suffruticulosa*).

R. f. subsp. *attenuata* (Ball) Maire, l.c.; Jah. et Maire, Cat. Pl. Mar. 3, 1934, p. 888; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016 (= var. *attenuata*).

R. f. var. *attenuata* (Ball) Maire in Jahand. et Maire, Cat. Pl. Maroc 3, 1934, p. 888; id. in Emb. et Maire, Cat. Pl. Maroc 4, 1941, p. 1016 (= var. *attenuata*).

R. suffruticulosa L., Sp. Pl. ed. 2, 1, 1762, p. 645 et ed. 3, 1764, l.c. sensu Richt., Cod. Linn. 1835, p. 463 (= var. *fruticulosa*).

R. suffruticulosa Loeffl., Reise Span. Länd. 1766, p. 113; Lange in Willk. et Lange. Prodr. Fl. Hisp. 3, 1880, p. 890; Yeo in Tutin et al., Fl. Europ. 1, 1964, p. 348 (= var. *suffruticulosa*).

R. s. var. *sessiliflora* Pau, Nueve Contr. Fl. Gran. in Mem. Mus. Cienc. Nat. Barcel. Ser. Bot. 1(1), 1922, p. 27 (= var. *suffruticulosa*).

R. bipinnata Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 499; Spreng., Syst. Veg. 2, 1825, p. 464; Muell. Arg., Mon. Rés. 1857, p. 107, tab. 6, f. 87 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Loscos et Pardo, Ser. Imperf. ed. 2, 1866, p. 51; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 556; Bolle in Engl. et Pr., Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688 (= var. *suffruticosa*).

R. b. β baetica J. Gay ex Muell. Arg., Mon. Rés. 1857, p. 109 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858) (= var. *suffruticosa*).

R. undata L. sensu Boiss., Voy. Bot. Esp. 2, 1839–45, p. 75, tab. 20 (= var. *suffruticosa*).

R. barrelieri Bertol. ex Muell. Arg. in DC., Prodr. 16(2), 1868, p. 557; Bolle in Engl. et Pr., Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688 (= var. *suffruticosa*; see Taxa et nom. rej.).

R. gayana Boiss. subsp. *attenuata* Ball in Journ. Bot. N.S. 2, 1873, p. 299 (= var. *attenuata*).

R. attenuata (Ball) Ball in Journ. Linn. Soc. 16, 1878 (1877), p. 338; Durand et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 181; Pau in Cavanillesia 4(10), 1931, p. 156; Maire in Bull. Soc. Hist. Nat. Afr. Nord 23, 1932, p. 166; Jahand. et Maire, Cat. Pl. Maroc 2, 1932, p. 316; id., l.c. 3, 1934, p. 888 (= var. *attenuata*).

R. macrostachya Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 890 (= var. *suffruticosa*).

R. baetica (J. Gay ex Muell. Arg.) Lange, l.c., p. 891 (= var. *suffruticosa*).

R. sessiliflora Pau in Mem. Mus. Cienc. Nat. Barcel. Ser. Bot. 1, no. 3, 1925, p. 12 (= var. *suffruticosa*).

Tereianthes fruticulosa Rafin., Fl. Tellur. 3, 1837 (1836), p. 72, nom., 'sphalm. *fruticulosa*'; Merril, Ind. Rafin. 1949, p. 132, excl. 'equivalent' (= var. *fruticulosa*).

Annual or perennial, erect, often coarse herb, up to 1(–2) m tall, usually branching in the upper part, and branching very irregular; taproot lignescent.

Stem usually solitary, erect, leafy, papillose to glabrous, ribbed, pith disintegrating.

Leaves bipinnatisect or pinnatisect, at least the lowermost, pale green to canescent, at base forming a rosette, the uppermost gradually changing to bracts, ± scabrid or glabrous, 7–15(–25) cm long, 3–6 cm wide (widely varying in dimensions); lobes numerous, upwards gradually fewer in stem leaves, narrow-ovate to linear, varying greatly in shape, size and length; margin flat to ± crisped, narrowly pallid, scabrid.

Flowers white to pale yellow, on short pedicels. Racemes narrow-cylindric, (densely) flowered, sometimes rather lax. Bracts persistent, comose at top of raceme, often scabrid, linear-subulate, 2½–4(–6) mm long; margins pallid. Pedicels short or sometimes almost absent below the flower, in fruit thick, 1(–4) mm long.

Sepals 5–6, persistent, glabrescent, ovate to narrowly oblong, 2–5(–6) mm long; margins hyaline, ± denticulate.

Petals 3 $\frac{1}{2}$ –6(–7) mm long, exceeding the sepals. Limb of superior petal 3(–5)-lobed or -cleft, often merely notched, 1 $\frac{1}{2}$ –2 times as long as the appendage, with many branching nerves, lobes oval or oblong, round-obtuse; appendage obovate-elliptic, 1 $\frac{1}{2}$ (–2) mm long, transverse rim extremely narrow, $\frac{1}{5}$ mm wide, continuous or \pm interrupted at the middle; margin ciliate-papillose. Lateral and anterior petals gradually smaller, and similar to superior petal.

Disc $\frac{3}{4}$ mm high, 1 $\frac{1}{2}$ mm wide, papillose(-hirtellous) towards the margin; margin papillose(-hirtellous), crenate.

Stamens 10–18, exerted. Filaments persistent, glabrous, 3–4 mm long. Anthers reddish or yellow, oblong, 2 mm long.

Ovary ovoid(-cylindric), sessile, walls papillose to glabrous, obtusely 4-angled, 4-toothed, teeth ca. $\frac{1}{4}$ as long as ovary. Ovules 15(–more) in 2–3(–4) rows.

Capsule erect, sessile, pyriform, clavate or cylindric, 15(–18) mm long, 4–6(–8) mm wide, \pm papillose to glabrous, walls usually reticulate-veined and sulcate, slightly constricted beneath the mouth, teeth short.

Seeds dark-brown, dullish, reniform, 1 mm long. Sinus narrow. Testa papillose(-echinate).

Caryology: KAERCHER et VALDES-BERMEJO (Anal. Inst. Bot. Cavanilles 32(2), 1975, p. 165–174) reported for '*R. suffruticosa* LOEFL. and *R. barrelieri* BERTOL. ex MUELL. ARG.': 2n = 20; n = 10 (see also Taxonomical notes).

Type: '*R. fruticulosa* A' (LINN 629.12, holotype).

Distribution: Spain, Portugal, and Morocco.

Key to the varieties

1. Capsules clavate or pyriform, round-angled. Anthers brick-red. Incisions in limb of superior petal usually shallow (lobes wide). Stamens up to 18. Leaves (at least basal ones) bipinnatisect. **c. var. suffruticosa**
1. Capsules cylindric to narrowly obovoid, acutely angled, often more or less curved. Anthers yellow. Incisions in limb of superior petal often deep (lobes narrow). Leaves pinnatisect.
2. Stamens 10–12. Leaves with a clearly enlarged terminal lobe. Pinnae few. **b. var. attenuata**
2. Stamens 12–18. Terminal leaf-lobe about equal or smaller than the lower lobes. Pinnae numerous. **a. var. fruticulosa**

a. var. fruticulosa

Leaves pinnatisect, glabrescent. Stem-base lignescent. Superior petal (shal-
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lowly) lobed; stamens 12–18, anthers yellow. Capsules cylindrical to narrowly obovoid, acutely angled, often more or less curved, with ca. 1½ mm long, thick pedicels. Seeds (echinate-)papillose.

Distribution: Spain, Portugal and Morocco.

b. var. attenuata (BALL) MAIRE in Jahand. et Maire, Cat. Pl. Maroc 3, 1934, p. 888.

Leaves pinnatisect, with few lobes and often conspicuously enlarged terminal (widely oblong) lobe, glabrescent. Stem-base woody, knobby; stem straight, slender, wiry, laxly leafed. Superior petal 3-cleft, lobes narrow; stamens 10–12, anthers yellow. Capsules cylindrical, rarely clavate, on ca. 3 mm long, slender pedicels. Seeds laxly and shortly papillose.

Type: BALL s.n., Maroc merid., in regione superiori Atlantis majoris – Ait Mesan! (n.v.).

Distribution: Morocco.

c. var. suffruticosa (LOEFL.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda suffruticosa* Loefl., Reise Span. Länd. 1766, p. 113.

Leaves (at least lower ones) bipinnatisect, scabrid. Stem base not woody. Superior petal shallowly lobed, lobes wide; stamens up to 18, anthers brick-red. Capsules clavate or pyriform, rounded-angled, pedicels up to 1½ mm long, very thick. Seeds echinate-papillose.

Type: 'L 395.a. c undata' (LINN 629.17, holotype).

Distribution: Spain.

Taxonomical notes: In the Linnean Herbarium is a specimen (629.12) labeled '3–4 gyna H. U. Hispania fruticulosa A' written by LINNAEUS. Whether this specimen is the original one LINNAEUS received from Spain, or whether it was grown from seeds received from Spain is uncertain, but there is no reason not to accept 629.12 as the holotype of *R. fruticulosa* L. A second specimen, pinned to this sheet is 629.13, received from LOEFLING (cf. SAVAGE, Cat. 1945, p. 85), and labeled 'L 397.a. fruticulosa'. This specimen is *R. lutea* L.

It is to be noted that in the Codex Linn. (by RICHTER, 1835, p. 463) the nomenclatural inadmissible replacement of the name *R. fruticulosa* by *R. suffruticulosa*

by LINNAEUS (Sp. Pl. 2nd ed., 1, 1762, p. 645) was rectified. It is interesting to note that LINNAEUS in 1759, in the protologue to *R. fruticulosa* noted that the base of the plant was 'fruticoso'; in 1762 he found that the base might also be less lignescent 'suffruticoso', and accordingly LINNAEUS made the epithet more fitting, viz. *suffruticulosa*. The old observation of LINNAEUS is still reflected in the present key to the infraspecific taxa in *R. fruticulosa* L.

Reseda suffruticulosa LOEFL. was described in 1766 (Reise Span. Länd., p. 113). In LOEFLING's It., 1758, p. 79, a description was given of a *Reseda* species, but no epithet was mentioned. The same description was applied by LOEFLING to '*R. suffruticulosa* LOEFL.' (l.c., 1766, p. 113).

In the Linnean Herbarium is preserved a specimen of *R. suffruticulosa* LOEFL. This specimen (629.17) is accompanied in handwriting by 'undata', possibly written by LINNAEUS in the course of preparing his second edition of Species Plantarum published in 1762. The specimen was collected by LOEFLING in Spain (395a; see also SAVAGE, Catal. Linn. Herb. 1945, p. 85). There is no sufficient argument to separate *R. suffruticulosa* LOEFL. (1766) from *R. fruticulosa* L. as a species.

Here is accepted LINN 629.17 as the type (either holotype or isotype) of *R. suffruticulosa* LOEFL. No specimen accompanied by LOEFLING's handwriting or identification as '*suffruticulosa*' apparently is preserved in any herbarium. LOEFLING collected his specimen at Ciempozuelos near Aranjuez (cf. WILLK. & LANGE, Prodr. Fl. Hisp. 3, 1880, p. 890). See also notes on typification of *R. undata* L.

Reseda bipinnata WILLD., Enum. Pl. Hort. Berol. 1, 1809, p. 449. In the WILLDENOW herb. (9233; Film 1857/7 (B)), is conserved a sheet bearing a leafy inflorescence and two leaves (and a leaf-base). This belongs in *R. fruticulosa* L. var. *suffruticulosa*.

The label accompanying the WILLDENOW specimen has the legend 'Planta speciosa sexpedalis & altior. Habit. circa oppidum Aranjuez in rupibus gypseis medio maji florens.'

Reseda undata L. sensu BOISS., Voy. Bot. Esp. 2, 1839–45, p. 75. BOISSIER (l.c. 1, 1839–45, pp. 44, 75, 'Atlas' t. 20 et 2, pp. 75–76) paid repeated attention to the identity of *R. undata* L. From his literature references and discussions it follows that he took LINNAEUS's *Reseda undata* of 1762 (Sp. Pl. ed. 2), as representing *Reseda undata* L. (1759). It is demonstrated in the present revision, on the bases of LINNAEUS's descriptions in 1759 and 1762, that *R. undata* L. (1759) is different from *R. undata* L. (1762), and *R. undata* L. (1762) is to be named *R. fruticulosa* L. The two specimens named '*R. undata* L.', preserved in the Linnean hb. support our decision (see taxonomical notes sub *R. alba* L. and *R. undata* L.).

Now, BOISSIER collected several specimens on dry mountains and hills (between 600–2000 m) in southern Spain and near Aranjuez and he expressed his conviction that they represented *R. undata* L. (1762), i.e. Sp. Pl. ed. 2, p. 644.

He further expressed his opinion (l.c., p. 76) that *R. bipinnata* WILLD. had received a wrong name, ('impropre'), because *R. bipinnata* WILLD. had, he

stated, not bipinnate leaves. Actually, BOISSIER was in error; *R. bipinnata* WILLD. (= *R. fruticulosa* L.) certainly has bipinnate leaves, especially the lower leaves, though sometimes this character is not constant in stem leaves.

BOISSIER's criticism, however, indicates that his specimens do not belong to, as he thought, *R. undata* L. (1762), and they had no bipinnate leaves.

It appears from BOISSIER's drawings and descriptions that he rightly considered his specimens referable to '*R. minor alba dentatis foliis*, BARREL. icon. tab. 588!'. Anyhow, this tabula cannot be identified with certainty.

The name '*R. undata* BOISS.' as listed in Ind. Kew. 2, 1895, p. 697, is an inaccurate citation. BOISSIER (l.c., p. 75, t. 20), cited '*R. undata* L.' (1762) at the end of the description and the legend of his tabula. At any rate, '*R. undata* BOISS.' has no status under the Code, being a later homonym to *R. undata* L. (1759).

The earliest reference to *R. baetica* J. GAY was made by MUELL. ARG. (Mon. Rés. 1857, p. 109) who reported it as a name in hb. BOISSIER. He accepted the taxon as a variety, '*Reseda bipinnata* WILLD. β *baetica* MUELL. ARG.', and quoted as a synonym to this variety: '*Reseda undata* BOISS. Voy. en Esp. p. 75 t. 20 (icon. pulcherrima), non L. nec Spec. plant. nec hb.'. The second synonym he cited was '*R. barrelieri* BERTOL. Fl. ital. V, p. 32 adnot. excl. Syn. BARR. ic. 588'.

MUELLER cited two specimens: 'In arenosis montium Granatensium alt. 2000–3000 ped. supr. m.; in Sierra de Gador (BOISS. in ej. hb.!)'.

Afterwards, *R. baetica* GAY was figured as a species (see LANGE in WILLKOMM et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 889, 891). On the other hand MUELLER himself adopted the taxon as a species under the name *R. barrelieri* BERTOL. (cf. DC., Prodr. 16(2), 1868, p. 557).

The type specimen of *R. bipinnata* WILLD. β *baetica* however, proves that a taxon was at hand which was adopted and published as a species for the first time by MUELLER ARG. who named it '*R. barrelieri* BERTOL.' (l.c.). BERTOLONI did not definitely accept the name *R. barrelieri*; he proposed the name only under certain conditions (cf. BERTOL., Fl. It. 5, 1842, p. 32). Therefore, the correct citation becomes *R. barrelieri* BERTOL. ex MUELL. ARG. dating from 1868 (cf. Int. Code Bot. Nom. 1972, Art. 34).

As to typification, it ought to be realized that MUELLER based *R. bipinnata* WILLD. β *baetica* MUELL. ARG. on two specimens (cited above) from Mt. Granada and the Sierra de Gador. These specimens, most probably, served as a model for BOISSIER's picture of '*R. undata* BOISS.', which was also referred to by MUELL. ARG. (l.c.). LANGE cited more specimens under *R. baetica* but included the specimen of Sierra de Gador and agreed with MUELL. ARG. on the identity of the picture by BOISSIER, cited above.

It follows that *R. baetica* (J. GAY ex MUELL. ARG.) LANGE and *R. bipinnata* WILLD. β *baetica* J. GAY ex MUELL. ARG. rest on the same type material (for *R. barrelieri* BERTOL. ex MUELL. ARG. are quoted two specimens, the same as for *R. bipinnata* β *baetica*).

Since *R. barrelieri* BERTOL. ex MUELL. ARG. and *R. baetica* (J. GAY ex MUELL.

ARG.) LANGE rest on the same type material, *R. baetica* (J. GAY ex MUELL. ARG.) LANGE becomes a homotypic synonym of *R. barrelieri*. See also rejected names sub *R. barrelieri* BERTOL.

LANGE is firmly convinced that '*R. baetica*' and '*R. suffruticosa*' are clearly distinguished but the differences suggested in his key (cf. LANGE in WILLKOMM et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 889) are not constant and disappear after examination of the range of specimens available for this present revision (including type material).

The flowers of specimens ascribed either to '*R. suffruticosa*' or '*R. baetica*' appear to possess stamens numbering between 12 and 20; the capsules in the type of '*R. baetica*' are papillose. Whether the radical leaves are bipinnatisect in all '*R. suffruticosa*' specimens is very doubtful, although it is certainly found in large, well-developed specimens. The seeds of '*R. baetica*' (type specimen) and '*R. suffruticosa*' are exactly identical in appearance.

It is here decided to reduce '*R. baetica* (J. GAY ex MUELL. ARG.) LANGE' (= *R. barrelieri* BERTOL. ex MUELL. ARG.) to the synonymy of *R. fruticulosa* L. var. *suffruticosa*.

HEYWOOD cited '*Reseda baetica* GAY ex MUELL.' (in FEDDES Rep. 64, 1961, p. 67) stating that *R. baetica* is a microspecies, 'very imperfectly known and in Madrid Herbarium the few sheets reputed to be this refer to other species' (i.e., p. 68). Apparently, HEYWOOD considers *R. baetica* to belong in *R. fruticulosa*.

In 1873 BALL published *R. gayana* BOISS. subsp. *attenuata* (Journ. Bot. N.S. 2, p. 299). He described his new subspecies and based it on a specimen collected in the Atlas Mountains 'Atlantis Majoris - Ait Mesan' and 'jugo Tagherot' at an altitude of 2100 m-3000 m.

He raised this subspecies to the rank of species *R. attenuata* (BALL) BALL in 1878 (Journ. Linn. Soc. Bot. 16, p. 338), repeating the text of 1873 verbatim, and as (an) additional specimen(s) he mentioned IBRAHIM s.n. (sent by COSSON), collected in the Mountains 'Djebel Afougueur et Djebel Ouense'.

When publishing the subspecific epithet '*attenuata*' in 1873, BALL stated 'facile sicut species distincta adnumeranda'.

In 1878, he declared that '*R. attenuata*' was allied to *R. gayana* but different mainly by very small petals which were trifid near to the base and all appendiculate whereas the capsules had more prominent teeth; added 'Forsan sicut subspecies enumeranda'.

R. sessiliflora was raised to the rank of a species by PAU (in Mem. Mus. Ci. Nat. Barcelona Ser. Bot. 1(3), 1925, p. 12), who had described the taxon previously as a variety 'nueva contrib. p. 27'. He referred to specimen(s) collected near Guadix and between Guadix and la Calahorra.

PAU (Nueva Contrib. Fl. Gran. 1922, p. 27), briefly described and discussed a supposed variety *sessiliflora* in *R. suffruticosa*, which he raised to the rank of a species afterwards.

The type was not seen, as the Barcelona Herbarium was not permitted to send specimens on loan. There being no evidence to segregate *R. sessiliflora* PAU as a species or as a variety it is here reduced to *R. fruticulosa*.

A specimen in the herbarium of A. HUBER-MORATH at Basel (BAS-SIM) appears to belong to *R. fruticulosa* (A. HUBER-MORATH 3592). This was collected on May 28, 1936, on the northern slope of Sierra Nevada (Granada province), at an altitude of 1100 m. The specimen is aberrant in its floral characters and in particular all stamens are reduced and sterile. Possibly, the unusual growing locality for *R. fruticulosa* caused reduction of the anthers. An exact identification is impossible.

· Ecological notes: Utrecht Univ. students observed *R. fruticulosa* in a 'steppe on hill, 1 km S. of Aranjuez (Castilia)', on May 3, 1957, in flower (CAI, U). FONT QUER and RIVAS GODAY collected it in Teruel Province, Valdelinares, on 'Collades arcilloso-calizos' at 1800 m alt., in seed about the end of June (F). J. BORJA found it in the type locality of '*R. suffruticosa* LOEFL.', dry arid gypsum hills near Aranjuez, flowering and fruiting 15th May, 1950 (F, U) where it had been collected by JOH. LANGE in 1852 (C, UPS). PORTA et RIGO collected '*R. suffruticosa*' in Prov. Malacitana, on waste ground, near the Convent of Sierra Nieve, at 800-900 m alt. (UC, W). At Yunquera (S. Spain) it was collected by N. HJALMAR NILSSON (no. 802, UPS), who found it also at San Geronimo and Mulahacen, Sierra Nevada, fruiting in August (UPS).

BALLS collected *R. fruticulosa* var. *attenuata* in Morocco (Djebel Amezduox, Tizi n'Tlata) and noted 'Flowers cream-yellow with soft red apricot anthers. Stems to 3 ft. tall. Leaves glossy, grey, much waved at edges. Granite slopes'. It grew at 2400 m alt. and flowered 9.VI.1936 (B 2724; GH).

In a personal letter H. C. D. DE WIT wrote to Dr ABDALLAH:

'On occasion of a visit to Aranjuez I decided to look for LOEFLING's *R. suffruticosa* on the locus classicus. I had seen no trace of it in various areas in the region although I was on the look-out (Tarancon, Noblejas, Ocana).

At 14 km NE. of Aranjuez is Villaconejos. Having passed Villaconejos proceeding to Titulcia in the direction of Ciempozuelos (the finding locality expressly mentioned by LOEFLING), the road winds through rolling country at ca. 600 m alt.

In the second half of July (I was there July 29th, 1966 to be exact), the plant-cover seems dead (except cultivated areas). The crops of the neighbourhood are wheat, barley, grapes and olives. The soil is bone-dry under a glaring sun and a fitful wind chases whirls of pale dust far over the land.

Immediately after passing Villaconejos, '*R. suffruticosa*' appears. Very conspicuously so, because the giant thistles massed along the roads all over that countryside, are strikingly less frequent here. Specimens of '*R. suffruticosa*' are easily seen because they are very much the largest plants in the vegetation-cover of their growing localities.

Nevertheless, the number of individual specimens is low, there may be a dozen or so together, widely interspaced, and the next group is only seen at a kilometre's distance. Solitary specimens are not uncommon.

The plants seem to be strictly confined to a kind of marble-like crystalline

light-grey rock and the powdery soil it produces. They prefer the upper slopes of low rounded hills. On the map by E. H. DE VILAR, Soils of the Lusitano-Iberian Peninsula (1938) these outcrops are described as 'semi-humid calcareous soils, areas with abundant calcareous rocky-skeletal character'. I found the finest set of specimens on an abandoned sparsely overgrown threshing-plot of about 100 m², which still was clearly demarcated in the terrain. By clearing away the plant-growth and bits of soil from the rock, the peasants obtain a hard floor on which mules or donkeys are (or were) driven around, tied to a kind of wooden sledge. Under the sledges the spread bundles of cereal were crushed and the grain secured by throwing the chaff into the wind.

On this plot, abandoned three or four years ago, a group of more than half a dozen specimens stood, some of them over 2½ m tall. It almost seemed that the plants had been put there on purpose, which certainly had not happened. '*R. suffruticosa*' appears to show the weedy tendency, common to many *Reseda*'s, within its narrow edaphic boundaries.

The basal rosette sometimes attains 50 cm in diameter. The very hard, lignescent taproot may become as thick as a woman's wrist and when wounded, it smells weakly like horse-radish (*Cruciferae*!). One or several spreading branches, and often numerous slender branchlets, occur at irregular intervals. Sometimes the inflorescence is over 1½ m long, a tail of hundreds of crowded capsules. Though the large majority of specimens were completely dried in their lower parts, there were some which still carried buds and flowers at the top of the branches. One wonders how these flowering stem-tops obtain the required amount of moisture.

Occasionally an old dry stem bears a young rosette on its base. Near the old dead fruiting plants were a few solitary rosettes of the first year. It looked as if a seed might germinate and survive only when starting in a tuft of some other, small plant (*Bromus*). Of the innumerable seeds not one in ten thousand appears to produce a new plant.

A discoloration to brownish-red or orange of the grey-green leaves is apparent in '*R. suffruticosa*', another trait common with many other *Reseda*'s. I did not perceive any fragrance of the flower.

Some kilometers before Titulcia the plants disappear and I saw no other specimens closer to Ciempozuelos (only from one side I approached that village). I feel sure that my description pertains to the original area because it is reached directly from Aranjuez where LOEFLING passed some years at the Royal Palace.

The vein of marble-like rock is recognizable from a distance, by the glittering bits of glassy rock and the whitish soil. This rock is strictly correlated with the occurrence of '*R. suffruticosa*'. Once one has become familiar with the habit of '*R. suffruticosa*', specimens are spotted from afar. When no plants were visible, the colour of the soil (and the kind of rock) invariably were different.

The next morning I went to Villaconejos but now I continued by Colmenar de Oreja and Belmonte to Villarejo de Salvanes, where the Madrid-Valencia road is reached. Not a single specimen was seen for the larger part of that first road,

where the marble rock appeared to be absent. Following the main road towards Madrid, all of a sudden the glittering stones reappear near Percales, and there are the plants again, in small groups, on the roadside and in all directions over the hills, wherever the rock essential to their occurrence, reaches the surface of the earth. After a few kilometres the vein is crossed and '*R. suffruticosa*' vanishes. I am convinced that after a full-scale control, '*R. suffruticosa*' will appear to keep without exception to the grey-white marble soil. This second finding locality is at ca. 20 km from the first and most probably connected by it, following the marble-vein across the land'.

Specimens examined:

Var. *fruticulosa*

Morocco. Gandoger s.n., VI.1909, s.l.

Portugal. Fernandes c.s. 6439, Pedreiras de Santo Adrião pr. Viniosa; Mariz s.n., VI.1888, *ibid.*

Spain. Beltrau s.n., V.1930, Valencia, Jativa; Boissier s.n., aest. 1837, Mt. Granatensis; id. s.n., VII.1838, Sa Nevada et Sa Tijida; Bourgeau 1694, Sierra de S. Antonio près Alcoy; Caballero s.n., 12.V.1933, Serrania de Cuenca, Puente Vaddilos (Cuenca); id. s.n., 24.VI.1935, pr. Cuenca, Serrania de Cuenca, Solan de Cabras (Cuenca); Camara 9784, Alicante, Alcoy; Font Quer y Rivas Goday 540, Prov. de Teruel, Valdelinares, en la Tajera; Huber-Morath 3591, Prov. Valencia, Jativa; id. 3592, Prov. Granada; Sierra Nevada, Nordhang; Jimenez s.n., 30.VIII.1883, Sierra Nevada, Mulhacén; Lange s.n., 10.V.1852, Aranjuez; Loscos s.n., à 1858, Aragon austr., Alturas de la Palomita, type *R. macrostachya*; id. 8, 4.VII.1876, prov. Aragon, pr. Mosqueruela; Nilsson 802 (28.V. 1883), Rio Grande & Nacimiento; id. 802 (2.VI.1883), Guadalhorce, Cortama; id. s.n., 20.VIII.1883, Sierra Nevada, Mulhacén also from San Geronimo; Porta et Rigo 102 (à 1891), Valentinum, Mt. Monlucher; id. 59 (à 1895), prov. Malacitana, ad Convento da Sierra Nieve; Rambur s.n., 7 br. 1837, Mts. de la Sierra Nevada, à Grenade, dans le lit du Xenil; Reese s.n., 13.IV.1924, Prov. Malaga, Andalusia, Tajo near Ronda; Reverchon 1413 (à 1906), Prov. Jaen, Sierra de Cabrilla; id. 1413 (à 1906), prov. Grenada, Sierra Segura; Stud. Biol. Rheno-Trai. 782 (1951), Prov. Valencia, Sierra de Corbera; Webb s.n., 9 br. 1837, Sierra Tejada, near Velez Malaga; Winkler s.n., 9.VII.1876, Sierra Alfacar.

Var. *attenuata*

Morocco. Andreánszky s.n., 22.V.1928, Atlanté major, Asvound; id. s.n., 24.VI.1930, Atlas Major, valle Aid Miran; Balls B2724, Tizi n'Tlata; Emberger s.n., 4.IX.1925, Ourika, Tahuages près Oukagmeden; id. s.n., 7.IV.1929, Marrakech, gorges de Mowlay Brahim près Ansi; id. s.n., 19.IV.1931, Anti-Atlas, entre Igherm et Issafen; id. s.n., 30.VI.1931, Grand Atlas, Demnet, Ghat-se; Gattefossé 366, Anti-Atlas, Massif du Siroua, Djebel Amezdour; id. s.n., 10.VI.36, Anti-Atlas, Djebel Amezdour, (Massif du Siroua); Gattefossé et Werner s.n., 30.VI.1932, Siroua au Tizi-n-Ougdoun; Giboulet 4, entre Sidi-Farès et L'Oukaimeden; Hooker s.n., IV-V.1871, S. Morocco, Greater Atlas, Revaia; id. s.n., V.1871; Ibrahim s.n., VII.1873, Djebel ?Afaugusir, Mt. SO. de la ville de Maroc; id. s.n., VI.1874, Djebel Quensa, SO. de la ville de Maroc; id. s.n., 18.VI.1875, Djebel ?Afaugusur, Mt. SO. de la ville de Maroc; id. s.n., 1883, Djebel Taboughert; id. s.n., à 1883, Dj. Touchka; id. s.n., 4.21.VII.1884, Dj. Lalla-Aziza; Jahandiez '837 bis' Grand Atlas, T(P)amatert (Ait Abessave), lieux pierre-ny; Lindberg 3688, Atlas Magnum, in convalle fl. Ait Messane; Maire s.n., 8.VII.1924, Atlas Majoris, ditioe Glaoua, Tizi-n-telouet; id. s.n., 19.VII.1924, *ibid.*, Vallee Reraya prope Arround; id. s.n., 9.V.1932, Anti-Atlas, prope Tachokcht; Samuelsson 6612, Atlas major,

Asni; Stomps s.n., 9.IV.1936, Haut Atlas, near Asni; De Wilde c.s. 2029, N. Tizi-n-Test, between the Test and Idni.

Var. suffruticosa

Spain. Borja s.n., 15.V.1950, Aranjuez (Madrid), loco typo; Bourgeau s.n., 4.V.1954, *ibid.*; id. 2277, coteaux du Cerro de Aranjuez; Hackel s.n., 12.VI.1876, prope Aranjuez; Huter, Porta et Rigo 950 (à 1879), Granatense, prov. Malacitana, Sierra de Alora; De Jus-sieu s.n., à 1717, in Hispania; Lange s.n., 20,21.V.1852, ad Aranjuez; Laguna s.n., à 1878, *ibid.*; Pau s.n., 21.V.1897, *ibid.*; Rouy s.n., 10.VI.1883, *ibid.*, près la Mar d'Ontigola; Stud. Biol. Rheno-Trai. 1192 (1957), 1 km S. Aranjuez (Castilia); Winkler s.n., 16.VI.1876, Aranjuez; De Wit 10061-65, Villaconejos prope Aranjuez per viam ad Ciempozuelos, in loco typico lecta; id. 10066, via grandis Madrid-Valencia, prope Tielmes.

19. *Reseda germanicopolitana* HUBER-MORATH

Fig. 44

In *Bauhinia* 2(3), 1965, p. 295; Coode in Davis, *Fl. Turk.* 1, 1965, p. 505.

Perennial, erect, pilose-hirsute (hairs ca. 2 mm long, clavate, \pm capitate), dull green herb, 70-100(-more) cm tall, tap-root not known.

Stems solitary or few, branching above middle, up to the inflorescence densely leafy, ribbed, papillose-hirsute, pith disintegrating.

Leaves deeply pinnatifid, 7-12 cm long, 3-5 cm wide, papillose-hirsute; lobes (2-)3-5(-more) on each side, gradually longer towards the top (terminal lobe larger and longer than the laterals), terminal lobe (ob-)ovate, 4-5 cm long, ca. 1 cm wide, lateral lobes narrowly ovate to sub-linear, $1\frac{1}{2}$ - $3\frac{1}{2}$ cm long, 2-6 mm wide, lobes of upper leaves (narrowly) linear, up to 4 mm wide, obtuse to acute; margin flat, entire.

Flowers white, on long patent pedicels. Raceme erect, 30-50 cm long and very lax towards maturity, occupying $\frac{1}{3}$ or more of the stem, peduncle strongly ribbed and indumentum shorter than the stem. Bracts deciduous, shortly comose, minutely scabridulous, linear-ovate, $6\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide, acute; margin entire. Pedicels slender, 5-10 mm in flower, up to 20 mm long in fruit, erect-patent to slightly flexuous.

Sepals 7-9, tardily deciduous, glabrous, foveolate when dry, linear-spathulate, $2\frac{1}{2}$ -3 mm long, $\frac{3}{4}$ mm wide, obtuse, margin entire.

Petals $2\frac{1}{2}$ -3 mm long. Limb of superior petal irregularly 9-15-palmatipartite, and often almost to base 3-partite, ca. $\frac{1}{2}$ as long as the appendage. Central lacinia much longer and wider than adjacent laciniae; laciniae linear(-spathulate), obtuse; appendage ovate, $2\frac{1}{2}$ mm long, 2 mm wide, free transverse rim $\frac{1}{2}$ (-more) mm wide, margin papillose. Lateral petal smaller, limb similar to that of superior petal, sometimes lateral laciniae irregular. Anterior petal 3-partite.

Disc $1\frac{1}{2}$ mm high, 2 mm wide, minutely papillose, margin erose.

Stamens ca. 28, much exceeding the petals. Filaments deciduous, glabrous,

3½ mm long. Anthers oblong, 1½ mm long, minutely asperulous.

Ovary ovoid-ellipsoid, short stipitate, teeth 3, ⅓ as long as ovary. Ovules 14–19 per placenta, in 3–4 rows.

Capsules (immature) patent, short stipitate, glabrous, obovoid or ellipsoid, 12 mm long, 5 mm wide, mouth narrowed, teeth erect.

Seeds (immature) orange yellow, subglossy, obliquely ovoid, 2 mm long. *Sinus* (when mature?) a very narrow slit. Testa appearing delicately striate.

Type: HUBER-MORATH 14852, Turkey, Prov. Çankiri, Distr. Çankiri, Steppe auf Gips beim Bahnübergang 10 km südlich Çankiri (= Germanicopolis nom. vet.), 670 m, 29.VI.1958 (hb. HUB.-MOR. = holotype); n.v.

Distribution: Known only from the type locality.

Taxonomical notes: By the indumentum, the pinnatisect leaves and the shape of the seeds, *R. germanicopolitana* shows affinity with *R. tomentosa* BOISS. It is easily distinguished from *R. tomentosa*, however, by the fruit-pedicels, which are longer than the capsules and the laciniae of the limb of the superior petal are irregular while the central lacinia much exceeds the almost linear laterals.

In *R. tomentosa* the capsules much exceed the pedicels and the lobes of the limb of the superior petal are linear-spathulate, flabellate.

The specimen studied by us, kindly supplied by Mr. C. SIMON (BAS), bore no collector's number, the date 29th June 1958, and for the altitude 730 m. It was found in a dry watercourse on gypsum, ± 6 km before Çankiri. Partly the collector's data agree with the data given for the holotype by HUBER-MORATH (l.c.) and partly they do not. It is just possible that we examined an isotype.

Ecological note: *R. germanicopolitana* (the Ancients used the name Germanicopolis for Çankiri) occurs at medium altitude (660–730 m), on gypsum, in steppe, sometimes associated with *Artemisia* in the Çankiri-Kalecik region.

Specimens examined:

C. Simon s.n., 29.VI.1958, Anatolica, Vil. Çankiri, Strasse Ankara-Çankiri, Im Tal des Tatli Çay, beim Bahnübergang, ca. 6 km vor Çankiri (hb. C. Simon, Basel = ?isotype).

In Engl., Bot. Jahrb. 43, 1909, p. 416; Cufod. in Bull. Jard. Bot. Brux. 24, Suppl., 1954, p. 160.

R. nogalensis Chiov., Fl. Somalia 1929, p. 88; Cufod., l.c. (= var. *nogalensis*).

Annual, erect, (bright) green herb, 30–60(–90) cm tall, tap-root lignescent.

Stems solitary, often branching from base, often virgate, densely leafy, mucicate-papillose to glabrous, subterete, ribbed, pith solid.

Leaves (bright) green, indistinctly petiolate, mucicate-papillose or glabrous, basal leaves entire, upper 3-fid or palmatifid (incisions ca. half way) (sometimes a lateral lobe bifid), 4–7 cm long, lobes narrowly (ob)ovate, terminal lobe longer (6–3 mm wide), lateral lobes narrower (3–2 mm wide), lobes acuminate, mucronate, margin mucicately serrate.

Flowers golden yellow, especially the anthers, large, on 2–2½ mm long pedicels. Raceme densely flowered, erect, 35 cm or more in fruiting; peduncle ribbed, (densely) mucicate-papillose to glabrous. Bracts deciduous, pale yellow, linear-subulate, 4–5 mm long, ⅓ mm wide, margin serrulate, undulate. Pedicels ribbed, usually scabrid-papillose, in flower ca 2½ mm long and sturdy, in fruit 3–6 mm long.

Sepals 6, deciduous, linear(-oblong), 2½–3 mm long, ⅓ mm wide, obtuse or acutish, margin narrowly whitish.

Petals 4 mm long, slightly less than twice as long as sepals. Limb of superior petal deeply 6–9-palmatifid (often 3-sect and lateral lobes multipartite), ca. 1½ as long as the appendage, central lobe (much) exceeding adjacent laciniae, lobes narrowly linear(-spathulate), obtuse; appendage obovate, ⅔ mm long, ⅓ mm wide, free transverse rim continuous, narrow (\pm ¼ mm wide), margin of appendage densely papillose. Lateral petal smaller, anterior lobe wanting, laciniae similar to those of superior petal. Anterior petal smallest, limb simple, linear(-spathulate).

Disc ¾ mm long, ⅔ mm wide, glabrous, margin recurved, papillose.

Stamens 18–20. Filaments deciduous, glabrous, 2½ mm long. Anthers oblong, 1½ mm long.

Ovary ovoid-cylindric, glabrous, 3-angled, 3(–4)-toothed, teeth ca. ⅙ as long as the ovary. Ovules 20–25 per placenta, in 4(–5) rows.

Capsules erect, imbricate, short stipitate, glabrous, ovoid, pyriform to ellipsoid, 5–10 mm long, 3–5 mm wide, mouth gaping, constricted below the teeth, side-walls sulcate.

Seeds black, dull(ish), reniform, ¾–1 mm long. Sinus narrow. Testa densely and shortly papillose, a small protuberance opposite the radicle.

Type (syntypes): DRAKE-BROCKMAN no. 281, Somaliland, Golis Range; ELLENBECK no. 2164, Gallahochland, Boran, Karro Gudda massenhaft am Rande des trockenen Flussbettes (n.v.).

Key to the varieties

- 1. Capsules ovoid to pyriform, ca. 5 mm long. Leaves dense. **b. var. brachycarpa**
- 1. Capsules cylindric-ellipsoid, ca. 7–10 mm long.
- 2. Leaves dense, sometimes biternately divided. Seed-papillae fine and close. Capsules up to 10 mm long. Usually scabridulous herbs. **a. var. gilgiana**
- 2. Leaves few and widely spaced, always trisect. Seed-papillae coarser and remote. Capsules ca 7 mm long. Usually glabrous herbs. **c. var. nogalensis**

a. var. gilgiana

Usually scabrid herbs. Leaves dense on the stems, often biternate. Capsule oblong-ellipsoid (much longer than wide), up to 10 mm long. Seeds ca. 1 mm long; papillae fine and close.

Distribution: Somaliland.

b. var. brachycarpa ABDALLAH et DE WIT, *nov. var.*

Herba minute scabridula. Folia densa, 3-fida aut palmatisecta. Capsula ovoidea aut pyriformia, longitudine ca. 5 mm. Semina $\frac{3}{4}$ mm longa, grosse et dense papillata.

Type: DE WIT 9953, Djibouti, Dorala, near the sea (holotype, WAG).

Distribution: Djibouti and Somaliland.

Slightly scabrid herbs. Leaves densely opposed on the stems, often palmatisect or lateral lobes bifid. Petals ?white. Capsule subglobose to obovoid very rarely pyriform (hardly longer than wide), ca. 5 mm long, mouth truncate. Seeds $\frac{3}{4}$ mm long, papillae coarse and close.

c. var. nogalensis (CHIOV.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda nogalensis* Chiovenda, Fl. Somala 1929, p. 88.

Glabrous herbs. Leaves few and widely spaced on the stems, trisect. Capsule cylindric-ellipsoid, ca. 7 mm long. Seeds ca. 1 mm long, papillae coarse and remote.

Type: STEFANINI et PUCCIONI 940, Somalia Sett. altipiano tra il Nogel e il Darror, Boscaglia fra Bio Godût e Saha Giòghen 28.VI.

Distribution: Somaliland.

Taxonomical note: *R. gilgiana* PERK. (l.c.) was based on DRAKE-BROCKMAN 281 and ELLENBECK 2164. These specimens were not seen by us but e.g. C. F. HEMMING entirely matched the description. Moreover, DRAKE-BROCKMAN 282 and 283 (Somaliland; K) are *R. gilgiana*.

Ecological note: HEMMING found flowering specimens on Nov. 20, 1961, in the coastal region 'in a wide area of alluvial soil in an ill defined drainage area. Basic vegetation *Balanites orbicularis*. A yellow flowered, woody herb to 2–3 ft.'. At Karro Gudda it flowered and bore young fruits in May.

Specimens examined:

Var. gilgiana

Somaliland. Bally 3784, Sheik Pass; Bicchetti '4', VII.–VIII. 1891, Da Obbia, Wuarandi; Burne 22, Sheik; Drake-Brockman 282 & 283, Golis Range; id. 388, s.l.; id. 1069–1072, 30 miles S. of Balhar; Gillet s.n., s.d., Behen a Dullah; Hemming 2345, N. Region, 5 miles E. of Bulhar; id. 2376, *ibid.*, 12 miles from Las Dureh on Duberin Rd.

Var. brachycarpa

Djibouti. De Wit 9953, Dorala, near the sea, holotype.

Somaliland. Glover and Gilliland 834, Boramo district, 70 miles from Boramo, in tug bed running in Marahle Hills, Tug Marahle, paratype; Hemming 1915, N. Region, Sheik Pass, paratype; Phillips s.n., s.d., Bihen (intermediate with *var. gilgiana*).

Var. nogalensis

Somaliland. Glover and Gilliland 1108, at Halin; Stefanini and Puccioni 940 [1034], Altipiano Tra Il Nogel e Il Darror, Boscaglia fra Bio Godût e Saha Giòghen (holotype).

21. *Reseda glauca* LINNAEUS

Fig. 46, 47

Sp. Pl. 1, 1753, p. 449; *id.*, Syst. Nat. ed. 10, 2, 1759, p. 1046; *id.*, Sp. Pl. ed. 2 and 3, 1, 1762 and 1764, p. 644; *id.*, Syst. Nat. ed. 12, 1767, p. 330; Houtt., Nat. Hist. 2(8), 1777, p. 725; Lam., Fl. Fr. 3, 1778, p. 206; Murr., Syst. Veg. ed. 14, 1784, p. 448; Moench, Meth. Pl. 1794, p. 57; Murr., l.c. ed. 15, 1798, p. 368; Willd., Sp. Pl. 2(2), 1800 (1799), p. 877; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 725; Willd., Enum. Pl. Hort. Berol 1, 1809, p. 449; Hornem., Hort. Hafn. 2, 1815, p. 501; Sprengel, Syst. Veg. 2, 1825, p. 463; Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Link, Handb. 3, 1831, p. 323; Richt., Cod. 1835, p. 463; Walpers,

Rep. 2, 1843, p. 751; Gren. et Godr., Fl. Fr. 1, 1848, p. 189; Muell. Arg., Mon. Rés. 1857, p. 196, tab. 9, fig. 121 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 582; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 890; Rouy et Fouc., Fl. Fr. 2, 1895, p. 249; Coste, Fl. Fr. 1, 1901, p. 160; Bolle in Engl. et Prantl, Pflz. fam. 2nd ed., 17b, 1936, p. 688; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347.

R. g. ex abortiva Muell. Arg., Mon. Rés. 1857, p. 198 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. l.c.

Tereianthes glauca Rafin., Fl. Tellur. 3, 1837 (1836), p. 72; Merr., Ind. Rafin. 1949, p. 132.

Luteola glauca (L.) Webb, It. Hisp. 1838, p. 67.

Perennial, ascending, glaucous herb (when fresh), 15–30(–50) cm tall, profusely branching from a woody base.

Stems numerous, slender, ascending, leafy, delicately ribbed, glabrous; pith disintegrating.

Leaves decurrent, entire, ascending to deflexed, glaucous, glabrous, linear, $1\frac{1}{2}$ –3 cm long, 1–2 mm wide, blunt to acutish, at least some leaves provided with 1–2 dents on each side near the base (dents whitish, 1 mm long, patent or retrorse).

Flowers white (yellowish when dry), on short pedicels. Raceme slender, 5–10(–15) cm long in fruit; peduncle strongly ribbed. Bracts persistent, not comose at top of inflorescence, pale green, glabrous, triangular, in flower $1\frac{1}{2}$ –2 mm long, 1 mm wide, almost equalling the pedicel, in fruit 2 mm long, margins widely hyaline, entire. Pedicels rather thick, strongly ribbed, in flower ca. $1\frac{1}{2}$ mm long.

Sepals 6(–5), persistent, glabrous, (narrow-)ovate, $1\frac{1}{2}$ –2 mm long, $\pm \frac{1}{2}$ mm wide ($\frac{1}{3}$ as long as petals), \pm acuminate, margins widely hyaline, smooth.

Petals 4–5 mm long. Limb of superior petal 3–5(–7)-lobed or -fid, flabellate, central lobe slightly longer than adjacents, \pm 3 times as long as the claw. Lobes almost triangular, incisions often irregular; appendage obovate, $1\frac{1}{2}$ mm long, 1 mm wide, rim continuous in front of limb, $\frac{1}{4}$ mm wide. Lateral and anterior petal undivided or (very rarely) 2–3-lobed, linear to narrowly ovate, sometimes abruptly tapering above middle, 4 mm long, $\frac{1}{4}$ mm wide. Appendages usually wanting.

Disc $\frac{1}{4}$ mm high, $1\frac{1}{2}$ mm wide, glabrous, margins recurved, almost entire.

Stamens 12–14, shorter than petals. Filaments persistent, glabrous, 2 mm long. Anthers broadly ellipsoid, $\frac{2}{3}$ mm long.

Ovary depressed globular, stipitate, sometimes warty, obtusely 4-sulcate, 4-toothed, teeth cuspidate, ca. $\frac{1}{2}$ as long as ovary. Placenta forked. Ovules few, 5–10, mostly 6–8 on each placenta, \pm collateral.

Capsule erect, stipitate, obovoid-subglobose, 3–4 mm long, 3 mm wide, 8-sulcate (grooves deep), mouth depressed and contracted.

Seeds black, tinged reddish brown, dull, globular-reniform, 1 mm long. Sinus narrow. Testa smooth but middle layer delicately tessellate under high magnification.

Type: '3 *glauca*' (LINN 629.4), (Hispania 396, LOEFL., right hand specimen, holotype).

Distribution: Pyrenees, medium and high altitudes.

Taxonomical notes: In the Linnean Herbarium are 2 specimens attached to one sheet (629.4), which carries in the Linnean handwriting '3 *glauca*'. On the back is 'Hispania 396 LOEFL.' and '*tetragyna* LOEFL.'. The left hand specimen is what became *R. virgata* BOISS. et REUT., the right hand specimen is *R. glauca*, as accepted unanimously by post Linnean authors. LINNAEUS cited in *Species Plantarum* as '3', *Reseda glauca*, and cited four earlier authors; three of these expressly mention the Pyrenees as the growing locality. So does LINNAEUS himself (*Sp. Pl.* 1753, p. 449). Now, *Reseda glauca* L. et auctt. occurs only in the Pyrenees, in restricted localities. *R. virgata* BOISS. et REUTER is a species of Spain, far South of the Pyrenees. The evidence is that the right hand specimen on sheet 629.4 (LINN) is the holotype of *Reseda glauca* L. A note by P. F. YEO (LINN) is in accordance with these findings.

Ecological notes: In the sets distributed by SCHULZ 'herb. norm. Cent. 3' (as represented at L (herb. sheet no. 908.185-85, herb. HASSKARL), and NY, PRC, S, UPS, and W herb.) is present a specimen of *R. glauca* accompanied by a printed label stating that it was found on sands on the banks of the Gave, in the fields covering granitic mother rocks at 1200 m alt. near Gèdre (Hautes Alpes). This leads into error. The specimen originates from BORDÈRE, and was collected in the Pyrenees near Gèdre, and there is no proof of the occurrence of *R. glauca* on granitic sands or in the Alps.

Reseda glauca is an endemic herb, occurring in the French and Spanish Pyrenees, apparently between about 1000–2000 m, and mostly on calcareous soils or rocks, on sunny slopes. It may spread along water-courses as a weed but only occasionally is found at a small distance from its true habitat. It flowers in summer (July, August). In herbarium specimens its white petals turn pale yellow or greenish.

R. glauca is apparently perennial, found at Gavarnie 1400 m alt. (E. WALL 22. VII.1925; S), at Cauterets 1250–1600 m alt. on the eastern slopes of Mt. Pégùère (NEYRAUT 4304); it grows on sandy soils at Gèdre (BORDÈRE VI.1882), in forest on grassy spots near the 'lac de Gaube' (ROUX VII.1912), or on calcareous rocky places at 900 m alt. in the same region (DESPLANTES VII.1933), on stony slopes in the valley of Héas (SENNEN 17. VIII.1903; BRNU). At 1100 m alt. BORDÈRE found it near Gèdre on calcereous soil, 11. VII.1873 (F), and

Students of Utrecht Univ. à 1947, 897, above Jouéou on an alpine meadow, on sands on the banks of Gave river, nr. Gèdre (WUK VI.-VII.1872; UPS). Above Gèdre, it flowered 25 July, in half shadow, in open beech-pine forest on calcareous rock (DE WIT 9607; WAG).

In Haute Garonne, vallée du Lys, it was collected in gravelly spots near the torrents (LEITHNER; W), and at Esquierry (Bagnères de Luchon) on stony slopes which were exposed to the sun (LERESCHE 26.VIII.1860; L). A. E. LOMAX collected it 31.VII.1888 on the Col d'Aubisque (Basses Pyrenées) (UC 188016).

RIVAS GODAY observed it at Alrededores del Balneario de Panticosa, Huesca, on 26.VII.1947 (S), while DE WIT (9744, WAG) collected it at Balneario de Panticosa (Spanish Pyrenees) flowering 4 aug., and noted that the fresh plant was very glaucous but turned light green when dried, while the white flowers changed into yellow. Syrphids visited its flowers and the plant grew at the base of a perpendicular rock, facing West, at 1636 m alt.

Specimens examined:

France. Alioth s.n., VII. 1854, Hautes Pyrenées, Cauterets; Aunier s.n., VII. 40, Haute Garonne, Luchon; Bloembergen 1736, *ibid.*, langs weg naar Gouffre d'Enfer; Bordère 81 & 4960, Hautes Pyrenées, Gèdre: id. 225 & 2353, *ibid.*, bord du Gave à Gèdre: id. s.n., à 1856, VII. 1863, VII. 1865, VI. 1869, VII. 74 & VI. 1884, *ibid.*, Gèdre; Bubani s.n., 12. VII. 1836, Haute Garonne, Lac d'Oo; Buwalda 2200, *ibid.*, Vallée de Lys, weg naar Cascade d'Enfer; Dahl s.n., 28 VII. 1949, Gavarnie; Desplantes s.n., VII. 1933, Mt. du lac de Gaube; Een s.n., 1. VIII. 1959, cirque de Gavarnie; Endrefs s.n., VIII. 1830, Mt. Llaurenti, summa rupe Roc Blanc; Grenier s.n., à 1896, Pyrenées, Eaux-Bonnes; Honnecart s.n., VII. 1850, Ubique prope Cauterets; Huet du Pavillon s.n., 3.IX.1852, Pyrenées Centrales, Esquierry; St. Lager s.n., 19.VII.1892, Entre Gavarnie et le port de Gavarnie, Hautes Pyrenées; Lange s.n., 7 VII. 1851, Haute Garonne, Vallée de Lys, pr. Bagus du Luchon; id. VIII. 1851, Hospice de Luchon; Leresche s.n., 23 & 26. VIII. 1860, Esquierry et Col de Castanze, Hautes Pyrenées; Lomax s.n., 31. VIII. 1888, Basses Pyrenées, Col d'Aubisque; Meebold s.n., s.d., Haute Garonne, Lac d'Oo; Mouillefarine s.n., 11. IX. 1890, Haute Garonne, Vallée d'Astos, près Bagnères de Luchon; Neyraut 4304, Hautes Pyrenées, Mt. Péguière, prope Cauterets; Pitard s.n., VII. 1904, *ibid.*, environs de Gavarnie; P. v. Royen 1962, Haute Garonne, weg van Jouéou naar Gouffre la Platte bij Luchon; Sennen s.n., 17. VIII. 1903, Hautes Pyrenées, Vallée d'Héas; Vallot 784, *ibid.*, Cauterets, sur la route de la Raillère; De Wit 9607, path to Cirque de Gavarnie; Wolfe s.n., VI. 1859, Foot of Cascade d'Enfer, Vallée de Lys, Bagnères de Luchon; Zetterstedt s.n., 25. VI. 1856, Pyrenées centrales, vallée de Lys.

Spain, Ball s.n., 18. VIII. 1861, Aragon, Furketa de Jentènera; id. 17.VII. 1862, *ibid.*, Panticosa; Boissier & Reuter s.n., VIII. 1858, Aragon, Port de Venasque; Bourgeau 78, Gerone, Setcasas; id. s.n., VI. 1847, *ibid.*, Vallée de Set-Casas; Goday s.n., 26. VII. 1947, Huesca, Alrededores del Balneario de Panticosa; Irat s.n., 4. VII. 1849, Aragon, Vallée de Littera près Venasque; Linnean Herb. 629.4, holotype, 629.5 'Hispan.'; Sennen 1919, Catalogne, Pyrenées à Nuria; De Wit 9744, Balneario de Panticosa.

In Ind. Sem. Hort. Petrop. 4, 1837, p. 45; id. in Linnaea 12, 1838, p. 167; Ledeb., Fl. Ross. 1, 1842, p. 236; Walp., Rep. 2, 1843, p. 753; Muell. Arg., Mon. Rés. 1857, p. 194, tab. 9, fig. 120 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 430; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 566; Post, Fl. Syr. Palest. Sin. 1896, p. 112; N. Busch in Kusnezow et al., Fl. Cauc. Crit. 3(4), 1910, p. 739; Dinsm. in Post, l.c. ed. 2, 1, 1932, p. 139; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689; Czerniak. in Komar., Fl. URSS 8, 1939, p. 611; Zohary, Fl. Palaest. 1, 1966, p. 335, tab. 489.

R. g. b. brevipes Post, l.c.; Dinsm. in Post, l.c.; Zohary, l.c., p. 336, notes.

R. g. forma brevipedunculata N. Busch, l.c., p. 739 (? pro var.).

R. g. forma longipedunculata N. Busch, l.c.

R. brevipedunculata N. Busch in Komar., Fl. URSS 8, 1939, p. 654: descr., p. 612, [p. 613]: tab. 34, fig. 5.

Annual and possibly perennial, erect to decumbent, often pale green herb, (10–)20–30(–50) cm tall, sometimes branching at base, with a lignescent taproot.

Stems solitary or few, sometimes with long, slightly spreading, slender branches, leafy, finely ribbed, glabrous, often papillose-scabrid, pith disintegrating.

Leaves rather rigid, glabrous. Radical leaves entire, spatulate to narrowly elliptic with a long attenuate base, 4 cm long, 8 mm wide. Stem leaves 3-partite or palmately 5–7-partite, 4–7 (–9½) cm long. Foliar lobes linear to linear-oblongate, narrowly decurrent (terminal lobe largest, up to 5½ cm long, 8 mm wide); lateral lobes entire or bipartite, obtuse, mucronate. All margins pallid-edged, rarely scabrid or serrulate.

Flowers pale yellow. Raceme dense when young, 5–15 (–30) cm, peduncle distinctly ribbed and more scabrid than stem. Bracts (tardily) deciduous, subhyaline, glabrous, linear-subulate, 4 mm long, ½ mm wide at base, almost equalling flower pedicels, margins entire. Pedicels slender, ribbed (ribs minutely scabrid), in flower (2–)5–6 mm long, in fruit often abruptly curved downwards at top and ½–2 times as long as capsule.

Sepals 6, persistent, (sub)membranous, glabrous, oblong, 2½ mm long, ¾ mm wide, obtuse; margins pallid, sometimes scabrid, reflexed in fruit.

Petals 3½ (–4½) mm long, exceeding the sepals. Limb of superior petal 3-sect (lateral lobes semilunate, longer than central lobe), 3–4 times as long as the claw; central lobe linear-spathulate, ½ as long as laterals, obtuse; lateral lobes 3(–3½) mm long, 1(–1½) mm wide, outer margin sinuately-dentate, sometimes entire or crenate; appendage orbicular to obovate, ± 1½ mm long and wide, rim continuous in front of the limb, very narrow, margins shortly papillose. Lateral petals smaller, anterior lateral lobe wanting, the other lateral

lobe often deeply incised. Anterior petal much smaller, simple.

Disc 1 mm high, 2 mm wide, papillose(-ciliate), margins membranous, recurved, slightly crenate.

Stamens 10–12, almost as long as the petals. Filaments persistent, 2 mm long. Anthers ellipsoid, $\frac{3}{4}$ mm long.

Ovary subglobose, distinctly short stipitate (almost sessile), glabrous, obtusely 6-angled (and with 6 deep longitudinal grooves), strongly constricted in the middle, 3-toothed, ca. $\frac{1}{3}$ as long as ovary, teeth very turgid, with globular base. Placenta carrying a single transverse row of 4–6 ovules.

Capsule erect to pendulous, sessile, on the stipiform disc, depressed subglobose, $3\frac{1}{2}$ – $4\frac{1}{2}$ mm long, $4\frac{1}{2}$ – $7\frac{1}{2}$ mm wide, 6-sulcate, glabrous, strongly constricted beneath the teeth; teeth $\frac{1}{3}$ as long as capsule.

Seeds blackish-brown, glossy, obliquely obovoid, $1\frac{3}{5}$ mm long, carunculate. Sinus wanting, represented by a shallow groove. Testa smooth.

Type: FISCHER et MEYER, provincia Schirwan (n.v.; neotype: R. F. HOHENACKER, Un. It. 1838; W).

Distribution: In the southern area between the Black Sea and the Caspian Sea and in Palestine.

Taxonomical notes: No type-specimen could be traced. The Leningrad Herbarium was unable to supply information. FISCHER and MEYER only mentioned 'in provincia Schirwan' as its habitat and gave no collector while publishing *R. globulosa* in the Index Seminum of the Petersburg botanical garden. In case no type-specimen actually can be traced with any certainty at Leningrad, a new type (neotype) is appointed; R. F. HOHENACKER, Un. It. 1838 (May/June), in desertis prope fluvium Terter, in ditone Karabach et ad fluvium Götshai in ditone Schirwan, is designated (neotype W; duplicates HAL, GH, GRO, L, PRC, WRSL).

POST described in 1896 (Fl. Syr. Pal. Sin., p. 112) var. *brevipes* in *R. globulosa* FISCH. et MEY., which occurred in Ain-Hesbân and Araq-el-Amîr, Moab. The new taxon was based on a specimen in the POST herbarium (cf. l.c. ed. 2 (DINSMORE) 1, 1932, p. 139). The only characteristic given is that the pedicel is shorter than the flower. In *R. globulosa* the pedicel varies in length and for that reason a variety cannot be distinguished solely on account of the length of the pedicel. We were unable to trace the type. Parts of the DINSMORE herbarium are at AMD, DR, GRO, L, S, Z, but no possible type was found among these specimens. Specimens collected by POST are e.g. at BM, C, UPS, US and W, but again no type material. Moreover, we doubt whether POST actually had a specimen at hand belonging in *R. globulosa* (cf. geographical distribution). For these reasons the taxon *R. globulosa* var. *brevipes* POST (l.c.), is not accepted here. In 1932 (l.c.) the number '1883' was added without explanation to POST's var. *brevipes*.

Ecological notes: *Reseda globulosa* grows at medium altitudes (\pm 600–700 m) on the slopes of the Caucasian mountains (Azerbaydzhan, Gruziya (Georgia), Daghestan), preferring steppe- or desert-like localities and clayey or gravelly soils. It flowers and fruits in early summer. PRILIPKO collected *R. globulosa* in the Karabach Steppe (Azerbaydzhan, distr. Agdam), fl. and fr. in May (BAK). GROSSHEIM found it in the Boz-dagh (near Karasachkal and in the gorges of Adzhigan-tshag river, on gravelly clays (BAK). In the plain Sarydzha (distr. Zakataly), SACHOKIA found it fruiting and flowering in June (BAK). PRILIPKO discovered it in a vegetation containing *Pistacia* and *Juniperus* (near Kutkaschen). J. D'ANGELIS collected 17-4-1950 on loess, in fields, in the northern Negev (Shoval) *R. globulosa* (short pedicels to the flowers!).

Specimens examined:

Caucasus. Alexeenko s.n., 26.VII.1898, Caucasia prov. Dagestan, distr. Samur, prope Achty; id. 13645, *ibid.*, distr. Awarsk, prope Gimpi; Becker '139', à 1874, *ibid.*, prope Achty; id. s.n., à 1876, Dagestan; Fedossaff s.n., V. 1899, Caucasia orient., prope Elisabethpol; Grossheim s.n., 15 VI. 26, prov. Tiflis, distr. Kazach, prope Uljanovka; id. 13.V.1940, Azerbaydzhan, distr. Agdash, prope Chanabad; id. 24.IV.1941, Azerbaydzhan, distr. Kiroavabad, prope Karasachkal; id. 13.V.1941, *ibid.*, distr. Samuch, in jugo Palan-Tjukjan, inter trajectos Plovdzhich et Dalmajel; Grossheim & Kolakovsky 366, Georgia, prov. Tiflis, distr. Kazach, prope p. Uljanovka; Heideman s.n., 17. VI.1932, Azerbaydzhan, distr. Gandzha, p.p. Dzhinly, mt. Naftalan; Hohenacker s.n., V. VI. 1838, prope flavum Terter, ditioe Karabach, ad flavum Götshai' ditioe Shirwan; id. 1842, Iberia caucasica; Kolakovsky s.n., 5. V. 1928, Azerbaydjan, prov. Gandzha, distr. Kazach, inter Lacum Kazan-gel et fl. Jora; id. 7.V.1928, *ibid.*, prope fl. Jora; id. 26.V.1928, *ibid.*, prope Karasachkal; Marcowicz s.n., 22.V.99, Caucasia, Ossetia, inter Unal et Misur; id. 26.VI.1901, Caucasia, Ossetia; Poretzky 397, prov. Dagestan, distr. Awarsk.; Prilipko s.n., 12.V.1928, *ibid.*, distr. Agdam, inter Borsunly et Bardy; id. 6.VI.1947, *ibid.*, distr. Kutkaschen, prope Savalan; Rady s.n., à 1880, Caucasia, Talysch; Sachokia s.n., 5.VI.29, Azerbaydzhan, distr. Zakataly, in planitia Sarydzha; Shevljakov s.n., 13.V.1940, *ibid.*, distr. Agdash, Boz-Dagh, fl. Adzhigan-tahaj.
Palestine. Angelis s.n., 17.IV.1950, N. Negev, Shoval.

23. *Reseda gredensis* (CUTANDA et WILLKOMM) MUELLER ARGOVIENSIS

Fig. 50

In DC., Prodr. 16(2), 1868, p. 582; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 897; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 688; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347.

R. virgata Boiss. et Reut. var. *gredensis* Cut. et Willk. in Linnaea 30(14), 1859–60, p. 95.

A perennial, ascending to decumbent, glaucous herb, 10–25 cm tall, densely branching from a woody, thick, stapelioid taproot, branching semi-subterraneously (digits 5–10 cm long).

Stems numerous, flexuous, branching at base, usually carrying interspaced leaf-tufts, glabrous, finely ribbed; pith disintegrating.

Leaves entire, fasciculate, (narrow) oblong to subulate, longitudinally wrinkled and foveolate when dry, glabrous, 4–8(–12) mm long, 1 mm wide, acute; margins narrowly pallid, crenate, provided by 1 or 2 pairs yellowish, 1 mm long, wide-based triangular dents at leaf-base (dents usually retrorse, often absent in axillary branch-leaves).

Flowers ochraceous-white, on short pedicels. Raceme slender, 8–10 cm long in fruit, peduncle distinctly ribbed. Bracts persistent, not exceeding flower-buds, pale green, glabrous, narrowly-ovate, 2–2 $\frac{1}{2}$ mm long, margin widely (especially at base) pallid, entire. Pedicels stout, ribbed, in flower 1–1 $\frac{1}{2}$ mm long, in fruit up to 2 $\frac{1}{2}$ mm long, sulcate.

Sepals 6, persistent, ovate to oblong, 1–2 mm long; pallid margin widening towards the base, entire to crenate.

Petals 3 $\frac{1}{2}$ –4 mm long, exerted, three times as long as the sepals. Limb of superior petal 3(–4)-lobed (incisions up to nearly $\frac{1}{2}$ downwards), at least twice as long as appendage; lobes equal or central lobe slightly larger, entire, tapering from the base, obtuse; appendage rhomboid to obovate, 1 $\frac{3}{4}$ –2 mm long, transverse free rim sometimes interrupted, $\frac{1}{3}$ mm wide, margins glabrous, entire. Lateral and anterior petal simple, obtuse, appendage wanting.

Disc $\frac{1}{2}$ mm high, 1 $\frac{1}{2}$ mm wide, glabrous, margin recurved, nearly entire.

Stamens 10–12, shorter than petals. Filaments persistent, glabrous, 2 mm long, increasing towards the base. Anthers subglobose, ca. $\frac{1}{2}$ mm long, glabrous.

Ovary obovate, substipitate, bulging between the 4 grooves (side-walls often not quite smooth), 4-toothed, teeth up to half as long as ovary. Placenta forked. Ovules 8–10 per placenta, in 3–4 rows, imbricate.

Capsule erect, sessile above the disc, obovoid-globose, 5 mm long (teeth included), glabrous, mouth often depressed, rather wide gaping.

Seeds reddish-brown, subglossy, smooth (delicately engraved, following the contours under high magnification), globose-reniform, $\frac{4}{5}$ mm long. Sinus narrow. Testa obscurely tessellate.

Type: Monte Sierra de Gredos alt. 9000 ped. in Pico de Almanzon, GRAËLLS, à ?1853, (Indic. pl. nov. sp. 13; G, lectotype).

Distribution: Spain and Portugal, in a narrow zone on some higher mountains between Madrid and Coimbra.

Taxonomical notes: WILLKOMM published *Reseda virgata* BOISS. et REUT. var. *gredensis* CUT. et WILLK. (in *Linnaea* 30(14), 1859–60, p. 95: Pug. Pl. nov. Pen. Pyr. no. 13). He stated that CUTANDA suggested to him in a letter that GRAËLLS, Indic. pl. nov. sp. 13, might represent *R. glauca* or a new species to be called *R. gredensis*. WILLKOMM made it a variety in *R. virgata*, naming and

describing it as *R. virgata* var. *gredensis* CUT. et WILLK.

One of the type specimens is GRAËLLS, leg. 1853(?) in the mountains range of Gredos, where he collected it on the top of Pico de Almazor ('Almanzon'), at about 9000 ft. The second specimen cited is CUTANDA et YSERN, Aug. 1857.

In Apend. to the Fl. Comp. Madr. 1861, p. 743, CUTANDA gave a list of the plants collected in 1857 (August) by the botanical section of the commission of the geological map, during a trip in the region of Avila. He cited '*Reseda gredensis?* Nob.', Sierra de Gredos, without description, no doubt the same specimen as cited by WILLKOMM as a syntype of *R. virgata* var. *gredensis* in 1859-60. There is no proof that CUTANDA wished to refer to WILLKOMM's earlier publication, and it is quite possible that CUTANDA had WILLKOMM's publication of 1859-60 not yet at his disposal when sending the msc. of the Apend. to the printer's. Under the circumstances, *R. gredensis* CUT. is a nomen nudum, without status under the Code. Afterwards MUELL. ARG. accepted this variety as a species which he named *R. gredensis* (CUT. et WILLK.) MUELL. ARG. (cf. DC., Prodr. 16(2), 1868, p. 582). No reference to CUTANDA's Appendice was made.

Ecological notes: GRAËLL's type specimen was reported to grow together with *Jurinea humilis*, *Juniperus nanus* and *Armeria caespitosa*. The flowers and fruits (of the paratype) were secured in August.

BOURGEAU (2396; C, GOET, LD, NY, PRC, US, W, WRSL, WU), collected it flowering in June on rocky grassfields, in the alpine region of the Sierra de Majareina, near Plasencia. At the same time it flowers in Serra da Estrela, in dry rocky areas at Cavão, Cimeiro (FERNANDES et SOUSA 4497; C, COI, U).

It is an endemic species, restricted to a few localities on the higher summits and regions of the ranges W. and SW. of Madrid.

Specimens examined:

Spain. Bourgeau 2396, Sierra de Majareina, region alpinis, au dessus Gerte, près Plasencia; Deverall et Flannigan 703A, Sierra de Gredos, Club Alpino, alt. 2050 m., among *Cytisus*; Dresser 832, distr. Avila, Sierra de Gredos, above Lagune de Gredos, alt. 2200 m; id. 889, *ibid.*, near Club Alpino; Fernandes et Sousa 4497, Serra da Estrela, Cavão, Cimeiro; id. 4504, *ibid.*, Cavão da Metade; Fernandes, Matos & Santos 6076, *ibid.*; Graëlls s.n., à 1851, Altos de la Sierra del Barco (inter Castellam novam et Veterem), circa de las Nieves; id. 12, Sierra de Gredos, ad Barco et Bejar, ad alt. 7000-9000'; Leresche s.n., 21. VII. 1862, Sierra de Gredos, vieille Castille; Pau 1120, 25.VII.1907, *ibid.*, Castille; id. s.n., 27.VII.1907, Sierra de Gredos.

24. *Reseda haussknechtii* MUELLER ARGOVIENSIS

Fig. 51

In DC., Prodr. 16(2), 1868, p. 574 '*hausknechtii*'; Boiss., Fl. Or. Suppl. 1888, p. 69; Rech. f., Fl. Lowl. Iraq 1964, p. 327.

Annual or ? perennial erect or sometimes ascending, glaucescent herb, 40–60(–80) cm tall; taproot lignescent.

Stems numerous, stiffly branching from the base (branches ascending), densely leafy (many crowded leaves on very short axillary branches), glabrous, ribbed; pith more or less disintegrating.

Leaves all entire, glaucous, glabrous, narrowly (ob)ovate to very often linear-subulate, 4–6 cm long, up to 4 mm wide (lower leaves usually 2–2½ cm long), mucronulate-acute; margin subundulate or ± crenate.

Flowers pallid yellow, subsessile, in a slender raceme, which is in fruit up to 40(–45) cm long, ca. 1 cm wide. Peduncle ribbed, glabrous to scaberulous. Bracts deciduous, very pale, linear-subulate, 3 mm long, ¼ mm wide, tapering towards the apex. Pedicels finely ribbed, usually minutely scaberulous, in flower ½–1½ mm long, in fruit up to 3 mm long.

Sepals 6(–8), deciduous, glabrous, elliptic-oblong, 1½ mm long, ½ mm wide, obtuse; margin subpallid, entire.

Petals 3½ mm long, much exerted. Limb of superior petal up to ⅘ of its length, ca. 11-palmatipartite, flabellate, up to twice as long as appendage, central and adjacent lobes linear-spathulate, lobes gradually narrowing centrifugally. Appendage obtriangular, 1½ mm long, ¼ mm wide, transverse rim ¼ mm wide, undulate; margin papillose. Lateral petal smaller, limb similar to that of superior petal but lobes less in number. Anterior petal smallest, limb simple, linear-spathulate, obtuse.

Disc ½ mm high, ¾ mm wide, semimembranous, minutely and sparsely papillose, margin densely papillose, crenulate.

Stamens ca. 17. Filaments deciduous, glabrous, 2(–2½) mm long. Anthers broadly ellipsoid, ¾ mm long, obscurely asperulous.

Ovary glabrous, sometimes sparsely and short papillose, side walls shallowly depressed, mouth 3-toothed, teeth ca. ¼ as long as the ovary. Ovules ca. 8 per placenta, in 3(–4) rows.

Capsules erect, subimbricate, short stipitate, obovate to ellipsoid, 5 mm long, 3 mm wide, glabrous, obtusely angled (angles rarely scaberulous), side-walls shallowly grooved, mouth contracted, teeth short, broadly triangular, up to ¾ mm long.

Seeds dark brown, subglossy, globose reniform, ¾ mm long. Sinus narrow, a minute protuberance opposite the radicle. Testa smooth.

Type: HAUSSKNECHT 136, in Persiae deserto cretaceo ad pedem montis Singarae, Mars-Juin 1867 (hb. BOISS., G).

Distribution: Iraq.

Taxonomical notes: MUELLER (l.c.) based *R. haussknechtii* on one single specimen collected by HAUSSKNECHT in Persia in a chalk-desert at the foot of Mount Singara; this holotype is preserved at G (hb. BOISSIER).

MUELLER declared that *R. haussknechtii* approaches *R. macrobotrys* by its habit though they differ in rather significant characters. The correction of the original spelling to '*haussknechtii*' is permitted and practiced.

Ecological notes: GILLETT and RAWI collected *R. haussknechtii* (11.160; K, US) in the locus classicus, in steppe, on loose dusty soil, where it was locally common, yellow flowering, and fruiting, in May (26 km east of Beled Sinjar).

RECHINGER secured it on hills of conglomerate stones, 20 km N. of Badra (9685; W), where it fruited in June. Apparently *R. haussknechtii* is an endemic, occurring in a very limited area.

Specimens examined:

Iraq. Field & Lazar 438, Jebel Golat, between Ain Tellawi and Balad Sinjar; Gillett & Rawi 11160, 25 km E. of Beled Sinjar; Haussknecht 136, ad ped. M. Singarae, Mars-Juin 1867; Rechinger 9676, Distr. Diyala, ad confines Persiae, inter oppida Mandali et Badra, 54 km a Mandali austro-orientum versus; id. 9685, ibid., ca 20 km a Badra septentriones versus.

25. *Reseda hemithamnodes* CHERNYAKOVSKAYA

Fig. 52

'Czerniak.' in KOMAR., Fl. URSS 8, 1939, p. 653: descr., [p. 613]: tab. 34, fig. 3, p. 616.

Perennial, suberect, glaucescent herb, 40–70 cm tall, branching; taproot lignescent.

Stems few, branching at base and above, leafy, delicately ribbed, glabrous, pith solid.

Leaves all entire, petiolate (petioles $1/2$ – $1\frac{1}{2}$ cm long), ovate, narrowly elliptic or -obovate, 2 – $4\frac{1}{2}$ cm long, $1/2$ – $1\frac{1}{2}$ cm wide, glabrous, foveolate especially on the lower surface, acuminate to obtuse, margin entire.

Flowers white (?cream), small, on erect short pedicels. Raceme slender, dense, up to more than 30 cm long and $1\frac{1}{2}$ cm wide in fruiting, with erect, dense and imbricate capsules; peduncle distinctly ribbed, sometimes obscurely papillose. Bracts tardily deciduous, linear-ovate, 2–3 mm long, $1/3$ mm wide, acuminate, margin undulate, hyaline. Pedicels thick, ribbed, muriculate-papillose especially towards the calyx, $1\frac{1}{2}$ –2 mm long, in fruit much thicker and appearing shorter.

Sepals 6, persistent or tardily deciduous, oblong to -spathulate or -ovate, $1\frac{1}{2}$ mm long, $1/2$ – $2/3$ mm wide, glabrous or muricate at base; margin entire, narrowly hyaline.

Petals 3–4 mm long, much exceeding the sepals. Limb of superior petal 7–8-palmatipartite (incisions limiting central lobe slightly deeper), lacinae flabellately arranged, central lobe longest, sometimes lateral lobes irregular, lobes linear(-spathulate), obtuse to acutish, up to ca. $1\frac{1}{2}$ as long as appendage; appendage obovate, $1\frac{3}{4}$ mm long, $1\frac{1}{2}$ mm wide, apically attached to limb-base, rim narrow (auricled on both sides), interrupted in front of limb-base, margin densely papillose. Lateral petal with a much reduced limb, usually deeply 3–2-partite and lengthening, limb of anterior petal usually simple.

Disc 1 mm high, 2 mm wide, glabrous; margin entire, minutely papillose.

Stamens ca. 20. Filaments tardily deciduous, glabrous, 3 mm long. Anthers ellipsoid or -ovoid, $1\frac{1}{4}$ mm long, asperulous.

Ovary cylindric-ovoid, distinctly stipitate, obtusely 3-angled (side walls sulcate), 3-toothed, teeth ca. $\frac{1}{5}$ as long as ovary. Ovules ca. 22 per placenta in 4–5 rows, imbricate.

Capsules erect, distinctly stipitate, short ovoid or -urceolate, 5–9 mm long, 3–5 mm wide, glabrous, edges rounded, sinder-walls sulcate, gradually narrowing towards the mouth, narrowly gaping, teeth short, tip usually bifid.

Seeds red-brown, more or less glossy, globose-reniform, 1 mm long. Sinus narrow, a minute protuberance opposite the radicle. Testa very shallowly and minutely tessellate-rugulose, sometimes with some minute papillae.

Type: LIPSKY, 30.VI.1897, Usbekistania, vallis Vachsch, infra Sengtod et Tutkaul, in decliviis argillosis, in rupestribus et glareosis; in herb. Ac. Sc. URSS conservatur, n.v.

Distribution: South Russia and Afghanistan.

Taxonomical notes: The capsules of *R. hemithamnodes* were described as obovoid. The specimens at hand (no type seen) though matching the protologue, have more or less urceolate capsules.

R. hemithamnodes is allied to *R. aucheri* from which it is distinguished by the acutish lacinae of superior petal, the interrupted rim at the middle of appendage suggesting apical attachment to the claw, and the urceolate capsule.

Ecological notes: The type was collected from clayey slopes between rocks and gravels. REGEL collected *R. hemithamnodes* at alt. 2–3000'; was fruiting in July-August 1882 (LE). RECHINGER (36899, W) found it at 2200–2500 m alt. in E. Afghanistan (Ghorband), in declivibus orientabilibus, jugi Shibar, flowering and fruiting, 12.VII.1967.

Specimens examined:

Afghanistan. Kōie 2094, near Kandahar, Pirzada; id. 2236, Herat; Lindberg '47, 2.VI.47, Takhat-Safar, Herat; Rechinger 32485, prov. Herat, 250 km WNW. of Girishk 31° 50' N., 64° 35' E., ad viam, versus Shindand, 33° 16' N., 62° 05' E.; id. 32515, *ibid.*, Badghir inter Herat 34° 20' N., 62° 10' E., et Kisil Islam Qaleh; id. 36899, Ghorband 34° 55' N., 68° 18' E.

Tadzhikistan. Linezevski 372, Babatag; Regel, A. in 1882, Hissar region, Rāngan plateau (SW. Kafirnagan and Yavan).

26. *Reseda inodora* REICHENBACH

Fig. 53

Ic. Fl. Germ. 2, 1838, p. 22, tab. 99, fig. 4445b; Walp., Rep. 2, 1843, p. 752; Muell. Arg., Mon. Rés. 1857, p. 139, tab. 7, fig. 99 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 428; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 562; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 690; Czerniak. in Komar., Fl. URSS 8, 1939, p. 609; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348.

Annual or perennial, erect or rarely ascending, pale green herb, 30–40(–60) cm tall; taproot lignescent.

Stems many (sometimes solitary), branching, leafy, glabrous, ribbed; pith disintegrating.

Leaves narrowly decurrent, glabrous. Radical and basal leaves entire, narrowly ovate-spathulate, 6–9 cm long, $\frac{1}{2}$ –1 cm wide. Stem-leaves mostly 3-partite, terminal lobe longest, $\frac{1}{2}$ (–more) as long as the leaf; margin narrowly pallid, minutely denticulate.

Flowers white (\pm yellow when dry). Raceme rather lax, up to 25 cm long and 3 cm wide in fruiting, scabrid. Bracts persistent, comose at top of raceme (slightly exceeding flower buds), pale green, linear, 3–4 mm long, $\frac{1}{3}$ mm wide, acuminate; midrib serrulate, margin hyaline uneven-serrulate. Pedicels strongly ribbed (ribs scabrous), in flower 4–6 mm long, in fruit \pm 8 mm long.

Sepals 6(–7), persistent, sometimes patent in flower and fruit, at least midrib scabrid, linear-spathulate, 3–5 mm long, hardly growing in fruit; margin narrowly pallid, sparsely scabrid.

Petals 4 mm long. Limb of superior petal ca. 11-partite, palmatisect, all incisions down to base or very nearly so, about as long as the appendage, laciniae linear, rarely subspathulate, central lobe half as long as the adjacent laciniae. Appendage rectangular, 2 mm long, ca. 1 mm wide, transverse rim broad, continuous in front of limb base, $\frac{1}{2}$ mm wide, \pm crenate; margins papillose. Lateral petals smaller, anterior lobe wanting. Anterior petal smallest, limb simple.

Disc up to 1 mm high, $1\frac{1}{2}$ mm wide, glabrescent; margin recurved, papillose-

ciliate, \pm crenate.

Stamens ca. 15. Filaments deciduous, glabrous, slightly dilated above middle, 3 mm long. Anthers ovoid, 1 mm long.

Ovary obovoid, 3-angled, ribs papillose-scabrid, 3-toothed, teeth half as long as the ovary. Ovules ca. 7 on each placenta in 2(-3) rows.

Capsule patent, sometimes pendulous, distinctly stipitate, short cylindric, 13(-18) mm long, 8 mm wide, ribs and veins scabrid, mouth widely gaping; teeth (long-)triangular, 1-2(-more) mm long, often divergent.

Seeds ochraceous, dull, reniform, up to 2 mm long. Sinus wide, filled with carunculoid red-brown tissue with a white hilum. Testa widely undulate-rugose, outer layer tardily detached.

Type: REICHENBACH, Ic. Fl. Germ. 2, 1838, p. 22, tab. 99, fig. 4445b.

Distribution: SE. Europe, introduced into Germany and the Netherlands.

Taxonomical notes: REICHENBACH pictured and described *R. inodora* (l.c.). The name *R. inodora* replaced *R. mediterranea* SCHULT., which was justified because the name *R. mediterranea* had been previously published by LINNAEUS (Mant. alt. 1771, p. 564).

R. inodora is somewhat allied to *R. phyteuma* L., but can be distinguished by the narrower sepals which do not or hardly increase when in fruit, by the shape of the petals and the fruit (long teeth). From *R. odorata* it differs by the shape of the petals and the capsules. It differs from both in its strict, stiff habit.

Ecological notes: In Hungary, Budapest region, it grows on grassy slopes facing the Danube, on löss soils (Racz-Almás; leg. DE DEGEN, AMD), fruiting in July. It seems to be common on Blocksberg, where *R. phyteuma* is also found, on dolomitic soils. Many specimens are found at Gellertshegy.

REICHENBACH distributed specimens (no. 1969, Cat. sem. 1837), collected by WIERZBICKI, in the Banat, along roads nr. Basias and on rocks bordering the Danube; specimens at L and WAG.

In Bulgaria, BLINVO s.n. (BRNU 57832) collected it along a road near Stanimaka; NOVAK found it (no. 643, PRC) in the same district on calcareous rocky soils, and near Plovdiv (Philippopolis), it was collected by KECK and PICHLER (PRC) in May.

In Yougoslavia. BORNMÜLLER (no. 258, NY) collected it at 300-500 m alt. near Skop(l)je (Ūsküb), on arid slopes on Wodno mt. on conglomerate rocks, and at the same alt. on Radus mt.

There seems to be some preference for calcareous soils.

As an introduced weed it was collected in the Netherlands (Rotterdam, ashes-road through Rozenburg, JANSEN and WACHTER 13163-64, May 1900, L). It was also introduced as a weed in Germany.

Specimens examined:

Bulgaria. Blinvo s.n., 20.IV.1922, Stanimaka; Keck & Pichler s.n., V. 1890, Mt. Tschien-demtepé, prope Philippopolim; Novak 643, Asenova Krepost, opp. Stanimaka; Širjaev 184 & 457, Stanimaka; Stribrny s.n., 24.VIII.1895, Ladows; Velenovsky s.n., VII. 1887, som Palauka; id. à 1903, Orhanie l'Ureiren.

Germany. Bonte s.n., 16.VIII.1911, Homberg am Rhein, Hafen; Scheuermann s.n., 27.VII. 1913, Hannover, Schult... Ahlen;

Hungary. Boros s.n., 13.VI.1926, Comit. Pest, Mt. Törökugraté, prope Budaörs; id. 25.V.1933, Fejer ad Velence, Nadap; Degen s.n., 2.VII.1911, Comit. Fehér, ad Danubium, prope Racz-Almás; Freyn s.n., 13.VI.1872, env. de Ofen-Pest, Blocksberg; János s.n., VI.1916, Deliblát, Kincstári; Kárpáti s.n., 23.V.1943, Comit. Pest, Mt. Uthegy supra pagum Budaörs; id. 25.V.1947, ibid., Mt. Gellert-Hegy supra opp. Budapest; Kováts s.n., VI.1852, Mt. Gerardi ad Budam; Lajos 1633, Vesprim; id. s.n., 18.VI.1878, Budapest, Mt. Gerardi; ?Lanyis 2727, Csongrad, Mt. Kamarás, Löszparton; Reichenbach f. s.n., X.1870, Pilis bei Czegled; Richter 225, Mt. Blocksberg; id. s.n., VI.1873, Blocksberg bei Ofen; id. V.–VI. 1876, Dolomit, Budae, Mt. Gerardi; id. VI. 1883, Ofen, Staub 2512, Mt. Sash prope Budam; Sonklar s.n., VII.1871, Ercsi, infra Buslem; Szépligeti s.n., 20.VI.1879, Budapest, Mt. Gerardi; Steinetz s.n., 25.VII.1882, Blocksberg bei Ofen; Taucher s.n., 15.VII.1870, Cotte Albensis, Capellanas prope Ercsi; id. s.n., 24.VI.1871, Cotte Pesth, prope Törökbalint; id. 15.VII.1870, Cotte Albensi, prope Ercsi; id. ii. VII.1873, comet. Ablo, Danubo, prope Ercsi; Wagner s.n., V.1918, prope ?Bariai; id. VI.1920, prope Budapest; Wierzbicki 1969, Banat, an Wegen bei Basias und längs der Donau an Felsen;

Netherlands. Henrard 3511, prov. Overijssel, Deventer; id. s.n., VIII.1917, ibid.; Jansen & Wachter 13163–64, Rotterdam, Koolaschweg, through Rozenburg; Kloos & Offerijns s.n., 28.VII.1917, prov. Overijssel, Deventer; Peteri s.n., midd. VII.1899, Deventer.

Yugoslavia. Adomovic s.n., VI.1896, Serbica, Vrantia; Bornmueller 258, ditionis opp. Úsküb (Skopje), Mt. Wodno (Úsküb-dagh); id. 3566, Raduše; Dörfler s.n., Úsküb, prope Dolnja-Voda; id. 446, prope Zeleniko.

27. *Reseda jacquinii* REICHENBACH

Fig. 54, 55

Ic. Fl. Germ. 2, 1838, p. 22; Lec. et Lam., Cat. Plat. Centr. Fr. 1847, p. 89; Gren. et Godr., Fl. Fr. 1, 1848, p. 188; Muell. Arg., Mon. Rés. 1857, p. 141, tab. 7, fig. 100 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 429; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 565; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 165; Rouy et Fouc., Fl. Fr. 2, 1895, p. 245; Coste, Fl. Fr. 1, 1901, p. 160; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348.

R. mediterranea L. sensu Jacq., Coll. Bot. 1, 1786, p. 147; id., Ic. Pl. Rar. 3, 1786–93, p. 5, tab. 475; Rchb., Fl. Germ. 1830–32, p. 696; id., Ic. Fl. Germ. 2, 1838, p. 22, tab. 99, fig. 4445.

R. litigiosa Sennen et Pau in Bol. Soc. Arag. 4, 1905, p. 309 (= subsp. *litigiosa*).

Annual, ± ascending, pale green herb, 25(–60) cm tall, sometimes branching at base; taproot slender.

Stems few, nearly erect, sparsely branching in the upper part, leafy, rather slender, ribbed, glabrous, or sparsely hairy or scabrid, pith disintegrating.

Leaves greyish green, glabrous. Leaves partly entire, narrowly ovate-spathulate and long attenuate at base, 4(–8) cm long, $\frac{1}{2}$ –2 cm wide, obtuse, partly (often deeply) 3-partite, or variously incised (more or less palmately lobed or pinnatifid), up to 12 cm long, lobes unequal (the terminal lobe longer and larger), narrowly decurrent along midrib by their attenuate bases, strongly constricted above their insertion, narrowly ovate-elliptic, occasionally mucronate. All edges light coloured, margins of lower leaves sometimes slightly undulate, minutely denticulate.

Flowers white or pale yellow, on erect to gradually spreading pedicels. Raceme up to 15(–30) cm long, 4 cm wide (when fruiting); peduncle markedly ribbed. Bracts persistent, comose at raceme-top and exceeding flower-buds, olive green, glabrous, linear to narrowly ovate, 3 mm long and less than 1 mm wide, ca. $\frac{1}{3}$ as long as flower-pedicel, and $\frac{1}{4}$ as long as fruit-pedicel, margins widely hyaline. Pedicels strongly ribbed, very minutely scabridulous, in flower ca. 8 mm long, in fruit ca. 12 mm long ($\frac{2}{3}$ as long as capsule).

Sepals 6, persistent, reflexed in fruit, glabrous, linear(-spathulate), $2\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide, hardly increasing in fruit, acutish or obtuse; margin pallid, sometimes serrulate at base.

Petals 4 mm long. Limb of superior petal 3-partite, lateral lobe semilunate, ca. as long as the claw or longer. Central lobe linear(-spathulate), shorter (often only $\frac{1}{3}$) as long as the lateral lobe, obtuse; lateral lobe semilunate in outline, margins more or less sinuate to laciniate (incisions shallow or up to halfway down); appendage rectangular, 2 mm long, $1\frac{1}{2}$ mm wide, transverse rim continuous, slightly undulate; margins papillose ciliate. Lateral petal without anterior lateral lobe. Anterior petal smallest, 1–3 variously reduced lacinae present.

Disc $\frac{1}{2}$ mm high, $2\frac{1}{2}$ mm wide, glabrous in the centre, but papillose towards the recurving edge.

Stamens ca. 20. Filaments deciduous, glabrous, sometimes slightly dilated above middle, 2 mm long. Anthers ellipsoid, $\frac{3}{4}$ mm long.

Ovary obovoid, \pm stipitate, obtusely 3-angled (ribs scabridulous), $\frac{1}{4}$ as long as ovary. Ovules ca. 7 on each placenta, in 2–3 rows.

Capsule pendulous, distinctly stipitate, (ob)ovoid-cylindric, 11(–15) mm long, 6 mm wide, glabrous or occasionally ribs scabridulous, widely gaping.

Seeds dark ochre, finally brown, dull, reniform, 2 mm long. Sinus wide, filled with carunculoid tissue. Hilum orange-brown. Testa very closely papillose or undulate-rugose, outer layer tardily detached.

Type: 'JACQUIN, Ic. rar., tab. 475' (1781–1793, sub *R. mediterranea* JACQ. non L., nec SCHULT.).

Distribution: SE. France and NE. Spain.

Key to the subspecies

Seeds very closely papillose (papillae very short, contiguous). Lateral lobes of superior petals crenate or shallowly incised.

a. *ssp. jacquinii*

Seeds undulately rugose. Lateral lobes of superior petals usually shallowly lacinate.

b. *ssp. litigiosa*

a. *subsp. jacquinii*

Leaves usually trifid, sometimes \pm pinnatisect or palmatifid. Lateral lobes of superior petal crenate to shallowly incised. Seeds minutely papillose.

b. *subsp. litigiosa* (SENNEN et PAU) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *R. litigiosa* Sennen et Pau in Biol. Soc. Arag. 4, 1905, p. 309.

In most characters similar to *ssp. jacquinii* but sometimes more or less pilose, the leaves usually pinnatisect; lateral lobes of superior petal usually halfway down incised; seeds smaller ($1\frac{3}{4} \times 1\frac{1}{3}$ mm), transversely and shallowly undulate-rugulose, crest of wrinkles blunt.

Type: HÉRIBAUD et SENNEN, Rosas.

Distribution. Area of the species; mainly in NE. Spain.

Taxonomical notes: *Reseda jacquinii* RCHB. was published by reference to *R. mediterranea* ('JACQUIN, Ic. rar., tab. 475' of 1781–93) and was not described by REICHENBACH. REICHENBACH appears to have changed JACQUIN's *R. mediterranea* because this name is homonymous with the earlier published *R. mediterranea* L. (1771). He acknowledged that the species described by JACQUIN was different from *R. mediterranea* L. (which was identical with *R. lutea* L.).

In Index Kewensis 2, 1895, p. 697, the epithet which was spelt by REICHENBACH '*jacquini*', is corrected to '*jacquinii*' (Code 1972, Rec. 73C).

Ecological notes: *R. jacquinii* RCHB. in the present study, appears to be distributed in SE. France and NE. Spain. Its area of distribution falls apart in a French area, north-east of the Pyrenees, where *ssp. litigiosa* is rare, and a Spanish area, south-east of the Pyrenees, where *ssp. jacquinii* is absent.

It was decided, therefore, to subdivide the species into 2 subspecies, *R.*

jacquinii subsp. *jacquinii* and *R. jacquinii* subsp. *litigiosa* (SENNEN et PAU) ABDALLAH et DE WIT.

It occurs in France (Gard) e.g. near Vallerangue on murs and schists (e.g. Fl. exs. BILLOT 3522 (F); Herb. ANTHOUARD 2583, BP), and in the Gorges du Tarn, flow. and fr. in May.

In the Hérault Dpt., on sandy places near Lamalon (NEYRA, PRC) or near Saint Gervais, on silicose soils in vineyards at 500 m alt. (COSTE, PRC).

Subsp. *litigiosa* was collected in fallow lands among weeds (DE WIT 9467, WAG).

Specimens examined:

Subsp. *jacquinii*

France. Anthouard s.n., 18.VIII.1876, in Vallerangue (Gard); Le Brun s.n., 11.VII.1948, road Villefort-Bleymard, col de Tribes (Lozère); Coste s.n., VIII. ?1874, dept. Hérault, Saint Gervais; id. 4.VIII.1892, Vallerangue; id. 22.VIII.1894, Hérault, Saint Gervais; Dorgelo et De Wilde s.n., 18.VI.1959, Pyr. Or., Madeloc, Banyuls; Grenier s.n., à 1856, La Lozère; Jolis s.n., 27.VIII.1867, Vallerangue; ?Kurkiewicz s.n., 30.IV.1861, *ibid.*; Loret s.n., 12.VII.1879, Gard; ?Los s.n., 27.VII.1863, Mayres (Ardèche); id., VIII. 1863, Ardèche à ?Thuegr; Martus s.n., VII.1882, Gard, Horae; Neyra 2373, Hérault, Lamalou-le-Haut; id. 1046, Hérault, à Lamalou; id. s.n., 30.V.1880, *ibid.*; id. s.n., 17.V.1881, *ibid.*; Nooteboom 550, Ardèche, near la Voulte; Sennen s.n., 22.VIII.1894, Hérault, St. Gervais; Simon s.n., 25.VI. 1963, Ardèche, Cévennes, Gravières-Ste. Marguérite, Chassesac; Tallon 4903, Lozère, Mt. Lozère, Vallée de L'Allier; Tuezkiewicz 3522, à Vallerangue.

Subsp. *litigiosa*

France. Sassi s.n., III.1904, vicinity of Beaulieu; Simon s.n., 26.VI.1963, Lozère, Cévennes, Villefort-Mende, W. Altier;

Spain. Jerónimo 8245, Almeria, Sierra de Gador; Sennen et Septimin 245, Catalogne, Cadaqués; id. 5224, prov. Gerona, prope Cadaqués; De Wit 9467, Rosas-Cadaqués.

28. *Reseda lanceolata* LAGASCA

Fig. 56

Gen. Sp. Pl. Nov. 1816, p. 17; Boiss., Voy. Bot. Esp. 2, 1839–45, p. 74, tab. 19; Muell. Arg., Mon. Rés. 1857, p. 170, tab. 8, fig. 115 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 572; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 892; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 182; Murb. in Lunds Univ. Årsskrift n.s. 2, 18(3), 1922, p. 51; Pau, Nuev. Contr. Fl. Granada 1922, p. 27, fig. 1; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 317; Bolle in Engl. et Prantl, Nat. Pflanz. fam. ed. 2, 17b, 1936, p. 689; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348.

R. l. var. *constricta* (Lange) Ball in Journ. Linn. Soc. Bot. 16, 1878 (1877) p. 340; Dur. et Schinz, l.c.

R. l. var. *trisecta* Rouy (= var. *constricta*).

Meded. Landbouwhogeschool Wageningen 78-14 (1978)

R. l. var. *trifida* Pau et Font Quer in Font Quer, Iter Maroc. 1927, fide Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 317; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016 (= var. *constricta*).

R. l. var. *eu-lanceolata* Maire in Mem. Soc. Sc. Nat. Mar. 15, 1927 (1926), p. 10; Jah. et Maire, Cat. Pl. Mar. l.c.; Emb. et Maire, l.c. (= var. *lanceolata*).

R. l. var. *maura* Maire, l.c.; Jah. et Maire, Cat. Pl. Mar. l.c. (= var. *constricta*).

R. l. m. forma *brachycarpa* Maire, l.c.; Jah. et Maire, Cat. Pl. Mar. l.c. (= var. *constricta*).

R. constricta Lange, Pl. Nov. Hisp. 1864, p. 6, t. 8; id. in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 893 (= var. *constricta*).

Annual or biennial, erect, glaucescent herb, (30-)60-90(-120) cm tall, rarely branching at base; taproot slender.

Stems often solitary, simple or fastigiately branching, leafy, glabrous, sometimes 1 cm thick at base, finely ribbed, pith disintegrating.

Leaves glabrous, indistinctly petiolate, all entire or partly 3(-5)-partite, narrowly ovate to -elliptic, 10-13 cm long, 1(-2) cm wide, terminal lobe much longer and twice as broad as lateral lobe; margin narrowly pallid, entire.

Flowers white. Raceme lax, 30-50(-more) cm long, 2-4 cm wide in fruit, flowers gradually horizontal, fruits \pm appressed; peduncle ribbed. Bracts deciduous, comose at top of raceme (exceeding flower-buds), yellowish-green, narrowly oblong, 3-5 mm long, occasionally scaberulous; margin hyaline, serrate-denticulate. Pedicels slender, papillose-scaberulous, in flower $\frac{3}{5}$ -1 cm long, in fruit up to 2 cm long.

Sepals 7(6-8), tardily deciduous, usually scabrid, narrowly ovate, 3-4(-5) mm long, $\frac{3}{4}$ mm wide, obtuse or acute; margins hyaline, scabrid to denticulate.

Petals 3-5 mm long. Limb of superior petal 3- or appearing multipartite (lateral lobes semilunate, often shallowly cleft), ca. as long as the appendage, central lobe narrowly oblong to -spathulate, shorter or longer than lateral, lateral lobes crescent-shaped, entire, crenate to incised; appendage broadly rounded, 2(-2 $\frac{1}{2}$) mm long, 2 mm wide, transverse rim continuous in front of limb base, $\frac{1}{2}$ mm wide, lacerate; margins papillose-ciliate. Lateral petal smaller, anterior lobe usually wanting, lobes similar to those of superior petal. Anterior petal smallest, limb usually simple, linear-spathulate.

Disc $\frac{1}{2}$ mm high, 1 mm wide, glabrous, curved downwards, margin shortly papillose-hirtellous, lacerate.

Stamens 22-24. Filaments deciduous, 4-5 mm long. Anthers oblong-elliptic, 2 mm long, delicately asperulous.

Ovary cylindric, subsessile, glabrous or rarely scaberulous, obtusely 3-angled, 3-toothed, teeth ca. $\frac{1}{4}$ as long as ovary. Ovules numerous, 20-50 on each placenta, in (2-)3-5 rows.

Capsule erect to appressed to stem, shortly stipitate, narrowly cylindric, 1 $\frac{1}{2}$ -2(-3) cm long, ca. $\frac{1}{2}$ cm wide, obtusely 3-angulate, walls grooved, glabrous, sometimes slightly constricted below mouth, teeth short, triangular,

± 1 mm long.

Seeds numerous, greenish-black, glossy, ovoid-reniform, ca. 1 mm long, ecarunculate. Sinus represented by a wide, shallow groove. Testa smooth, middle layer delicately tessellate.

Type: 'Locis montosis in Regno Jenensi et Granatensi. Floret aestate. ♂'; neotype: BOURGEOU no. 1087 (NY).

Distribution: SE. Spain and NW. Africa.

Key to the varieties

- Leaves all entire. Capsules not (or obscurely) constricted beneath teeth. **a. var. lanceolata**
Leaves partly 3(-5)-partite. Capsules constricted beneath teeth. **b. var. constricta**

a. var. lanceolata

All leaves entire. Capsules not or obscurely constricted beneath the teeth.

Distribution: SE. Spain and Algerian Atlas.

b. var. constricta (LANGE) BALL in Journ. Linn. Soc. Bot. 16, 1878 (1877), p. 340.

Leaves partly 3- or rarely 5-partite. Capsules usually constricted beneath the teeth.

Type: LANGE, Jaen, May 6, 1852, Cerro Zumbalejo, Plantae ex Hispania (C).

Distribution: Area of the species.

Taxonomical notes: LAGASCA mentioned that *R. lanceolata* is found in mountains in 'regno Jenensi et Granatensi'. He declared that the flowering period of this species is in summer, and the plant is biennial.

MUELLER adopted *R. lanceolata* LAG. as a distinct species (Mon. Rés. 1857, p. 170 et in DC., Prodr. 16(2), 1868, p. 572). LANGE (in WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 892) also maintained it, whereas BOISSIER described and pictured it adequately and in agreement with LAGASCA's description (Voy. Bot. Esp. 2, 1839-45, p. 74, tab. 19).

No specimen collected by LAGASCA is cited by previous authors, and also no type specimen, referred to by LAGASCA was seen by us. As a neotype E. BOURGEOU, Pl. Espagne 1851, no. 1087, collines incultes à Vera, province de Grenade (NY, dupl. at TL et WAG) is designated.

BOISSIER declared to have observed *R. lanceolata* in the Sierra Nevada in the Rio Grande Valley, District Lanjaron, and judged the plant to be characterized by the length of the capsule (Voy. Bot. Esp. 1, 1839–45, p. 144). It is a species, BOISSIER declared, endemic to Spain and found in the region of Granada (l.c., p. 208).

LANGE (Pl. Nov. Hisp. 1864, p. 6, t. 8) based *R. constricta* on a specimen collected by him near Jean on May 6, 1852, on a calcareous mountain 'Cerro Zumbalejo'.

He stated that it was most nearly allied to *R. lanceolata* LAG. and continued: this latter species is very distinct by its much branching stem, entire leaves, smaller flowers, finely glabrous and less spreading pedicels, deciduous and much shorter sepals which are very obtuse and broad tipped, the petals exceed the calyx, the lateral lobes of the upper petals are obovate and often sinuate-dentate, the appendix is slender translucent and longer than the limb, produced below and involute, a shorter and broader capsule that is little or not constricted in the upper part and has much shorter and very blunt teeth. In *R. constricta* the inflorescence is much laxer by its long pedicels than in *R. lanceolata*, and the root seems perennial perhaps biennial. *R. crystallina* WEBB is very much less allied and differs by its low stems, sixparted flowers which are yellow, by a broad and shortly tridentate capsule which is covered by white warts. –

In the present revision '*R. constricta* LANGE' is reduced to synonymy of '*R. lanceolata* LAG.', representing a variety. The differences attributed by LANGE to his taxon, fall within the variability of *R. lanceolata* LAG. This view was previously suggested by BALL in Journ. Linn. Soc. Bot. 16, 1878 (1877), p. 340.

Ecological notes: In Maroc it occurs on 'falaises' surrounding the valley of the Reraïa, at 100 m (GATTEFOSSÉ) near Asni (Grand Atlas). In the same region at 1300–1400 m alt. it was collected by ANDREÁNSZKY, south of Demnate on calcareous rocks at 1000–1100 m; ANDREÁNSZKY found it flowering in May.

In Southern Spain, JERÓNIMO collected it in the river-bed near Murcia. BOISSIER found it at 2000–4000 ft in the Sierra de Gador near Almeria. PORTA et RIGO collected *R. lanceolata* in the Sierra de la Fuensanta, on calcareous soil at 200–300 m alt. and the same collectors saw it at 50–100 m alt. on dry hills, on schist-soils, near Almeria. HEYWOOD reported *R. lanceolata* from the Sierra de Cazorla, SE. Spain, between Fte del Pino and Barranco de Palamares, pathsides 1500 m, 14.VII.1951; it was infrequent in the middle zone in clearings, pathsides and probably more common in the lower zone as a weed (cf. FEDDES Rep. 64, 1961, p. 68). GATTEFOSSÉ collected on July 10, 1933, in 'Maroc, Grand Atlas, Tizi-n-Test', in stony siliceous grazed fields no. 2785 (TL), the type of '*Reseda lanceolata* var. *maura*' MAIRE.

Specimens examined:

Var. lanceolata

Algeria. Emberger s.n., 23.VI.1927, Alger Atlas, ?Mausa ou Saleh, à ?Tamkraraut.

Spain. Boissier s.n., aug. 1837, Sierra de Gador, regionis Alpujarres; Bourgeau 1087, prov. Grenada, à Vera (NY, p.p., neotype); Hackel s.n., 21.VI.1876, near Jaen; St. Lager s.n., 24.VI.1908, prov. d'Almeria, Illar; Lange s.n., 3, 5, & 6.XII.1851, reg. Murcica, Pozo de la Higuera; id. 20.XII.1851, Almeria; Porta et Rigo 47 & 287, Almeria prope Viator (BP, LD); id. 216, reg. Murcicum, Sierra de Fuensanta (LD, PRC, W); Reese s.n., 8.VI.1930, prov. Murcia, Rambla bei Librilla; Stud. Bjol. Rheno-Trai. 987 (1951), Murcia, S. Puente Lumloves; id. 638 (1957), prov. Granada, E. Motril; id. 974 (1964), road Motril-Malaga, near Almunecar.

Var. constricta

Morocco, Andreánszky s.n., 19.V.1928, Demnate; id. 24.VI.1930, Atlas Major, Valle Ait Misau supra pag. Asni; Balls B2515, Ichonhak; Emberger s.n., 20.VI.1926, Bou Chta prope ?Duered; id. s.n., 13.VI.1929, NE. Targuist; id. 21.VI.1936, Grand Atlas or., ?Chênair près Tassent, et Plateau de Lacs, env. de Tassent; Font Quer 245, c. Targuist; Frödin & Murbeck s.n., 6.V.1921, Grand Atlas, Imin Tala; Gattefossé 2785, *ibid.*, Tizi-n-Test; id. s.n., 9. VI. 1935, *ibid.*, Asni falaises escarpées vallée de la Reraïa; Gandoger s.n., V.1909, Benifruor; Hooker s.n., V.1871, Greater Atlas, ?Schaoua; Lindberg 3247, Atlas magnum, fl. Reraïa....; Maire s.n., 4.VII.1924, Atlantis Majoris, ditone Glaoua prope Enzel; id. 28.IV.1925, *ibid.*, Amismiz pr. Imi-n-Tala; id. 6.VII.1925, Demnat, Imi-n-Ifri; Murbeck s.n., 11.V.1921, Grand Atlas, Asni; Sennen & Mauricio 8694, Atlas rifaen, à Beni Hadifa, près Targuist; De Wilde c.s. 2077, NE. Tizi-n-Test, road to Idni.

Spain. Bourgeau 1087, prov. Grenada, à Vera (NY, p.p.); Gandoger s.n. ?V.1882, Cordoba; Gaussen 7478, 5.10.1952, vers Torviscon, talus Alpujarre; Jerónimo 5121, Murcia, Lorca, vers Puerto de Lumbreras; id. 7316, *ibid.*, La Hoya; Lange s.n., 6. V. 1852, Cerro Zumbalejo pr. Jean; Porta & Rigo 47 & 287, Almeria prope Viator; id. 216, reg. Murcicum, Sierra de la Fuensanta; Reese s.n., 29.V.1929, prov. Granada, Nordhang des Alpujarras, Orgwa, Tal der Velez; Roivaren s.n., 4.VI.1952, prov. de Granada, Almünecar, la Herradura, Cerro Gordo; Sennen & Jerónimo 7316, Murcie, La Hoya; Winkler s.n., 12-13. VII. 1873, & 13.VII.1876, prov. Granada, Langeron; id. 20.VI.1876, Fuendelapena, pr. Jaen; id., 21.VI.1876, Iabalour, pr. Jaen.

29. *Reseda lutea* LINNAEUS

Fig. 57-59

Sp. Pl. 1, 1753, p. 449; *id.*, Syst. Nat. ed. 10, 2, 1759, p. 1046; *id.*, Sp. Pl. ed. 2, 1762, and ed. 3, 1764, p. 645; *id.*, Syst. Nat. ed. 12, 1767, p. 330; Houtt., Nat. Hist. 2(8), 1777, p. 729; Lam., Fl. Fr. 3, 1778, p. 205; Murr., Syst. Veg. ed. 14, 1784, p. 448; Moench, Meth. Pl. 1794, p. 58; Murr., l.c. ed. 15, 1798, p. 368; Willd., Sp. Pl. 2(2), 1800 (1799), p. 879; Brot., Fl. Lusit. 2, 1804, p. 305; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 727; Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 449; Hornem., Hort. Hafn. 2, 1815, p. 502; St. Amans, Fl. Agen. 1821, p. 187; Spreng., Syst. Veg. 2, 1825, p. 464; Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Ten., Fl. Neap. 4, 1830, p. 256; Rchb., Fl. Germ. 1830-32, p. 696; Link, Handb. 3, 1831, p. 323; Richt., Cod. 1835, p. 463; Rchb., Ic. Fl. Germ. 2, 1838, p. 22, t. 100, fig. 4446; Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 100; Boiss., Voy. Bot. Esp. 2, 1839-45, p. 75; Bertol., Fl. It. 5, 1842, p. 26; Ledeb., Fl. Ross. 1, 1842, p. 236;

Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 241; Walp., Rep. 2, 1843, p. 752; Lecoq et Lamotte, Cat. rais. Pl. C. Fr. 1847, p. 90; Gren. et Godr., Fl. Fr. 1, 1848, p. 188; Hausm., Fl. Tir. 1851, p. 104; Vis., Fl. Dalm. 3, 1852, p. 94; Guss., Enum. Pl. Vasc. Ins. Inar. 1854, p. 27; Muell. Arg., Mon. Rés. 1857, p. 183, tab. 2, fig. 18–23, tab. 3, fig. 24–31 & 37, tab. 4, fig. 54 & 60, tab. 5, fig. 70 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Fuss, Fl. Transsilv. 1866, p. 86; Boiss., Fl. Or. 1, 1867, p. 429; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 569; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 893; Arc., Comp. Fl. It. 1882, p. 67; Batt. in Batt. et Trab., Fl. Alg. 1888–90, p. 85; Terracc. in Caruel, Fl. It. 10, 1894, p. 172; Rouy et Fouc., Fl. Fr. 2, 1895, p. 246; Post, Fl. Syr. Palest. Sin. 1896, p. 112; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 182; Coste, Fl. Fr. 1, 1901, p. 160; Muschl., Man. Fl. Egypt. 1, 1912, p. 441; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 124; Hand.-Mazz. in Ann. K. K. Naturhist. Hofmus. 27, 1913, p. 56; Blatt., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 47; van Soest in Nederl. Kruidk. Arch. 1925, p. 111; Ramis, Bestimm. Fl. Aeg. 1929, p. 97; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 317; Dinsm. in Post, l.c. ed. 2, 1, 1932, p. 138; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689, fig. 428a, (k-1; monstrosity); Czerniak. in Komar., Fl. URSS 8, 1939, p. 610; Claph. in Claph. et al., Fl. Br. Isl. 1952, p. 238; Täckh., Stud. Fl. Egypt 1956, p. 332; Roles in Claph. et al., Fl. Br. Isl. 1957, tab. 63, fig. 246; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 276; Claph. in Clapham et al., Fl. Br. Isl. ed. 2, 1962, p. 187; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 441, tab. 38, fig. 1226; Rech. f., Fl. Lowl. Iraq 1964, p. 326; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348; Coode in Davis, Fl. Turk. 1, 1965, p. 502, fig. 20 (2–4); Zohary, Fl. Palaest. 1, 1966, p. 335, tab. 488.

R. l. β L., Sp. Pl. 1, 1753, p. 449.

R. l. β crispata St. Amans, Fl. Agen. 1821, p. 187; Ten., Syll. 1831, p. 232; Muell. Arg., Mon. Rés. 1857, p. 187 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 182.

R. l. var. crispata a. tenuisecta A. Terr., Prodr. Fl. Luc. 1, p. 44, fide Terracc. in Caruel, Fl. It. 10, 1894, p. 174.

R. l. γ rugosa St. Amans, l.c.

R. l. β longifolia Ten., l.c.

R. l. β subbipinnatisecta Moris, Flora Sard. 1, 1837, p. 189.

R. l. β mucronata (Tin.) Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 241; Ball in Journ. Linn. Soc. Bot. 16, 1878 (1877), p. 329, sphalm. '*mucronulata*'; Arc., Comp. Fl. It. 1882, p. 67, sphalm. '*mucronulata*'; Dur. et Schinz, l.c., p. 183.

R. l. β gracilis (Ten.) Gren. et Godr., Fl. Fr. 1, 1848, p. 188; Hausm., Fl. Tir. 1, 1851, p. 105; Muell. Arg., Mon. Rés. 1857, p. 191 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Arc., Comp. Fl. It. 1882, p. 67; Terracc. in Caruel, Fl. It. 10, 1894, p. 175.

R. l. α vulgaris Muell. Arg., Mon. Rés. 1857, p. 185 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 569; Terracc. in Caruel, Fl. It. 10, 1894, p. 173; Rouy et Fouc., Fl. Fr. 2, 1895, p. 247 (= var.

lutea as well as its subordinating taxa).

R. l. v. αα crispa (St. Amans) Muell. Arg., ll.cc., p. 187; id. in DC., Prodr. l.c.; Terr., l.c., 'd.'; Rouy et Fouc. l.c., 's. var.'

R. l. v. a. pauciflora Terr., Fl. Vult. Syn., p. 28 etc. (fide Terr., l.c.); Rouy et Fouc. l.c., 's. var.'

R. l. v. b. maior Terr., l.c.

R. l. v. c. latifolia Terr., l.c.

R. l. v. e. minor (Muell. Arg.) Terr., l.c.; Rouy et Fouc., l.c., 's. var.'

R. l. v. f. heterophylla Schur, Phytogr. Mittheil, p. 123 (fide Terr., l.c.).

R. l. v. g. scabriuscula Schur, l.c. (fide Terr., l.c.).

R. l. v. S.-var. hispidula (Muell. Arg.) Rouy et Fouc., Fl. Fr. 2, 1895, p. 247.

R. l. v. S.-var. latisecta (Schur) Rouy et Fouc., l.c.

R. l. β minor Muell. Arg., Mon. Rés. 1857, p. 188 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 569; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 893 (= var. *lutea* as well as its subordinating taxa).

R. l. m. ββ hispidula DC. ex Muell. Arg., ll.cc.; id. in DC., Prodr. l.c., p. 570.

R. l. m. βγ flaccida Muell. Arg., ll.cc.

R. l. γ stricta Muell. Arg., ll.cc.; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 85; Terracc. in Caruel, Fl. It. 10, 1894, p. 173; Rouy et Fouc., Fl. Fr. 2, 1895, p. 247; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 183 (= var. *lutea* as well as its subordinating taxa).

R. l. s. γγ mucronata (Tin.) Muell. Arg., Mon. Rés. 1857, p. 188, sphalm. 'mucronulata' (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. l.c.; Terr., l.c., p. 174, 'C.'; Rouy et Fouc., l.c., p. 248, 's. var.'

R. l. s. a. tenuisecta A. Terr., Prodr. Fl. Luc. 1, 1893, p. 44, '*R. lutea* var. *crispa* a. *tenuisecta*' (fide Terracc. in Caruel, Fl. It. 10, 1894, p. 173); Rouy et Fouc., l.c., p. 247, 's. var.'

R. l. s. b. longifolia (Ten.) Terr., l.c., p. 174; Rouy et Fouc., l.c., p. 248, 's. var.'

R. l. s. d. papillosa Gennari ex Terr., l.c.

R. l. s. forme gynodioique Faure in Bull. Soc. Hist. Nat. Afr. Nord 14, 1923, p. 235 (= var. *lutea*).

R. l. δ maritima Muell. Arg., Mon. Rés. 1857, p. 188 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. l.c., p. 570; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 893; Terr., l.c.; Rouy et Fouc., l.c. (= var. *lutea*).

R. l. ε suffruticulosa Link ex Muell. Arg., ll.cc., p. 189; id. in DC., Prodr. l.c. (= var. *lutea*).

R. l. ζ orientalis Muell. Arg., ll.cc. (= var. *nutans*).

R. l. η rigida Muell. Arg., ll.cc.; id. in Buhse, Aufzählung Ges. Pflz. 1860, p. 32 (= var. *lutea*).

R. l. θ besseriana Muell. Arg., ll.cc. (= var. *lutea*).

R. l. ι divergens Muell. Arg., ll.cc.; id. in DC., Prodr. l.c. p. 571 (= var. *lutea*).

R. l. υ streptocarpa Muell. Arg., ll.cc., p. 191; id. in DC., Prodr. l.c., p. 571

(= var. *lutea*).

R. l. κ pulchella Muell. Arg., ll.cc.; Lange in Kjøb. Vidensk. Meddel. 8, 1865, p. 87; Terracc. in Caruel, Fl. It. 10, 1894, p. 175; Rouy et Fouc., Fl. Fr. 2, 1895, p. 248 (= var. *lutea*).

R. l. β nutans Boiss., Fl. Or. 1, 1867, p. 430; Post, Fl. Syr. Palest. Sin. 1896, p. 112; Dinsm. in Post, l.c. ed. 2, 1, 1932, p. 138; Coode in Davis, Fl. Turk. 1, 1965, p. 503; Zohary, Fl. Palaest. 1, 1966, p. 335.

R. l. θ orthostyla (C. Koch) Muell. Arg. in DC., Prodr. l.c., p. 570; Czerniak. in Komar., Fl. URSS 8, 1939, p. 610 (= var. *lutea*).

R. l. λ lecoqii Muell. Arg. in DC., Prodr. 16(2), 1868, p. 571; Rouy et Fouc., Fl. Fr. 2, 1895, p. 248 (= var. *lutea*).

R. l. var. *yannezii* (Cut.) Lange in Willk. et Lange, Prodr. 3, 1880, p. 894 (= var. *lutea*).

R. l. ε reyeri (Porta et Rigo ex Strobl) Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 174 (= var. *lutea*).

R. l. var. *vivipara* Héribaldi in Bull. Soc. Dauph. p. 182 (Rouy et Fouc., Fl. Fr. 2, 1895, p. 249) (= var. *lutea*).

R. l. var. *genuina* Post, Fl. Syr. Pal. Sin. 1895, p. 112; Dinsm. in Post, l.c. ed. 2, 1932, p. 138; v. Soest in Nederl. Kruid. Arch. 1925, p. 112 (= var. *lutea*).

R. l. var. *ovata* Post, l.c.; Dinsm. in Post, l.c. (= var. *lutea*).

R. l. var. *delicatula* Murr. in Deutsche Bot. Monatsschr. 15, 1897, p. 15 (= var. *lutea*).

R. l. var. *brevifolia* v. Soest, l.c. (= var. *lutea*).

R. l. var. *latifolia* v. Soest, l.c. (= var. *lutea*).

R. l. subsp. *eu-lutea* Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 318; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 441 (= subsp. *lutea*).

R. l. e. var. *maritima* (Muell. Arg.) Maire, l.c. 3, 1934, p. 888 (= var. *lutea*).

R. l. subsp. *neglecta* (Muell. Arg.) Ball fide Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 318; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 441.

R. l. var. *subreflexa* Maire in Bull. Soc. Hist. Nat. Afr. Nord 34, 1943, p. 181 (= var. *nutans*).

R. l. var. *ramosissima* (Pourr.) Heywood in Feddes Rep. 64, 1961, p. 68.

R. crispa Mill., Gard. Dict. ed. 8, no. 2 (= var. *lutea*).

R. vulgaris Mill., l.c. no. 1 (= var. *lutea*).

R. mediterranea L., Mant. Alt. 1771, p. 574; Houtt., Nat. Hist. 2(8) 1777, p. 731; Vahl, Symb. 2, 1791, p. 53, excl. *R. tetragyna* Forsk.; Murr., Syst. Veg. ed. 14, 1784, p. 448; id., l.c. ed. 15, p. 368; Willd., Sp. Pl. 2(2), 1800 (1799), p. 880, excl. *R. tetragyna* Forsk.; Hornem., Hort. Hafn. 2, 1815, p. 502; Spreng., Syst. Veg. 2, 1825, p. 464, excl. *R. 4-gyna* Forsk.; Richt., Cod. 1835, p. 463; Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 241; Walp., Rep. 2, 1843, p. 751, excl. *R. quadragyna* Forsk. et *R. mediterranea* Jacq. (= var. *lutea*).

R. difformis Moench, Meth. Pl. Alt. 1802, p. 22, nom. illeg. (= var. *lutea*).

R. ramosissima Pourr. ex Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 499; Spreng., Syst. Veg. 2, 1825, p. 464; Ten., Fl. Neap. Prodr. App. 1826, p. 96;

Walp., Rep. 2, 1843, p. 752; Willk., Str. Stepp. Iber. Halbins. 1852, p. 105; Muell. Arg., Mon. Rés. 1857, p. 193 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 568; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 893; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689 (= var. *lutea*).

R. r. α abortiva (Pourr. ex Willd.) Muell. Arg., Mon. Rés. 1857, p. 194 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr., l.c. (= var. *lutea*).

R. gracilis Ten., Fl. Neap. Prodr. App. V, 1826, p. 15, and 1827, p. 96; id., Fl. Nap. 4, 1830, p. 257, tab. 230, fig. 2; id., Syll. 1831, p. 232; Rchb., Ic. Fl. Germ. 2, 1838, p. 22, tab. 102, fig. 4446b; Bertol., Fl. It. 5, 1842, p. 29; Walp., Rep. 2, 1843, p. 753; Lecoq et Lamotte, Cat. rais. Pl. C. Fr. 1847, p. 90 (= var. *lutea*).

R. mucronata Tin., Cat. Pl. Hort. Reg. Panorm. 1827, p. 280 (= var. *lutea*).

R. laevigata G. Don, Gen. Syst. 1, 1831, p. 289; Walp., Rep. 2, 1843, p. 752 (= var. *lutea*).

R. gallica Raf., Fl. Tell. 3, 1837 (1836), p. 72; Merr., Ind. Rafin. 1949, p. 132 (= var. *lutea*).

R. truncata Fisch. et Mey. in Ind. Sem. Hort. Petrop. 4, 1837, p. 45 (cf. Linnaea 12, 1838, p. 167); Ledeb., Fl. Ross. 1, 1842, p. 236 & 772; Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 242; Walp., Rep. 2, 1843, p. 753; Muell. Arg., Mon. Rés. 1857, p. 182, tab. 9, fig. 119 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 429; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 571; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348 (= var. *lutea*).

R. t. β mülleri Boiss., Fl. Or., l.c. (= var. *muelleri*).

R. tenuifolia Wallr. in Linnaea 14, 1840, p. 574 (= var. *lutea*).

R. orthostyla C. Koch in Linnaea 15, 1841, p. 705; Ledeb., Fl. Ross. 1, 1842, p. 771; Walp., Rep. 2, 1843, p. 751 (= var. *lutea*).

R. clausa Rchb. ex Muell. Arg. in Bot. Zeit. 14, 1856, p. 39; Muell. Arg., Mon. Rés. 1857, p. 192 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858) (= var. *nutans*).

R. neglecta Muell. Arg., Mon. Rés. 1857, p. 178 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 568; Ball in Journ. Linn. Soc. Bot. 16, 1878 (1877), p. 339; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 85; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 184; Murb. in Lunds Univ. Arsskrift n.s. 2, 18(3), 1922, p. 51; Senn. et Maur., Cat. Fl. Rif Or. 1933, p. 11 (= subsp. *neglecta*).

R. yanezii Cut., Fl. Comp. Madr. 1861, p. 151; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 580 (= var. *lutea*).

R. podolica Rehm. in Verh. Naturf. Ver. Brünn 10, 1871, p. 55 (= var. *nutans*).

R. petrovichiana Muell. Arg. in Rohlf's, Kufra 1881, p. 551; Dur. et Barr., Fl. Lib. Prodr. 1910, p. 27, tab. 2 (= var. *lutea*).

R. reyeri Porta et Rigo ex Strobl in Oesterr. Bot. Ztschr. 35, 1885, p. 101; Coode in Tutin et al., Fl. Europ. 1, 1964, p. 454 (in indice, nomen!) (= var.

nutans).

R. fluminensis Simonkai in Magyar Növ. Lapok 12, 1888, p. 19 (= var. *lutea*).

R. macedonica Form. in Verh. Naturf. Ver. Brünn 34, 1896 (1895), p. 332; Vand., Reliquiae Form. 1909, p. 46 (= var. *muelleri*).

R. othryana Form., l.c. 35, 1897 (1896), p. 190; Vand., l.c. (= var. *muelleri*).

× *R. benitoi* Senn. in Bol. Soc. Arag. 15, 1916, p. 263 (= var. *lutea*).

R. nainii Maire in Bull. Soc. Hist. Afr. Nord 14, 1923, p. 126; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016 (= var. *muelleri*).

R. n. subsp. *genuina* Maire, l.c. 31, 1940, p. 11; Emb. et Maire, l.c. (= var. *muelleri*).

R. n. subsp. *integrifolia* Maire, l.c. (= var. *integrifolia*).

R. dutoiti Sennen et Mauricio in Sennen, Diagn. Nouv. Pl. Esp. Mar. 1936, p. 225 (= var. *lutea*).

R. vinyalsi Sennen, l.c., p. 302 (= var. *lutea*).

Annual or perennial, erect to ascending, light green to glaucous, subbushy herb, 15–30–70 (–100) cm tall, diffusely branching from a woody stock, a leaf-rosette and a lignescent taproot.

Stems numerous leafy, glabrous, papillose-scabrid or hirtellous, ribbed; ± rough; pith disintegrating.

Leaves variously incised, very rarely all entire, glabrous to ± scabrous or rarely hirtellous. Basal leaves rosetted, often ± pinnatifid, narrowly obovate, 2½–8 cm long, 1½–2 cm wide. Stem-leaves ternately or biternately lobed (lateral lobes repeatedly forked), up to 15 cm long, lobes equal, divergent, sometimes subopposite, narrowly oblong, (1)–3–7(–10) mm wide. Margins bright, flat to ± crisped.

Flowers pale to deep yellow, on (long) pedicels. Raceme rather densely flowered, 15–30(–50) cm long, peduncle ribbed, ± scabrid. Bracts (tardily) deciduous, comose at top of raceme (exceeding flower buds), glabrous to scabrid, ± linear, 3–4 mm long, ½ mm wide; margins widely pallid, ± scabrid. Pedicels patent in flower, ascending or curving downwards in fruit, slender, markedly ribbed (ribs scabrid), in flower (2–)4–5(–7) mm long, slightly longer in fruit.

Sepals 6 (5–7), persistent to tardily deciduous, glabrous, linear (-spathulate), ± 3 mm long, ½ mm wide; margins narrowly pallid, scabrid.

Petals (2–)3–5 mm long. Limb of superior petal 3- or seemingly multipartite (lateral lobes entire or variously incised), up to twice as long as the appendage; central lobe entire, up to almost as long as lateral, linear-spathulate; lateral lobe semilunate or narrow falcate, entire, crenate or variously cleft. Appendage rectangular-obovate, 1½ mm long, 1 mm wide, transverse rim continuous in front of limb base, ⅓ mm wide, margins ciliate to erose. Lateral petal smaller, anterior lobe usually missing, other lobes similar to those of superior petal. Anterior petal the smallest, limb entire, rarely evenly 2–3-partite.

Disc 1 mm high, 1½ mm wide, pilose-hirtellous (hairs ± capitate); margin recurved, erose.

Stamens (12–)15–20(–22). Filaments deciduous, ± scabrid, filiform to subulate, 3 mm long. Anthers narrowly ellipsoid, 1½ mm long, asperulous.

Ovary obovoid to cylindric, subsessile, glabrous to (densely) papillose, 3-angled, (ribs hyaline, ± scabrid); 3–(4)-toothed, teeth ca. ¼ as long as ovary. Ovules 12–25 per placenta in (2)–3–4 rows.

Capsule erect or deflexed, sometimes pendulous, short stipitate, oblong to cylindric, often obovate, 1–2 cm long, ca. ½ cm wide, ± glabrous to ± papillose, side walls sometimes sulcate; ribs scabrid, mouth widely opened, truncate, teeth minute.

Seeds dark brown, very glossy, obliquely ovoid; (1–)1¾–2 mm long, carunculate or not. Sinus wanting, represented only by a shallow groove. Testa smooth.

Caryology: Chromosome number of *R. lutea* $n = 24$ (TISCHLER, Tab. biol. per. 1, 1931, p. 141; reported by OKSJK; identification uncertain, no preserved herbarium specimen seen).

Type: '7 *Lutea*' (LINN 629.18; holotype).

Distribution: Indigenous in the Mediterranean area and Asia Minor (to Turkmenistan). Everywhere naturalized in Eurasia and locally also in America as an escape from cultivation.

Key to the infraspecific taxa

1. Ovules 20–25 per placenta, in 2 rows. Seeds very numerous, ca. 1 mm long, ecarunculate. **b. ssp. neglecta**
1. Ovules 10–15 per placenta, in (2–)3–4 irregular rows. Seeds few, ca. 1½–2 mm long, carunculate. **a. ssp. lutea**
2. All leaves entire, often few ones obscurely incised. **a3. var. integrifolia**
2. Leaves (partly) ternately or biternately divided.
3. Leaf-lobes filiform. **a2. var. filiformis**
3. Leaf-lobes linear, oblanceolate or spatulate.
4. Capsules at least lower ones pendulous. **a5. var. nutans**
4. Capsules erect or spreading.
5. Lateral lobe of superior petal entire to very shallowly incised. **a1. var. lutea**
5. Lateral lobe of superior petal deeply 2–4(–6)-cleft or -partite. **a4. var. muelleri**

a. subsp. lutea

Ovules (8-)10-15 per placenta, in (2-)3-4 irregular rows. Seeds ca. $1\frac{1}{2}$ -2 mm long, carunculate.

Distribution: Area of the species.

a1. var. lutea

Glabrous, scabrid-papillose or rarely hirtellous indurate herbs. Leaves partly variously incised, rarely all entire. Lateral lobes of superior petal entire or crenate, rarely shallowly incised. Capsule erect, deflexed or pendulous.

Distribution: Area of the species.

a2. var. filiformis ABDALLAH et DE WIT, *nov. var.*

Varietas nova *Reseda lutea* omnia folia-lobatae filiformis per totam folia lobatae linearae, oblanceolatae vel spatulatae.

Type: J. NITKA et B. VYTOUŠ 17, Slovakia australis, in ruderatis vici Radvaň, haud procul oppidum Komárno, Cca 110 m.s.m., 26.6.1958 (W, acqu. 1963, no. 4317 = holotype).

Leaf-lobes filiform and not linear, oblanceolate nor spatulate.

Distribution: Known from the type locality.

a3. var. integrifolia ABDALLAH et DE WIT, *nov. var.*

Folia omniae integrae vel rarissimae parce et obscuri incisae.

Type: REICHENBACH F. à 46 (W, acqu. 1889, no. 309699 = holotype).

Leaves all entire, very rarely few ones obscurely incised.

Distribution: Occasionally seen, e.g. Port Mesin, 'Csepeliensis'; Arnhem, Netherlands.

a4. var. muelleri (BOISS.) ABDALLAH et DE WIT, *nov. comb.*

Basionym: *R. truncata* Fisch. et Mey. *β mülleri* Boiss., Fl. Or. 1, 1867, p. 429.

Lateral lobe(s) of superior petal deeply 2–4(–6)-partite.

Type: Tab. 9, fig. 119, MUELL. ARG., Mon. Rés. 1857.

Distribution: Czechoslovakia, Denmark, France, Greece, Hungary, Italy, Yugoslavia, Morocco, and USA.

a5. var. nutans BOISS., Fl. Or. 1, 1867, p. 430.

At least lower capsules pendulous when fully ripe.

Type: REICHENBACH F. à 1831, e sem. persicis (W, acqu. 1889, no. 309743 = holotype).

Distribution: Algeria, Bulgaria, Czechoslovakia, Crete Isl., France, Germany, Greece, Iran, Italy, Iraq, Yugoslavia, Malta Isl., Netherlands, Portugal, Spain, S. Africa, Egypt, and USSR.

b. subsp. neglecta (MUELL. ARG.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda neglecta* Muell. Arg., Mon. Rés. 1857, p. 178.

Ovules 20–25 per placenta, in 2 rows. Seeds very numerous (ca. 60 per capsule), ca. 1 mm long, caruncle indistinct.

Type: JAMIN 273, 'Pl. exs. d'Algérie, 1852', in saxosis Algeriae prope Biskra loco dicto: Ras-el-ma, sub *R. lutea* Coss. et DUR. (holotype, C).

Distribution: NW. Africa, Algeria, Morocco, and Tunisia.

Taxonomical notes: In the Linnean Herbarium are 8 sheets carrying specimens of *R. lutea* L., of which is the holotype 629.18 '7 lutea'.

No. 629.13 has 'L. 397a fruticulosa'. This apparently is a specimen collected by LOEFLING (397a) and is *R. lutea* L.

No. 629.19, sine inscriptione, carries *R. lutea*.

No. 629.20 has '55 *Reseda crispa gallica*' written by an unidentified hand to a specimen of *Reseda lutea*.

No. 629.22 has 'HU' and is *Reseda lutea*, originating from the Uppsala Meded. Landbouwhogeschool Wageningen 78-14 (1978)

garden. No. 629.23 and 629.26 are also from Uppsala ('HU').

No. 629.27 has a specimen of *R. lutea* apparently from the orient.

MILLER (1768) described *R. crispa* as follows: 'foliis omnibus trifidis, inferioribus pinnatis'. He further referred to 'Hort. Cliff. 213' and '*Reseda crispa Gallica*. BOCC. Sic. 77'. It appears that on p. 212 in Hortus Cliffortianus mention is made to '*Reseda foliis omnibus trifidis, inferioribus laciniatis*'. As a literature reference is added '*Reseda crispa gallica* BOCC. sic. 77, t. 41, f. 3'. As there is no Resedaceous plant treated on p. 213 in Hortus Cliffortianus it must be assumed that in spite of small inaccuracies MILLER wished to base his *Reseda crispa* on the data found on p. 212 in Hortus Cliffortianus; he appears to have copied the error in the page-reference ('213') from LINNAEUS's Sp. Pl., 1753, p. 449. LINNAEUS used '*Reseda folius omnibus etc.*' (Hort. Cliff. '213') as the first literature reference for *Reseda lutea* L. (Sp. Pl. 1, 1753, p. 449), while he accepted BOCCONE's '*Reseda crispa gallica etc.*' as a variety ' β ' in *Reseda lutea* L. (l.c.).

It is thus proved, that MILLER raised actually *R. lutea* L. β (l.c.), to the rank of a species, and so it appears that *R. crispa* MILLER is a synonym of *R. lutea* L.

A specimen in the British Museum, designated as the type specimen of *Reseda crispa* MILL. (photo in MICH, NY, UC, US) is, therefore, no specimen on which a description was based but only a specimen named by MILLER but based on *R. lutea* L. In passing it may be observed that undulate leaves occur sometimes in *R. lutea* without any correlated character of taxonomic value.

MILLER (1768) also described *Reseda vulgaris* 'foliis pinnatis, foliolis integris alternis floribus tetragynis'. He further referred to '*Reseda vulgaris* C.B.P. 100'. In CASPER BAUHIN's Pinax 1623, p. 100, no descriptive data are found of *Reseda vulgaris* (only literature references and a remark on its variability).

The description in LINNAEUS's Sp. Pl. 1, 1753, p. 449, was not copied by MILLER. MILLER had a specimen (BM-HS 230) at his disposal when he described *Reseda vulgaris* MILL. LINNAEUS (l.c.) reduced BAUHIN's *Reseda vulgaris* to *R. lutea* L. The specimen named *R. vulgaris* MILL. BM-HS 230 does not differ from *R. lutea* L., therefore it is reduced in this revision to the synonymy of that species.

R. mediterranea L. In Index Kewensis (2, 1895, p. 697) is a reference to *Reseda mediterranea* L., 'Sp. Pl. ed. II. 564'. Origin: N. Africa ('Afr. bor.'). However, in LINNAEUS's Sp. Pl. ed. 2, and 3, 1763 and 1764, no reference to *R. mediterranea* is found (cf. Sp. pl. 1, pp. 643-646). Index Kewensis intended to refer to Mant. Alt. 1771, p. 564, where *R. mediterranea* was first described and named by LINNAEUS; the country of origin LINNAEUS declared to be Palestine.

In the Linnean Herbarium (London) are preserved (cf. SAVAGE, Cat. 1945, p. 85): 629.25 '*Reseda mediterranea* SCHREBER', 629.26 'HU', and 629.27 θ . The specimen from the Uppsala Garden is *Reseda lutea* L. (629.26), and the Central Asian specimen is also *R. lutea* L. (629.27).

In the Linnean Herbarium at Stockholm is one specimen marked 'ex horto Uppsala. e Cairi desertis. FORSKÅHL. *Reseda* LINN. *mediterranea*' (41:22). This specimen is conspecific with the specimen designated by SCHREBER (cf.

629.25). Both belong in the genus *Cayusea*.

The name *R. mediterranea* has caused a great deal of confusion. Here only an outline of the various slips and errors is given. LINNAEUS's protologue runs as follows (Mant. alt. 1771, p. 564);

'mediterranea.

RESEDA foliis integris trilobisque, calycibus flore brevioribus.

Habitat in Palaestina.

Caulis pedalis, adscendens s. erectus, superne ramosus, scaber.

Folia inferiora lanceolata, alterna, indivisa, subtus scabra, *Caulina superiora* trifida.

Racemus terminalis, longus erectus.

Calyx hexaphyllus, brevissimus, linearis, patens.

Corolla hexapetala, alba: *Petala* 2 superiora tripartita; media minore: 2 lateralia bipartita: inferiore minore; 2 infima linearia.

Stamina pallida.

Germen tricuspidatum, calyce vix longius. *Styli* nulli.

Stigmata simplicia.'

A review of all species of *Resedaceae* occurring in Palestine, or near it, reveals that no species is characterized by all data specified by LINNAEUS. Only one very likely possibility appears to be present. In *R. lutea* of Palestine (and elsewhere) the flower often is exactly as described by LINNAEUS (6 petals, of a shape as given in the protologue); there are 6 narrow sepals, 3 carpels and pale anthers. The habit of the plant, the leaves that are scabrid below, match LINNAEUS's description, and the lower leaves are entire whereas the upper ones usually are 3-lobed. The only uncertainty, perhaps, is in the shape of the lower leaves which LINNAEUS described as 'lanceolate' whereas at present the term 'spathulate' or narrowly obovate would seem preferable. The colour of the flower is said to be 'alba' and so it has to be accepted that LINNAEUS saw pale flowers, which he believed to have been white when fresh. Pale specimens of *R. lutea* are repeatedly met with.

If the protologue would be clear in all its details, no problem would have persisted during 2 centuries. However, it might seem reasonable that, while stressing the fact that absolute certainty can never be attained, a logical and soundly founded decision may be taken now. The discrepancies with the Linnean description and present interpretation of *R. lutea* are very slight indeed and for that reason *R. mediterranea* L. is reduced to *R. lutea* L.

As a neotype for *R. mediterranea* L. is designated LINN 629.26 (HU). Pale or whitish flowered specimens of *R. lutea* L., with eventually undeniably lanceolate leaves are reducible to *R. lutea* L. representing nothing more than an edaphic form.

Reseda difformis Moench. MOENCH (Suppl. Meth. Pl. 1802, p. 22) described *Reseda difformis* and added by way of reference: '*Reseda, mediterranea, foliis integris trilobisque calycibus flore brevioribus* LINN. Sp. Pl. II, p. 880'.

In Species Plantarum, edition WILLDENOW (2,2, 1800, p. 880) under *Reseda mediterranea* is found the description which was literally quoted by MOENCH. WILLDENOW, on the other hand, copied Mantissa altera 1771, p. 564, for the description of *R. mediterranea* L., and added some literature references, and, as a synonym, *Reseda tetragyna* FORSKÅL.

MOENCH added some descriptive data (which seem to be inaccurate, to say the least of it, cf. 'petala tria etc.') but there can be no doubt that he declared *R. mediterranea* L. identical with his *R. difformis*. It follows that *R. difformis* MOENCH is nomenclaturally a superfluous name and must be rejected.

In Index Kew. 2, 1895, p. 696, *R. difformis* is listed as identical with *Caylusea canescens* ST. HILAIRE. MUELL. ARG. cited *R. difformis* MOENCH in synonymy to *R. macrosperma* RCHB. (= *R. media* LAG.) in 1857 (Mon. Rés., p. 133), while later on (in DC., Prodr. 16(2), 1868, p. 563) he cited it in synonymy to *R. media* LAG. (the correct name for *R. macrosperma* RCHB.).

WILLDENOW (Enum. Pl. Berol. 1, 1809, p. 499) described *R. ramosissima* from a specimen collected by POURRET in Spain and adopted POURRET's herbarium name. He stated that *R. ramosissima* resembled *R. lutea* ('similis') but it was much more slender ('multo tenuior'). MUELLER stated that WILLDENOW's specimen was not collected in Spain but it was a plant grown in a botanical garden which for that reason was exceptionally slender, badly developed and carried half-abortive capsules. He adopted WILLDENOW's taxon as *αα abortiva* in *R. ramosissima* WILLK. (1852); see MUELLER, Mon. Rés. 1857, p. 194. Nomenclaturally '*R. ramosissima* WILLK.' is, of course, illegitimate (cf. also DC., Prodr. 16(2), 1868, p. 568) and the correct author's name was re-established by LANGE (in WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 893).

The reference in Index Kewensis to *Reseda ramosissima* POURR. ex WILLD. suggests, by adding SPRENG., Syst. 2, 1825, p. 464, as a second literature (author's) citation, that WILLDENOW's publication of *R. ramosissima* was not valid; in fact the citation of SPRENGEL's Systema is superfluous.

In the WILLDENOW Herb. is conserved a specimen (B 9235, Film 1057/6) which is labeled: 'no 118 *Reseda ramosissima* POURR. species distincta a *Reseda lutea* L. (POURRET)'. This is to be accepted as the holotype of *R. ramosissima* POURR. ex WILLD. A wider range of specimens shows that *R. ramosissima* is best referred to *R. lutea* L. var. *lutea*.

WILLDENOW, when publishing POURRET's herbarium name, indicated that he considered *R. ramosissima* POURR. ex WILLD. as closely allied to *R. lutea* (Enum. Pl. Hort. Berol. 1, 1809, p. 449). It is reduced in the present study to the synonymy of *R. lutea*.

In Linnaea (24(2), 1851, p. 163) KUNZE repeated SPRENGEL's statement (Syst. Veg. 2, 1825, p. 464) that *R. ramosissima* POURR., sphalm. 'POIR.', is conspecific with *R. erecta* LAG. but it was possible, KUNZE added, that the fruits seen were young and might be different when fully grown. MUELL. ARG. (Mon. Rés. 1857, p. 168) reduced both names to the synonymy of *R. stricta* (see taxonomical notes to *R. stricta*).

The name *R. ramosissima* G. DON ex KUNZE is so listed by Index Kewensis

(2, 1895, p. 697). Actually it was intended to refer to '*Reseda ramosissima* POIR.' (in Linn. 24(2), 1851, p. 163), a name sent in msc. by G. KUNZE from the botanical garden at Leipzig to SCHLECHTENDAL, the editor of *Linnaea*, who published '*Reseda ramosissima* POIR.' (l.c.), which was subsequently listed in *Index Kewensis* as *R. ramosissima* G. DON ex KUNZE.

There existed a name '*Reseda ramosissima* POURR.' (cited by WILLDENOW, Enum. Pl. Hort. Berol. 1, 1809, p. 499) and it seems very probable that KUNZE in his letter meant to refer to 'POURR.' as an author (or, perhaps, he even correctly cited 'POURR.') but that finally either by error of KUNZE's or of the printer's or of SCHLECHTENDAL's the author's name was cited as 'POIR.'. The name *R. ramosissima* G. DON ex KUNZE, therefore is an inaccurate reference in *Index Kewensis*, and *R. ramosissima* POIR. is an error in *Linnaea* (l.c.). Both author's citations are to be rejected, nomenclaturally.

Finally it is to be remarked that G. DON cited POURR. as author of *R. ramosissima* (Gen. Syst. 1, 1831, p. 289).

MUELLER cited in his monograph (1857, p. 193) and later in DC., Prodr. 16(2), 1868, p. 568, *Reseda ramosissima* WILLK. He seems to have adopted WILLKOMM as the author of *R. ramosissima* instead of POURRET ex WILLDENOW and appears to have made this change because he considered that POURRET's plant (and description) rested on an impoverished garden plant (*R. ramosissima* $\alpha\alpha$ *abortiva* MUELL. ARG.) whereas WILLKOMM had the 'formam typicam ante oculos' (cf. ll.cc.). Of course, this change is not permitted. G. KUNZE also pointed out that POURRET's plant had young fruits only (*Linnaea* 24(2), 1851, p. 163).

WILLKOMM (Str. Stepp. Iber. Halbins. 1852, p. 105) explained fully that he had found his specimen an exact match to *R. ramosissima* POURR. (of which he studied type material). *R. ramosissima* WILLK., therefore, is an incorrect citation.

TENORE (Fl. Nap. 4, 1830, p. 257) stated that *R. gracilis* TENORE was published by him (Viagg. Basil. Calab. 1827, p. 122). On the other hand *Index Kewensis* (2, 1895, p. 697) refers to TENORE's publication of 1831 (Syll., p. 232). TENORE pictured '*R. gracilis* TENORE' in his Fl. Nap. 5, 1835-1838, t. 230, f. 2 (sphalm. 't. 232. f. 3'). Actually, *R. gracilis* was published and described by TENORE in *Florae Neapol. Prodr. App. Quinta* 1826, p. 15, who stated that it was closely allied to *R. lutea*.

REICHENBACH pictured *R. gracilis* TENORE in Ic. Fl. Germ. 2, 1838, tab. 102, fig. 4446b and further referred to it on p. 22, stating that he had received a specimen from Dr. WELWITSCH, who collected it in Austria, on the high wall next to the 'Schneeberg'. REICHENBACH did not mention any type material nor was any type material of TENORE's seen by us. However, there is no reason to doubt that MUELLER was not correct in reducing *R. gracilis* TENORE to *R. lutea* L., although he maintained it provisionally as a variety '*divergens* MUELL. ARG.' (cf. MUELL. ARG., Mon. Rés. 1857, p. 190). In DC., Prodr. 16(2) 1868, p. 571, MUELLER referred to NEILREICH's Fl. Wien, Nachtr. 1851, p. 272. NEILREICH (l.c.) stated that an authentic specimen was seen by him and declared 'such forms are seen everywhere on dry, stony soils'. All data confirm NEILREICH's

opinion.

TINEO (l.c., p. 280), gave a full description of *R. mucronata* mentioning a specimen 'Militello Val di Noto alle Beverie', and stated that *R. mucronata* was near to *R. lutea* and the leaf-lobes were 'mucronulatis'.

MUELLER so referred (Mon. Rés. 1857, p. 188) to *R. mucronulata* TIN., a 'corrected' spelling of 'mucronata' (see also *R. mucronulata* GUSS.), a correction not in agreement with the Code. This has the consequence that '*R. lutea* L. γ *stricta* $\gamma\gamma$ *mucronulata*' MUELL. (l.c.) must be changed into *R. lutea* L. γ *stricta* $\gamma\gamma$ *mucronata*, because this name was fully based on *R. mucronata* TIN. (see also MUELL. in DC., Prodr. 16(2), 1868, p. 570). In both works '1828' was cited as the year of publication.

All data at our disposal point to synonymy with *R. lutea* L. var. *lutea*.

GUSSONE distinguished in *Reseda lutea* L. a variety b. (Fl. Sic. Prodr. 1, 1827, p. 528), which he afterwards wished to raise to the rank of a species: *Reseda mucronulata* (Suppl. Fl. Sic. Prodr. 1832, p. 147). He quoted '*R. mucronulata* TIN. Cat. H. R. Pan. an. 1828, p. 280'. This proves that he wanted to refer to *R. mucronata* TINEO (Cat. Pl. Hort. Reg. Panorm. 1827, p. 280).

PRITZEL and BRADLEY stated that the year of publication of TINEO's Cat. Pl. Hort. Reg. Panorm. was 1827, which is accepted in this revision (cf. Ind. Kew. 2, 1895, p. 697).

The change of epithet, *mucronata* into *mucronulata* is, of course, not allowed. *R. mucronulata* GUSSONE is, accordingly, rejected as a name. STROBL applied GUSSONE's epithet '*mucronulata*' for a variety in *R. lutea* (Fl. Etn. in Oesterr. bot. Zeitschr. 35, 1885, p. 101) following MUELLER ARG. who cited '*mucronulata*' in GUSSONE's way, ascribing this to TINEO also. TERRACCIANO rectified GUSSONE's erroneous citation in 1894 (in CARUEL. Fl. It. 10, 1894, p. 174). *R. lutea* L. var. *mucronulata* TODARO, cited by STROBL (l.c.) is based on TODARO N265, Villafrate, distributed with a printed label 'Todaro Flora Sicula Exiccata' (TL). It is debatable whether *R. lutea* L. var. *mucronulata* TODARO ex STROBL is a nomen nudum, or perhaps, legitimate. Whatever the case may be, all proposed taxa belong in *R. lutea* and deserve no further distinction. The reference in Index Kewensis '*R. mucronulata* GUSSONE' (2, 1895, p. 697) is now sufficiently explained.

G. DON based '*R. laevigata*' on (a) specimen(s) cultivated since 1828 in Kew Gardens and stated that its native country was Egypt. He declared that this species behaved as a biennial plant (Gen. Syst. 1, 1831, p. 289).

From G. DON's protologue, the variations he attributed to his species, fall within the variability of *R. lutea* L. Therefore *R. laevigata* G. DON is reduced to a synonym of *R. lutea* L.

Concerning typification, G. DON (l.c., p. iv) declared '..... descriptions of numerous plants never before published, and derived chiefly from the Lambertian Herbarium', so the type may be present in LAMBERT's herbarium.

No type specimen of *R. truncata* FISCH. et MEY. (Ind. Sem. Hort. Petrop. 4, 1837, p. 45) was seen by us. MUELLER (Mon. Rés. 1857, p. 182, and in DC., Prodr. 16(2), 1868, p. 571) and YEO in TUTIN et al. (Fl. Eur. 1, 1964, p. 348) kept

it as a separate species. *R. truncata* is better reduced to the synonymy of *R. lutea* (cf. also Flora URSS 8, 1939, p. 610, and YEO in TUTIN et al., Fl. Eur. 1, 1964, p. 348). Specimens with somewhat widened and rougher filaments, also with very warty ovaries can be considered to represent a variety occurring round the north-eastern Mediterranean (and on Crete). As a rule the flowers are intensely yellow. It is to be realized that every intermediate form in *R. lutea* occurs (diluted filaments or not, etc.; cf. also BOISSIER, Fl. Or. 1, 1867, p. 429).

Index Kewensis (2, 1895, p. 697), refers to *R. tenuifolia* WALLR. citing 'Beitr. Fl. Hercyn. 204; et in Linnaea, XIV. (1840) 574 = *lutea*'.

The protologue in Linnaea (l.c., p. 573–574), is as follows:

'118. *Reseda* – caule e basi ramosissima diffuso adscendente, foliis petiolatis omnibus conformibus (viridi-glauciscentibus) trifido-pinnatis, pinnis simplicissimis anguste aequaliterque linearibus acutis juxta rhachin alatum cum illis conformem decurrentibus, calyce 6-phylo, phyllis linearibus squamam nectariferam vix superantibus, antheris subrotundis, capsula e basi tenuata elliptica apice tricorni stigmatibus retractis coronata dilata. – *R. tenuifolia* herb. Wallr.? *R. gracilis* Tenor.

An sonnigen &C.'.

This text is difficult to interpret as regards the author's intention. It may be inferred that WALLROTH (l.c.), wished to publish *R. tenuifolia*, but that he had some doubt as regards a possible identity with *R. gracilis* TENORE. If this view is correct, it means that WALLROTH had taxonomic doubt as regards his new species but that nevertheless, the name may be accepted as legitimately published.

There is nothing to indicate that WALLROTH's specimen differed from *R. lutea* L. and so *R. tenuifolia* WALLR. is reduced to synonymy, a view previously taken by MUELL. ARG. (Mon. Rés. 1857, p. 191 and in DC., Prodr. 16(2), 1868, p. 571). No specimen could be traced, which could be accepted as the holotype; a specimen in WAG is accompanied by an old, scarcely legible label, which could be interpreted as indicating an isotype. It is appointed here as a neotype (? isotype) '*Reseda tenuifolia* m.' (WAG), belonging in *R. lutea*.

C. KOCH (in Linnaea 15, 1841(2), p. 705), based the description of *R. orthostyla* on a specimen collected by him near Gori village where it was abundant near Cyrum (Kur) river, in 1836–7 (S. Russia).

KOCH stated that *R. orthostyla* is very near in habit to *R. inodora* RCHB. (but that species must not be referred to the subgenus '*luteola*', according to KOCH). He declared that it is very different from *R. truncata* FISCH. et MEY. by the stems which were procumbent and the never pinnate leaves.

MUELLER saw the type specimen at Berlin and observed six-petaled flowers, and declared *R. orthostyla* C. KOCH to be synonymous with *R. lutea* L., a view which is accepted here.

Index Kewensis (2, 1895, p. 697) cited 1845, a year which is also accepted by MUELLER (Mon. Rés. 1857, p. 190, and in DC., Prodr. 16(2), 1868, p. 570) as

the year of publication, but volume 15 of *Linnaea* carries the date 1841, which is followed here.

MUELLER based *Reseda clausa* REICHENBACH ex MUELL. ARG. (in Bot. Zeit. 14, 1856, p. 39) on (a) specimen(s) growing in RCHB.F. garden from seeds, received from Persia in 1831, collected by REICHENBACH senior. The cultivated plant was sent by REICHENBACH's son to MUELLER. The name '*clausa*' was given by REICHENBACH in herb.

MUELLER stated that *R. clausa* was closely allied to *R. lutea* from which it was, after all, he said, widely different by much broader leaves which were only incised at the top and not up to the middle or more than one third, and by capsules which were more or less hanging on curved pedicels.

MUELLER accepted *R. clausa* RCHB. ex MUELL. ARG. (Mon. Rés. 1857, p. 192) as a good species but later on he reduced it to a variety in *R. lutea* (cf. DC., Prodr. 16(2), 1868, p. 570). The type specimen of *R. clausa* (W, acqu. 1889, no. 309743 = holotype) proves it to belong in *R. lutea* var. *nutans*.

MUELLER based *R. neglecta* (Mon. Rés. 1857, p. 178) on a specimen previously named '*R. lutea* COSS. et DUR.' No. 273, collected by JAMIN in 1852 on rocks in Algeria near Biskra (Ras-el-ma). The specimen was said to be present in hb. BOISS.

MUELLER declared that *R. neglecta* at first sight appears like *R. lutea* when small, but it differed from the latter among other things by the shape of the petals and the size of the seed. It differed from '*R. papillosa*' by the glabrous parts and by the sepals which equaled the petals, by the cylindrical capsule, by the number of the ovules etc. Finally it was distinguished from *R. crystallina* by the shape of the petals, by the short pedicels and by the capsule which is only $\frac{1}{2}$ its size.

BALL discussed the position of *R. neglecta* which he wished to reduce (as a form) to *R. lutea*. It seemed to him sooner a variety than a subspecies (in *R. lutea*; cf. Journ. Linn. Soc. Bot. 16, 1878 (1877), p. 340). BALL did not publish a new combination or name, nor was he certain of the rank the taxon *R. neglecta* ought to acquire. Hence *R. lutea* subsp. *neglecta* (MUELL.) BALL (JAH. et MAIRE, Cat. Pl. Mar. 2, 1932, p. 318; EMB. et MAIRE, Cat. Pl. Mar. 4, 1941, p. 1016 and QUÉZEL et SANTA, Nouv. Fl. Alg. 1, 1962, p. 441) is nomenclaturally an error.

CUTANDA (Fl. Comp. Madr. 1861, p. 151) described *R. yannezii* and stated that he saw one specimen only. It was not 'complete' and had been collected by JUAN ISERN at Valdemoro. The flowers were not described (being absent). MUELLER included *R. yannezii* CUT. in his treatment of *Reseda* in DC., Prodr. 16(2), 1868, p. 580, by copying literatim CUTANDA's description. He cited no specimen and CUTANDA's description clearly indicates that the petals were absent. On what ground MUELLER (l.c., p. 579) placed it in the group having the sidelobes of the upper petal divided in many laciniae remains unexplained.

R. yannezii CUTANDA was treated as a synonym to *R. lutea* var. *pulchella* by LANGE with doubt (cf. LANGE in Kjöb. Vidensk. Meddel. 8, 1865, p. 87).

Index Kewensis (2, 1895, p. 697) referred it to *R. lutea*, a possibility already

suggested by CUTANDA himself.

Reseda podolica REHM. was published in 1871 (Verh. Naturf. Ver. Brünn 10, p. 55); a description was given and it was said to occur on stony hills on fallow or in sown fields near Jaryszow in Podolia (Black Sea region) associated with *Reseda lutea*. REHMANN (l.c.) remarked that *R. podolica* was allied to *R. lutea* but differed in the characters mentioned in the diagnosis, and in particular in its hanging capsules.

In the description no differences from *R. lutea* can be discovered; the hanging capsule indicates that *R. podolica* is to be reduced to *R. lutea* var. *nutans*.

Reseda petrovichiana Muell. Arg. was described in 1881 (ROHLFS, Kufra, p. 551–552); it was stated to be closely allied to *R. duriaeana* and *R. papillosa*. In this present revision *R. papillosa* was reduced to synonymy (in *R. duriaeana* var. *papillosa*). No type material of *R. petrovichiana* was seen; material from the type locality (RUHMER 32, Cyrenaica, Benghasi, HBG, K, LD) proved to belong in *R. lutea*, which is a close ally to *R. duriaeana*. In addition a specimen collected by PETROVICH '217, Benghasi 1884', identified previously by ASCHERSON (WU 3125), however, answered MUELLER's description, also the plate (DUR. et BARR., Fl. Lib. Prodr. 1910, tab. II), in all particulars. It appears from the description that *R. petrovichiana* has 14–16 ovules per placenta. *R. lutea* has 12–25 ovules and *R. duriaeana* has 6–8(–12) ovules. The capsules in *R. duriaeana* are nodding, but erect in *R. lutea* (in *R. lutea* var. *nutans* they are nodding). The capsules of *R. petrovichiana* are not stated to be nodding. The description suggests they are erect, and narrow, cylindric, not having the wider shape of *R. duriaeana*-capsules. *R. duriaeana* flowers are normally white, those of *R. petrovichiana* (pallid-)yellow. All data point to synonymy with *R. lutea*.

A specimen kindly lent to us by Dr. H. SCHOLZ (SCHOLZ 70158, 27-4-1970, B) was collected in Libya, Cyrenaica, NE. approaches to Djebel Harusch, in a 'wadi' with *Tamarix*, southeast of Zella. This represents *R. lutea*, but shows the desert-form and suggests more or less *R. duriaeana* or '*R. petrovichiana*'. However, the yellow flowers, the erect capsules and the short central lobe of superior petal exclude *R. duriaeana*. Because the finding locality is not far distant from the type locality of '*R. petrovichiana*', it supplies another argument for reducing *R. petrovichiana* to *R. lutea*.

The name *Reseda reyeri* PORTA et RIGO is repeatedly found in literature, often as a nomen nudum or also as an infraspecific taxon (e.g. TERACC. in CARUEL, Fl. Ital. 10, 1894, p. 174) where it is described as a taxon 'ε' in *Reseda lutea*. As a specific name it was quoted by STROBL (Fl. Etn. in Oesterr. Bot. Ztschr. 35, 1885, p. 101). STROBL regards it as a scarcely distinguishable variety in *R. lutea* ('eine kaum erwähnenswerte Varietät') but did not publish a varietal name. His taxonomic evaluation does not prevent, it would seem, the publication of *R. reyeri* PORTA et RIGO as a species, according to the Code, because he added a few descriptive data (more numerous basal leaves and wider leaf-lobes of the lower leaves, than in normal *R. lutea*; transl.). Fortunately, *R. reyeri* PORTA et RIGO ex STROBL can be reduced to the synonymy of *R. lutea* L. without hesita-

tion, as is proved by the type-specimens of *R. reyeri* (Manfredonia, Apulia, in 1875, no. 343; isotype TL).

Reseda reyeri PORTA et RIGO was quoted in Flora Europaea (1, 1964, p. 454 (Index)) with a reference to *R. lutea*. *R. reyeri*, however, is not mentioned in the text, nor elsewhere in the treatment of *Reseda* (l.c., pp. 346–349). Index Kewensis contains no reference to *R. reyeri*. 'PORTA et RIGO, no. 343, ex itinere II italicum, *Reseda Reyerei* PORTA et RIGO 1875 ex grato animo Rautori illustr. Italia austral. Apulia in agris maritimis circa Radi Manfredoniae et ad caput Leucae 1–200, 14 + 29.VI.1875, PORTA et RIGO' (W 46304-05-06) is designated as a type of *R. reyeri* PORTA et RIGO. TERRACCIANO (in CARUEL, Fl. It. 10, 1894 (1893), p. 174) used the same specimens mentioned above when publishing the var. 'ε *Reyeri*' in *R. lutea*.

A. TERRACCIANO published a detailed study of *Resedaceae* in Italy (in CARUEL, Fl. It. 10, 1894, p. 145–186). He coined on that occasion a host of infraspecific names which were partly identical to those found in MUELL. ARG.'s treatments (1857 & 1868) and partly similar but used in a different taxonomical rank, and partly new. It was a valiant effort to create some order in the endless variations within *R. lutea* (and other species), but in the present revision the systematy of TERRACCIANO has not been adopted.

It is thought to be impossible to arrive at well-founded conclusions regarding nearly all infraspecific taxa distinguished in *R. lutea* previously by TERRACCIANO and other authors. Only an extensive genetic and ecological study might lead to a satisfactory microsystematy within *R. lutea*. In the literature cited more or less an enumeration has been attempted; a detailed discussion of these infraspecific names seems not useful at present.

SIMONKAI cited no type specimen when describing *R. fluminensis* in Magyar Növ. Lapok (Fiume Floraja) 12, 1888, p. 19, but mentioned its occurrence on road-sides near the sea, close to a chemist's shop near the Luisa road and close to a paper shop near Susak.

He declared that it differed very much from *R. lutea* occurring in Austria and Hungary being much larger, and by its rigid glaucous leaves, of which some upper leaves were entire and by the lobes of the leaves which were narrowly oblong, tapering gradually to a bristle.

No type material was seen. The description contains no data justifying a segregation from *R. lutea* and so *R. fluminensis* SIMONKAI is reduced to synonymy.

Reseda macedonica FORMÁNEK in Verh. Naturf. Ver. Brünn 34, 1896 (1895), p. 332. From the description and the type specimen it appears that *R. macedonica* FORMÁNEK belongs in *R. lutea*, where it represents var. *muelleri*. The type locality of '*R. macedonica*' is stony fallow fields near the railroad near Demirkapu in Macedonia.

Reseda othryana FORMÁNEK (in Verh. Naturf. Ver. Brünn 35, 1897 (1896), p. 190) was described and based on a specimen collected by FORMÁNEK in 1896 on the footspurs of the Othrys mountain range. There is nothing in the description and the type specimen to segregate *R. othryana* specifically from *R. lutea*

and in all characters it falls into *R. lutea* var. *muelleri*.

SENNEN (in Bol. Soc. Arag. 15, 1916, p. 263) proposed a hybrid species '× *R. benitoi*'. He supposed it to represent a cross between *R. phyteuma* and *R. lutea*. In the description (l.c.) SENNEN stated: 'capsulae abortivae'. The type specimen carries, however, a ripe capsule and ripe seeds. The appearance of the seeds is similar to the seeds of *R. lutea* var. *lutea* but they have a slightly smaller hilum and somewhat less carunculoid tissue. × *R. benitoi* is here reduced to the synonymy of *R. lutea* L.

MAIRE (in Bull. Soc. Hist. Nat. Afr. Nord 14, 1923, p. 126) stated that *R. nainii* was found on rocks at the foot of the Eastern Great Atlas, near Midelt town, where it was flowering in June and July. He declared that he named it after Dr. NAIN.

MAIRE enumerated a list of differences supposed to exist between *R. nainii* and *R. lanceolata* LAG., 'sphalm. BOISS.', *R. stricta* PERS. and *R. scoparia* BROUSS. The study of the type specimen reveals that it belongs in *R. lutea* L. var. *muelleri*.

R. dutoiti SENNEN et MAURICIO was described (in SENNEN, Diagn. Nouv. Pl. Esp. Mar. 1936, p. 225) and based on SENNEN et MAURICIO no. 9296. The specimen was collected in Morocco at Gueznaia, hauteurs de Bu-Ilma, vers 1000 m. They added a note to their protologue 'Les localités des No. 9246 et 9247 ont été interpolés'.

Specimen no. 9246 was seen by us. It is labeled '*Reseda dutoiti* SENNEN et MAURICIO' and collected in Morocco at 'Telata de Bu-Beker, vers 900 m (Gueznaia) on 28.V.1934' (RAB, sheet no. 14278 & BM). It belongs in *R. lutea* L. var. *lutea*. *R. dutoiti* SENNEN et MAURICIO is reduced to the synonymy of *R. lutea* L. since the characters suggested in the description are not sufficient to segregate it specifically, a conclusion supported by examining their specimen no. 9246.

Reseda vinyalsi SENNEN was described in Diagn. Nouv. Pl. Esp. Mar. 1936, p. 302, and based on a specimen collected in the Catalonian Pyrenees, Val de la Molina, at 1500 m, by the author and Dr. VINYALS.

The description of the specimen – which seems to have gone lost on account of bad weather, and was collected on the roadside – shows that *R. lutea* was at hand and accordingly *R. vinyalsi* is reduced to synonymy.

Possibly SENNEN gave the descriptive data from memory and new collections in the area should be made but, it seems extremely unlikely that a new taxon in *Reseda* could be found in the area indicated.

Ecological notes: It is said that 'the endosperm' of *R. lutea* turns green. The rootsystem of *Reseda lutea* was pictured and described by KUTSCHERA (Wurzelatlas 1960, p. 316–318). DE WIT found the fresh white root tasteless (9660, WAG).

R. lutea may occur anywhere in the temperate zones of the world, especially as a weed escaping from cultivation. There seems to be a certain tendency to settle on calcareous soils and it may grow at medium or even considerable

altitudes (e.g. DE WIT at ± 1000 m in Spain, Balneario, S. Pyrenees; fruits turning bright orange; no. 9738, WAG).

R. lutea is a natural inhabitant of gravelly river-banks in Dalmatia, also on rocky heaths, in the *Bromus erectus* vegetation of the Pontic hills and, possibly, in the *Stipa*-steppe of Hungary. From there it penetrated in the Hungarian lowland plains and in the Vienna Basin, especially on arable fields. It is a characteristic species in the *Onopordion acanthii* (KUTSCHERA, Wurzelatlas 1960, p. 318).

In Great Britain, where *R. lutea* is generally accepted as a species belonging in the native flora, it was introduced. *Resedaceae* are foreign to Great Britain.

A record of seeds of *R. lutea* of 12/13th century age found at Hungate (Yorkshire) published in GODWIN, The history of the British Flora (1956, p. 86), would seem to cast doubt on the view that *R. lutea* is a mediterranean species that spread gradually when long-distance transportation became easier. In those early centuries the occurrence of *R. lutea* so far North in Great Britain is an argument for its being indigenous in the British Isles. It seemed likely that *R. luteola*, the age-old 'dyer's weed', was at hand, its seeds being somewhat similar to those of *R. lutea*.

When asked, prof. GODWIN immediately forwarded the half-fossilized seeds for examination, and he agreed (letter 22 March, 1967) that *R. luteola* was the correct identification. Dyer's weed was also introduced and afterwards naturalized in many parts of Germany, in Belgium, the Netherlands, (occasionally) in Scandinavia, in N. America (e.g. Colorado and California), and in South Africa (Cape Province).

Algeria. KRALIK collected it flowering in June (at Chercell (GH), and FAURE in May, Oued Imbert, alt. 450 m (NY).

Austria. It occurs in the Inntal at 1100 m (PEERAER, AMD). It was stated to be rather common in Austria, but found mostly solitary, or sparse specimens along roads, in quarries, or gulches, both on calcareous and not-calcareous soils, up to in the subalpine zone (CREUSEN 1520 m), and apparently extending its area along railroads and on rubbish heaps e.g. nr. St. Moritz at 1800 m (BRAUN-BLANQUET 958, U).

Azerbeidjan. KARJAGIN found it between 1300–1500 m (NY), in Transcaucasia on slopes (Kalijev; BAK) and in the Dzhebrail distr. by CHADARIN on stony slopes associated with *Paliurus* (s.n., 4 VII.1932, BAK). In the now-mentioned area the species may be wild or escaped from cultivation.

Cyprus. It was repeatedly collected, flowering in November.

Egypt. It was found flowering in March on sandy desert grounds, in a barley field by SHABETAI (CAIM), on calcareous fields N. of Amria Station in Mariut district (Alexandria) by G. TÄCKHOLM (CAI).

France. MAGNOL (Bot. Monsp. 1686, p. 221) saw '*R. vulgaris*' (in Pinax '*R. lutea*') abundantly growing near Montpellier. It was e.g. collected at 1700 m alt. (Col du Lautaret-Villars (JACOBI, 24.7.1963, AMD)). JEANPERT in various places collected *R. lutea* on calcarous soils, flowering from May to August. COSTE (s.n., Juillet 1902) found *R. lutea* var. *muelleri* near Aveyron, Saint-Paul-des-Fonts, on 'coteaux calcaires' at 600 m alt. (TL).

Iran. RECHINGER FIL. collected it with flowers and fruit on Mt. Elbrus (105, US).

Italy. Calcareous hills are reported for *R. lutea* (Palermo).

Jordania. It was collected by KASAPLIGIL (2180, MICH) at 1500 m alt., near *Cupressus sempervirens*.

Lebanon. It occurs up to above 2000 m.

Palestine (Israel). A common weed in the mediterranean provinces (ZOHARY & AMDURSKY 57, AMD), common also in the mountain districts of Cis- and Transjordania. 'Met with, but rarely in the Jordan valley'. It was not observed in the maritime nor in the Esdraelon plain (no. 57, AMD).

Portugal. It was flowering in June on calcareous soils (FERNANDES et al. 7050, COI).

Rumania. AL BORZA (CAIM) collected it in vineyards on calcareous rocks, in Besarabia (July).

Spain. The main flowering season is Jan.-April. It occurs up to \pm 1600 m (Sierra Nevada), or on schists at 900-1100 m alt. (KRAMER-WESTRA 3627, U). SENNEN collected in Catalonia, nr Badalona, bords de la route de Montalegre (no. 2512), on 29 Dec. 1915 the type of \times *R. benitoi* (TL).

Turkey. It occurs at medium altitudes and on heavy lime-containing clay (BALL 2087, MICH). HENNIPMAN et al. (969, L, U, WAG) collected it at 1400 m alt. in İçel prov. near Pozanti on a lime-containing slope, associated with *Hedera*, *Clematis*, *Carpinus*, in a forest, in May.

Yugoslavia. It was repeatedly collected by Mrs. F. HILLENUS (AMD 57634), in all parts of the country.

In Morocco, the Grand Atlas Mts, JAHANDIEZ (512) collected it at 1000 m alt. on fields (Toussirine). GATTEFOSSÉ found it SE. of Mogador in a vegetation characterized by *Argania spinosum* (AMD 038506) where it flowered in April. It grew on calcareous soils (MURBECK 154).

In Algeria CHEVALIER (14a) collected it in cultivated fields near Laghouat, flowering in April. Along streams it is particularly luxuriant (CHEVALIER 14; Biskra).

In Tunisia PITARD (338) secured it in similar localities (Gafsa).

Monstrosities: A monstrosity in *R. lutea* was collected by Dr. DEDEGEN near Pest, on löss slopes near Nagy Tétény (Baross-Selep; S). Many other monstrosities were collected by other collectors. They are abnormal in having very long stipitate, clavate ovaries. Similar monstrous forms are known e.g. in *R. odorata* and in *R. pruinosa* (see there). Frère HÉRIBAUD-JOSEPH collected a viviparous form of *R. lutea* on 9 Sept. 1877 at Clermont-Ferrand, which he described as 'var. *vivipara*'. The specimen is at TL.

Vernacular names: Great Britain: (*french curled*) *bastard rocket* (MILLER, 1768), *cut-leaved mignonette* (teste GREENWAY); Jordania: *murevhe* (teste Meded. Landbouwhogeschool Wageningen 78-14 (1978)

KASAPLIGIL); Netherlands: *gele reseda* (teste ENSINK, Brummen, 1882), *wilde reseda*; Palestine: *blyia* (teste DE MEYERS); Sweden: *gulreseda* (Gottland).

Specimens examined:

Subsp. *lutea*

Var. *lutea*

Algeria. Bourgeau s.n., 22.IV.1856, Oran; Durand s.n., à 1851, du Sig, prov. Oran; Faure s.n., 13.V.1935, Oued Imbert; Gandoger s.n., VI.78, Mustapha; Kralik s.n., 4.VI.1875, Cherchell.

Austria. El-Hadidi s.n., 1.VI.1957, Hackelsborg; Peeraer s.n., 25.VII.1961, Inntal.

Belgium. Lawalrée 3555, Visé; Montinis 264, Obourg; Thielens et Devos 355, Jambe, prov. Namur.

Czechoslovakia. Cypers s.n., 21.IX.1914, Harta (Böhmen); Nitka et Vyouts 17, Slovakia, Radvaň; Schube 567, Myslowitz, Dsieckowitz; Siertsema 1800, Praag.

Denmark. Hartz s.n., 28.VI.1895, Amager, Kløvermarken; Lith s.n., 21.X.1897, Copenhagen, Rysenstin.

Egypt. Shabetai Z4871, Maruit Bahig; Simpson 4625, Dabáa; G. Täckholm s.n., Maruit, Amria.

France. Faure s.n., V.1874, Le Luc, Var; Garnier s.n., VII.1907, Malzeville, Meurthe; Heimans s.n., 14.VII.1956, Corsica Is., Sisco; Héribaud 1520, Clermont-Ferrand, lieux incultes; Moldenke 9025, Mt. Savoy, Salève; Segal s.n., 25.VI.1956, Pyrénées Bas, Portes Henders; Scheppi s.n., 8.VIII.1900, Paris; Tidestrom 13922, St. Adrien, SE. Rouen; De Wit 4679, Vosegensé, N. Mülhouse.

Germany. Dürer s.n., 22.VII.83, Frankfurt, bei Suckbach; Haussknecht s.n., VIII. 1876, Pröbsdorf, pr. Weimar; Popta s.n., 21.VII.1901, Eule bij Jena; Schepping s.n., V.1891, Berlin Copinick.

Great Britain. Gerrans 36, Surrey, Nebley Heath; id. 455, *ibid.*, Boytill nr. Leatherhead; Glanville 18, Kent; Hoover 7027, Oxfordshire, Elsfield & Wood; Melderis c.s. 160, Surrey, Chepstead; Philcox 2057, Sussex, Brighton; Raven c.s. 15976, Suffolk, Foxhole Heath, Barton Mills; C. et N. Sandwith s.n., 3.VIII.1910, Lincoln at Riseholme; id., 11.VIII.1913, at Par. Cornwall; id., 6.VIII.1916, Hauts, Easton Down nr. Winchester; id. 4823, N. Somerset.

Greece. Haradjian 521, Cyprus Is., Mt. Crovolos; Honig 1007, *ibid.*, Bauplatz bei Landau; Schelling 1450, *ibid.*, Regensburg, Donauhafen; Sintenis 1255, Thessalicum, Volo, inter Portavia et Drakia.

Hungary. Steinitzer s.n., 15.V.1878, Ofen, Adlerberge; id., 11. VI. 1879, Engelofeld b. Piod; id. à 1881, Blocksberg near Budapest.

Iran. Aucher-Eloy, *Herbier d'Orient* 4172, Ghilaw; id. 4174, Ispahan; Dr Buhse 1847 'var. *rigida*'; Bunge s.n., V.1859, Isfahan; Rechinger f. 105, Mt. Elburs, Keredi, Kalak; Gardine 606, Azerbaijan, above Goya Bel pass 20 km W. of Ahar.

Iraq. Gust 1336, Mosul; Kasapligil s.n., 11.III.1955, Taflia, Reshadiya, Lehda; Rawi 8771, Oluka, Mosul Liwa.

Italy. Cubrieli et Corradi s.n., VIII.1933, Marchia di donaratico, S. Vincenzo-Livorno; Ross 808, Sicily Is., Messina; Schoemakers 280, Piarsa Tommaseo, N. Italy; id. 1217, Genova-Riglie; Todaro 264, Sicily Is., Palermo; id. 265, junio, Villafrate, 'type' of *R. lutea* var. *mucronulata* Todaro ex Strobl.

Jordan. Meyers et Dinsmore 4110a, Tiberias.

Lebanon. Douglas 88, Biskinta-Hadeth; Eig et Zohary s.n., W. slopes of Antilebanon, near Baalbek.

Libya. Ruhmer 32, Cyrenaica, Bengasi; Scholz 70158, Cyrenaica, Djebel Harusch, SE. Zella.

Madeira Isl. Macaully s.n., à 1839.

Morocco. Mardochee s.n., à 1879, Assak.

Netherlands. Andreas s.n., 15.VI.1946, Arnhem; Bloembergen 1663, Deventer; Hattum 3070, Leiden; Kalkman 41, Maarn, Utrecht; Oudemans 557, Haarlem; Swart 1952, Soest; Westra 759, Den Dolder, Utrecht.

Palestine. Angelis s.n., 17.IV.1950, N. Negev, Shoval; Eig. c.s. s.n., 9.V.1927, Gile'ad, Majdal; Feinbrun s.n., 12.V.1956, Upper Galilee, near Safad; Gabrielith s.n., 30.V.1929, Judean Mts., Wadi el-Kuff; Nofstolsky s.n., 20.IV.1929, Ammon, Salt. Mts.; Segal s.n., 5.X.50, Shefela, Hulda; Zohary s.n., 25.V.54, Jerusalem, Beit Tsafafa; Zohary et Amdursky 57, Mt. Scopus, Jerusalem.

Poland. Baenitz s.n., 3.VII.77, Danzig, Westerplatte ad mare Balheim.

Portugal. Fernandes c.s. 7050, Entre Abrantis e Surdoal; Matos 3694, Lisboa; Raniha 3663, Halgarve Tavira.

Romania. Al. Boose s.n., 8.VII.1924, Basarbia, Orheiu; Venera et Jon s.n., 12.X.1963, 10.VI.1964, 7, 8 et 9.VI.1965, distr. Dobrogea, Pád. Hagieni.

S. Africa. Blum 187, Cape Infanta, Cape Colony; Pillans 10699, Cape prov., Blauwberg coast; Werdermann et Oberdieck 229, Kap Prov., Kap de Vlakte.

Spain. Bourgeau 77, Barcelona; id. 849, Puerto Santa Maria; Buwalda 2485, Catalonie, Tarrego; Guirao 850, Murcia; Sennen 3332, 1918-11-VI ('var. *serrulatifolia* Sennen'), Barcelona: Massif du Tibidabo, vers la Meca.

Sweden. Asplund 919, Gotland, Paroecia Law; Osterland s.n., 26.VIII.1937, Jamtland, Lockne; Trolander s.n., 5.VIII.08., Sthlm. Eldkvarnen.

Switzerland. Mennega s.n., 8.V.46, Arlesheim; Walsh 7, Genève.

Syria. Barkouda 10, Kassioune; Eig et Zohary s.n., 24.VI.32, between Kuristein and Hawarin; id., 26.VI.32, Tel et Hazne, between Homs and Selemie; Post s.n., 26.VI.1882, Anitab; id. à 1882, Bitias; Zohary s.n., 3.V.1931, about Aleppo; id. 12.V.1931, about Hama.

Turkey. Davis 33186, Crimea distr., Yalta, Nikita; id. 33513, *ibid.*, distr. Simferopl, 9 km S. of Simferopl; Hennipman c.s. 357, Antalya; id. 969, Içel, Pozanti; id. 1438, Elaziğ, Malatya-Elaziğ; Mc. Neill 667, Prov. Van, Van-Hoşap; Sintenis s.n., 10.V.1892, Paphlagonia, Tossia, Kawak-Tschesme; id. 5.VIII.1892, Paphlagonia, Tossia.

U.S.A. Gorman 4753, Oregon, Linnton; Heller s.n., California, Middetown, St. Helena Creek; Mackenzie 6436, New Jersey, Woodruffs Gap; id. 10659, *ibid.*, S. Vernon; Martindale s.n., VIII.1878, N. Y., Camden; Meredith s.n., 21.IV.1921, Pennsylv., Wolf St., Delaware River; Parker s.n., 11.IX.1879, Phila; Perry s.n., 1.VII.1894, Mass. Tyngsboro.

U.S.S.R. Heideman s.n., 13.VI.1933, Transcaucasia, Ordubad; Karjagin s.n., 25.VI.1934, Kartshevan-Agarak; Holmberg 299, prov. et distr. Baku, Tschornj Gorod ad Baku; Prilipko s.n., 19.V.1933, Transcaucasia, Darsoshom; id., 24.V.1933, *ibid.*, St. viae ferr. Negrom; Sintenis 352, Regio Transcaspica, Aschabad.

Yugoslavia. Hillenius s.n., 6.V.1954, Dalmatia, S. Kradin; id., 4.IX.1954, Macedonië, Prizren; id., 20.VIII.1958, Hercegovina, Sarajevo.

Var. filiformis

Slovakia. Nikta et Vytouš 17, vici Radvaň, haud procul opp. Komarnó.

Var. integrifolia

Italy. Tauscher s.n., 20.IX.1869, Sicily Isl., port Messin.

Morocco. Maire s.n., 12.V.1932, prope Castellum Tinghir, in valle omnis Todgha; Maire and Weiller 374, Atlas Major, in faucibus amnis Dades.

Netherlands. Brand s.n., 9.X.1907, prov. Gelderland, Arnhem.

Spain. Apon 38, Teruel; Willkomm s.n., 6.VII.1844, prope Aranjuez.

Var. muelleri

Czechoslovakia. Součková s.n., 8.V.1949, Moravia, Moravsky, Bohutice.

Denmark. A. Lange s.n., 16.VII.1911, Skrant, v. Lynge Station; id., 11.VI.1934, Ved ?Lindhoem Stat.

Greece. Formánek s.n., VIII.1895, Demirkapu; id., VIII.1896, Longici ad Othrys.

Hungary. Steinitzer s.n., 25.VII.1882, Donau-Damm, near Ofen.
Italy. Ball s.n., 17-19.VIII.1899, Alpius Pedemontanis, Val de Cogne; Fiori s.n., IX.1897, prov. di Modena, Gliaie del Secchia a Sattuolo.
Morocco. Humbert s.n., VI.1926, Grand Atlas orient., Gourrama; Maire s.n., 11.VIII.1924, Atlante medio, Marmoucha prope Bou-Khamouj; Maire et Weiller 544, Atlas Major, prope Imilchil; Maire et Wilczek s.n., 21.IV.1933, inter Midelt et amnem Ansegmir; Nain s.n., 15.VII.1920, Midelt, rég. Hte Moulouya; Sauvage 11657, Haut Plateau, le piste de Toanfiti, Adaou-Atlas.
U.S.A. Phelps 529, N. New York, Canton, Stockholm and other towns.
Yugoslavia. Laus s.n., VIII.1918, Bosnien, Serajevo, Migackatal.

Var. *nutans*

Algeria. Debreaux 1049, Oran; H. Knoche s.n., Tr.1906, *ibid.*
Bulgaria. Stříbrny s.n., 24.VIII.1895, Lavano.
Czechoslovakia. Jehlik 220, okres Frydlant, Višňova.
Creta Isl. Watal et Zemann s.n., 13.IV.1914, Südküste, Tybaki.
Egypt. Shabetai Z7520, Bahiz.
Finland. Häyren s.n., 9.VIII.1951, Helsingfors, Natholmen.
France. Beger s.n., 14.VII.1915, St. Marie à Py., Kreidehügel.
Germany. Fielder 5187, Leipzig, Schüttzwischen; Glotz s.n., VII.1953, Bahngelände, ?Schlauvoth, bei Görlitz; Kaulfuss s.n., 19.VII.1902, Bavaria, prope Nürnberg; Schultz s.n., 29.VI.1899, Berlin, near Humboldt-Mühle.
Great Britain. C. Sandwith s.n., 25.VI.1951, N. Somerset, Failand.
Greece. Abel s.n., 26.V.1902, Attika Pikerimi; Bornmueller 3569, distr. Lac Doiran, Hudo-va.
Iran. Herb. Bungeanum 19a, 19b, 20; Grant 15852, Hoseinabad, W. Shiraz; Kotschy 53, prope urbem Teheran.
Iraq. Thesiger 670, Kurdistan, Sheikh Adi; 6 miles NW. Ain Sifni.
Italy. Porta et Rigo 343, 14+29/6, 1875, Apulia, Manfredonia.
Malta Isl. Brener s.n., IV.1831, prope Kad-Dynrle.
Netherlands. Hoogenraad 606, Rockanje; Larsen 59, Wijk aan Zee; Struyckenkamp s.n., 15.VII.1901, Gendringen.
Palestine. Nofstolsky s.n., 26.V.1924, Mt. Scopus, near Jerusalem; Orshansky s.n., 7.IV.1952, Beit Mazmiel, Jerusalem.
Portugal. Beliz c.s. 105, Algarve-Tavira.
S. Africa. Salter 9141 & 9142, Cape Peninsula, Wijnberg Hill.
Spain. Jerónimo 7315, Murcie, La Hoya; Reverchon 1267 (1902), prov. Granada, Sierra del Cuarto; Stud. Biol. Rheno-Trai. 509 (1957), Coastal region, SW. Alicante; Willkomm 41, near Chiva; De Wit 9807, Gerona.
Turkey. Balansa 415, Smyrne (Izmir); Birand et Zohary s.n., 2.VII.1953, centr. Anatolia, S. of Ankara; Koster c.s. s.n., 23.V.1951, Zonguldak, Beycuma; Kotschy 333d, Bulgar Dag, Güllök; Sintenis 631, Armenia, Kharpout, Schuschnas; id. 2454, *ibid.*, Abdschagha.
U.S.S.R. Paczowski s.n., 8.21.VII.1912, Znamvenka, Alexandria.
Yugoslavia. Ginzberger s.n., 29.V.1904, Dalmatia, Föhren-Auffarstlug bei Station Perkovic-Slivno.

Subsp. *neglecta*

Algeria. Battandier et Trabut 223, Inkerman; Chevalier 14, Biskra; id. 14a, Laghouat; Kralik 20, ad amnem Oued Segrir, inter Guarr; Olin s.n., 15.III.1896, Biskra.
Morocco. Balls B2755, Tachoksht; De Campou s.n., 2.VII.1885, Oued Tamerah; Gattefossé s.n., près Mogador; Ibrahim s.n., 19.V.1889, Oued Tigi; id., 23.V.1889, Tiferdin; id., 28.V.1889, Arboloh; id., 14.VI.1889, Sidi Ouasmin; Jahandiez s.n., 2.VI.1921, Toufsirine (Reroia), Gd. Atlas; id. 154, Pavant (Entifa); Joly 21, Kemkem Izzougouern, Ntchout; Lindberg 2137, prope app. Mogador; Maire s.n., 11.VIII.1924, Atlas medio, Bou Khamouj, Narmoucha; Maire et Raymond s.n., VI.1950, épandage du Zig en aval de Rissani; Murbeck

s.n., 3 et 4.IV.1921, Marrakech; Panouse s.n., 1.III.1954, environs d'Aouinet-Torkoz, Grara de Taskalla; id., 9.III.1954, ibid., Mader Tamlougout; Reese s.n., 6.V.1934, Agadir; id., 8.V.1934, Djebilet, NW. Marrakech; ?Rorillain 1, Plaine de Guercif, secteur DRS. Tonmiat; Rungs s.n., 10.II.1951, Station Horticole d'Ain Chaib; Sauvage 12184, Rherin/Dra, Fom el Kous, an SW. de Tinerhir.

Tunisia. ?Huber s.n., 16.III.1923, Osthang der Djebel... Forum Pataonine; Murbeck s.n., 9.IV.1896, Dj. Dissa pr. Gabès; id., 17.IV.1896, inter El Hafay et Bir Saad; Pitard 338, Gafsa.

30. *Reseda luteola* LINNAEUS

Fig. 60

Sp. Pl. 1, 1753, p. 448; id., Syst. Nat. ed. 10, 2, 1759, p. 1046; id., Sp. Pl. ed. 2, 1, 1762, et ed. 3, 1764, p. 643; id., Syst. Nat. ed. 12, 1767, p. 329; Mill., Gard. Dict. ed. 8, 1768, no. 8; Hoult., Nat. Hist. 2(8), 1777, p. 722; Lam., Fl. Fr. 3, 1778, p. 203; Murr., Syst. Veg. ed. 14, 1784, p. 448; Moench, Meth. Pl. 1794, p. 57; Murr., l.c. ed. 15, 1798, p. 367; Willd., Sp. Pl. 2(2), 1800 (1799), p. 876; Brot., Fl. Lusit. 2, 1804, p. 305; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 725; Pers., Syn. 2, 1806, p. 9; Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 499; Hornem., Hort. Hafn. 2, 1815, p. 501; St. Amans, Fl. Agen. 1821, p. 187; Spreng., Syst. Veg. 2, 1825, p. 463; Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Ten., Fl. Neap. 4, 1830, p. 256; Rchb., Fl. Germ. 1830-32, p. 696; Link, Handb. 3, 1831, p. 323; Richt., Cod. 1835, p. 462; Rchb., Ic. Fl. Germ. 2, 1838, p. 22, tab. 99, fig. 4442; Boiss., Voy. Bot. Esp. 2, 1839-45, p. 77; Bertol., Fl. It. 5, 1842, p. 24; Ledeb., Fl. Ross. 1, 1842, p. 235; Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 241; Walp., Rep. 2, 1843, p. 751; Lec. et Lam., Cat. Plat. C. Fr. 1847, p. 90; Gren. et Godr., Fl. Fr. 1, 1848, p. 190; Hausm., Fl. Tir. 1851, p. 105; Vis., Fl. Dalm. 3, 1851, p. 94; Guss., Enum. Pl. Vasc. Ins. Inar. 1854, p. 27; Muell. Arg., Mon. Rés. 1857, p. 202, tab. 9, fig. 124 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 434; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 583; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 897; Arc., Comp. Fl. It. 1882, p. 67; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 86; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 159; Rouy et Fouc., Fl. Fr. 2, 1895, p. 250; Post, Fl. Syr. Palest. Sin. 1896, p. 113; Dur. et Barr., Fl. Lib. Prodr. 1910, p. 27; Coste, Fl. Fr. 1, 1901, p. 161; Muschl., Man. Fl. Egypt 1, 1912, p. 442; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 125; Blatt., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 47; Ramis, Bestimm. Fl. Aeg. 1929, p. 97; Pamp., Prodr. Fl. Ciren. 1931, p. 236; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 318; Dinsm. in Post, l.c. ed. 2, 1, 1932, p. 140; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 665, fig. 427e & p. 688; Czerniak. in Komar., Fl. URSS 8, 1939, p. 608; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016; Stella Ross-Craig, Draw. Brit. Pl. 4, 1950, pl. 2; Claph. in Claph. et al., Fl. Br. Isl. 1952, p. 237; Cufod. in Bull. Jard. Bot. Brux. 24, Suppl. 1954, p. 160; Täckh., Stud. Fl. Egypt 1956, p. 332; Roles in Claph. et al., Fl. Br. Isl. Ill. 1957, tab. 63, fig. 245; Heywood in Feddes Rep. 64, 1961, p. 68; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 440; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 347; Coode in Davis, Fl. Turk. 1, 1965, p. 505,

fig. 20(10); Stearn, Bot. Latin 1966, p. 144–146, 188–189.

R. l. β australis (Webb) Walp., Rep. 2, 1843, p. 751; Muell. Arg., Mon. Rés. 1857, p. 206 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 583; Ball in Journ. Linn. Soc. 16, 1878 (1877), p. 341, 'var.'; Batt. in Batt. et Trab., Fl. Alg. 'Dicotyl.' 1888–90, p. 87; Terr. in Car., Fl. It. 10, 1894 (1893), p. 160; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 183; Pau in Nuev. Contr. Fl. Gran. 1922, p. 27; Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 318.

R. l. α vulgaris Muell. Arg., ll.cc., p. 205; id. sub 'ε' in DC., Prodr. l.c.; Terr. in Car., l.c., p. 159.

R. l. v. αα abortiva Muell. Arg., ll.cc. ('*R. crispa* hort.').

R. l. v. virescens (Hornem.) Muell. Arg. in DC., Prodr. l.c., p. 584; Terr. in Car., l.c., p. 160, 'var.'

R. l. β crispata (Link) Muell. Arg., ll.cc., p. 206; id. in DC., Prodr. l.c., p. 583; Ball in Journ. Linn. Soc. 16, 1878 (1877), p. 341; Arc., Comp. Fl. It. 1882, p. 67; Batt. in Batt. et Trab., Fl. Alg. 'Dicotyl.' 1888–90, p. 87; Terr. in Car., l.c., p. 160; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 183; Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 318; Zohary, Fl. Palaest. 1, 1966, p. 338, 'var.' (= subsp. *luteola*).

R. l. γ pseudovirens (Friv. ex Hampe) Muell. Arg., ll.cc., p. 207.

R. l. ε gussonii (Boiss. et Reut.) Muell. Arg., ll.cc.; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 897; Batt., l.c.; Terr. in Car., l.c.; Dur. et Schinz, l.c.; Pamp., Prodr. Fl. Ciren. 1931, p. 236; Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 318.

R. l. γ americana Muell. Arg. in DC., Prodr. 16(2), 1868, p. 583.

R. l. ζ dimerocarpa Muell. Arg., l.c., p. 584; Terr. in Parlat., Fl. It. 10, 1894, p. 161; Rouy et Fouc., Fl. Fr. 2, 1895, p. 251, 'forme *R. dimerocarpa*' (= subsp. *dimerocarpa*).

R. l. var. partita Coincy in Journ. de Bot. 13, 1899, p. 303.

R. l. var. biaui (Pit.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 19, 1928, p. 33; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 318, 'subsp.'; Sauv., Fl. Subér. Mar. 1961, p. 76, 'subsp.'

R. l. b. forme glaucescens Maire in Jah. et Maire, l.c.; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016.

R. l. var. glomerata Zohary in Palest. Journ. Bot. Jerus. ser. 2, 1941, p. 165; id., Fl. Palaest. 1, 1966, p. 339.

R. undulata Gilibert, Fl. Litan. 2, 1781, p. 210; Muell. Arg., Mon. Rés. 1857, p. 203; Raynal in Taxon 17, 1968, p. 515 (Ind. Kew. Suppl. XV, sphalm. 'lutea').

R. tinctoria Salisbury, Prodr. Hort. All. Vig. 1796, p. 345, nomen.

R. virescens Hornem., Hort. Hafn. 2, 1815, p. 501; Spreng., Syst. Veg. 2, 1825, p. 463; Walp., Rep. 2, 1843, p. 751.

R. salicifolia S. F. Gray, Nat. Arr. Brit. Pl. 2, 1821, p. 666 (incl. *β polygalae-folia*).

R. crispata Link, Enum. Pl. Hort. Berol. 2, 1822, p. 8; Ten., Fl. Neap. 4, 1830, p. 256; Bertol., Fl. It. 5, 1842, p. 26; Walp., l.c.; Guss., Enum. Pl. Vasc. Ins. Inar. 1854, p. 27.

R. glauca Eichw., Pl. nov. Casp.-Cauc. 1831, p. 24, nomen.

R. pseudovirens Frivald. ex Hampe in Flora 20(1), 1837, p. 232.

R. gussonii Boiss. et Reut. in Boiss., Diag. Pl. Nov. Or. ser. 2, 3(1), 1854 (1853), p. 49, recte: *gussonei*.

R. dimerocarpa Rouy et Fouc., Fl. France 2, 1895, p. 251.

R. biaui Pitard, Contr. Etud. Fl. Mar. 1918, p. 4.

Arkopoda Raf., Fl. Tell. 3, Cent. VIII, 1837 (1836), p. 73; Merr., Ind. Rafin. 1949, p. 132, pr. gen.

A. luteola Raf., l.c.

Luteola tinctoria Webb et Berth., Phytogr. Canar. 1, 1837, p. 106; Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 103.

L. t. var. *australis* Webb et Berth., l.c.

L. resedoides Fuss, Fl. Transsilv. 1866, p. 86.

Annual or perennial, erect (or rarely ascending), light green herb, (30–) 50–90(–150) cm tall, at base rosetted on a heavy, often branching taproot.

Stems stiffly erect, simple or with few, rather long and ascending branches, usually densely leafy, glabrous, ribbed, pith disintegrating.

Leaves all entire, decurrent, glabrous. Rosette leaves sessile, narrowly oblong, 5–8(–15) cm long, $\frac{1}{2}$ – $1\frac{1}{2}$ cm wide. Upper leaves sessile, all linear to ovate, smaller than rosette-leaves. Leaf-margin entire, \pm bright, flat or \pm undulate, often provided by 2–3(–4) glands on each side; glands brownish, conical, 1(–2) mm long, near the base.

Flowers (pale) yellow to greenish-yellow. Raceme sometimes branching, 30–60 cm long in fruit. Bracts persistent, comose at top of raceme, in flower $2\frac{1}{2}$ – $3\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide, in fruit up to 4(–5) mm long, margin pallid, rarely \pm denticulate. Pedicels short, rather thick, in flower $1\frac{1}{2}$ –2(–3) mm long, in fruit hardly longer.

Sepals 4, persistent, connate at base, ovate-elliptic, 2(– $2\frac{1}{2}$) mm long, 1(– $1\frac{1}{2}$) mm wide.

Petals 4 (3–5), exceeding the sepals. Limb of superior petal obovate, (3–) 5–7(–10)-partite (incisions irregular), $1\frac{1}{2}$ –4 times as long as the appendage, lobes narrow, obtuse, of irregular length; appendage obovate, $1\frac{3}{4}$ mm long, rim narrow, $\frac{1}{4}$ mm wide, margin glabrous. Lateral petal smaller, limb-lobes reduced in number, similar to those of superior petal. Sometimes anterior petal entire and linear, or rarely with lateral lobes reduced to rudimentary denticles.

Disc $\frac{3}{4}$ mm high, $1\frac{3}{4}$ mm wide, glabrous; margin recurved, crenate.

Stamens (18–)20–40, \pm curved downwards. Filaments persistent, 2–3 mm long. Anthers ellipsoid, $\frac{1}{2}$ mm long, obscurely asperulous.

Ovary ovoid, short stipitate, deeply 3-sulcate, 3-toothed, teeth ca. $\frac{1}{2}$ as long as ovary. Ovules ca. 10 per placenta, transversely arranged, placenta penetrating

into the teeth.

Capsule erect, short stipitate, obovoid to \pm obcampanulate, 4–5 mm long, 6 mm wide, glabrous, deeply and lengthwise 6-sulcate, rugose, mouth wide, sometimes depressed, 3-toothed, teeth triangular.

Seeds dark-brown, glossy, globose-ovoid, 1 mm long. Sinus wanting, represented by a shallow groove. Testa smooth.

Type: '1 *Luteola*' (LINN 629.1).

Distribution: Europe, Asia Minor to Afghanistan, circummediterranean (including Iraq), N. Africa.

Key to the subspecies

Ovaries 2-carpellate. **b. ssp. dimerocarpa**
Ovaries 3-carpellate, rarely few 2- or 4-carpellate ovaries occur on the same inflorescence. **a. ssp. luteola**

a. subsp. luteola

Ovaries 3-carpellate, rarely mingled with 2- or 4-carpellate ovaries in one inflorescence.

b. subsp. dimerocarpa (MUELL. ARG.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda luteola* Linn. ζ *dimerocarpa* Muell. Arg. in DC., Prodr. 16(2), 1868, p. 584.

Carpels 2, otherwise similar to subsp. *luteola*.

Type: ASCHERSON, 'ad fodinas antiquas Inguertosu Sardiniae inter Iglesias et Oristano', hb. DC., n.v.

Distribution: Sardinia.

Taxonomical notes: In the Linnean Herb. is pinned to sheet 629.1 (type of *R. luteola* L.), a sheet 629.2, from 'Alger' with crisped leaves and long petals, which belongs in *R. luteola*. This indicates that LINNAEUS did not wish to segregate a species on account of its leaf-shape and longer petals, (cf. *R. crispata*, *R. gussonei*, *R. biaui* etc.), a view which is supported here.

In the 13th century ALBERTUS MAGNUS referred to *R. luteola* as 'gauda', a

dye, not a medicine.

Catanance is a pre-Linnean name (*Catanance* (LONICER), Plant. hist. 1565, p. 155 D (n.v.); Kreuterb., ed. P. UFFENBACH 1679, p. 353–354 (repr. 1962)), without nomenclatural status. It was mentioned by TABERNAEMONTANUS (Icon., p. 325) and by MUELL. ARG. (Mon. Rés. 1857, p. 202).

In Kreuterbuch (l.c.) LONICERUS gives a reasonably accurate picture and description. He mentions the German names 'Orant' (HIERONYMUS BOCK!), 'Stärckkraut' and 'Streichblum'. TABERNAEMONTANUS has 'Streichkraut'. The latter names very probably rest on the women's habit to colour sheets yellow by means of the plant (Stärke = starch).

LONICER also records that DIOSCORIDES described this as *Κατνάγκη*, Latin *Catanance*, 'because it urges love' (*αναγκη* (Gr.) = compulsion, urge). He does not specify in which manner it is applied. One could suppose it is an allusion to some old custom to colour bridal beds. In addition LONICER recorded the Italian name 'unge de gatto' and the Spanish 'unhas de gato'. This may well allude to the shape of the fruit which resembles a cat's paw. LONICER compared in a graphic way the gaping (dehiscent) fruit to a calf's snout.

The dye is also used in obtaining green. Women prepare the dye by boiling the green plants in water and alum. The plant protects against ghosts and magic. If added to the oil of lilies and put on the face, one becomes beautiful and attractive, a communication LONICER says to have from DIOSCORIDES, who also reported its usefulness in love-relations. However, LONICER confused DIOSCORIDES' data on *Antirrinon* with those on *Katananke*.

DIOSCORIDES (lib. IV, no. 134, 'Katananke', *Katananke etera*, cf. ed. GUNTHER, 1934, p. 523–524) are unidentifiable and may represent *Reseda* or some Ranunculaceous, Leguminous, Cruciferous plant, or a *Plantago*. His data are, therefore, entirely unreliable. MUELL. ARG. (l.c.) accepted also *Pseudostruthium* (MATTHIOL., Comm. p. 406, and ed. BAUH., p. 442) and *Tericaria* (CAST. DURANTE, Herb. Nuov., p. 452) as *R. luteola*.

For *R. undulata* GILIBERT see Taxa et nom. rej.

Reseda tinctoria SALISBURY (Prodr. Hort. All. Vig. 1796, p. 345) was published by referring to 'LINNAEUS, Sp. Pl. ed. 2, p. 643, *R. luteola*' while the epithet '*Tinctoria*' was added. There is no description. *R. tinctoria* SALISB. therefore is superfluous (cf. Ind. Kew. 2, 1895, p. 697).

HORNEMANN (Hort. Hafn. 2, 1815, p. 501), pointed out that *R. virescens* is an annual plant which occurs in Spain, 'D. intr. 1808' (in Copenhagen?). He declared that *R. virescens* was closely allied to *R. luteola* but differed from it, besides other mentioned characters, by the annual root, the green colour of the leaves and branches, and by the size and colour of the seeds. He suggested the possibility that a *Reseda* cultivated in French gardens was the same. There is nothing in HORNEMANN'S data which suggests a specific difference with *R. luteola* L.

The type specimen in the Copenhagen Herbarium (a specimen on a sheet marked in verso '*Reseda virescens* HORNEM. 1 ex Hort. Hafn., Hb. HORN., Museum Botanicum Hauniense' and '*Reseda* var. J.L. 1857') further proves that

R. virescens HORNEM. is *R. luteola* ('filia hortorum', as graphically declared by MUELLER (Mon. Rés. 1857, p. 206, and in DC., Prodr. 16(2), 1868, p. 584).

Reseda salicifolia S. F. GRAY (Nat. Arr. Brit. Pl. 2, 1821, p. 666) was described, but among synonyms was mentioned e.g. '*Reseda luteola* LIN. S. P. 643'. MUELLER (Mon. Rés. 1857, p. 203) correctly referred *R. salicifolia* to the synonymy of *R. luteola* L. In 1868 (DC., Prodr. 16(2), p. 584) he cited it in the synonymy to *R. luteola* L. ε *vulgaris* MUELL. ARG. *R. salicifolia* S. F. GRAY is a superfluous name to *R. luteola* L. and has no status nomenclaturally (cf. Ind. Kew. 2, 1895, p. 697).

S. F. GRAY (l.c.), proposed a variety ('*Reseda salicifolia* S. F. GRAY β *polygalaeifolia*') distinguished by small flowers, and slender, 3-toothed capsules (*Reseda* q. *luteola minima polygalae folio* DU BOIS, DILLEN. in RAII Syn. 367, 2*). This supposed taxon is not adopted in the present revision.

LINK described *R. crispata* (Enum. Pl. Hort. Berol. 2, 1822, p. 8) as having lanceolate, undulate, entire leaves which were biglandular at base. He added that it occurred in southern Europe and stated that it differed from '*R. luteola* LINN. W. E. 499' by its wavy leaves. He added that the Spaniards said that the plant contained no pigment. The name *R. crispata* was also cited, according to LINK in his (unpublished) Flora of Portugal.

MUELLER referred *R. crispata* LINK to *R. luteola* β *crispata* (LINK) MUELL. ARG. (maintaining this view in his later treatment in DC., Prodr. 16(2), 1868, p. 583). In the present revision *R. crispata* LINK is reduced to the synonymy of *R. luteola* L. ssp. *luteola*. The characters attributed by MUELLER (ll.cc.) to β *crispata* and to the other varieties recognized by him in *R. luteola* seem to be variable and not correlated. Therefore, these varieties are not recognized in this revision.

R. glauca EICHW.: see Taxa et nomina rej.

Reseda pseudovirens FRIVALDSZKY ex HAMPE was published in Flora 20(1), 1837, p. 232. HAMPE stated that it was allied to *R. luteola* but the fruit had three teeth. Although this is the only descriptive fact that was given, the name is validly published.

No specimen is mentioned but the type is to be found among the plants from Turkey collected by FRIVALDSZKY VON FRIVALD and elaborated by HAMPE. The specimen(s) of *R. pseudovirens* FRIVALD. was offered for sale in a centuria of plants collected in 1835, in European Turkey (see Flora 19(2), Intellig. Bl. II, p. 26, 1836). A 3-toothed ovary is characteristic for *R. luteola* L. Specimens collected by FRIVALDSZKY (104, in 1837; HAL, K, W) are very probably type-material.

Reseda gussonii BOISS. et REUT. (in BOISS., Diagn. ser. 2, 3(1), 1853, p. 49 (recte: *gussonei*)) was based on specimens collected by GUSSONE in Sicilia, by BOVÉ in N. Africa near Algeria, by REUTER at Oran, by BALANSA (pl. exs. 1852 No. 674) at Saida, and by STEINHEIL at Bone. Here is designated as the lectotype: BALANSA 674.

BOISSIER and REUTER declared that this species was different from *R. luteola* L. by its much larger petal(s) which they judged much longer than the stamens

and not as long as the stamens, by the much rougher capsules, which terminate in longer horns.

They pointed out that GUSSONE's specimen had been identified incorrectly by BERTOLONI as *R. crispata* LINK, and stated that true *R. crispata* LINK occurred in Spain and Portugal. BALANSA 674 is designated as the locotype of *R. gussonii* BOISS. et REUT. However, this supposed species is nothing more than a widespread variant of *R. luteola* L. and reduced to its synonymy.

FUSS published and described *Luteola resedoides* (Fl. Transsilv. 1866, p. 86) and cited only 'B.n. 895' as the specimen on which *Luteola resedoides* was based. In addition FUSS enumerated many localities where the new species occurred. The type was not seen but there is no doubt as to its identity. 'B.n. 895' was quoted by FUSS as '*R. luteola*' and because FUSS wanted to place this in the genus '*Luteola* DC.', he had to change the epithet and adopted '*resedoides*'. FUSS overlooked the fact that WEBB had published the genus *Luteola* in 1837 (Phyt. Can. 1, p. 104) and at that date coined *Luteola tinctoria* WEBB, and also that MUELL. ARG. only accepted *Luteola* as a section (in DC., Prodr. 16(2), 1868, p. 582). *Luteola resedoides* thus is a superfluous name.

Reseda dimerocarpa ROUY et FOUC. (Fl. Fr. 2, 1895, p. 251) was based on *Reseda luteola* var. *dimerocarpa* MUELL. in DC. (Prodr. 16(2), 1868, p. 584). ROUY and FOUCAUD published this binomial in the foot-note and they applied it to a 'forme'. By a 'forme' they did not wish to refer to a species (cf. l.c., Aux lecteurs, p. VIII-X). It follows that the binomial was applied to a taxon which, according to the Code, 1972, Art. 24, ought to be a species. The procedure is, therefore, contrary to the Code and in consequence the name *R. dimerocarpa* (MUELL. ARG.) ROUY et FOUC. is rejected, being illegitimate (Code Art. 23 & 24). The binomial *Reseda dimerocarpa* was entered in the index of ROUY et FOUC. (Fl. France 2, 1895, p. 346) as *R. dimorphocarpa*, an obvious error.

On the other hand, the taxon is rather strikingly distinguished from *R. luteola* in general. It has constantly in all flowers only 2 carpels and it appears that on cultivation outside Sardinia this character is retained. It seems best to regard it as an island-taxon in *R. luteola*, of established constancy and geographically isolated. For these reasons, and because the number of carpels is an important character in *Reseda*, it seems best to adopt it as a subspecies: *R. luteola* ssp. *dimerocarpa* (MUELL. ARG.) ABDALLAH et DE WIT, nov. comb. et stat., based on *Reseda luteola* var. *dimerocarpa*.

Reseda biau PITARD (Contr. Etud. Fl. Maroc 1918, p. 4) was effectively published by indelible autograph (Code 1972, Art. 29). PITARD mentioned in the protologue (l.c.) to have received a beautiful specimen from Dr. BIAU, collected in a locality, which PITARD does not specify. Presumably the type is a specimen collected by PITARD ('Maroc central: Immouzev, Anoceur. Fl. et fr. en juillet. Montagnes pierreuses et rochers') which we did not see.

DE WILDE c.s. (nr. 2649) collected fine specimens in open *Cedrus* forest, SW. Ain-el-Leuh, off road Azrou-Khenifra, 110 km SSW. of Fez (L., WAG), flowering 29.5.1961, on bare slopes; anthers yellow, flowers yellow-white.

It is an interesting fact, that specimens originating from America (Mexico)

resemble the Moroccan plants very closely. *R. biaui* belongs in *R. luteola*.

When publishing *Luteola tinctoria* var. *australis*, WEBB (in WEBB et BERTH., Phyt. Canar. 1, 1837, p. 101–108) acknowledged the difficulty of splitting the genus *Reseda* s. lat. into smaller genera. He accepted besides *Reseda* s. str.: *Luteola* and *Resedella*. *Luteola* was based on '*Luteola lusitanico pumila crisper* TOURNEFORT' (Inst. 1, 1700, p. 424), and WEBB stated that TOURNEFORT's plant was a variety of *Luteola tinctoria* (*R. luteola* auctt.) as it occurred in N. Europe. He added that LINK (in BUCH, Phys. Besch. Can. Ins. 1825, p. 153) already knew this different variety which occurred in S. Europe, N. Africa and in Mauretania. The southern plant differed by a diffuse habit (not erect or stiff), by irregularly undulate, more ruff and opened leaves, the lateral petals were longer, and the capsules larger. WEBB was not sure whether '*Luteola tinctoria* var. *australis*' (l.c., p. 106) was a new species or not and wanted this to be investigated by cultivation. The (type) material of *Luteola tinctoria* var. *australis*, he stated, was found in many places on the Canary Islands, both in fallow fields and in wild vegetation. *L. tinctoria* var. *australis* is here reduced to the synonymy of *R. luteola* L. (see also notes sub *Reseda*).

Ecological notes: *Reseda luteola* is a perennial herb indigenous around the Mediterranean, naturalized in Europe to the North as far as Sweden, to the West as far as Ireland and the Canary Islands, to the South as far as Girgeh in Upper Egypt and to the East as far as Afghanistan. It occurs in America in the southern United States, abundantly in Mexico, and as far south as La Plata (Argentina). It seems of Mediterranean origin, and introduced into America.

From a leaf-rosette an erect stem, simple or branching, rises up to about 1 m high. The flowers are yellow to greenish, odourless, and appear in early summer. PENZIG noted 3 cotyledons in seedlings (Pflz. terat. 2nd ed. 2, 1921, p. 126–127). In general the plants behave like a weed, escaping from cultivation in regions where it is not indigenous, but never becoming a pest. Its country of origin cannot be established with certainty, the plant having been cultivated since very early times but the evidence makes it probable that it might be found wild in the Mediterranean region or in or near Asia minor.

In general there is a preference for calcareous soils but it also grows on clays or on sands and it is often seen along roads, near river-banks, on old walls and in various disturbed areas. Sometimes seedlings may appear in large numbers if the soil is turned (Groningen, Netherlands). It occurs from sea level to above 2000 m (2850 m Mexico, 2500 m Spain) altitude. Among many growing localities a few may be cited:

In Algeria BALANSA (no. 674; C, W, WAG) found it in the 'hauts plateaux près de Saïda'.

In Belgium VAN STEENIS took it from walls of the Citadel at Namen, associated with *Kentranthus ruber* (L).

WEBB (l.c.) stated that var. *australis* occurred in many waste places in the Canary Islands. It appears to be unsuitable for dyeing, but this needs confirma-

tion, he stated.

In Egypt SHABETAI (no. Z3378; CAIM) collected it from barley fields, sandy soil near Sellum. FORSKÅL (C) found it in gardens at Cairo. Vernacular name 'Uaehae'. DELILE noted the Arab name *blyhah* and found it wild growing near Cairo.

In France, SEGAL (no. 352; WAG) found it growing on road-side at 8 km SW. St. Florent.

In Great Britain it was found e.g. on shingle beach (Suffolk) or on weedy chalk grassland (Kent); see also *R. lutea*, p. 254.

In Greece it was observed on gneiss and mica-schist rocks, at 400 m alt. flowering in June.

In Ireland it grew on sandy areas near the coast (Dublin Bay, DE WILDE & DE KOCK 127; WAG).

In Italy HERMAN ROSS (CAIM) found it growing in fields at Aetna (Sicily Island). Stud. Biol. Rheno-Trai. (U 187862b) found it growing at the foot of the 'nuraga' near Silanus.

Lebanon. BOULOUMOY recorded it for the coastal zone.

In Morocco it occurred on sands near Rabat. SAUVAGE records it for loamy sands or on the lower mountains, mainly in slightly shaded places, Rif SW., Tazekka, Moyen Sebow S., and Zaiane. SAUVAGE remarked that this is probably the most wide-spread *Reseda* but it is nowhere common and only scattered specimens are met with. He recorded that the plant is hemicryptophytic or (biennial) growing in semi-humid and humid bioclimates.

In Mexico (west of Concepcion del Oro) it grew on bare sandstone outcroppings covered with low bush and herbs at 2850 m alt.

In the Netherlands LEEUWENBERG & Van DIJK (57; U, UC) found it in meadows on the banks of the Rhine near Oosterbeek on clayey soil accompanied by *Cirsium vulgare*, *Sisymbrium officinale*, *Bromus sterilis*, *Capsella bursa-pastoris*, *Artemisia vulgaris* and *Arrhenatherum elatius*. It was also seen in loose sands (dunes) and on calcareous soils (S. Limburg).

In S. Spain, BAYER collected it on the Pico de Veleta at 1600 m alt. on the N. slope: long slender specimens up to \pm 1 m tall, flowering in June, flowers yellow-green (L). On Mallorca it grows on calcareous soils.

In Switzerland, M. et J. BRAUN-BLANQUET (1255; U) found it at 700 m alt., near Tomils, along roads in remnants of the *Onopordetum* on somewhat dunged sites often trodden by cattle.

In Turkey P. SINTENIS found it in 'Wilajet Kastambuli. Tossia: Szuluk-Tschesme' in Paphlagonia (4272; BRNM, LD, PR).

In the United States in general it is found occasionally in places near harbours or railroads.

Uses. *R. luteola* was used for dyeing during many centuries, a regularly cultivated crop. White tissues (esp. wools and silks) turn a beautiful yellow, and green is obtained by adding blue. The Romans in antiquity applied 'Lutum'

(PLINY, VERGIL). In 1788 it was used in Sicily for dyeing (L 911.135–458).

TEIRLINCK noted (*Flora Diabolica*, no date, p. 168): 'Provence (Aix) Herbe dey Jusious was explained by GARIDEL (*Hist. Pl. env. Aix*, 1716): Jew's Herb, because it gives the yellow colour which the Jews were obliged to wear formerly in this land and which they still have to use in the County Venaissin to dye their bonnets.' At Apt (dép. Vaucluse): Erbo dei Jusiaou; in dép. Gard: Erbo des Jusious, at Forcalquier (dép. Basses-Alpes): Erbo dei Judiéou; in modern Provençal: Erbo di Judioou (ROLLAND, *Fl. popul.*, 187–8). It is also stated that the French name 'Herbe Maure' alludes to its property to colour the skin yellowish (TEIRLINCK, l.c., p. 190).

It was applied everywhere in Europe to dye yellow. In North England nuns used to dye the woollen tissues they had spun by it (G. JOHNSTON, *Bot. East. Borders* 1853, p. 38). See also notes to *R. lutea*.

In western and southern Europe *R. luteola* was an important crop, easily grown and thriving on poor soils, which was used to dye yellow wool, silk and linen. By adding alum, tartaric acid etc. it was possible to produce various shades of yellow and green. The yellow dye was generally known as 'Gaude', which was said to be derived from the Celtic word 'God', meaning yellow. Cattle refuse *R. lutea* and *R. luteola* (sheep take it); bees are very keen on *Reseda* flowers.

Reseda luteola was cultivated in Central Europe in the 13th century (FISCHER, *Mittelalt. Pflzk.* 1929, p. 252).

MAGNOL noted (*Bot. Monsp.* 1686, p. 168) that '*Luteola*' flowered in May at Montpellier. 'Magni usûs est tinctoribus ad colorem fulvum, aureumve pannis conciliandum'.

In the middle of the 19th century *R. luteola* was grown in various places ('Wau' in Germany, 'wouw' in the Netherlands). Perhaps a remnant of cultivation might linger on in some remote place in our time.

R. luteola was usually grown on sandy soils as a crop to be harvested in the second season. Low and yellow green plants were judged preferable to the taller, greener wild ones. The plants are uprooted, the roots removed (being useless). Boiling produces the dye. By certain additions various shades of green (olive) and orange or red can be brought about. If applied in the right manner the yellow silks will not fade in light and retain their colour when washed in soapy water.

Formerly an oil from the seeds of *R. luteola* was used for the manufacturing of certain varnishes. This is now without importance because no industrial quantity of seeds becomes available (cf. BOLLE, l.c., p. 678, and WIESNER, *Rohst. Pflz.* 4th ed. 1, p. 777).

Reseda luteola is said to be occasionally wild in South Africa (MARLOTH, *Fl. S. Africa*, reported by WATT and BREYER-BRANDWIJK, *Med. Pois. Pl. S. and E. Africa* ed. 2, 1962, p. 882).

WATT and BREYER-BRANDWIJK report that the yellow dye 'luteolin' is an isomer of lotoflavin $C_{15}H_{10}O_6$ dihydroxychrysin (from *Lotus arabicus* in which the glucoside lotusin $C_{28}H_{31}NO_{16}$ yields to hydrolysis lotoflavin, hydrocyanic

acid and dextrose) and of fisetin (from *Rhus cotinus*; reported by R. KOBERT, Lehrb. Intox. ed. 2, 1902–1906). The herb and the root have a horseradish-like smell and have been used as a diaphoretic, diuretic and anthelmintic (i.a. reported by DRAGENDORFF, Heilpfl. Völk. Zeit. 1898). The seed contains up to 30% of fixed oil (reseda oil; cf. MOLDENHAWER in Biol. Abstr. 32, 1958, 17351). They further refer to a suspicion in New S. Wales, that the plant caused the death of several sheep, which became blind and dizzy and died after several days illness (WEBB, Coun. sci. industr. Res. Aust. Bull. 232, 1948). The herb is bitter and cattle avoid the plant (GRESHOFF, Med. Dep. Landbouw, Buitenzorg 17, 1913, p. 51). Aqueous extracts have given negative antibiotic tests (OSBORN in Brit. J. exp. Path. 24, 1943, p. 227, app. 1–45).

SPACH (Hist. nat. Vég. 7, 1839, p. 105, 106) reported that *R. luteola* was known as 'Gaude', 'Réséda des teinturiers, Herbe à jaunir' and 'Herbe aux juifs'. It was cultivated in his time in many parks of France and in other European countries. Boiled in water it coloured silk, wool and cotton beautifully yellow. SPACH further stated that the plants are torn entirely from the fields, with the roots, at time when the seeds begin to ripen. They are put on racks where they are dried, either on the field or in lofts and so they are conserved till they are used.

The name 'herbe aux juifs' comes, SPACH declared, from the Middle Ages, when the Jew, as it is asserted, was compelled to wear a yellow mantle. To colour these mantles yellow *R. luteola* was employed.

R. luteola can also be used in a fresh state. It is said that the ashes contain much potash. The juice of the leaves formerly was used as apéritif and to treat wounds.

LINNAEUS. SPACH finally remarked, was the first to observe that the inflorescence of *R. luteola* follows exactly the course of the sun during the day, even if the sky is covered or if it rains. The inflorescence points to the east in the morning, towards the south round twelve o'clock, towards the west in the afternoon and towards the north during the night.

Monstrosities: An evidently malformed specimen was collected by VOGEL in 1853. It was cited together with other specimens by MUELL. ARG. (Mon. Rés. 1857, p. 207), who classified it as *R. luteola* var. *crispata*. As distinguishing characters MUELL. ARG. stressed the undulate margins of the leaves.

VOGEL's specimen carries very richly branching inflorescences (Casa del Peon Caminero, Puerto de Guadarrama, Madrid, ex Herb. SCHÖNE in Herb. Dresden). All branches of the inflorescence are in their basal part decorticated.

Vernacular names: Germany: *Färber-Wau*, *Gelber-Wau*; Great Britain: *yellow weed*, *weld*, *wild weld*, *dyer's weed*, *dyer's greenweed*; Netherlands: *wouw*, *verf reseda*, *verf wouw*, *woude*, *lutum cruydt*, *orant*; France: *gaude*, *herbe à jaunir*, *herbe aux juifs*, *réséda des teinturiers*; Italy: *guaderella*, *guaderella crespa*

BERTOLONI, the form with wavy leaves), *bietola gialla*, *biondella*, *erba gialla*, *erba guada*, *erba guada maggiore*, *guaderella de tintori*, *guidone*, *melardina*, *pancella*, *luteolo*, *crocoë*, (early) *galdula*; Portugal: *lirio des tinturines*; Egypt: *blyhah* (DELILE), *uaehae* (Caïro, FORSKÅHL).

Specimens examined:

Subsp. *luteola*

Afghanistan. Aitchinson 359, Kurrum valley; Rechingen 16341, prov. Mazar-i-sharif, SE. Tashkurgan versus Haibak.

Algeria. Alleizette s.n., V.1922, Oran; Balansa 674, hauts plateaux, près de Saïda; Faure s.n., 23.V.1926, 15.VII.1933, dépt. d'Oran, Bossuet; id. 7.VI.1908, Elemcen, route de Terny; Fubuis et Faurel 1650, dépt. d'Alger, Atlas de Blida, Chréa; St. Lager s.n., 7.VI.1908, prov. d'Oran, Tlemcen; Lefebure s.n., 30.IV.1861, prov. d'Alger, Plaine de la Mitidja; R. Maire s.n., 24.V.1933, prope Sidi Aïssa; Warion s.n., 1.VI.1868, Sahara, Ravin de El May.

Argentina. Cabrera 5722, La Plata, prov. de Buenos.

Austria. Richter s.n., VI.1876, Kahlenberg, bei Wien.

Belgium. Hoogland 2276, Robertville; Kramer s.n., 10.VI.1949, *ibid.*; Ogterop s.n., VIII.1893, Waterloo; van Steenis s.n., 21.VI.1924, Namen.

Canary Islands. Børgesen 246, Tenerife Isl., Mt. Orotava; Pitard 476. Hierro, Valverde; Pitard s.n., III.1906, Hierro, Valverde; Tullgren s.n., 20.VI.1896, Tenerife, barranco Llarena; id. s.n., 2.VII.1896, *ibid.*, Realejo alto.

Czechoslovakia. Laus s.n., VII. 1931, Moravia, Olmütz.

Creta Isl. Baldacci 202, distr. Misabeles, Omaló Zamiti; id. 202bis, distr. Momfatn, Kavaka.

Denmark. Leth s.n., 8.IX.1862, Sjaelland, Sårslev, NE. Kalundborg.

Egypt. Gauba 167, Debaa; Kralik s.n., 2.III.1848, Berge du Nil à Girgeh; G. Maire s.n., 5.III.1909, Amriah, Mariaout; id. 15.III.1909, Iles du Nil à Minieb; Shabetai Z3378, Ghot et Awshadi, near Sellum; id. Z4872, Behig, Mariut; Simpson 628, El Bourg, Mariut; id. 4623, Daba'a; G. Täckholm s.n., 15.III.1928, Mariut, Burg el Arab.

France. Boom 9595, Corsica Isl., Ajaccio; Segal 352, *ibid.*, Oletta, SW. St. Florent; Tidestrom 13001, prov. Manche, Mt. St. Michel.

Germany. Behrendsen s.n., VII.'04, Pommern, Kolberg, auf Schutt an der Persante; H. Knoche s.n., 24.VII.1888, Göttingen, Hannover; Pease 8387, Stein Bachtal, Würzburg; Schepping s.n., 5.VII.1884, Berlin, Bauterrain Bellevue.

Great Britain. Lomay s.n., 8.VIII.1891, Lancashire, Anglia, Hightown; Raven 16112, Kent, W. Accles; Raven et Cannon 16395, Suffolk, near Hollesley; Rhodes 4336, Bingley, W. Yorkshire; Salmon s.n., 11.VII.1909, Surrey, Reigate.

Greece. De Heldreich 1610, Aegaea, Cycladum Ins. Mykonos; id. s.n., 20-28.VI.1885, Thessaliam, Mt. Pindo, c. monasterium Korona; id. 25... 1890, Mt. Telethron, Kastanio Tisso, Euboea Septentr.; St. Lager s.n., 16.VI.1899, Thessalie; Strobly s.n., 21.VI.1874, fluvii Symaethi (Giarette) prope Catanam.

Iran. Rechingen f. 1598a, prov. Khorasan, inter Meshhed et Kučan; id. 1854, *ibid.*, inter Shirwan et Budjnurd; K. H. et F. Rechingen 5238, prov. Khorasan, Mts. Hazar Masdjid, Ardak.

Iraq. Rawi 8529A, near Jebel Bekheir.

Ireland. Heimans s.n., 22.VII.1953, N. Galway.

Italy. Ross s.n., VIII.1884, Sicily Isl., Mt. Aetna.

Jordan. Field et Lazar 166, Umm Jemal.

Luxemburg. Gravet s.n., 6.VI.1866, Bouillon, Becombres.

Madeira Isl. Lanjouw et Lindeman 59, above Funchal.

Mauretania. Bovi 130, s.l.

Mexico. Chase 7209, state of Hidalgo, Jacala municipality; Dressler 155, Zacatecas, la

Encantada; T.C. et E.M. Frye 2498, Saltillo, Coahuila; Gentry 8495, Zacatecas, Llano de Zaragoza; Lundell 5147, Characas, San Luis Potosi; Moore 3173, state Didalgo, distr. Pachuca, near Venta Prieta; Parry et Palmer 27, Region San Luis Potosi.

Morocco. Andreánszky s.n., 13.V.1928, Azrow; id. 21.V.1930, Tara, Chikeo; Balls B3053, Djebel Ghat, Toisal; Font Quer 248, Sok-et-tnin (Beni Hadifa); id. 249, Targuist; Gattefossé s.n., 3.V.1936, Zaian, Moulay Bou Azza; Humbert s.n., IV.1927, Oued Ziz à Kasr-es-Souk; Ibrahim s.n., 18.VI.1875, 30.VI.1876, Dj. Afouguez. Sud-ouest de la ville de Maroc; id. s.n., à 1883, Dj. Aziwel; Jahandiez 243, 301, Rabat, Bou Regreg; id. 445, Daiet Achlef (Moyen Atlas); id. 1.V.1925, Midelt (Haute Moulouya), Oued Bou Adil; Lindberg 3996, Atlas medium, prope Azrou; R. Maire s.n., 6.VII.1924, Atlantis regionis, ditione Glaoua, pr. Ider; Mardochée s.n., à 1876, Ida, between Ouchemlal and Adrar Mqorn; Sennen et Mauricio 7510, 7511, Mt. Gurugu, vers Taquigriat; id. 7784, Zeluan; id. 8348, Ketama à Telata; Wall s.n., 18.I.1934, Moyen Atlas, Asrou; id. 26.V.1934, Oued Gharrad near ?Bou Lhaut; de Wilde c.s. 1881, Imouzzev, Grand Atlas; id. 2649, SW. Ain-el-Leuh, road Azrou-Khenifra, SSW. Fez.

Netherlands. Jansen et Wachter '182', VI.1905, prov. Gelderland, Oosterbeek Laag; Kampen 832, Deventer; Ruijs s.n., 25.VII.1877, Zwolle.

Palestine. Dinsmore 2675, Jerusalem; Yaffa s.n., 2.V.1949, Negev, S. Beersheba.

Portugal. Beliz c.s. 3920, Zstremadura, Sezimbra; Buchtien s.n., VII.1891, Porto; Carvalho 86, Coimbra; Daveau 1193, prov. Alemtejo, between Almodovar and Ourique; H. Knoche 2834, Majorca Isl., Calvia; Mendonça et Sousa 2761, S. Martinho do Porto; Simões 284a, *ibid.*, Redondo; Stud. Biol. Rheno-Trai. 327 (1959), Algarve, Cab. de S. Vicente.

Spain. Maguagut s.n., 27.VI.1858, Casa de Campo, près de Madrid; Nilson 618, Antequera.

Sweden. Fries s.n., 17.VII.1932, Gotland, Flenuge, Blasé; Hasslow 920, prov. Skåne, Höganäs; Lamm s.n., 24.VI.1918, Gotland, Ilite.

Switzerland. Migahid et Montasir s.n., VI-VIII. 1936, station La Linnaea, Burg St. Pierre.

Syria: Rechinger 13005, Hauran, inter Damaskus et Daraa.

Turkey. Sintenis 4272, Paphlagonia, Wilajet Kastambuli, Tossia, Szuluk-Tschesme.

U.S.A. Moore s.n., VI.1937, Missouri, Laclede Co; Nelson 497, Oregon, Linton; id. 1750, *ibid.*, Albina; id. 2597, *ibid.*, Portland, Lower Albira; Parker s.n., 16.VI.71, New Jersey, Camden, Kaighn's Point.

U.S.S.R. Prilipko s.n., 4.VIII.1927, Azerbajdzhan, prov. Gandzha, distr. Agdam, steppe Karabach prope Bardy; id. 31.V.1928, *ibid.*, prov. Baku, distr. Saltany, steppe Mill inter Pej-Gambar et p. Karadonly; id. 10.VI.1935, *ibid.*, distr. Astrachanbazar, prope p. Muranly.

Yugoslavia. Hillenius s.n., 3-4.IX.1958, Macedonië, Prizzen Mts.

Subsp. *dimerocarpa*

Ex herb. A. Braun '*Luteola sativa* var. *australis* WEBB forma *dimerocarpa* ASCHERSON Index sem. 1867 e. sem. Sardaeis in h. Ber. 1868, culta (B)'.

31. *Reseda macrobotrys* BOISSIER

Fig. 61

Fl. Or. 1, 1867, p. 433; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 576.

Annual, erect, glaucescent herb, 40-60 cm tall, strict, virgately branching; taproot slender.

Stems many, branching at base or above, densely papillose-muricate, becoming glabrate at base, leafy, subterete, finely ribbed; pith solid.

Leaves glaucescent, strict, fleshy, papillose-muricate, all entire, lower leaves

oblong-ovate, attenuate towards base, 2–3 $\frac{1}{2}$ cm long, 8 mm wide, upper ones narrower, linear(-spathulate) or lanceolate, 2–5 mm wide, obtuse to acutish; margin narrowly pallid.

Flowers white or yellow-tipped, small, on short pedicels. Racemes finally up to 40 cm long, peduncles markedly ribbed, densely papillose-muricate. Bracts deciduous, comose at raceme-tip, linear-subulate, 2 mm long, margin widely pallid. Pedicels thick, ribbed, scabrid, 1–2 mm long, in fruit up to 4 mm long and as a rule distinctly shorter than capsule.

Sepals 6(–5), deciduous, sometimes asperulous, (ob)ovate-oblong, 1 $\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide, obtuse; margin widely pallid, entire or asperulous.

Petals 2 mm long, nearly $\frac{1}{3}$ longer than sepals. Limb of superior petal 7–9-sect, $\frac{2}{3}$ as long as the appendage, flabellate, or central lobe shorter than adjacent lobes, lobes oblong, obtuse; appendage broad-obovate, 1 $\frac{1}{4}$ mm long, 1 $\frac{1}{4}$ mm wide, rim continuous in front of limb-base, $\frac{1}{3}$ mm wide, crenate and coarsely wrinkled, margin sparsely and minutely papillose. Lateral petal smaller, lobes of the limb usually less in number, \pm different in shape. Anterior petal smallest, limb entire, oblong-spathulate, obtuse.

Disc excentrically orbicular, $\frac{1}{3}$ mm high, 1 $\frac{2}{3}$ mm wide, glabrous, margin curved downwards, crenate.

Stamens 15–20, longer than the petals, Filaments deciduous, 2–2 $\frac{1}{2}$ mm long. Anthers oblong-ellipsoid, 1 mm long, obscurely asperulous.

Ovary ovoid, substipitate, glabrous, sulcate, 3-toothed, teeth $\frac{2}{3}$ mm long. Ovules ca. 11 per placenta in 3–4(–5) rows.

Capsules strict-erect, subsessile above the disc, globular, 5 mm long, 5 mm wide, glabrous, walls deeply sulcate, reticulate, mouth contracted, teeth minute.

Seeds brown-black, dull, reniform, 1 $\frac{1}{4}$ mm long. Sinus narrow, a minute protuberance opposite the radicle. Testa smooth, (subtly striate under high magnification).

Type: BUNGE 17b, Maj. 1859, in Persia inter Yezd et Ispahan et prope Ispahan (G = holotype; GOET = isotype).

Distribution: Iran, Afghanistan.

Taxonomical notes: BOISSIER (l.c.) declared that *R. macrobotrys* occurred in Persia between Yezd and Ispahan, and near Ispahan. He based it on a specimen collected by BUNGE.

Ecological notes: On stony slopes, flowering in June.

Specimens examined:

Afghanistan. L. Ekberg W 9095, prov. Samangan, N. Side of mountain W. of Tangi Taschkurgan.

Iran. Bunge 17b., V.1859, inter Yezd (Yasd) et Ispahan (Esfahan); Field et Lazar 1089, Ispahan; K.H. et F. Rechinger 2691, Prov. Sennan et Yezd, inter Nā'in et Aghda (Agda); id. 3546, Prov. Kermān, inter Kermān et Mahun (Mahān); Stapf 114, Sattel d. Kuh Pinar b., Ispahan.

32. *Reseda media* LAGASCA

Fig. 62

Gen. Sp. Nov. 1816, p. 17; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 563; Ball in Journ. Linn. Soc. Bot. 16, 1877, p. 339; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 895; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 183; Jah. et Maire, Cat. Fl. Mar. 2, 1932, p. 316; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348.

R. m. var. pinnatisecta P. Court., fide Sauvage, Fl. Subér. Maroc. 1961, p. 76.

R. macrosperma Reichenb. in Flora 13, 1830, p. 130; Walp., Rep. 2, 1843, p. 752; Muell. Arg., Mon. Rés. 1857, p. 133, tab. 7, fig. 97 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858).

R. m. β tetragyna Muell. Arg., ll.cc., p. 135.

R. m. δ subpinnatisecta Muell. Arg., ll.cc.

R. phyteuma L. *β hirsuta* Boiss., Voy. Bot. Esp. 2, 1839 (1839-'43), p. 77.

Annual to perennial, decumbent to ascending, a dull green herb, (30-) 40-50(-75) cm tall, branching from a somewhat lignescent base and a rather weak, finally lignescent taproot.

Stems many, as a rule slender though rigid, rarely branching above, leafy, pilose or hirtellous (hairs 1 mm long), ribbed, pith finally disintegrating.

Leaves dull green, thinly hirtellous on both surfaces and margins. Lower leaves entire, narrowly ovate-spathulate to elliptic, 1½-5(-8) cm long, 3-8 (-20) mm wide, margins often undulate. Stem leaves entire or deeply 3-lobed to pinnatisect, often shortly cuneate at base. Foliar lobes 1-4(-8) pairs, unequal, broadly decurrent along midrib, terminal lobe usually larger, ovate-elliptic, sometimes up to 3 cm long, 2 cm wide, obtuse to acutish; lateral lobes linear to narrowly elliptic-ovate, up to 1½ cm long, 3 mm wide, ± acute. Margin pilose, scabrid.

Flowers white, erect-patent. Raceme up to 30(-more) cm long (in fruiting); peduncle markedly ribbed, scabrid. Bracts persistent, not exceeding flower-buds, glabrescent, subulate to narrowly ovate, 2 mm long, ± ½ mm wide, half (or less) as long as the flower-pedicel; margin pallid, ± minutely scabrid. Pedicels slender, distinctly ribbed (ribs scabrid), 3-4(-6) mm long in flower.

ascending, gradually becoming horizontal and sometimes curving downwards in fruit and then up to 6(-10) mm long.

Sepals 6, persistent, not or hardly increased and finally reflexed in fruit, narrowly oblong-spathulate, 3-4 mm long, $\frac{3}{4}$ mm wide, obtusish, margin pallid, sometimes minutely scabrid.

Petals 4 mm long. Limb of superior petal appearing 11-17-partite, (central lobe shorter than adjacent laciniae), twice as long as the appendage. All laciniae linear-spathulate, obtuse; appendage rectangular, $1\frac{1}{2}$ -2 mm long, 1 mm wide, a $\frac{1}{2}$ mm wide rim continuous in front of limb base, margin ciliolate. Lateral petal smaller, lobes and laciniae similar to those of superior petal but central lobe often longer, anterior lobe missing. Anterior petal smallest, lateral lobes often wanting.

Disc 1 mm high, $2\frac{1}{2}$ -3 mm wide, velutinous (hairs (glandular?) capitate); margin crenate.

Stamens (16-)18-20(-21). Filaments deciduous, $2\frac{1}{2}$ -3 mm long, subulate or dilated above the middle. Anthers narrowly elliptic, $\frac{3}{4}$ mm long.

Ovary ovoid-cylindrical, stipitate, walls glabrous, obtusely 3-angled (ribs narrowly hyaline, scabridulous), 3-toothed; teeth up to $\frac{1}{4}$ as long as ovary. Ovules 6-10 on each placenta, in 2 rows.

Capsule patent to pendulous, stipitate, obovoid to obovoid-cylindrical, $1\frac{1}{2}$ cm long, $\frac{3}{4}$ cm wide, walls glabrous, ribs raised, scabrid; mouth gaping, slightly constricted beneath the teeth.

Seeds reddish-ochre, dull, subglobular-reniform, $2\frac{1}{4}$ mm long. Sinus wide, filled with carunculoid tissue. Testa transversely undulate-rugose, wrinkles blunt, outer layer tardily detaching.

Neotype: N. HJALMAR NILSSON 1093b, Hispania, San Roque, 15.VI.1883 (UPS = neotype; C = isoneotype).

Distribution: Western (Atlantic) zone of the Iberian Peninsula, NW. Morocco and SE. Spain and on the Azores.

Taxonomical notes: *R. media* LAGASCA was referred with some doubt by MUELLER to the synonymy of *R. macrosperma* RCHB. (Mon. Rés. 1857, p. 133). He (in DC., Prodr. 16(2), 1868, p. 563) accepted it later as a distinct species. LANGE (in WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 895) also adopted *R. media* LAG. as a species.

LAGASCA stated in the protologue that *R. media* was an annual plant, occurring in southern Spain.

Technically *R. media* LAG. could be reduced to the synonymy of *R. phyteuma* L. There is no type specimen extant which might show differences not apparent in LAGASCA's brief description, which contains no data to distinguish it from *R. phyteuma* L. There is also no evidence that several specimens showing the distinctive characters noted by MUELLER and LANGE (ll.cc.), (viz. a relatively

shorter calyx which does not (or scarcely) increase in fruit and more slender filaments (which are distinctly thickened above the middle in *R. phyteuma*)) actually belong to *R. media* LAG.; they do not cite any specimen referred to by LAGASCA.

Though it remains doubtful whether *R. media* LAG. as interpreted by MUELLER and LANGE actually is LAGASCA's taxon, it was nevertheless decided to follow their view, so to maintain *R. media* LAG. in their usually accepted circumscription. If rejected, *R. media* LAG. would be reduced to the synonymy of *R. phyteuma* L. acquiring an infraspecific rank. To avoid this change, which is not strictly necessary or unavoidable, a neotype of *R. media* LAG. is designated in accordance with LAGASCA's ambiguous description and also within the current delimitation of *R. media* LAG.

REICHENBACH (in Flora 13, 1830, p. 130) declared that *R. macrosperma* was allied to '*R. tournefortii* ZEYH.' but differed from it by having smaller white flowers. He added that *R. macrosperma* was still less related to '*R. mediterranea*' and '*R. phyteuma*'.

The type of *R. macrosperma* was collected by HOLL in Portugal (cf. MUELLER, Mon. Rés. 1857, p. 133 & 134). MUELLER was able to study the type specimen forwarded by REICHENBACH's son (Herbarium RCHB.). He (in DC., Prodr. 16(2), 1868, p. 563) reduced *R. macrosperma* to *R. media* LAG., which we believe is correct taxonomically. The type specimen (HOLL in REICHB.F. hb. (W; Acq. 1889 no. 208397, holotype) matches the description given in this present revision.

BALL stated (Journ. Bot. N.S. 2, 1873, p. 330) that *R. macrosperma* was common in Morocco 'in agro Tingitano' and that the upper petal had somewhat widened lobes towards the top. These lobes, he stated, were not like MUELLER's picture (Mon. Rés. 1857, tab. 7, fig. 97) viz. spathulate.

Ecological notes: In Portugal, BUCHTIEN collected *R. media* on a heath near the sea in the Porto region (fl. and fr. in June). MYRE found it in Beira Alta at \pm 200 m alt., near a road, associated with *Rubus* sp., *Quercus robur* and *Brachypodium* (nr. 1487, Herb. Sta. Agron. Nat., COI, L). KOSTERMANS et KRUIJT found it in rocky meadows near Coimbra, flowering in April (nr. 35, L).

In Morocco, WEILLER found it near Ceuta on rocky slopes facing the sea (fl. and fr. in March).

In Spain, LEROY observed it on fields and meadows in the Santander district, flowering and fruiting in July. It grew on heaths near la Coruña (Lange; fl. and fr. in August). Near Murcia it was collected in vineyards by GANDOGGER (nr. 403), before flowering, in March.

On the Azores (St. Michael Island) it was reported by T. C. HUNT (C).

SAUVAGE (Fl. Subér. Maroc. 1961, p. 76) records *Reseda media* LAG. var. *pinnatisecta* P. COURT. on sandy soil or loamy sands on the plains, in places without trees in Tanger and Rharb (Morocco). He stated that the plant occurs as a shrub or a small shrub (or biennial) in semihumid bioclimates; the variety is not accepted in this present revision.

Specimens examined:

- Azore Isls. Hochst 43, St. Miguel; Hunt s.n., à 1846, *ibid.*; Guthuick s.n., V. 1835, *ibid.*
- Morocco. Bertault 123, Tangérois, *Perdicaris*; Emberger s.n., 29.III.1928, Cap Spartel; *id.* 29.III.1928, à 72 km de Tanger; Font-Quer 150, Yebel Sugna (Yebala); Gandoger s.n., à 1910–11, Kas Faraoun; Huber-Morath 3584, Tetouan-Tanger, *Macchie*; R. Maire s.n., 25.IV.1924, circa Tingidem; Schousboe s.n., IV.1802, Tanger; Vischer s.n., 27–IV-1928, Arzila, SW. Tanger; *id.* 29.IV.1928, Ziata, westl. Tanger.
- Portugal. D'Aranjo s.n., VII.1889, Arredores do Vizella; *id.* IV. 1890, Arred. de Porto, Serra de Pilar; Aranje e Sastro s.n., III.87, Gaya, Grijo; Aroso s.n., 6.IV.1909, Paço, Lavra, Bouças; Ball s.n., IV.1879, prope Olyssiponem; Beliz et al. 2354, Beira Alta, between Tondela and Santa Comba Dão; Bourgeaux 1783bis, à Loule, Algarve; Buchtien 2574, Porto, auf Heiden am Meere; Cardozo s.n., VI.1883, Cartaxo; de Carvalho 857, Buarcos; de Carv^o s.n., III.99, Amarante, Gatão; Castro '1257b', IV.1887, Arredores de Villa Nova de Gaya, Grijo; *id.* s.n., 10.IV.1901, Villa do Coude; Christensen et A. Lange 102, Serra Caramulo, Dal Mod Nord; *id.* 603, Serra Monchique, Algarve; Clementi et Pereira s.n., VI.1916, Insaldi-Daveclu de Coure; Cunha 10, Caminha, Caes Novo; *id.* 11, Melgaço, Louridal; Daveau s.n., VIII.1881, Valesine, Serra da Estrella; *id.* VI.1884, prov. de Estremadura, de Contancia à Abrantès; Dempster et Kuijt 2068, top of Mt. Foia, near Monchique; Fernandes s.n., V.1914, Alfeite; Fernandes et Sousa 1731, 1757, Herdade and Alto da Queijeira, Serra d'Ossa; *id.* 2406, Serra do Gerês, Margeus e leito do rio de Leonte, de Leonte a Abergaria; Fernandes c.s. 4337, Oliveira de Frades, Zuinta do Sur. Costa; Fernandes et Sousa 2627, Serra do Gerês, S. Bento da Porta Aberta; Ferreira s.n., VII.1886, Arred. de Vizeu. Passos de Silqueira; Gouveia s.n., VII.1883, Miranda do Corvo, Godinhella; Guthnick s.n., IV.1838, Fagum; Hackel s.n., Serra do Cintra; Henriques s.n., VIII.1881, S. da Estrella (S. Ramão), Johnston 857, Arredores do Porto, Custoias; Justiça s.n., IV.1898, Aveiro, Zuinta do Picado; Kostermans et Kruijt 35, S. Antonio dos Oliveis; da Liha 26, Beira-Alta, Santo Comba Dão; Luisier s.n., à 1901, Arredores de Setubal; Matos s.n., 24 III.1954, Coimbra, Dianteiro; Matos et Matos s.n., 18.V.1953, Coimbra, Estação Velha, Mondego; Matos c.s. 5011, Oliveira do Hospital, Quanta da Ponte; Moller 187, Coimbra, Villa Franca; *id.* 995, *ibid.*, Alpenduradas; *id.* 996, Serra do Gerez, Caldas; *id.* s.n., VII.1886, Serra da Estrella. Amieiro; *id.* IV.1889, Algarve, Lagos; Myre 1487, Beira Alta, Santa Comba Dão, between Santa Comba and Fontainhas; Palhinha et Sobrinho s.n., 27.V.1940, Beira Alta, Castelo, prov. Souta de Lafões; Pimentel s.n., Marinha Grande; Rainha 2615, prov. Beira Baixa, Oleiros; Porta et Rigo s.n., V.1887, Coimbra, Penedo da Meditacao; Sampaio s.n., III.1894, Pavia de Lanhoso; Sequeira s.n., III.1883, Arred. de Braga, S. Jeronimo; Welwitsch 18, pr. Va. nova de Mitfontes; Winkler s.n. 6.V.1876, Cintra; Zimmerman s.n., à 1901, S. Fiel.
- Spain. Diets s.n., à 1868–69, Algeciras; Friedrich s.n., à 1953, Granada, E. Malaga; Fritze s.n., 2.IV.1873, Cadiz; *id.* 23.IV.1873, Algeciras, Sa Seta Luna; Hackel s.n., 15.IV.1876, Algeciras; Huber-Morath 3585, prov. Malaga, Estepona-San Roque; Lange s.n., 20.IX.1851–52, 3.VIII.1852, Bentazos (Gallicia); *id.* 10.VIII.1851–52, la Coruña; *id.* 7.9.1852, El Burgo Gallecio; Leroy 6018, Santander, Suances; Lindberg 506, prov. Cadiz, Algeciras; Nilsson 1093, *ibid.*; *id.* 1093b, San Roque; Porta et Rigo 58, prov. Gaditana, near Algeciras; Reese s.n., 31.III.1924, prov. Cadiz, Andalusia bei Algeciras; *id.* 20.V.1929, *ibid.*, Rio Palmona bei Algeciras; Reverchon 117, Andalousie, Sierra de Palma près Algeciras; Stud. Biol. Rheno-Trai. 970 (1957), prov. Cadiz, Mt. Sierra de Luna, inter Algeciras et Tarifa; *id.* 1045 (1962), Sierra de Carbonera, N. Gibraltar; Willkomm 558, Chiclana, Couil, Algeciras; Winkler s.n., 26.IV.1873, Sierra Palma, p. Algeciras; *id.* 16.VI.1876, Algeciras.

In Bot. Zeit. 14, 1856, p. 35; id., Mon. Rés. 1857, p. 148, tab. 7, fig. 104 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 431; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 577; Bolle in Engl. et Prantl., Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Czerniak. in Komar., Fl. URSS 8, 1939, p. 615, tab. 34, fig. 2; Coode in Davis, Fl. Turk. 1, 1965, p. 504, fig. 20(9).

Reseda mira Bordz. in Bull. Jard. Bot. Kieff 7-8, 1928, p. 17, fig. 4.

Annual to perennial, erect or ascending, glaucescent herb, 25-35 cm tall; taproot lignescent.

Stems branching, leafy, glabrous or sparsely asperulous, finely ribbed; pith solid.

Leaves fleshy, pale green, surface wholly or partly punctate-foveolate (see notes), all entire, obovate-spathulate to oblong, glabrous (veins \pm muricate), $3\frac{1}{2}$ - $4\frac{1}{2}$ cm long, 1- $1\frac{1}{2}$ cm wide, short acuminate; margin narrowly pallid.

Flowers white to yellowish, small, on short pedicels. Raceme slender, up to 15(-20) cm long in fruiting; peduncle ribbed. Bracts deciduous, comose and exceeding flower-buds at raceme-top, glabrous, \pm linear, $3\frac{1}{2}$ -4 mm long, $\frac{1}{2}$ mm wide, acuminate; margin widely pallid, \pm muricate. Pedicels ribbed (ribs minutely asperulous), in flower $1\frac{1}{2}$ mm long, in fruit up to 3(-6) mm long.

Sepals 6, deciduous, glabrous, oblong, $2\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide; margin widely pallid, smooth or sometimes \pm muricate.

Petals $2\frac{1}{2}$ mm long. Limb of superior petal 3(-5)-partite, (incisions up to $\frac{3}{4}$ downwards), often lateral lobes reduced or wanting, flabellate, usually $\frac{2}{3}$ or almost as long as appendage; central lobe oblong, obtuse, lateral lobes narrower, sometimes all or the very laterals appearing as dents; appendage the upper part densely papillose, broadly obovate, 2 mm long, free transverse rim continuous in front of the limb, margin crenate, minutely papillose. Lateral petal smaller, sometimes longer than others. Anterior petal smallest, limb usually simple, sometimes lateral lobe(s) represented by dents.

Disc excentric-orbicular, $\frac{3}{4}$ mm high, $1\frac{2}{3}$ mm wide, minutely papillose, glabrescent.

Stamens (12-)17-18, widely exerted in flower. Filaments deciduous, $2\frac{1}{2}$ mm long. Anthers oblong, $1\frac{1}{2}$ mm long.

Ovary ovoid to ellipsoid, rather long stipitate, glabrous, obtusely 3-angled (ribs minutely scabrid), 3-toothed, teeth $\frac{1}{5}$ or less as long as the ovary. Ovules 9-13 per placenta, in 3(-4) irregular rows.

Capsules erect, on thickened pedicels, stipitate, obovoid to -globular, 5(-8) mm long, 4 mm wide, orange when ripe, 3-angled, walls (deeply) sulcate, bulging over seeds, mouth contracted, teeth minute.

Seeds brownish-black, subglossy, globular-reniform, $1\frac{1}{4}$ mm long. Sinus narrow, a minute protuberance opposite the radicle. Testa delicately papillose.

Type: BUHSE, ad Karadagh (Persia) (G = lectotype).

Distribution: Iran, Russia (Transcaucasia).

Taxonomical notes: MUELLER (l.c.) based *R. microcarpa* on a fruiting specimen collected by 'BUHSE in hb. BOISS.!' in July. The type was collected near 'Karadagh' in Persia.

The holotype had no petals. In 1868 MUELLER ARG. again described *R. microcarpa* and stated that the superior petal was 7- to 9-lobed (1 central lacinia, and both the lateral laciniae divided in 3-4 lacinulae). The description of the petals was based on a second specimen referred to *R. microcarpa* by MUELL. ARG., viz. BUNGE, inter Ispahan et Teheran (in DC., Prodr. 16(2), 1868, p. 577-578). MUELLER's second description was preceded by BOISSIER (Fl. Or. 1, 1867, p. 431), who gave the same data.

It is, obviously, impossible to establish the characters of the petals in the holotype. Here it is contended that these petals were 3-lobed, as described in the present revision and found in numerous specimens quoted here (see also fig. 63). The 7-9-lobed petals belong in *R. buhseana* to which, accordingly, BUNGE's latter specimen, as cited above, may belong. It is contended here that MUELL. ARG. erred in his second description of *R. microcarpa* (l.c.).

BORDZIŁOWSKI (in Bull. Jard. Bot. Kieff 7-8, 1928, p. 17) mentioned that *R. mira* occurred in 'Nachiczewanensi republic' in Aserbajdzhan. He added that it was found on the slopes of Kassaba mountains not far from Karabagliar village. The plant was just flowering (11.7.1926). He accompanied the original description by a (poor) drawing of a flowering branch of *R. mira* (l.c., fig. 4). BORDZIŁOWSKI further stated that *R. mira* should be considered one of the caucasian species in the section *Resedastrum*. He mentioned differences supposed to exist between *R. mira* and *R. bungei* and *R. microcarpa*.

It appears from BORDZIŁOWSKI's description however, that *R. mira* belongs in the synonymy of *R. microcarpa* to which it was already reduced by CHERNYA-KOVSKAYA (Flora URSS 8, 1939, p. 616).

Ecological notes: On magnification of dried leaves their surface appears to be wholly or partly punctate or foveolate, possibly by internal aggregations of some slimy substance, which expands after boiling the leaf. The dots or foveoles are slightly darker than the surrounding tissue.

In Transcaucasia, near Buzgov it was collected on stone loams or schists (PRILIPKO, BAK); in the gorge of Kizil-Boçaz it grew on calcareous rocks (GROSSHEIM et GURVITSH, BAK), and near Ordubad on calcareous schists (HEIDEMAN, BAK); in general it prefers dry stony localities at considerable altitude.

Specimens examined:

Iran, Bunge s.n., V.1859, inter Ispahan et Teheran.

U.S.S.R. ?Fowin s.n., 27.VI.1901, Armenia, distr. Nachiczewan, Schachlinz-Dagh; Grossheim s.n., 25.V.1923, distr. Nachitshevan, Dosty; id., 18.V.1933, Transcaucasia, Nachrespublica, Ordubad; Grossheim et Heideman s.n., 12.V.1933, ibid., inter Ordubad et Akulisy; Grossheim et Gurvitsh s.n., 16.V.1934, republica Nachitshevan, distr. Shach-Buz, Kizil-Boçaz; Heideman s.n., 19.VI.1933, Nachrespublica, Ordubad, Mt. Paltshan; Karjagin s.n., 3.V.1934, republica Nachitshevan, distr. Dzhulfa, inter Dzhulfa et Darosham; Karjagin et Saflev s.n., 30.V.1931, Azerbaidshan, pp. Dshuga et Negram; Prilipko s.n., 15.V.1933, Nachrespublica, prope Dzhulfa; id., 26.V.1933, ibid., prope St. Viae ferr Negrom; id., 12.VI.1933, ibid., prope Bilav; id. 23.V.1934, republica Nachitshevan, prope p. Aza Super; id., 11.VI.1934, ibid., prope p. Shajtan-Abad; id., 14.VIII.1934, ibid., prope p. Buzgov.

34. *Reseda migiurtinorum* CHIOVENDA

Fig. 64

Fl. Somala 1, 1929, p. 87, tab. 32, fig. 2; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689; Cufod. in Bull. Jard. Bot. Brux. 24, Suppl., 1954, p. 160.

?Perennial, erect, pale green herb, ca. 50 cm tall, densely branching; taproot perhaps slender.

Stems many, branching, densely leafy, delicately ribbed, velutinous; pith solid.

Leaves all entire, petiolate (petioles up to 1 cm long), rather chartaceous, velutinous-sericeous, elliptic to broadly (ob-)ovate, $2\frac{1}{2}$ –6 cm long, 1–3 cm wide, top obtuse; margin entire.

Flowers pale yellow (at least in dry specimens), small on short, erect pedicels. Raceme dense, up to 30(–more) cm long in fruiting, velutinous. Bracts deciduous, long comose on raceme top, pilose-velutinous, linear-subulate, 6 mm long, $\frac{1}{5}$ mm wide; margin entire. Pedicels rather thick, terete, hirtellous, $1-1\frac{1}{2}$ mm long, in fruit $2-2\frac{1}{2}$ mm.

Sepals 6, deciduous, glabrescent, oblong, $1\frac{1}{2}$ mm long, $\frac{1}{3}-\frac{1}{2}$ mm wide, obtuse to acutish, margin entire.

Petals 2–3 mm long, exceeding the sepals. Limb of superior petal almost to base 5-palmatipartite, slightly longer than the appendage, flabellate, lobes linear(-spathulate), obtuse; appendage obovate, $1\frac{1}{2}$ mm long, $\frac{1}{4}$ mm wide, transverse rim continuous in front of limb, wavy, $\frac{1}{4}$ mm wide; margin coarsely papillose. Lateral petal smaller, limb-lobes much reduced, usually deeply 3-2-partite. Anterior petal smallest, limb usually simple, linear-spathulate.

Disc $\frac{3}{4}$ mm high, $1\frac{1}{2}$ mm wide, glabrous; margin shortly papillose, entire.

Stamens ca. 20. Filaments deciduous, $2\frac{1}{2}$ mm long. Anthers ovoid(-oblong), 1 mm long, apiculate.

Ovary obovoid, stipitate, glabrous, obtusely 3-angled, side walls sulcate,

3-toothed. Ovules 18–20 per placenta in 4–5 rows.

Capsules erect, stipitate, obovoid, 5 mm long, 3 mm wide, glabrous, obtusely 3-angled, side walls sulcate, mouth much contracted, truncate, subdentate.

Seeds dark olive-green, glossy, reniform, $\frac{2}{3}$ mm long. Sinus narrow. Testa regularly, minutely papillose.

Type: Somalia Sett.: N. PUCCIONI et J. STEFANINI 644 (708), 29.V.1924, Costa dei Migiurtini, Dintorni di Uanane (FI, lectotype).

Distribution: Somalia.

Taxonomical notes: CHIOVENDA (Fl. Som. 1, 1929, p. 87) based *R. migiurtinorum* on two specimens collected by PUCCIONI and STEFANINI in 'Somalia Sett.: Costa dei Migiurtini, altipiano di El Gafi presso Hafün 24.V. (n. 620); dintorni di Uanane 29.V. (n. 644)'. Both specimens are preserved in FI herbarium and were available for the present revision. PUCCIONI et STEFANINI 644 is selected as a lectotype of *R. migiurtinorum* CHIOV. CHIOVENDA (l.c., p. 88) recorded that the indigenous name of the taxon at Hafün was 'Ulass', and attributed some medicinal properties to the plant 'è usata come medicinale contro i motsi del serpente abesso grossa vipera (*Echis carinata* SCHN.?) mastecandosene le radici.'

Specimens examined:

Somalia. Hemming 1854, Mijertein, Bender Baila; Merla, Azzaroli et Fois s.n., 27.XII. 1953, Migiurtinia: Uadi Mireflata sotto l'altipiano (Gibalei), su terrano sabbioso; Puccioni et Stefanini 620 (683), Costa dei Migiurtinori, altipiano di El Gafi, presso Hafün, paratype; id. 644 (708), *ibid.*, Dintorni di Uanane, lectotype.

35. *Reseda muricata* PRESL

Fig. 65, 66

In Abh. Kön. Böhm. Ges. Wiss. ser. 5, 3, 1845, p. 438; id. in Bot. Bemerk. 8, 1846 (1844), p. 8; Muell. Arg. in Bot. Zeit. 14, 1856, p. 36; id., Mon. Rés. 1857, p. 159, tab. 8, fig. 110 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 431; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 577; Post, Fl. Syr. Palest. Sin. 1896, p. 113; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 184; Muschler, Man. Fl. Egypt 1, 1912, p. 441; Blatter, Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 48; Ramis, Bestimm. Fl. Aeg. 1929, p. 98; Dinsmore in Post, l.c. ed. 2, 1, 1932, p. 139; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Burt et Lewis in Kew. Bull. 1949(3), p. 304; Täckh., Stud. Fl. Egypt 1956, p. 334; Zohary, Fl. Palaest. 1, 1966, p. 336, tab. 491.

R. m. β canescens Muell. Arg. in Bot. Zeit. l.c.; id., Mon. Rés. 1857, p. 161 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. l.c.

R. m. var. undulata Post, Fl. Syr. Palest. Sin. 1896, p. 113; Dinsmore in Post, l.c. ed. 2, 1, 1932, p. 140; Zohary, Fl. Palaest. 1, 1966, p. 337, notes.

R. m. var. latifolia Post in Bull. Herb. Boiss. 7(3), 1899, p. 151; Dinsmore in Post, Fl. Syr. Palest. Sin. ed. 2, l.c.

R. m. var. hierochuntica Zohary in Palest. Journ. Bot., Jerusalem Ser. 2, 1941, p. 164; id., Fl. Palaest. l.c., p. 337.

R. m. var. lepidocarpa Zohary, ll.cc.

R. m. var. macrocarpa Zohary, ll.cc.

R. patzakiana Rech.f. in Anz. Math.-Naturw. Kl. Oesterr. Akad. Wiss. 1961, p. 246; id., Fl. Lowl. Iraq 1964, p. 326 (= ssp. *patzakiana*).

Perennial, erect or ascending, a pale green to glaucescent herb, (10-)25-35 (-60) cm tall, woody at base; taproot lignescent.

Stems almost simple or branching from lower parts, stiff, erect or ascending, leafy, minutely papillose-muricate to scabrid-papillose, finely ribbed; pith disintegrating.

Leaves pale green to glaucous, sometimes accompanied by axillary fascicled young leaves, glabrous to (sparingly) papillose-scabrous, especially on nerves and margins; basal leaves narrowly (ob)ovate, $1\frac{1}{2}$ -2 cm long, $2\frac{1}{2}$ -4 mm wide, middle and upper variously incised, pinnatisect or palmatisect or very deeply 3-sect or biternate, 2-4(-5) cm long, lobes filiform to linear-oblong, lobes up to 8 mm wide, edge pallid, sometimes undulate; muricate.

Flowers white, small. Raceme in fruit 10-15(-25) cm long, $1\frac{1}{2}$ cm wide. Bracts tardily deciduous or persistent, comose at the top of raceme, pale green, muricate especially on midrib, narrow, 5-6 mm long, less than 1 mm wide, margin widely white, slightly muricate, seemingly undulate. Bracts deciduous, linear to subulate, up to $2\frac{1}{2}$ mm long. Pedicels ribbed, muricate to scabrid-papillose, in flower $1\frac{1}{2}$ mm long, in fruit longer, up to 5 mm.

Sepals 6, tardily deciduous or persisting, narrowly ovate, 2- $3\frac{1}{2}$ mm long, obtuse; margins white.

Petals (2-)4-5 mm long, far exserted. Limb of superior petal 7-9(-more)-partite (incisions $\frac{1}{3}$ to more than $\frac{3}{4}$ down), laciniae flabellate (central one widest and longest), almost equalling the appendage, laciniae linear-spathulate to narrow-obovate. Appendage obovate, 2 mm long, rim continuous in front of limb, $\frac{1}{4}$ mm wide, erose, margins papillate. Lateral petals usually as the superior or smaller, lobes and incisions similar to those of superior petal, often lobes reduced in number or irregular in shape. Anterior petal smallest, limb rarely entire, mostly 2-3(-more)-partite.

Disc ca. $\frac{1}{2}$ mm high, $1\frac{3}{4}$ mm wide, sparsely papillose; margin recurved.

Stamens (10-)13-16(-18). Filaments persistent or tardily deciduous, $2\frac{1}{2}$ mm long. Anthers ellipsoid to obovoid, $1\frac{1}{2}$ mm long.

Ovary obovoid to urceolate, stipitate, side-walls smooth to densely papillose,

3(-4)-toothed, teeth ca. $\frac{1}{4}$ as long as ovary. Ovules 15-20(-25) per placenta in 4-5 rows.

Capsule erect, sessile or hardly stipitate on the disc, obovoid or globular-urceolate or \pm pyriform, 4-8 mm long, 3-6 mm wide, walls smooth or papillose, often deeply sulcate; mouth widely gaping, dentate, slightly constricted beneath the teeth.

Seeds greenish-brown to black, \pm glossy, globular-reniform, $\frac{2}{3}$ mm long. Sinus narrow. Testa finely to densely and coarsely papillose, sometimes papillae spaced and in rows.

Type: SCHIMPER 103, 'Unio itiner. 1835', ad radices montis Sinai, 10 Mai, sub *Reseda pruinosa* DEL. (BOISSIER herb., G).

Distribution: Sinai (Egypt), Palestina, Jordan, Saudi Arabia and Iraq.

Key to infraspecific taxa

1. Incisions of the limb of superior petal almost up to halfway down. Capsules globular-urceolate, distinctly stipitate over the disc. Stem-leaves often subpinnatisect, lobes filiform-subulate or linear-oblong. **b. ssp. patzakiana**
1. Incisions of the limb of superior petal much deeper, ca. $\frac{3}{4}$ (or more) way down. Capsules (sub)sessile on the disc. Stem-leaves often subpalmatisect, lobes obovate. **a. ssp. muricata**
2. Capsules obovoid or \pm pyriform, longer than wide, side walls smooth or nearly so. **a1. var. muricata**
2. Capsules globular, as long as wide, densely papillose. **a2. var. intermedia**

a. ssp. muricata

Stem leaves often subpinnatisect, lobes obovate. Incisions of the limb of superior petal down to ca. $\frac{3}{4}$ (or more) of the limb, lobes linear-spathulate, middle lobe much wider and larger than the others. Stamens 16-18, persistent. Capsules (sub)sessile on the disc, obovoid, \pm pyriform or globular, 6-8 mm long, 4-6 mm wide, side walls glabrous or papillose, decidedly longer than bearing pedicels. Seeds finely or coarsely papillose, papillae dense or rather lax.

Distribution: Area of the species.

a1. var. muricata

Capsules obovoid or \pm pyriform, 6–8 mm long, 4–6 mm wide, (longer than wide), side walls smooth or nearly so. Seeds densely and finely papillose.

Distribution: Area of the species.

a2. var. intermedia ABDALLAH et DE WIT, *nov. var.*

Varietas nova, faciliter distinguenda. Folia caulina subpalmatisecta, lobis obovatis. Petali superiores profunde incisi (per 3 quartas). Pedicelli breviores quam capsulas. Capsula dense papillosa, globosa (ca. 5 mm diam.). Semina dense tenuiterque vel grosse et laxe, seriatim papillosa.

Type: J. MANDEVILLE no. 332, Saudi Arabia, Riyadh, in waste lot behind the al-Jamamah Hotel, poorly drained, probably saline ground, 23.11.1964 (W, Acqu. 1965 no. 3454, holotype).

Easily distinguished from var. *muricata* by its globular capsules (ca. 5 mm in diameter), side walls densely papillose.

Distribution: SE. Saudi Arabia, Riyadh, Khurays and Al-Kharj triangular; endemic.

b. ssp. patzakiana (RECH.F.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda patzakiana* Rech.f. in Anz. Math.-Naturw. Kl. Oesterr. Akad. Wiss. 1961, p. 246.

Stem leaves often subpinnatisect, lobes filiform, linear-oblong or subulate. Incisions of the limb of superior petal hardly up to halfway down, lobes narrow obovate, apex round obtuse. Stamens 10–13, persistent or tardily deciduous. Capsules distinctly stipitate over the disc, globular-urceolate, with rounded base, 4–5 mm long, 3–4 mm wide, almost as long as or shorter than bearing pedicels, papillose. Seeds coarsely and laxly papillose, papillae rather in regular rows.

Type: K. H. RECHINGER no. 9287, Iraq, Distr. Diwaniya, Desertum meridionale (Southern Desert), 10–15 km E. As-Salam, 22.IV.1957 (W, sheet no. 13289).

Distribution: Iraq and Saudi Arabia.

Taxonomical notes: PRESL published *Reseda muricata* (l.c.), giving a very poor description ('fructibus folisque muriculatis') and basing it on SCHIMPER, '*Reseda pruinosa* Herb. arab. itin n. 103.' See also notes sub *R. pruinosa*.

MUELL. ARG. stated (Mon. Rés. 1857, p. 161) that the seeds of *R. pruinosa* PRESL were 'ut in *R. pruinosa*, levia'. SCHIMPER 103 Un. it. is the holotype of *R. muricata*. The seeds of the holotype are densely and regularly papillulose (papillulae not touching). The seeds of *R. pruinosa* Del., stated by MUELL. ARG. (l.c., p. 156) to be 'levissima', could not be checked with type material. However, seeds of numerous specimens of *R. pruinosa* are practically smooth (very minutely and vaguely undulate). They are, moreover, brightly glossy, black, whereas the seeds of *R. muricata* are green-brownish-black, dull, with a light coloured area over the top of the cotyledons at one end of the seed. The seed of *R. stenostachya* is semi-glossy; the testa is distinctly and finely rugulose; the light-coloured spot over the cotyledons is present. It may be stated in general that the seed-characters of *R. stenostachya* are more or less intermediate between *R. muricata* and *R. pruinosa*.

The taxa described as *R. pruinosa*, *R. muricata*, *R. stenostachya*, and *R. patzakiana* are closely allied, and appear to be linked if only one single character is studied as regards its variability. The broad and short laciniae of the superior petal in *R. patzakiana* is also found in *R. stenostachya*, and some extent in *R. pruinosa*. The slender, long and sometimes spatulate laciniae of the superior petal in *R. muricata* are also seen in KADRY and KHODEIR 303 and 308, and KHODEIR 34 (from Central Arabia) and in QUEST, RAWI & RECHINGER 19223 (from Iraq, near Shabicha). Actually, the superior petal in the paratypes of *R. patzakiana* (RECHINGER 9313 and id. 9327; from Iraq, Southern Desert) are intermediate to those in typical *R. muricata*. The capsule, which is narrow and more or less cylindric in *R. pruinosa* and *R. stenostachya*, is obovoid-ellipsoid or \pm pyriform in *R. muricata* and (sub)globular in *R. patzakiana*, but there are intermediates; in addition the length of the pedicel, and of the stipe vary independently from the shape of the capsule. The stamens, as a rule, are persistent in *R. muricata* but exceptions occur, and in *R. patzakiana* they vary between subsistent and deciduous. In *R. stenostachya* they are deciduous, very rarely subsistent, and in *R. pruinosa* they are deciduous. The shape of the disc and of the sepals (which may be deciduous or not) offer no clue. The seed is finely papillose in *R. muricata*, coarsely and laxly papillose in *R. patzakiana*, in *R. pruinosa* almost smooth and in *R. stenostachya* subtiliter rugululose. Shape and size of the seeds offer also no clue. The leaves are generally ternate, but not constantly so and the indumentum varies between coarsely papillose or muricate to glabrescent or a complete smoothness. Although the evidence might suggest that all these species might be united into one single taxon, i.c. one species, it cannot be denied that this involves the union of, in many cases, very different specimens. For that reason it is now preferred to maintain them to some extent, noting that intermediates can be expected, perhaps in some cases as a result of hybridization. There is, clearly, some geographical segregation of some of the characters discussed above, but if any and to what extent the

characters are correlated, can only be established after more extensive study, probably requiring experimental trials and genetic-ecological research.

RECHINGER (l.c.) when publishing *R. patzakiana* RECH.F. as a new species, discussed its affinities and judged it to be clearly different from *R. stenostachya*, *R. microcarpa*, and *R. haussknechtii*. His judgment is partly supported here. It is to be observed that *R. muricata* is very much closer allied to *R. patzakiana* than the other above-mentioned species. It is to be noted that RECHINGER F. in the protologue described the stamens of *R. patzakiana* as 'persistent', but they appear to be deciduous (as is demonstrated e.g. in the type specimen), if perhaps sometimes tardily deciduous. The characters of the superior petal, of the sepals and the leaves, and the number of the stamens are inconstant and merge. The only characters by which *R. muricata* and '*R. patzakiana*' can be segregated with certainty are in the capsule and the testa. The capsule of *R. patzakiana* is almost globular or urceolate (base widely rounded) and of *R. muricata* narrowed at the base and obovoid to ellipsoid in shape. This character is correlated with the appearance of the testa, which is finely and closely papillose in *R. muricata*, but more coarsely papillose in *R. patzakiana*, where the papillae are widely spaced. Moreover, in *R. patzakiana* occur ca. 12 stamens as a rule and the capsule is usually coarsely and closely papillose, whereas in *R. muricata* occur 16–18 stamens and the capsule is smooth or sparsely papillose.

Our conclusion is that at the present stage of knowledge of these taxa *R. patzakiana* cannot be maintained as a species, but is better accepted as a subspecies in *R. muricata*.

ZOHARY distinguished, named and described 3 new varieties in *R. muricata* (in Palestine Journ. Bot., Jerusalem Ser. 2, 1941, p. 164): var. *hierochuntica* (with unusual racemes, pedicels, and capsules; plants up to 70 cm tall), var. *lepidocarpa* (with dense, scale-like papillae on the fruit), and var. *macrocarpa* (with pyriform capsules, up to 8 mm long and 6 mm wide). These varieties are not adopted here. ZOHARY himself commented 'all these forms, as well as var. *undulata* POST (Fl. Syr. Pal. Sin. 1883–1896, p. 113) should be examined for constancy' (Fl. Palaest. 1, 1966, p. 337). The type of var. *lepidocarpa* ZOHARY (LJ, Ein Gedi 1926 EFZ) was not seen. ZOHARY always pays much attention to the shape of the capsule and mentions no difference in the shape of the capsule of var. *lepidocarpa* and *R. muricata* var. *muricata*. It is therefore concluded that the capsule of var. *lepidocarpa* is longer than wide, which excludes its being identical with var. *intermedia* ABDALLAH et DE WIT.

Ecological notes: *R. muricata* flowers on chalky soil in the wilderness of Judea, in April. Near Jerusalem, MEYERS and DINSMORE found it in fruit in May at 800 m alt. on a hot hillside. In the Dead Sea region it occurs on clay (fruits in April) and 350 m below sealevel on sandy soil (H. BOJKO). EIG, FEINBRUN, and ZOHARY indicate *R. muricata* as a 'middle-saharo-sindian' element in the Palestine flora. They observe it seems to belong in the '*Chenoleetum arabicae*', a vegetation cover apparently characterized by *Chenolea arabica* (*Chenop.*).

They further stress in a printed label accompanying FEINBRUN, BERNSTEIN, and AMDURSKY 245 (wilderness of Judea) that the filaments are persistent, a fact not always correctly recorded in literature though persistent stamens are one of the best characters to distinguish between *R. muricata* and allied species.

Iraq. QUEST c.s. (no. 14096; K) collected ssp. *patzakiana* from the S. Desert where it was growing in hard silty soil in the neighbourhood of a well, fruiting in April at alt. 200 m. It was (no. 19223; K) also gathered in a rocky limestone desert-spot, overgrazed due to its proximity to Waksa Well and Sharaf pool, in April (few flowers and fruits) at ca. 22 km SE. Shabicha. Another specimen was collected by them (no. 19072; K) on a silty flat with low stony ridges (alt. 3500 m) at 62 km. WNW. of Ansab, near the Saudi Arabia border. Finally they met ssp. *patzakiana* growing with *Peganum harmala* on a silt flat in a depression at 15 km ESE. of Salam (QUEST c.s. no. 18854; K). RECHINGER FIL. (no. 9313; W) collected it 'ditione stationis' at 15 km ESE. of As Salman, flowering and fruiting in April. He (no. 9327; W) collected it in a flat stony plain 35 km SE. As Salman.

Saudi Arabia. VESEY-FITZGERALD (no. 15654/4; BM) was collected at Anaiza where it was growing frequently in dry stony parts, where he noted it as a characteristic element of this type of the country. He (no. 16984/6; BM) collected it in April from rocky (granite) hills, alt. 4000' from Wady Harjab.

Specimens examined:

Ssp. *muricata*
Var. *muricata*

Egypt. Abdallah 1093 (=13), S. Sinai, El Nabi Saleh; id. 944 (=50), *ibid.*, Gebel Kathrine; Boulos s.n., 24.IV.1959, Wadi el-Mizeirie, near Geb. El. Maghara, N. Sinai; id. 27.IV.1959, Wadi el-Maghara; Drar 304, Deir el Rablea, near St. Catherine Convent; id. 386, Wadi el-Lega, near St. Catherine Convent; id. 722, El-Themed, NC. Sinai; id. 755, N. Sinai, Wadi Khaahm el Tarif, near El-Themed; id. 828, Aqaba Gulf, Ras el-Naqb; id. s.n., 24.V.1928, N. Sinai, Kosseima; id. 5.IV.1939, Wadi el-Arish; id. 6.IV.1939, Wadi 'Ain el Gedeirat; ?Frauenfeld s.n., 1855, Sinai; Glober s.n., 25.VI.1943, Sinai Desert, Quntella; el-Hadidi s.n., 13.V.1956, Wadi el-Raha, Sinai; Innes s.n., à 1902, Sinai Haloon, W. el-Deir et Ouary Eshech; Kaiser 4, 677, 1000, Sinai; March s.n., V.1851, Sinai; Range 2142, Sinai, Felsboden bei Hemme; Schimper 103, foot of Mt. Sinai, type; V. Täckholm c.s. s.n., 24.IV.1961, Sinai, Wadi Ferieh, Abu Zeitun; Zohary et Feinbrun s.n., 8.V.1940, W. Sinai, Wadi Scheikh; id., 12.V.1940, *ibid.*, ca. 20 km N. Deir St. Cathrine.

Iraq. Chakravarty, Khatib, Rawi and Tikrity 30104, 22 km E. of Chakravarty; Quest and Mahallal 15296, S. Desert, 21 km SSW. of Briaya; Quest, Rawi and Long 14095, *ibid.*, Salman; Quest, Rawi and Rechinger 18739, District DSD, ca. 30 km E. of Salman, near Golaib; Rawi 13842, 6 km E. of Shabicha; Rawi and Haines 1637, Wadi Um Agroon, on... Negev pilgrim Road.

Jordan. Bornmueller 124, Jericho, ad Ain-i-sultan et Wadi-Kilt; Davis 9288, Wadi Ith'm; Dinsmore 543, ad Jericho; id. 2543, Hamman ez-Zarka; Hunting Aero Survey 64 a, above Wadi es Siq; Lowne s.n., à 1863-64, Jericho.

Palestine. Aaronsohn 3522, Wadi Zekra, Ma'in; Baum s.n., 10.III.1964, C. Negev, 116 km on Beersheva-Eilath Rd.; Boissier s.n., IV.1846, Gaza, Naplouse; Bojko s.n., 9.III.1936, Totes Meer, Ejn Gedi; Davis 4904, Wadi Qelt; Eig. s.n., 3.IV.1925, env. of Dead Sea, Cal-

lirhoua, ?holotype of 'var. *macrocarpa* ZOH. '; Eig and Feinbrun s.n., 1.IV.1932, Judean Desert, env. of Khirbet el Mird Hammada; Eig and Zohary s.n., 14.IV.1929, *ibid.*, 26 km on Jerusalem-Jericho Rd.; id. s.n., 18.IV.1929, Arava Valley, about 10 km N. of Aqaba; id. s.n., 19.III.1932, Lower Jordan Valley, Arvat Jericho, near Wadi Qilt, type of 'var. *hierochuntica* ZOH. '; id. s.n., 27.III.1935, Judean Desert, env. Ein Faur; Eig, Zohary and Feinbrun s.n., 26.III.1926, env. of Dead Sea, Wadi Daraja to Ras Feshka; id. s.n., 31.III.1936, Edom, Wadi Ithm, ca. 15 km NE. of Aqaba; Feinbrun, Bernstein and Amdursky 245, wilderness of Judea, between Hirbeth-el-Mird and Nebi Mussa; Gabriellti s.n., 31.III.1928, Lower Jordan Valley, Wadi Farah; Meyers 543, Jericho road; Meyers et Dinsmore B543, Ain Jidi; id. 2543b, Jerusalem, Jericho road; id. 4543b, Jerusalem; Post s.n., 31.III.1881, Mar Saba to Dead Sea; Samuelsson 809, Judaea, inter Khan Hatrur et Jericho; Terpstra 78, Avdad (Negev ten Z. van Bursheva); Zohary s.n., 31.III.1946, Negeve, env. of Beer Hafir; id. s.n., 28.III.1961, *ibid.*, Meishor Hava on road to Ras Ramon; id. s.n., 19.IV.1966, S. Negev, env. of Eilath near Heachzut Ein Netafim.

Var. *intermedia*

Saudi Arabia. Khodeir 34, Kharj Road near Riyadh; Kadry et Khodeir 303, 308, Khurays Road; Mandeville 332, Riyadh, in waste lot behind al-Jamamah Hotel, holotype (W.).

Ssp. *patzakiana*

Iraq. Bharucha and Abbas s.n., 10.III.1961, between Bussaya and Al-Salman; Quest et Rawi 14096, Salman, South Desert; Gillett and Rawi 6257, S. Desert, Shabicha; Haddad 9604, Diwaniyah Liwa, 30 km of Salman; Quest & Mahallal 15274, S. Desert, Khashu 1 km Hallag, 45 km SW. ?Bwira; Quest, Rawi and Long 14013, near Ukhaidhir, ca 50 km WSW. of Karbala; Quest, Rawi and Rechinger 18854, District DSD, Haddaniya, 15 km ESE, of Salman; id. 18873, *ibid.*, ca. 40 km SSE. of Salman; id. 19072, *ibid.*, 62 km WNW. of Ansab, ca 134 km SSW. of Salman, on Darb al Haj at Saudi border; id. 19223, *ibid.*, 5 km NW. of Sharaf, ca. 22 km SE. of Shabicha; Rechinger 9287, prov. Diwaniya, S. Desert, 10–15 km E. As-Salman, type; id. 9313, Haddaniya, S. Desert, 15 km ESE. As-Salman, paratype; id. 9327, S. Desert, 35 km SE. As-Salman; id. 9427, Desertum meridionale, Distr. Diwaniya, 5 km NW. Sharaf, ca. 22 km SE. Shabicha; id. 12695, W. Desert, inter Ramadi et Rutba, 55 km à Ramadi occidentum versus.

Saudi Arabia; Mandeville 262, 301, Badanah Pump station; Vesey-Fitzgerald 15654/4, Anaiza, 26° 05' N., 44° 05' E.; id. 16984/6, Wadi Harjab, 19° 30' N., 42° 50' E.

36. *Reseda odorata* LINNAEUS

Fig. 67

Amoen. Ac. 3. 1756, p. 51; Syst. Nat. ed. 10. 2. 1759, p. 1046; Sp. Pl. ed. 2. 1. 1762, p. 646; l.c. ed. 3. 1764; Syst. Nat. ed. 12. 1767, p. 330; Miller, Gard. Dict. ed. 8. 1768, no. 6; Houttuyn, Nat. Hist. 2(8), 1777, p. 731; Murray, Syst. Veg. ed. 14, 1784, p. 448; Curtis's Bot. Mag. 1, 1787, tab. 29; Aiton, Hort. Kew. 2, 1789, p. 133; l.c. ed. 2. 3, 1811, p. 155; Moench, Meth. Pl. 1794, p. 58; Murray, l.c. ed. 15, 1798, p. 368; Desfontaines, Fl. Atlant. 1, 1798, p. 376; Willdenow, Sp. Pl. 2(2), 1800, p. 881; Lamarck et DC., Fl. Fr. ed. 3. 4. 1805, p. 727; Willdenow, Enum. Pl. Hort. Berol. 1, 1809, p. 500; Hornemann, Hort. Hafn. 2, 1825, p. 502; Sprengel, Syst. Veg. 2, 1825, p. 464; Duby, Bot. Gall. ed. 2, 1, 1828, p. 66; Reichenbach, Fl. Germ. 1830–32, p. 696; Link, Handb. 3. 1831, p. 323; Richt., Cod. 1835, p. 463; Rchb., Ic. Fl. Germ. 2, 1838, p. 22, tab. 99, f. 4444; Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 98; Walpers, Rep. 2, 1843,

p. 751; Grenier et Godron. Fl. Fr. 1. 1848. p. 188; Hausm., Fl. Tir. 1851, p. 104; Muell. Arg., Mon. Rés. 1857, p. 128, tab. 6, fig. 95 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boissier, Fl. Or. 1, 1867, p. 428; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 565; Lange in Willkomm et Lange, Prodr. Fl. Hisp. 3. 1880, p. 895; Battandier in Batt. et Trab., Fl. Alg. 1888-90, p. 84; Terracc. in Caruel. Fl. It. 10. 1894 (1893), p. 166; Rouy et Fouc., Fl. Fr. 2, 1895, p. 245; Post, Fl. Syr. Palest. Sin. 1896, p. 112; Durand et Barratte, Fl. Lib. Prodr. 1910, p. 26; Muschler, Man. Fl. Egypt 1. 1912, p. 440; Blatter, Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 48; Ramis, Bestimm. Fl. Aeg. 1929, p. 98; Pampanini, Prodr. Fl. Ciren. 1931, p. 235; Dinsmore in Post, l.c. ed. 2, 1, 1932, p. 138; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2. 17b, 1936, p. 690, f. 427c, 428d; Czerniak, in Komar., Fl. URSS 8, 1939, p. 610; Clapham et al., Fl. Br. Isl. ed. 2, 1962, p. 188; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348; Coode in Davis, Fl. Turk. 1. 1965, p. 501; Zohary, Fl. Palaest. 1. 1966, p. 334.

R. o. β suffrutescens Edwards in Bot. Reg. 3. 1817, tab. 227; Muell. Arg., Mon. Rés. 1857, p. 131 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 565; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 167.

R. o. s. a. integrifolia Terracc., l.c.

R. o. s. b. heterophylla Terracc., l.c.

R. o. s. c. digitato-pinnatifida Terracc., l.c.

R. o. s. d. inodora Terracc., l.c.

R. o. s. i. α subphyteuma Terracc., l.c.

R. o. s. i. αα macrocalyx Terracc., l.c.

R. o. s. e. grandiflora (hort. ex Vilm.) Terracc., l.c.

R. o. var. grandiflora hort. ex Vilm., Fl. Pl. Terr. ed. 2, 1866, p. 772.

R. o. f. pilosa O. Ktze, Rev. Gen. Pl. 3(2), 1898, p. 8.

R. neilgherrensis Muell. Arg. in Bot. Zeit. 14, 1856, p. 34; id., Mon. Rés. 1857, p. 131, tab. 6, fig. 96 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 564; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 690.

Annual or subperennial, erect to ascending or procumbent herb, 30(-80) cm; branching at base from a taproot.

Stems often numerous, branching, ribbed; pith disintegrating.

Leaves usually glabrescent, the proximal part of margins and petiole muricate, all entire or (some of) the upper leaves lobed, 3-partite or palmately incised, narrowly obovate, 5-7(-10) cm long, 1-1½ cm wide; margin ± pallid, sometimes denticulate, especially near base.

Flowers white, greenish or yellowish, fragrant. Raceme elongating up to 15 (-more) cm long in fruit, peduncle ribbed. Bracts persistent, just exceeding flower buds at top of raceme, glabrous, linear-ovate, 2½ mm long in flower, 4 mm long in fruit; margin widely pallid, sparsely denticulate. Pedicels markedly

ribbed, glabrous, in flower 5–6 mm long, in fruit up to 10 mm long, ± as long as the capsule, patent or curving downwards.

Sepals 6, persistent, (scarcely increasing in fruit), 3–4 mm long, 5 mm long and reflexed in fruit, oblong-obovate; margin narrowly pallid, denticulate.

Petals 3–5 mm long. Limb of superior petal 3-sect and lateral lobes deeply multipartite, appearing 9–14-partite, flabellate or rarely central lobe shorter than the adjacent laciniae of lateral lobes, as long as the appendage or longer, laciniae linear-spathulate obtuse; appendage obovate, up to 2 mm long, transverse rim continuous, 1/2 mm wide; margins ciliate. Lateral petals smaller, anterior lobe usually wanting. Anterior petal smallest, limb usually entire.

Disc 1/2 mm high, 2 1/2 mm wide, puberulous to velutinous; margin entire.

Stamens 20–25. Filaments deciduous, often scaberulous, 3 mm long. Anthers at least when young brick-red, oblong-ellipsoid, 1 1/2–2 mm long.

Ovary (ob-)ovoid, glabrous, obtusely 3-angled (ribs narrowly hyaline, scabridulous), 3(–4–5)-toothed, teeth ca. 1/4 as long as ovary. Ovules 7–11 in 2–3(–4) rows.

Capsule pendulous, stipitate, globular to broadly cylindric, 5–8(–11) mm long, 4–5 mm wide, glabrous, ribs often minutely scabrid, mouth slightly constricted below the teeth.

Seeds yellowish to dark-brown, ultimately black, glossy, reniform, almost 2 mm long. Sinus wide, filled with carunculoid tissue. Testa undulate-rugose, wrinkles blunt, usually continuous, outer layer tardily detached.

Caryology: Chromosomes $n = 6$ (reported by TISCHLER, Tab. biol. per. 1, 1931, p. 141; reported by OKSIJUK; identifications uncertain, no conserved herbarium specimen seen).

Type: '8c' *odorata* (LINN 629.28, holotype).

Distribution: Cosmopolitan, as an escape from cultivation. Wild ancestors presumably in the SE. Mediterranean region.

Key to the varieties

- Limb of superior petal flabellate. Stout erect herbs or subshrubs.
- **a. var. odorata**
- Central lobe of the limb of superior petal shorter than the adjacent laciniae.
- Slender ascending herbs. **b. var. neilgherrensis**

a. var. odorata

Stout erect herbs or subshrubs. Limb of superior petal flabellate. Disc puberulous.

Distribution: Area of the species.

b. var. neilgherrensis (MUELL. ARG.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda neilgherrensis* Muell. Arg. in Bot. Zeit. 14, 1856, p. 34.

In all characters similar to *R. odorata* var. *odorata* but easily distinguished by the slender and ascending habit, the yellowish colour of the petals, the central lobe of the limb of the superior petal being shorter than the adjacent lobes, the hairier disc and the smaller capsules.

Type: METZ 1119, 'Pl. Indiae or. (M. Nilagiri) Ed. R. F. HOHENACKER 1851', in montibus Nilagiri, *Reseda*, forsan n. sp. (holotype; C, HAL, L, W).

Distribution: Known from Nilagiri Mts and 'Kahublivhur' Hills, 200 m SE. Bombay; Deccan Peninsula.

Taxonomical notes: No indubitably wild specimen of *R. odorata* is known. Its closest ally was said to be *R. phyteuma*. *R. odorata* is different from *R. phyteuma* in that its sepals do not grow when the fruit ripens. In addition the filaments of *R. odorata* are slightly rough and (usually) not dilated in the upper half and the ovules are arranged irregularly on each placenta, the seeds are smaller than in *R. phyteuma*, and there is also its strong fragranciness, its brick-red anthers and, as a rule, a more erect habit when cultivated.

On the other hand, the variability in cultivated *R. odorata* and in wild or weedy *R. phyteuma* is so wide, that it appears almost impossible to indicate any character representing a constant difference. It is rather the correlation of the characters mentioned, which decides the difference between the two species, and it seems very possible that *R. odorata* is a direct descendant of *R. phyteuma*, which after many centuries of cultivation (selection, isolation, hybridization) acquired a measure of taxonomical stability.

The origin of *R. odorata* thus is, possibly, *R. phyteuma*, but we suggest a closer (experimental) study of *R. orientalis*. *R. phyteuma* is at any rate morphologically closely allied. As a weed it is a pretty, not aggressive plant, weakly fragrant, and it is easily grown and very widely spread. It would seem possible that in early times man let this non-aggressive weed keep a place in his plantings and gardens, and gradually promoted the more obviously scented (e.g. *R. phyteuma* var. *fragrans*; see notes sub *R. phyteuma*) and unusually pretty-flowered specimens.

BORNMÜLLER (in Verh. Zool. Bot. Ges. Wien 48, 1898, p. 558) stressed the point that a possible ancestor might be traced on account of fragrant flowers; this seems correct but many species of *Reseda* spread a scent (e.g. *R. alba*, *R. lutea*), especially when the temperature is raised suddenly. From a morphological point of view, fragrant *R. orientalis* (eastern Mediterranean) and non-fragrant *R. arabica* (Algeria-Iraq) may easily be supposed to have participated in the origin of *R. odorata*.

If *R. odorata* originated by selection and eventually by hybridization, a search for *R. odorata* as a wild plant would become superfluous. Nevertheless, escapes and untended populations under natural circumstances might produce additional facts in support of, or contradicting this view. Naturally, genetical trials and cytological research is urgently needed as a further step towards solving *R. odorata*'s origin.

ASCHERSON declared in 1910 (Naturwiss. Wochenschr. Neue Folge 9, p. 241) that the country of origin of *R. odorata* had been discovered. It appeared that TAUBERT had collected *R. odorata* in 1887 in Cyrenaica where it grew 'in a wild state' and certainly was 'indigenous'. ASCHERSON based his argument first of all on specimens collected by TAUBERT (in 1887) in the region of Derna (Wadi Derna, and Wadi Chalik-el-Tefesch). He refers to MUELLER ARG.'s identification (which proved to be correct) who was reported to be also of the opinion that the wild ancestor of *R. odorata* was now discovered.

ASCHERSON further stated that LINNAEUS mentioned *R. odorata* in 1759 (Syst. nat. ed. 10) for the first time, and ASCHERSON noted that 'certainly' *R. odorata* had not reached Uppsala till 1753. He overlooked J. HAARTMAN's lecture of Nov. 23, 1751, published in Amoen. Acad. 3, 1756, p. 51, who cited and described *Reseda odorata* among the 'hybrid plants' he studied under LINNAEUS's supervision, and who suggested *R. phyteuma* as possible origin for this fragrant *Reseda*. It is interesting to note that MILLER's Gard. Dict. of 1768 has 'Bastard-rocket' for *R. odorata*.

ASCHERSON reported an unedited note by MUELL. ARG. supporting the view that Tripolitania, Cyrenaica and Marmarica are the country of origin of *R. odorata*.

As regards the spreading in cultivation of *Reseda odorata*, ASCHERSON referred to specimens collected (1733-1737) by a physician, N. GRANGER, who sent a '*Reseda aegyptiaca odoratissima*' to Europe, and possibly described it in msc. (cf. HALLER, Enum. pl. hort. reg. Goett. 1753, p. 95; JUSSIEU, Gen. Pl. 1789, p. 340). SAUVAGES knew '*R. aeg. odor. GRANGER*' (Meth. fol. pl. flor. Monspel. 1751, p. 194) and also ZINN (Cat. pl. ag. hort. Goett. 1757, p. 123). Now ASCHERSON made it very probable that GRANGER visited the Derna region, and deduced that he might have collected seeds there and sent these to Europe by way of Egypt.

All may very well have happened in this way. There are, however, other considerations.

Fragrance will have been an inducement to direct attention to a *Reseda*; they are not obvious ornamentals. It is to be noted that *R. odorata* is common in the Libyan Wadi's round Derna, as stated by ASCHERSON. Repeatedly it was collected there after TAUBERT (and GRANGER). There are specimens available collected by VACCARI, SANDWITH, and quite recently by BOULOS. Other specimens are present from surrounding parts of Cyrenaica. Never once a collector noted that the flowers were fragrant, the very first character one notices when handling cultivated *R. odorata*. When comparing the comparatively small, half decumbent 'wild' specimens with the cultivated plants, the question can be raised why

these Derna specimens are not taken as escapes from cultivation, which lost their qualities as garden plants. GRANGER, it seems certain, sent very fragrant *R. odorata* to Europe (Paris), and may have obtained seeds in Egyptian gardens.

DUPARQUET, msc. 10 févr. 1871 (Herb. BOISSIER), noted: 'Quoique cette plante, très odorante, me semble se rapporter au *R. suaveolens* de nos jardins, et qu'elle croisse dans les terrains très arides, à l'E.S.E. du petit lac Ramleh, je n'ose la déclarer spontanée dans nos environs. On sait que beaucoup de botanistes assignent au *R. suaveolens* l'Egypte pour patrie, mais cela est discuté par d'autres qui prétendent que son pays natal nous est inconnu, comme celui du marronnier d'Inde (*Aesculus hippocastaneus*), du lilas (*Syringa* var. sp.) etc.

A mon avis cependant, je ne vois trop pourquoi le *R. suaveolens* ne serait pas originaire de la Basse Egypte, on est toujours fils de quelqu'un et il faut aussi bien être né quelque part. Pourquoi cette plante ne serait elle pas née ici? En tous cas je l'y ai trouvée, mais je n'affirme pas que sa graine, toutefois, ne serait échappée de quelque jardin.'

Concluding it seems safest to accept the Derna specimens of *R. odorata* as either naturalized or wild in that region and to presume that though they could have participated in the origin of cultivated *R. odorata*, they are, most probably, not the sole ancestor, if of ancestral stock at all. As was stated above, here is a clearly defined problem of promise for cytological and genetical research. Perhaps it is useful to recall GORI's remark in this respect that in root meristems of *R. odorata* instances of aneuploidy ($2n = 14$) were found (Caryologia 10(2), 1957, p. 401). *R. orientalis* was found to carry very fragrant flowers (odoratissimi) by HAUSSKNECHT, which deserves attention.

BOLLE refers to a 'most doubtful' statement concerning the use of *R. odorata* in wreaths of the dead in a cemetery near Fayum dating from the Roman emperors (1936, p. 678). He seems to derive his doubts from the fact that near Fayum *R. odorata* would be cultivated, at the time when the wreath components were discovered (\pm 1890). Why this would make its being used in wreaths there in the Roman period doubtful, is puzzling; its local cultivation rather strengthens the correctness of the discovery. All facts at present known, support the view that *R. odorata* comes from the SE. of the Mediterranean Basin, Egypt or an adjacent country. The changes in human taste in the 20th century (BOLLE rightly stressed this point, l.c., p. 678), which becomes more and more direct and superficial (no schooling or acquired refinement by mental training) and thus favours vision (colours) more and more instead of fragrance, caused a decline in the interest in *Reseda odorata* as a garden plant. As regards its spreading outside Europe, LOUREIRO stated in 1790 that he saw plants grown at Canton from seeds introduced from Europe (Fl. Cochinch. 1, 1790, p. 300; MERRILL, Transact. Amer. Phil. Soc. Philad. 24, 2, 1935, p. 267).

Reseda neilgherrensis Muell. Arg. (in Bot. Zeit. 14, 1856, p. 34) was entered in Index Kewensis as *R. nilgherrensis*, a misprint. In a footnote (Mon. Rés. 1857, p. 131) reference was made to the epithet '*nilagirica*', ascribed to WIGHT, Icon. pl. Ind. or. VI, no. 2047. This plate and text date from March 1853, but there no binomium is made as regards '*nilagirica*' which, in that event, would have

priority over '*neilgherrensis*'. Mr. G. BOELEMA drew our attention to WIGHT's introductory comments to no. 2047, obviously referred to by MUELL. ARG. WIGHT's remarks reflect the period in which they were made so nicely that we decided to quote them in full (cf. WIGHT, l.c., p. 25).

'- The naturalist prizes the honor of naming the subjects he has studied and is about to add to the Catalogues of Natural History - it is usually his only reward for his pains-taking labour - and, as the laborer is worthy of his hire, that credit ought not on any account, to be wrested from him, and still less when to be conferred, perhaps, on a person utterly incompetent either to examine or define, or what is about as bad, on one too idle or indifferent to do so for himself.

One other subject remains to be very briefly adverted to. Universal practice, among the British residents of India, has fixed the orthography of the name of the neighbouring range of mountains which is now always written Neilgherry. In conformity with this spelling I, in latinizing the word for the formation of specific names of plants, have merely altered the termination, writing it Neilgherrensis. The writers, however, of the German catalogues, above alluded to, apparently thinking themselves better acquainted than we are, with the pronunciation and orthography of English words, take upon themselves to correct us, and therefore write the word Nilagiry and Nilagiricus, and have even, in at least one instance, altered our orthography to make it suit their conceptions of what is right. Against this presumptuous liberty, I here enter my most unqualified protest. We make no attempts to soften or amend the orthography of their, to us, harsh and often almost unpronounceable language, and neither ought they to venture on the task of attempting to adapt our softer and more flexible tongue to their pronunciation. Nor ought we to tolerate such interference.-'

MUELLER (l.c.) based '*R. neilgherrensis*' on a single specimen, 'R. F. HOHENACKER Plant. exs. 1119 in hb. DC.!' This specimen was collected in the Neilgherry mountains in Eastern India (Pl. Metzianae, 1851).

MUELLER stated that *R. neilgherrensis* was very closely allied to *R. odorata* by the shape and size of the ovary and the seeds. Another close ally was '*R. macrosperma* RCHB.'. Only one specimen (holotype) was mentioned by MUELLER, both in 1857 (p. 133) and in 1868 (p. 565).

R. neilgherrensis MUELL. ARG. (Bot. Zeit. 14(3): 34. 1856), actually was first distinguished by TURCZANINOW (Bull. Soc. Imp. Moscou 27(2), 1854, p. 330) who declared that a specimen originating 'e Nilageri', viz. METZ no. 1119, appeared to be allied to *R. odorata* but seemed to be either a variety or a separate species. TURCZANINOW, however, did not publish a new name. MUELLER ARG., when publishing *R. neilgherrensis* referred to TURCZANINOW's earlier statement.

There is every reason to refer *R. neilgherrensis* to *R. odorata*, in spite of MUELLER's maintaining *R. neilgherrensis* in his subsequent revisions of 1857 and 1868. The characteristic large, hairy disc, the appearance of the filaments, the testa, the ovary, and the leaves, the shape of the petals, number of stamens, the seeds etc. are all within the limits for *R. odorata*. The Neilgherry material is, however, slightly aberrant in the ascending habit of the plant, the colour of the petals and the short central lobe of the limb of the superior petal. Although some geographical correlation with these latter characters may exist, they are of little significance and *R. neilgherrensis* should be maintained as a variety in *R.*

odorata at best. There is just as much reason to count or to reject *R. odorata* var. *neilgherrensis* among the possible ancestors of cultivated *R. odorata* as there is regarding the Derna specimens, discussed above, or e.g. the Cilicia specimens, collected by PÉRONIN, a close match to the Derna finds.

Ecological notes: *R. odorata* may be found as an escape (TILLET; 84240 BRNU) as it is often cultivated in temperate and subtropical regions in gardens. Its nectar is much appreciated by bees and their keepers. The flowers are sweetly scented ('*odorata*'). As an escape, it is found on various soils i.e. alluvial, dry clay (JAMES 2000; RSA) and it was recorded growing at 1300 m above sea-level ('Alp. Cottiarum', ROSTAN s.n.; L).

BAILEY (Stand. Cycl. Hort. 3, 1927, p. 2918) referred to the following garden cultivars of *R. odorata*: *arborea*, *ameliorata*, *compacta*, *eximia*, *gigantea*, *grandiflora*, *pyramidalis*, *multiflora*, *pumila*. CHITTENDEN (Dict. Gard. 3, 1951, p. 1751) refers to 'a shrubby form of *R. odorata*', both as '*Reseda frutescens*' and as '*Reseda odorata* var. *frutescens*'. In the Suppl. (l.c., 1956, p. 60) reference is made to *Crimson Giant*, *Giant Machet*, *Golden Machet*, *Red Monarch*. ENCKE (in PAREY, Blumengärtn. ed. 2, 1, 1958, p. 704) refers to '*Grandiflora Goliath*' and '*Machet Rubin*'. ASCHERSON heard (l.c. 1910, p. 242) of an 'Abart': '*meliorata*'.

The nomenclature and identity of these cultivars is uncertain. It is of interest to summarize the data concerning *R. odorata* β *suffrutescens* EDWARDS who reported in Bot. Register 3, 1817, tab. 227 on 'this well-known annual' which was made into a 'suffrutescent perennial' by appropriate treatment.

EDWARDS saw a msc. note in Sir JOSEPH BANKS's library, that Lord BATEMAN sent seed in 1742 from Paris to England. This plant was an annual (and could have been a descendant from GRANGER's import; see above).

BANKS obtained perennial plants from the continent, from where l'Abbé L'ARBALESTE at Liège sent word that the 'Tree-Mignonette' was 'no novelty in the continental gardens' but was 'produced at will'. The plant to become a shrub is placed in a garden-pot, a stick of about 2 feet long inserted by the side, to which it is tied as it advances in height, the leaves being occasionally stripped from the lower part, that a stem may be formed to the height required; the plant in the meantime is kept in some place where it can be protected from the effects of frost, by which means it is made to last for two or three years. As soon as the seed-vessels begin to ripen they are cut off.

EDWARDS further describes the capsules as 'full of small knots' and he mentions and pictures 3 stigma's.

Reseda odorata L. is reported as a fragrant garden plant grown in S. Africa (WATT and BREYER-BRANDWIJK, Med. Pois. Pl. S. and E. Africa ed. 2, 1962, p. 882). WATT and BREYER-BRANDWIJK also supplied the following data. The herb and the plant juice have been used as a 'resolvent' (DRAGENDORFF, Heilpfl. Völk. Zeit. 1898). The leaf, stem and root yield a rhodan compound. The herb contains salicylic acid and the ash 18% of SO₃. The flower contains 0,002%

of a solid volatile oil known as reseda flower oil and also a wax (WEHMER, Die Pflz.stoffe ed. 2, 1929–31, suppl. 1935). This volatile oil is probably identical with that isolated from the root (KOBERT, Lehrb. Intox. ed. 2, 1902–06). The root gives 0,014 to 0,035% of volatile oil known as reseda root oil, which is phenylethyl mustard oil $C_6H_5CH_2NCS$ released from a glucoside by the action of 'the ferment mycosin' (GRESHOFF in Med. Dep. Landbouw Buitenzorg 17, 1913, p. 51). Watery extracts of the leaf inhibit in a dilution below 1:20 *Mycobacterium tuberculosis* and extracts of the leaf and of the stem inhibit the growth of *Micrococcus pyogenes* var. *aureus* (FRISBEY et al. in Quart. Bull. Mich. Agric. Exp. Stat. 35, 1953, p. 392; KAREL and ROACH, Dict. Antibiosis, New York 1951), and this brings us again near PLINY's ancient report (cf. page 6–8, 30).

In S. France *R. odorata* is locally cultivated for the essential oil in its flowers (reseda flower-oil, perfume industry). The oil is distilled from fresh flowers by means of steam; the product is 0,002% of the weight of the flowers; if distilled with aetheric carbohydrates 0,003% may be obtained.

Seeds of *R. odorata* germinate readily, even when pallid or brownish (and appearing not quite ripened). Among the trials with seeds of *Resedaceae* from the wild, *R. odorata* (cultivated) germinated the quickest and at the highest percentage. The testa opens by a circular operculum (or at least by the detaching of a part of the testa having that shape), pushed from the inside by the top of the growing radicle. The cotyledons differ in size, the smaller escapes first from the testa. At the junction (base) of the cotyledons is a single dent, which on anatomical investigation might appear to consist of two equal parts. The cotyledons are green when appearing but the central part along the nerve is white, soon turning green also.

Vernacular names: France: *réséda*, *herbe d'Amour*, *herbe maure*; Germany: *Garten Reseda*; Great Britain: *mignonette*, *sweet reseda*, *bastard rocket* (MILLER, 1768); Italy: *miglionet*, *minoneta*, *amoretti d'egitto*, *melardina*, *amorino*; Netherlands: *welriekende reseda*; Portugal: *reseda de cheiro*; Spain: (Catalonia): *marduji*.

Specimens examined (escapes only):

Var. *odorata*

- Canada. Macoun 78285, Vancouver Isl., vicinity of Victoria.
Creta Isl. Dörfler 69, distr. Sphakia, Insel Gaudos, Karstboden bei Vathyana.
Cyprus Isl. Hardjan 639, Paphos; Kotschy 670, ad ?Potim ?Crisysathu.
Czechoslovakia. Cábera 214, Na Rybníčku v. Humpolci; Novak s.n., 12. ..., 1933, Praha, Zanrádky, na Cibulce, Pěstovaná; Pospisil 1508, Moravy, Prerovo Lopovice.
Denmark. Leth s.n., 8.X.1864, Sjaelland, Sørslev, NE. Kalundborg; Mortensen s.n., 26.IX.1885, Amager, Tommerup; Rostrup s.n., 16.IX.58, Ladigaavdiaam.
Egypt. Duparquet 441, 9 février 1871, entre le petit lac de Ramleh et les terrains incultes, Alexandrie Nord Est; Duparquet, Herb. Aeg. 310, 10 février 1871, terrains très arides à

l'E.S.E. du petit lac Ramleh.

France. Calberla s.n., 18.VII.49, Neuilly sur Seine; Tillet s.n., 14.VII.1878, Rhône, entre Villefranche sur Saône et Anse.

Germany. Beger s.n., IX.11, Dresden, auf Schutt an der Picardie; O. et R. Schulz s.n., 2.IX.1894, Berlin, im Reinickendorf verwildert; Stiefelhagen s.n., 14.IX.1898, Dresden; Theilung s.n., 20.IX.1905, Freiburg i/B, auf Schutt, verwildert.

Iraq. Graham 440, Jebel Sanam (poor specimen); Gillet 6528, Kut Liwa, Kut el-Imara, cult.; Lazar 3925, Baghdad, cult.

Italy. Behrendsen s.n., X.1871, Tirol, bei Meran; Rostan s.n., en 1880, 'Alp. Cottiarum'.

Lebanon. Hartmann s.n., I.1899, El Burdsch, bei Beirut.

Libya. Boulos Loutfy 1249, Derna; Maire et Weiller 130, Cyrenaica, supra Apolloniam; Pampanini 3175, *ibid.*, Martuba, SE Barce U. el-Bgar; *id.* 3179. *ibid.*, Umm er-Rzem, SE Barce U. esc-Suensia; Vacari 75, *ibid.*, Derna.

Netherlands. Borssum Waalkes 6100, Putten (Veluwe); Danser 3165, SE Bussum; Kloos s.n., 30.VI.1913, 17.VII.1914, Dordrecht; Rheno-Trajectini s.n., 17.VIII.1918, prov. Gelderland, Arnhem.

Rhodesia. Goldsmith 20/58, Shargani, Gwampa Forest Reserve.

Spain. Augustin s.n., 22.VI.1926, Figueras (Gerona); Bianor 1918, Baléares, Palma, carrières de Portopi.

Switzerland. Huber 1409, Kt. Tessin, Castagnola.

Turkey. Péronin 3, Cilicia, Anamour.

U.S.A. Burk s.n., 26.IX.74, Greenwich, Philadelphia; Blatchford s.n., 12.VIII.1875, Wisconsin, Lake Ieneva; Fosberg 8135, California, Los Angeles, Avalon, Santa Catalina; Martindale s.n., VIII, IX, 1878, New Jersey, Camden; Millspaugh 4914, California, Santa Catalina Isl., Descanso Canyon; Pollard s.n., 29.I.1956, *ibid.*, Santa Barbara County, Fox Canyon; Parker s.n., 27.VI.1878, New Jersey, Camden; Ross 2563, California, San Diego Co., Oceanside.

Var. neilgherrensis

India. Delessert s.n., II.1839, 'Kahublivhur'-hills, plateau des 'Gâtes occid.'; Metz no. 1119, Mt. Nilagiri, Ind. or., ed. Hohenacker 1851.

37. *Reseda oligomeroides* SCHINZ

Fig. 68

In Bull. Herb. Boiss. 3. 1895, p. 395; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 184; Perk. in Engl., Bot. Jahrb. 43, 1909, p. 416; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Cufod. in Bull. Jard. Bot. Brux. 24, Suppl., 1954, p. 160; Eloff. et Tayl. in Hubb. et Milne-Redh., Fl. Trop. E. Afr. 'Resedaceae' 1958, p. 5.

R. carmen-sylvae Volk. et Schweinf. in Ghika, Pays des Somalis 1898, p. 202; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1898 (1897), p. 181.

Low, glaucescent, papillose-scabrid, 50–100(–150) cm tall shrub.

Stem woody, closely and diffusely branching above, branches erect-spreading, stiff, densely leafy, papillose-scabrid (papillae generally conical), sharply ribbed; pith solid, very slender.

Leaves deeply tripartite, usually lateral lobes deeply forked (then the leaf

irregularly digitate), $3\frac{1}{2}$ –5 cm long, (papillose-)scabrid, finally \pm glabrate, lobes linear fleshy, with the petioles canaliculate, upper parts flatter, narrowly linear, terminal lobe longer than the (sub)opposite lateral, all longitudinally and irregularly wrinkled, \pm foveolate, acuminate; margin asperulous, axillary buds developing into numerous crowded leaves.

Flowers (pale) yellow, small, on short, erect pedicels. Raceme dense, rigid, 8–15 cm long in fruiting; peduncle densely papillose(-asperulous). Bracts deciduous, forming a tuft at the top of the raceme, linear-subulate, $3\frac{1}{2}$ mm long, acuminate, pale green; margin crenulate to denticulate. Pedicels rather thick, gradually thickened towards top, densely papillose-scabrid, 2 mm long in flower, 4–5 mm long in fruit, usually \pm appressed to the peduncle, $\frac{1}{2}$ as long as capsule.

Sepals 6, deciduous, minutely papillose to glabrate, oblong, 2 mm long, $\frac{1}{2}$ mm wide, obtuse; margins denticulate to serrulate.

Petals $2\frac{1}{2}$ –3 mm long, exserted. Limb of superior petal 3–5-palmatipartite, ca. equalling the appendage, central lobe exceeding the others; lobes linear, appendage obovate-triangular, $1\frac{1}{4}$ mm long, $1\frac{1}{2}$ mm wide, transverse rim interrupted at middle in front of limb-base, narrow; margins densely papillose-ciliate. Lateral and anterior petals progressively shorter, limbs entire.

Disc $\frac{1}{2}$ mm high, $1\frac{1}{2}$ mm wide, glabrous, margin slightly recurved, papillose.

Stamens ca. 14, longer than petals. Filaments deciduous, often dilated above middle, $2\frac{1}{2}$ mm long. Anthers ovate, $1\frac{1}{3}$ mm long, asperulous.

Ovary (ob)ovoid-cylindric, short-stipitate, glabrous, obtusely 3-angled (ribs scabridulous), 3-toothed. Ovules ca. 12 on each placenta, in 3–4 irregular rows.

Capsule erect, stipitate, oblong-cylindric, ca. 10 mm long, 4 mm wide, glabrous, side walls sulcate, mouth slightly contracted, \pm truncate, teeth minute.

Seeds black, glossy, globular-reniform, 1 mm long. Sinus narrow, a minute protuberance opposite the radicle. Testa closely tuberculate.

Type: Prof. KELLER 52, Somaliland, Tujusteppe (G).

Distribution: Somali Republic, Kenya, and Ethiopia.

Taxonomical notes: SCHINZ (in Bull. Herb. Boiss. 3, 1895, p. 397) based *R. oligomeroides* on a specimen from Somaliland 'Tujusteppe, 1891, Prof. KELLER, 52'. The specific epithet refers to the finely dissected leaves for which reason the plant resembles *Oligomeris*.

ELFFERS and TAYLOR described the seeds as 'smooth' (FTEA, fasc. Reseda-ceae, 1958) which is an inaccuracy possibly due to lack of sufficient magnification.

G. SCHWEINFURTH and G. VOLKENS based '*R. carmen-sylvae*' on a specimen collected by Prince NICOLAS D. GHIKA in Birka Region, in moist places in Somalia (in GHIKA, Pays Somal. 1898, p. 202). They added that the plant was

flowering and fruiting in December. SCHWEINFURTH and VOLKENS declared that *R. carmen-sylvae* was allied to *R. amblycarpa* FRESEN. and *R. stenostachya* BOISS. They added that their species was the same as the plant of the 'celebrated KELLER', first collected in 1891, during the journey he made with Prince RUSPOLI; possibly this is a reference to the type specimen of *R. oligomeroides*. PERKINS (l.c.) reduced *R. carmen-sylvae* to the synonymy of this latter species.

Ecological notes: HEMMING (2205; PRE) collected *R. oligomeroides* at Hargeisa at 1310 m alt. on the grounds of the Desert Locust Survey Base. The climax vegetation is *Acacia etbaica* and there is a perennial cover of *Chrysopogon aucheri* (rainfall 435 mm annually). It bore fruit in October. The area consists of eroded limestone slopes with a very poor cover of ungrazed species (*Aloë*, *Hypoëstes*). The specimens branch irregularly and become \pm 70 cm tall.

J. J. F. E. DE WILDE (7202; WAG) found *R. oligomeroides* 98 km SE. of Jijiga, along road to Degahabur, at 1500 m alt., in flat, very slightly rolling country, in open *Acacia*-tree and -shrub vegetation, in an open grass cover. Anthers cream-coloured to very pale brown. Flowers not fragrant (Oct. 3, 1970).

A specimen collected by Mrs. WHITE, on 10.3.1953 (no. 84; PRE) in Somalia (Hargeisa distr.) at 1200 m alt. showed in one of the anterior petals a change towards a stamen having laterally a developed anther containing apparently perfect pollen.

Specimens examined:

Ethiopia. De Wilde 7202, 98 km SE. of Jijiga, along road to Degahabur, alt. 1500 m.

Kenya. Mrs. Adamson B3576, Lake Rudolf, 200 yd from the shore on lava, 1200 ft.

Somalia. Bally 10002, 2-3 miles E. of Beder Wanak; id. 11863, hills between Busten and Behindulla; Godman 4, upper Sheikh, 4700 ft; Hemming 2205, prov. Hargeisa; Prof. Keller 52, Tujesteppe; Mrs. White 84, *ibid.*

38. *Reseda orientalis* (MUELLER ARGOVIENSIS) BOISSIER

Fig. 69

Fl. Or. 1, 1867, p. 427; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 562; Post, Fl. Syr. Palest. Sin. 1896, p. 112; Dinsm. in Post, l.c. ed. 2, 1, 1932, p. 138; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Täckh., Stud. Fl. Egypt 1956, p. 332; Yeo in Tutin et al., Fl. Eur. 1, p. 348; Coode in Davis, Fl. Turk. 1, 1965, p. 501; Zohary, Fl. Palaest. 1, 1966, p. 334, tab. 487.

R. macrosperma Rchb. γ *orientalis* Muell. Arg., Mon. Rés. 1857, p. 135 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858).

Annual, decumbent to ascending, more or less canescent, 20–35 cm tall, branching from a long, slender taproot.

Stems usually numerous, often branching from base, leafy, pilose to papillose-scabrid, delicately ribbed; pith disintegrating.

Leaves pilose to scabrid or almost glabrous (canescent), partly entire, (stem leaves) trisect or pinnatifid (very rarely lateral lobe bifid). Basal leaves entire, often rosetted, narrow, obovate to spatulate long attenuate towards base, 3–4(–6) cm long, ca. 6 mm wide, usually obtuse. Stem leaves 3–7 cm long, cuneate towards base, terminal lobe longer and larger than lateral lobes; margins narrowly pallid, more or less ciliate.

Flowers white, fragrant (fide EIG). Raceme elongating, up to 13 cm long. Flowers gradually spreading and turning downwards after anthesis; peduncles markedly ribbed. Bracts persistent, not exceeding flower-buds, scabrid, linear, 4 mm long, $\frac{1}{3}$ mm wide, margins \pm pallid, scabrid. Pedicels markedly ribbed, in flower 6–8 mm long, in fruit curved downwards, up to 15 mm long.

Sepals 6, persistent, reflexed in fruit, scabrous, oblong, $3\frac{1}{2}$ mm long, $\frac{1}{2}$ –1 mm wide, obtuse to acute; margin narrowly pallid, scabrid.

Petals 3–4 mm long. Limb of superior petal appearing 9–13-partite (sometimes obscurely 3-sect and lateral lobes multipartite), more or less exceeding the appendage, central lobe shorter than adjacent laciniae of lateral lobes, acicular or linear, fleshier than the other laciniae. Lateral lobe deeply 4–6-partite or -sect, laciniae linear-obovate. Appendage obovate-quadrangular, $1\frac{3}{4}$ mm long, $1\frac{1}{2}$ mm wide, transverse rim continuous, $\frac{1}{2}$ mm wide, sometimes with long clavate hairs. Lateral petal smaller, anterior lobe missing, lobes and incisions similar to those of superior petal. Anterior petal smallest, limb entire, linear-spathulate, obtuse.

Disc 1 mm high, $2\frac{1}{2}$ mm wide, velutinous; margin recurved, entire, \pm ciliate.

Stamens 15–16 (rarely 10). Filaments deciduous, glabrous, dilated beneath the anthers, $3\frac{1}{2}$ mm long. Anthers ellipsoid, 1 mm long.

Ovary ellipsoid-obovoid, rather long and thick stipitate, ribs scabrid, 3-toothed, teeth long, $\frac{1}{3}$ as long as the ovary. Ovules 7–9 per placenta in 2(–3) rows.

Capsule pendulous, cylindric(-obovoid), and abruptly narrowing towards its base, often stipe visible above the disc, (8–)10–12(–18) mm long, 6 mm wide; ribs scabrid, walls glabrous, reticulate, mouth slightly constricted beneath teeth, widely gaping.

Seeds greyish red-brown, dullish, reniform, 2(–3) mm long. Sinus wide, filled with carunculoid tissue. Testa undulate-rugose, wrinkles blunt, outer layer tardily detached.

Type: BOISSIER, April 1846, Palaestina, pr. Gaza (G, lectotype; NY, UPS, isotypes).

Distribution: Eastern region of the Mediterranean: S. Turkey, Lebanon, Syria, Palestine and Cyprus.

Taxonomical notes: BOISSIER (Fl. Or. 1, 1867, p. 427) raised the variety *Reseda macrosperma* RCHB. var. *orientalis* MUELL. ARG. to the rank of a species: *R. orientalis*, citing the following specimens: 'Boiss! KY. exs. 124!, Bové exs. 462!', and 'GAILL!'. MUELLER (Mon. Rés. 1875, p. 135) based the variety on the same specimens cited by BOISSIER except that of KOTSCHY.

BOISSIER's citation (l.c.) 'KY. exs. 124!', presumably meant to refer to 'KOTSCHY, Iter Syriacum 1855, Plantae ex Palestine 424, *Reseda macrosperma* REICHENB. var. *orientalis* MÜLLER' which was stated to be frequent on the edges of cultivated fields between Gazah and Ramlah (UPS). BOISSIER further referred to 'Bové exs. 462!', presumably meaning Bové 463 (317869, W). The GAILLARDOT specimen was collected on 'sables ferrugineux au sud de Bayrouth'.

Ecological notes: In Palestine, FEINBRUN, ZOHARY and ZOLTSCHANSKY collected *R. orientalis* at Ramath-Gan near Tel-Aviv (no. 56; AMD, BAS, BRNU, C, CAIM, etc.). On the label A. EIG noted: 'This *Reseda* is a fragrant plant, as was already stated by J. BORNMÜLLER (1898) ... Till now, it is known only from the light-soil belt of the coastal plain, from Gaza to Beirut. It grows here exclusively in the sandy fields and on the sandstone hills.'

MEYER and DINSMORE observed it near Jaffa (no. 7331; F) flowering and fruiting at the beginning of March at sealevel in vineyards. DINSMORE found it near Haifa fruiting at the end of November (no. 1331; L.).

HAUSSKNECHT noted in msc. (Herb. BOISS.) a 'forma *hyemalis*' along the roads towards Beyrouth with very fragrant flowers (no. 138).

It grows in the mountains of Cyprus (SINTENIS et RIGO 39; FR, LD, WRSL, WU). In Fl. Pal. the area of distribution is outlined: 'Acco Plain, Sharon Plain, Philistean Plain, N. Negev' (p. 334).

In the botanical garden of Geneva, seeds sent from Beyrouth by BLANCHE in Sept. 1888 produced *R. orientalis*; it was noted: 'fl. odorati fere ut in *R. odorata*.'

Specimens examined:

Cyprus. Haradjian 243, env. de Rizokarpaso; Lindberg s.n., 11.VI.1939, distr. Kyrenia, Boghazi ad opp. Kyrenia; Sintenis 39, 8.III.1880, Larnaka bei Mavrosphilos; id. 39, 20.IV.1880, Carpass prope Arthana; Sintenis et Rigo 39, 20.IV.1880, Fulduw bei Arthana, i/ Carpass; id. 39, V.1880, pr. Kythraea.

Lebanon. Gaillardot 888, 'Berythum'; Haussknecht s.n., XII. 1866, Beyrouth.

Palestine. Boissier s.n., IV.1846, Gaza; Bornmüller 121, Jaffa; Bové 463, *ibid*; Dinsmore 1331, Haifa; Feinbrun, 21.III.1952, Sharon Plain, Beit. Lid; Feinbrun c.s. 56, Ramath-Gan, near Tel-Aviv; Kotschy 424, inter Gaza et Ramlah; Meyer et Dinsmore 7331, 28.I.1910, 3.III.1911, Saronia; id. 7331, 3.III.1911, Jaffa; Samuelsson 778, Judea, opp. Jaffa. Ramath-Gan; Shabetai Z3663, Khan Junis; Simon 28, ?Rikavbovan, bei Newi Shimon.

Syria. Reese s.n., 19.V.1933, S. Banyas, between Laltoquio and Tripoli.

Turkey. Péronin 3, Cilicia, près Anamour.

Sp. Pl. 1, 1753, p. 449; id., Syst. Nat. ed. 10, 2, 1759, p. 1046; id., Sp. Pl. ed. 2, 1762, et ed. 3, 1764, p. 645; id., Syst. Nat. ed. 12, 1767, p. 330; Mill., Gard. Dict. 1768, ed. 8, no. 3; Houtt., Nat. Hist. 2(8), 1777, p. 731; Murr., Syst. Veg. ed. 14, 1784, p. 448; Moench, Meth. Pl. 1794, p. 58; Murr., l.c. ed. 15, 1798, p. 368; Willd., Sp. Pl. 2, 1800 (1879), p. 880; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 727; Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 500; Hornem., Hort. Hafn. 2, 1815, p. 502; St. Amans, Fl. Agen. 1821, p. 188; Spreng., Syst. Veg. 2, 1825, p. 464; Duby, Bot. Gall. ed. 2, 1, 1828, p. 66; Ten., Fl. Neap. 4, 1830, p. 256; Rchb., Fl. Germ. 1830–32, p. 696; Link, Handb. 3, 1831, p. 323; Richt., Cod. 1835, p. 463; Rchb., l.c. Fl. Germ. 2, 1838, p. 22, tab. 99, fig. 4443; Spach, Hist. Nat. Vég. Phan. 7, 1839, p. 99; Boiss., Voy. Bot. Esp. 2, 1839–45, p. 77; Bertol., Fl. It. 5, 1842, p. 33; Ledeb., Fl. Ross. 1, 1842, p. 235; Griseb., Spic. Fl. Rum. Bithyn. 1, 1843, p. 241; Walp., Rep. 2, 1843, p. 742; Gren. et Godr., Fl. Fr. 1, 1848, p. 187; Lecoq et Lamotte, Cat. rais. Pl. Centr. Fr. 1847, p. 89; Hausm., Fl. Tirol 1851, p. 104; Vis., Fl. Dalm. 3, 1852, p. 94; Muell. Arg., Mon. Rés. 1857, p. 135, tab. 7, fig. 98 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 427; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 563; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 894; Batt. in Batt. et Trab., Fl. Alg. 1888–90, p. 84; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 168; Rouy et Fouc., Fl. Fr. 2, 1895, p. 243; Coste, Fl. Fr. 1, 1901, p. 160; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 184; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 124; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 316; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 690, fig. 428e, 431a–d; Claph. in Claph. et al., Fl. Br. Isl. 1952, p. 239; Roles in Claph. et al., Fl. Br. Isl. Ill. 1957, tab. 63, fig. 248; Claph. in Claph. et al., Fl. Br. Isl. ed. 2, 1962, p. 188; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 441, tab. 38, fig. 1229; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348; Coode in Davis, Fl. Turk. 1, 1965, p. 501, fig. 20(15–16).

R. p. β L., Sp. Pl. 1, 1753, p. 450, et ed. 2, 1762, p. 646.

R. p. γ L., ll.cc. (= var. *integrifolia*).

R. p. γ *fragrans* Texid., Apunt. 1869, p. 21; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 895.

R. p. δ *integrifolia* Texid., l.c.; Lange, l.c.; Rouy et Fouc., Fl. Fr. 2, 1895, p. 244 (= var. *integrifolia*).

R. p. β *rupestris* Lange, l.c.

R. p. β *confusa* (Pomel) Batt. in Batt. et Trab., Fl. Alg. 1888–90, p. 84; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 184.

R. p. α *vulgaris* Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 169.

R. p. v. a. *undulatifolia* Terracc., l.c.

R. p. v. b. *latisepala* Terracc., l.c.

R. p. v. c. *microsepala* Terracc., l.c.

R. p. β *ligustica* Terracc., l.c.; Rouy et Fouc., Fl. Fr. 2, 1895, p. 245, 'forme *R. ligustica*'.

- R. p. l. β gracilis* Rouy et Fouc., l.c.
R. p. γ glaucescens Terracc., l.c.
R. p. β undulata Rouy et Fouc., l.c., p. 244.
R. p. γ platysepala Rouy et Fouc., l.c.
R. p. δ microsepala (Terracc.) Rouy et Fouc., l.c.
R. p. forme aragonensis (Loscós et Pardo) Rouy et Fouc., l.c., 'forme *R. aragonensis*'.
R. p. ssp. eu-phyteuma Maire in Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 316; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 441.
R. p. ssp. collina (J. Gay) Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 184; Jah. et Maire, l.c.; Quéz. et Santa, l.c.
R. calicinalis Lam., Fl. Fr. 3, 1778, p. 204.
R. tournefortii Schult., Obs. Bot. 1809, p. 89.
R. collina J. Gay in Expl. Sc. Alg. Bot. 1846–47, tab. 71, fig. 2; Muell. Arg. in Bot. Zeit. 14, 1856, p. 34; id., Mon. Rés. 1857, p. 127, tab. 6, fig. 94 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 564; Batt. in Batt. et Trab., Fl. Alg. 1888–90, p. 84; Senn. et Maur., Cat. Fl. Rif. Or. 1933, p. 11.
R. aragonensis Loscós et Pardo, Ser. Inconf. 1863, p. 14; id., Ser. Imperf. 1866, p. 51.
R. confusa Pomel, Nouv. Mat. Fl. alt. 1875 (1874), p. 224.
Pectanisia Rafin., Fl. Tell. 3, 1837 (1836), p. 73, pro genere; Merrill, Ind. Rafin. 1949, p. 132, pro gen.
P. phyteuma Rafin., l.c.; Merrill, l.c.

Annual or perennial, ascending or nearly erect, often glaucous herb, (10–) 20–30(–40) cm tall, branching from a (slender) taproot.

Stems numerous, laxly branching, leafy, often scabrid or hirtellous, pith disintegrating.

Leaves chartaceous to fleshy, light green to glaucous, glabrous or sometimes ± scabrid, all entire, or partly lobed, long attenuate towards base. Radical and lower leaves entire, spatulate, 3–6(–8) cm long, 1(–2) cm wide, broadly obtuse. Upper leaves often variously incised. Foliar lobes unequal and blunt, terminal lobe longer, obovate to ± elliptic, lateral lobes narrowly oblong. Margin pallid-edged, coarsely denticulate.

Flowers white. Raceme up to 20(–40) cm in fruit; peduncle sometimes ± scabrid. Bracts persistent, not exceeding flower buds, scaberulous, oblong, 2 mm long, $\frac{3}{4}$ mm wide; margin hyaline, denticulate. Pedicels ribbed, sometimes ± scabrid, in flower 3–4(–6) mm long, gradually reflexed during ripening of fruit, in fruit 5–8(–10) mm long.

Sepals 6, persistent, accrescent, glaucous, sometimes sparsely scabrid, oblong, sometimes ± falcate, 5 mm long, 1 mm wide in flower, up to 8(–more) mm long in fruit, top rounded; margins hyaline, smooth to scabrid.

Petals $3\frac{1}{2}$ (–5) mm long. Limb of superior petal appearing 9–19-partite

(3-sect, lateral lobes multipartite and longer than the central lobe), twice as long as the appendage or longer. Central lobe short, narrowly ligulate; lateral lobe (4-)5(-9)-partite, laciniae similar to central lobe. Appendage obovate or nearly quadrangular, $1\frac{1}{2}$ (-2) mm long, $1(-1\frac{1}{2})$ mm wide. transverse rim wide, continuous in front of limb-base; margins densely and coarsely ciliate. Lateral petal smaller, lacinia and incisions similar (but irregular) to superior petal. Anterior petal smaller, very often limb simple, linear(-spathulate).

Disc $\frac{1}{2}$ mm high, $\frac{3}{4}$ mm wide, papillose-hirtellous; margin hyaline, recurved, crenulate.

Stamens 16-20. Filaments deciduous, glabrous, ca. filiform or widened above middle, $3(-3\frac{1}{2})$ mm long. Anthers ellipsoid-oblong, 1 mm long.

Ovary ellipsoid, rather long stipitate, walls glabrous, obtusely 3-angled (ribs acute, minutely scabrid), 3(-4)-toothed, teeth ca. $\frac{1}{4}$ as long as ovary. Ovules (6-)8(-10), in 3 rows.

Capsule nodding, (sub)stipitate, ovoid-cylindrical to -globose, 12-15(-20) mm long, 6-8(-10) mm wide, acutely 3-angled, edges \pm smooth, mouth slightly or not constricted below teeth, widely gaping.

Seeds greyish to yellow dark-brown, dull, reniform, ca. 2 mm long. Sinus wide, filled with carunculoid tissue. Testa undulate-rugose, outer layer tardily detached.

Type: '8 *Phyteuma*' (LINN 629.21).

Distribution: N. and S. of the western and central Mediterranean; S. Europe.

Key to the infraspecific taxa

1. Laciniae of superior petals linear, the lateral ones often dichotomous in upper half. Leaves entire or partly trifid. Capsules ovoid-cylindric. **a. ssp. phyteuma**
2. Leaves partly trifid. **a1. var. phyteuma**
2. Leaves all entire. **a2. var. integrifolia**
1. Laciniae of superior petals slightly widening in the upper half, not dichotomous. Leaves (the upper ones) usually digitate; petioles winged. Capsules ovoid-subglobose. Seeds with terminal carunculoid tissue. **b. ssp. collina**

a. ssp. phyteuma

Leaves partly trifid or entire and spathulate; blades not decurrent till the leaf-base. Limb of superior petals narrowly attached to the appendage; lobes linear, laciniae of the lateral lobes usually furcate. Capsules ovoid-cylindric.

Crest of wrinkles of the testa usually sharp.

Distribution: Area of the species.

a1. var. phyteuma

Leaves partly trifid.

Distribution: Area of the species.

a2. var. integrifolia TEXIDOR, Apunt. 1869, p. 21.

Leaves all entire.

Type: To be appointed from specimens collected near Olot (Catalonia), leg.? TEXIDOR.

Distribution: Area of the species.

b. ssp. collina (J. GAY) DURAND et SCHINZ, Consp. Fl. Afr. 1(2), 1897, p. 184.

Leaves (upper ones) often digitate; blades decurrent up to leaf-base (petiole winged). Limb of superior petals broadly attached to appendage; lacinae widening in upper half, of lateral lobe of superior petal never furcate. Capsules ovoid-subglobose. Crest of wrinkles of testa blunt.

Type: Tab. 71, fig. 2, '*Reseda collina* J. GAY', Expl. Sc. Alg. Bot. 1846-47.

Distribution: Algeria, Morocco and Spain.

Taxonomical notes: DIOSCORIDES refers to '*Φυτεύμα*'; a picture accompanies his notes. It is impossible to interpret these data with any certainty but, judging on a general impression of the picture, it is not unlikely to represent *R. phyteuma*. Drawn in a rough outline, but with a correctly represented habit (rosetted, narrow, incised or wavy leaves, ascendent stems, terminal plump, rough inflorescence) it is not contradictory to an identification as *R. phyteuma*, and even slightly supports this view although other possibilities cannot be entirely excluded. This view would imply that *R. phyteuma* was an ingredient in love philtres in early Greece and Asia minor. MAGNOL (Bot. Monsp. 1686, p. 204) referred *Phyteuma* to the affinity of '*Reseda*'.

'*Resedae affinis Phyteuma Monspeliensium Parkins.* Herbal. 823 cum ic.

rud. (1640)' was cited by MUELL. ARG. (Mon. Rés. 1857, p. 135). PARKINSON pictured *R. affinis Phyteuma Monspeliensium* 'Loves plant of Mompelier' and described it on p. 822 and 823. It is one of the species that grow on the 'Pyrenaeen hills and about Mompelier'. '*Reseda* in *Latine a sedandis doloribus collectiones et inflammationes discutere nomen traxit*: for it hath no Greeke name that I know: yet is thought by most to be that *Reseda* of *Pliny* which he saith grew about *Ariminum*, for as *Camerarius in horto* saith, both the two former sorts grow there now frequently'.

MAGNOL (Bot. monsp. 1686, p. 221) found *Phyteuma monspeliensium* 'frequent' in olive gardens near Montpellier. He supports LOBELIUS who remarked that *Phyteuma* varied as to its leaves according to the humidity of the soil and the amount of sunshine.

LINNAEUS based *R. phyteuma* L. only on literature references, while distinguishing 3 taxa within the species (Sp. Pl. 1, 1753, p. 449). He previously gave a description in Hortus Upsaliensis (1748, p. 150), and quoted the name '*Phyteuma*' as it had been used by J. BAUHIN (1651).

A specimen in the Linnean Herbarium (629.21) is accompanied by '8 *Phyteuma*' in LINNAEUS's handwriting and is designated as the type, although there is no certain evidence that it served as a basis when publishing the name *Reseda phyteuma* L. (1753). There are 2 specimens marked HU (629.22 and 629.23) and so originating from Hortus Upsaliensis. They are less eligible as type material because LINNAEUS did not name them. Probably they were added after the publication of Species Plantarum (1753).

LAMARCK did not cite any specimen for *Reseda calicinalis* (Fl. Fr. 3, 1778, p. 204). He quoted in syn. *R. phyteuma* L. vars. β and γ .

He further stated that the species was found in sandy soils in fields. The fragrant *Reseda* cultivated in gardens was different from *R. calicinalis* by its small and very short calyx, by its brick-red anthers and by its very glabrous stems and peduncles.

From LINNAEUS's descriptions (Sp. Pl. 1753, 1762 & 1764) it appears that LINNAEUS distinguished specimens of *R. phyteuma* with less deeply incised leaves (var. β) or entire leaves (var. γ) as varieties. The LAMARCK herbarium in Paris may contain a type of *R. calicinalis*.

SCHULTES's protologue (Obs. Bot. 1809, p. 89) for '*Reseda tournefortii*' is as follows: -*Reseda tournefortii*: caule simplici, foliis integris cuneiformibus, calycum maximorum laciniis lanceolatis obtusis. (Caules foliaque glabri).-

MUELLER (Mon. Rés. 1857, p. 136, and in DC., Prodr. 16(2), 1868, p. 564) cited *R. tournefortii* in the synonymy of *R. phyteuma* L. There is nothing in the protologue nor any other information which might lead to doubt MUELLER's decision.

As no specimen came to hand which could be believed to have been described by SCHULTES, it was decided to designate the specimen named '*Reseda tournefortii* ZEYHER' (W à 1889 No. 309714) as a neotype.

Index Kewensis (2, 1895, p. 697) and MUELLER (ll.cc.) cited the name with 2 terminal i's, which is in accordance with the Code.

R. collina J. GAY is a legitimate name, being based on a figure accompanied by analytic drawings (Expl. Sc. Alg. Bot. 1846–47, tab. 71, fig. 2).

In 1856 MUELLER described *R. collina* (in Bot. Zeit. 14, p. 34) and cited some specimens (BALANSA 202, REUTER, MUNBY in Herb. BOISS. et DC.) but there is no evidence that he saw any specimen serving as a base for GAY's earlier published figure.

MAIRE (in JAHANDIEZ et MAIRE, Cat. Pl. Mar. 2, 1932, p. 316) published the name *R. phyteuma* ssp. *collina* (GAY) BATT. It would seem that they based this on BATTANDIER in BATT. et TRAB., Fl. Alg. 1888–90, p. 84, where *R. collina* GAY is placed aside *R. phyteuma* and the description of the former is given in smaller print. This may have caused JAHANDIEZ et MAIRE to assume that BATTANDIER wished to reduce *R. collina* to *R. phyteuma* (as a subspecies) but the intention of BATTANDIER was only to indicate a close affinity between the two species of which he judged *R. phyteuma* the more important. A careful reading proves BATTANDIER's interpretation to be correct. The name *R. phyteuma* ssp. *collina* (J. GAY) BATT. was also adopted by QUÉZEL and SANTA (Nouv. Fl. Alg. 1, 1962, p. 441). It seems that MAIRE and QUÉZEL et SANTA (Il. cc.) overlooked the correct combination made by DURAND et SCHINZ (Consp. Fl. Afr. 1(2), 1897, p. 184) in this connection.

Reseda aragonensis LOSCOS et PARDO was published in Ser. Inconf. Pl. Ind. Aragon. 1863, p. 14. It is to be noted that *R. aragonensis* LOSCOS et PARDO was listed in Index Kewensis (2, 1895, p. 696), with reference to 'Ser. Imperf. 51', a Spanish work published in 1866–67, where the name *R. aragonensis* (1866, p. 51) was accompanied by some finding localities, and the statement that it was biennial and flowering in all seasons. The Spanish 'Serie Imperfecta' was published as a 'segunda edicion', to an earlier (Latin) edition (curante WILLKOMM) in 1863, titled 'Series Inconfecta'. The here designated type of *R. aragonensis* LOSCOS et PARDO is FRANC. LOSCOS, Junio-Sept. 1863, Aragonia austr., circa Castelseras, no. 71 (UPS; isotype W).

POMEL described *R. confusa* (Nouv. Mat. Fl. Atl. 1875 (1874) p. 224). The description is insufficient to decide on the identity of *R. confusa*, which was already suggested by the epithet. The type could not be traced and in the absence of an authentic specimen it seems best to refer *R. confusa* to *R. phyteuma*. The type locality is 'Terrains de Sebkha, Saint-Louis près d'Oran, Télamine'. BATTANDIER reduced *R. confusa* POMEL to the synonymy (*R. phyteuma* L. β *confusa* (POMEL) BATT.; cf. BATT. in BATT. et TRAB., Fl. Alg. 1888–90, p. 84), so also did DURAND et SCHINZ (Consp. Fl. Afr. 1(2), 1897, p. 184), but under the circumstances there is no evidence supporting the view that a variety is at hand.

Pectanisia phyteuma RAFIN.: See taxonomical notes sub *Reseda*.

Ecological notes: *R. phyteuma* is usually an annual ascending herb but occasionally may occur as a biennial or perennial and develop a subliguous taproot. In the first year the root is whitish with a pallid violet-grey hue. The

stems are as a rule ascending but may also be erect; the leaves may become large and herbaceous on fertile soils or remain much smaller and somewhat crisped on poor soils.

The sepals are covered by a wide-celled epidermis and carry scattered, hyaline, triangular, wart-like, minute dents. Similar dents are found on the edges of the ovary.

When botanizing in NE. Spain, DE WIT noted: 'The petals are white; the flowers produce a usually very faint, somewhat fetid, rather unpleasant smell. The orange-brown stamens are closely packed and curved downwards when the bud opens. In the following days some filaments turn upwards, gradually followed by other filaments. The anther splits lengthwise, while the yellow pollen escapes.

The fleshy, grey or purple light-margined disc on the marginal zone bears a dense mass of short, whitish capitate hairs. On its lower surface an abundance of sweet nectar is secreted.

In the young flower the ovary appears to be closed (on its top, the edges of the carpels are showing as 3 lines running from the centre to the tip of the teeth) but soon after fertilization the top splits as the edges of each carpel draw back and the development of fruits begins. The stigma's are the very tips of the 3 teeth of the ovary. The young fruit is directed upwards but the pedicel curves after a few days and the fruit then hangs'.

R. phyteuma occurs all over central and southern Europe (east to Hungary), and in the western mediterranean region of northern Africa. It may be found in flower all through the spring and summer, but sometimes flowers in October (France, Ain dept.) or even December or January (France, Villefranche, leg. DORGELO; L).

Usually it is observed as a weed in e.g. abandoned fields, vineyards, on roadsides and uncultivated grounds, along rice-fields (Camargue) or in the Colosseum at Rome. It was placed in the '*Onopordetum illyrici*' (by LEEUWENBERG, 1287, France, Jura mts; U) or in the '*Thero-Brachypodion*' (by BARKMAN, 3755, France, Montpellier; L). It grew on a wall at Nagd near Riva (Italy) associated with *Sedum villosum*, *Asplenium ruta-muraria*, *Ceterach officinarum* and *Scrophularia canina* (VAN STEENIS s.n.; L). Very often it was collected in the 'garigue herbeuse' but it is also common in the puszta's of the Budapest district or in other steppe-like plant-covers or pastures.

A wide range of mother-rock and soils serve for growing localities but there seems to be a preference for calcareous soils, e.g. near Montpellier, Malaga, the Jura mountains, Hungary (on dolomite) etc. Other growing-localities were e.g. volcanic soils in S. Spain, gravels in Algeria (Biskra), sandy fields near Geneva, siliceous slopes in the E. Pyrenees, schists near Barcelona. Mostly it grows on well-drained, dry and often stony or sandy grounds, much heated by the sun (Zaragoza, Malaga, Algarve (Portugal), Geneva). As a rule it occurs at or near sea-level (slopes facing the sea, Banyuls, SEGAL 203; AMD, WAG) but may ascend to the lower and medium altitudes on mountains e.g. 350-1450 m (Jura, Alps), 900-1300 m (S. Spain), 900-1000 m (Pyrenees).

BALANSA collected ssp. *collina* near Oran (Batterie Espagnole), BOURGEAU found it on rocks near the sea in the same area. All collectors in Morocco found it in flower and fruit during April. LOSCOS reported (15, Ser. Exic. Fl. Ar., Cent. pr.; TL) glaucous leaves and a scent like violets.

ST. AMANS (Fl. Agen. 1821, p. 188) noticed a scent in *R. phyteuma* very much the same as the fragrance of *R. odorata*. DE LAMBERTYE (Cat. pl. Marne 1846, p. 26) judged the scent of *R. phyteuma* to be goat-like, unpleasant, nearly similar to that of *Orchis hircina*.

PENZIG (Pflz. terat. 2 ed., 2, 1921, p. 127) described teratological forms ('Vergrünung').

R. phyteuma is said to be eaten as a vegetable in Greece (*όχιστρα*).

Specimens examined:

Ssp. *phyteuma*

Var. *phyteuma*

Algeria. Balansa s.n., III.1853, Oued-Biskra, à Biskra; Debeaux s.n., 16.IV.1882, Oran, fort Saint Grégoire; Faure s.n., 13.V.1909, à Gambetta; id., 12.VI.1909, Oued Imbert (Oran); id., 15.IV.1925, env. Oran; Kralik 20a, prov. Cirtensi, el-Kantara; Murbeck et Olin s.n., 1.III.1896, Fontaine des Gazelles; Samuelsson 7051, prov. Oran, vicinity Montagne des Lions.

Austria. Keller s.n., VIII.91, Bahndamm bei Neunkirchen; id., 22.VI.1912, Brachfelder bei Himberg & Ranheuwart; Korb s.n., 19.VI.1907, between Kerms and Dürrenstein; Rechinger s.n., 17.VI.1899, an Mauern bei Dürrenstein a/Donau; Weiss s.n., VI.1859, Wien.

France. Berger 2639, Vidauban, vicinity Chapelle St. Pons; Coste s.n., Mai 1900, Saint-Paul-des Fonts, champs calcaires, 600 m; Irat s.n., VII.1846, Lectoure (Gers); Kralik 1017bis, Saint-Maur près de Paris; Leredde s.n., 9.IX.1946, Haute-Garonne, Toulouse Pech-David; Martin s.n., 23.VIII.1851, Isère, environs de Lyon, Vauhe; Masson s.n., Menton; Penchinat 1037, Alluvions du Tarn, Moissac (Tarn-et-Garonne); Reijnders 1957, Vancluse, Cavailon; Rouy s.n., 3.VI.1897, Pyrénées or., vicinity of Perpignan; Segal 203, Pyrénées B., S. Banyuls; Simon s.n., 11.VII.1961, Pyrénées or., Roussillon, between St. Laurent de Salanque & Mas de Garrigue; Zetterstedt s.n., Montpellier.

Germany. Heischmann 2471, Krain, Laibach.

Hungary. Bartha s.n., 2.VI.1933, Esztergom, Mt. Kavicshegy ad pag. Piliscsaba; Karpati s.n., 22.V.1943, comit Pest, Mt. Rokaahegy, supra pag. Békásmegyer; Rechinger s.n., 29.VI.1898, bei Winden am Neusiedlersee auf Brachfeldern; Richter s.n., V.1873, Ofen, Blocksberg; id., VI.1875, Budae, Blocksberg; id., VI.1876, Budapest, Blocksberg; Steinitz s.n., 23.VIII.1881, Donau-Damm bei Blocksberg, Ofen.

Italy. Ball s.n., IV.1874, prope Brundisium; Boom 3221, Rome; id. 3710, Tivoli; Caruel s.n., IX.1855, Livorno.

Morocco. Font-Quer 205, Hasdra Djiba (Mitgera); Gandoger s.n., 1910-11, Dj Habibi; Jahandiez s.n., 24.III.1920, Grand Atlas, Amisnuz Oued N'fis; Mardochee s.n., à 1876, distr. Tazeroualt et Issighiwar jusqu'à Si Ahmed ou Moussa.

Portugal. Bourgeau 1783bis, Loule, Algarve; Daveau s.n., IV-V-1877, environs de Lisbonne; Fernandes c.s., 5645, 6507, estrada Freixo-Barca d'Alva, 12 km do Barca d'Alva.

Spain. Bourgeau 76, Pyrénées, Barcelone, Commun; id. 853, Hellin; Huter c.s. 951, Granatense, Sierra de Mijas, prope Malaga; Jerónimo 8245, Almeria, Sierra de Gador; Lange s.n., 2.IV.1852, Beilen; Loscos 72, circa Castelseras; id. 14, 15, Aragon, pr. Castelseras; Reverchon, Andalousie, Ronda, 746 (1889); id. Almeria, Velez-Rubis; id. 746 (1892), prov. Valence, Ségorbe; id. 746 (1893), prov. de Teruel, Valacloche; id. 746 (1894), *ibid.*, Albarra-cin; Sennen 244, Catalogne, vicinity Figueras; id. s.n., 9.V.1909, Valance, Benicarlo; id.

6044, Cerdagne, Estavar (Pyr.-Or.); id. 6517, Barcelone, massif du Tibidabo; Vicioso s.n., 12.IV.1909, 28.IV.1911, Calatayud; Vogel s.n., IV.1853, Madrid, Buen Retiro; Willkomm 406, Granada; De Wit 33, Santa Cristiana.

U.S.A. Brown s.n., VII.1879, New York, Hunter's Point.

Yugoslavia. Ferman et van Hille 235, Locrum; Kocsis s.n., 19.V.1908, Ins. Pago, prope Pago; Ooststroom 19018, near Trogir; Teuber s.n., 6.IV.1898, b. Ragusa.

Var. integrifolia

Algeria. Ball s.n., II.1880, El Kantara.

Austria. Brandmayer s.n., VII.1872, bei Ebergaping, Wien; Korb s.n., 27.IX.1920, in Feldrainen am Rande Donau; Sonklar s.n., VII.1868, VI.1872, Wiener Neustadt; Teyber s.n., 15.V.1904, Jetzelsdorf n. Hangsdorf; Vetter s.n., 5.VII.1914, Weinbergsrändern bei Krems; Welwitsch s.n., V.1839, Vienne; Widerspach s.n., à 1846, near Krems.

Belgium. Maréchal s.n., VII.1935, Liège.

Czechoslovakia. Bily s.n., 27.VIII.1924, Moravia, Vinohrady u Dol. Vistonic et Costa. Kolenfurtevod; Osvačilová 602, *ibid.*, Distr. Mikulov, Palavské inter Popovice et Strachotin; Podpera s.n., 15.V.1927, *ibid.*; Polak s.n., VII.1889, prope Velvary.

France. Andreánszky s.n., 14.V.1925, Coute prope Nice; Ball s.n., 14.VII.1851, Dept. Hérault, Valargues; Bécourt s.n., VII.1895, près d'Isle Adam; Berger, Prov. Ain, Glandieu; id. 2592, Prov. Drôme, St. Paul-Trois Châteaux, near Pierrelatte, direction St. Vincent; id. 2760, Seillans near Col de St. Arnoux; Deséglise s.n., 18.VII.79, Sabandiaf, prope Neybzar; Hennegart 1834, Grenoble; Kralik s.n., VIII. 1841, St. Maur près Paris; Neyraut 2653, Pyrenées Or., Tet à Perpignan; Simon s.n., 7.IV.1950, Peyzieu, S. Belley; id. s.n., 3.VIII.1960, Pyrenées Or., Roussillon, S. Dorfes le Barcarès; Venema s.n., XII. 1930, La Colombière; De Wilde 1077, Camargue, Le Sambuc; Zetterstedt s.n., IV.1857, Montpellier.

Hungary. Korb s.n., 28.IX.1902, Kaglersberge bei Winden; Richter s.n., V.1874, Often, Blocksberg; Vestergren s.n., 30.VII.1922, Esepel Isl.

Italy. Ball s.n., VIII.1866, Alpibus Pedemontanis, Val Maire, prope Stropo; Ferro 69, Pedemontium, Prov. Cuneo; Firls s.n., 14.I.1877, San Remo; Koster 3795, Rome, Palatin; Pisani s.n., à 1847, Arno near Pisa; Porta s.n., 16.VI.69, Distr. Lombardia, Benaum.

Morocco. Jovet-Ast c.s. 13259, Env. Tarquist, Ktama; Reese s.n., 16.V.1934, Grand Atlas Or., near Rich, Tal des Ziz; Sauvage s.n., 11.VI.1953, Hauts Plateaux, Tounfite, Adaou Atlas; id., 20.VI.1953, *ibid.*, env. de Midelt, Tachasuit; Steenis 19410, High Atlas, Adaou-Atlarh, road to Tounfite.

Romania. Lányi s.n., 28.IV.1913, Magyar, Szeged.

Spain. Ball s.n., 26.VI.1851, Sierra Nevada, Trevenque; Berger s.n., 7.X.1959, Prov. Gerona El Pasteral, bei La Sellara. Rio Ter; Dompester et Kuijt 2211, between Calatayud and Zaragoza; Gandoger 411, 412, Murcia, Bullias; Hackel '54', 5.VII.1876, Sierra di Alfacar prope Granatam; Heywood 3081, Prov. Jaen, Cerro Bucentaina, Sierra de Segura; Huber-Morath 3589, Prov. Malaga, Ronda, road to Jerez; Nilsson 508, Cobo de Gata; Reese s.n., 2.VI.1929, Neu Castilien, S. Alcala de Henares; Reverchon 746(1903), Sierra de Castril, Prov. Jaen; Sennen s.n., 27.V.1926, Prov. Barcelona, Massif du Tibidabo; Stud. Biol. Rhenotrai. 1044 (1951), between Diezma and Granada.

Switzerland. Ayasse s.n., 16.VIII.1874, Vessy près de Genève; Chavin s.n., VII.1866, Compesières; Reuter s.n., IX.1847, Aire près Genève; Romieux s.n., 10.X.1875, between Carouge and Lancy (Genève); id., 18.VII.1879, près Veyvier; Schleicher s.n. (Comm. hb. Boiss. 1898), près Genève.

Yugoslavia. Korb s.n., 11.VI.1927, Barche bei Sebenico; Maly s.n., 17.VII.1900, Bosnia, Moscanicatal bei Sarajevo; ?Spreitjenhofer s.n., 15.V.76, Clifsa near Spalato.

Ssp. collina

Algeria. Alleizette s.n., IV.1920, Oran, Djebel Santo; Balansa 202, near Oran; Boissier & Reuter s.n., 1849, *ibid.*; Bourgeau s.n., 10.IV.1856, rocks of Falaises, Oran; Cosson, 8.V.1852, *ibid.*; id. s.n., 9.IV.1856, Oran; Debeaux s.n., 12.II.1881, *ibid.*, vignes sous Santa Cruz; Durieu (Hb. Gay) s.n., 27.IV.42, Oran, type; Faure s.n., 13.V.1909, *ibid.*, à Gambetta.

Libya. Tripolitania. Johnson 43, Azizia Plain.

Morocco. Faure s.n., 26.IV.1930, Massif des Beni-Snassen, env. de Taforalt; Maire s.n., 30.IV.1927, Bou-Denib; Sennen et Mauricio 7779, à Muley-Rechid, Melilla; id. 8436, 9249, Ulad-Settut, a Muley-Rechid; Sauvage s.n., 12.V.1962, Mt. Taferiste, Tizi Aza; Vindt 6886, Beni-Snassen, Taforalt; Weiller 2033, fin mai 1927, Azilal, champs argileux.

Spain. Loscos 15, 15.IV.1875, Ser. Exic. Fl. Arag., Cent. prima, pr. Castelseras.

40. *Reseda pruinosa* DELILE

Fig. 72, 73

Fl. Aeg. Illustr. 1813, p. 63; Spreng., Syst. Veg. 2, 1825, p. 464; Fresen. in Mus. Senckenb. 1, 1834, p. 172; Walp., Rep. 2, 1834, p. 752; Muell. Arg., Mon. Rés. 1857, p. 157, tab. 8, fig. 109 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 433; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 575; Oliver, Fl. Trop. Afr. 1, 1868, p. 103 (= *R. amblycarpa*); Baker f. in Kew Bull. 1894, p. 329 (= *R. amblycarpa*); Post, Fl. Syr. Palest. Sin. 1896, p. 113; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 184; Muschl., Man. Fl. Egypt. 1, 1912, p. 442; Ramis, Bestimm. Fl. Aeg. 1929, p. 98; Dinsm. in Post, l.c. ed. 2, 1, 1932, p. 140; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Andr., Fl. Pl. Angl.-Egypt. Sud. 1, 1950, p. 69; Täckh., Stud. Fl. Egypt 1956, p. 334; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 276; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 440; Zohary, Fl. Palaest. 1, 1966, p. 336, notes to *R. stenostachya*.

R. p. ssp. *eu-pruinosa* Maire in Bull. Soc. Hist. Nat. Afr. Nord 20, 1929, p. 14 (= var. *pruinosa*).

R.p. var. *stenophylla* Zoh. in Palest. Journ. Bot. Jerus.Ser. 2, 1941 (1940-42), p. 165 (= var. *pruinosa*).

Perennial, erect or ascending, pruinose, pale green or subcanescent herb, (10-)25-35(-50-70) cm tall; base and taproot lignescent.

Stems rather rigid, usually branching, leafy, papillose-muricate; finely ribbed, pith solid.

Leaves muricate, lower entire, narrowly oblong to -obovate, ca 4 cm long, 1/2 cm wide; upper incised (3-partite), 3-7(-11) cm long, 2-4(-9) cm wide, lobes narrowly oblong to -obovate, 2 1/2-5(-8) cm long, 1/2-1 1/2 cm wide; margins narrowly pallid, muricate, (occasionally glabrescent).

Flowers white, small. Raceme in fruit 13-20(-25) cm long; peduncle ± ribbed. Bracts deciduous, short comose at top of raceme, pale green, linear, 4 mm long, exceeding the flower-pedicel; margins hyaline, scabrid. Pedicel densely muricate, 1-2 mm long in flower, 3-4(-5) mm long in fruit (up to half as long as capsule).

Sepals 6, deciduous, oblong, 1 1/2-2 mm long, margins and abaxial surface more or less papillose-squamose.

Petals white, 3 1/2 mm long. Limb of superior petal 7-11-palmatiparite, up

to twice as long as the appendage, lobes dimorphic, central lobe longer than adjacent lobes, linear-spathulate to -obovate, wider and larger than the others, lateral lobes \pm linear, extreme ones dentiform; appendage obovate, $1\frac{1}{4}$ mm long, 1 mm wide, auriculate, transverse rim wanting or rarely some remnant in front of limb base, margins lacerate-papillose. Lateral petal smaller, lateral lobes usually missing, limb often deeply bipartite, with linear-spathulate, longer central lobe. Anterior petal entire or 2-3-partite.

Disc $\frac{2}{3}$ mm high, $1\frac{1}{2}$ mm wide, nearly smooth; margin crenate.

Stamens 15-20. Filaments deciduous, 3 mm long. Anthers ellipsoid to ovoid, $1\frac{1}{2}$ mm long, asperulous on top.

Ovary cylindrical, its upper part (dents) inflated, subsessile, densely papillose-squamose, 3-toothed (very rarely 4-toothed), teeth very turgid, ca. $\frac{1}{4}$ as long as ovary. Ovules numerous, 30-45 per placenta, in 3-4(-more) rows.

Capsule erect, sometimes patent, or hanging, substipitate, cylindrical but the top slightly inflated, 8(-13) mm long, 3 mm wide, muricate to glabrescent, mouth widely gaping, teeth short, broad, inflated.

Seed reddish-brown, glossy, reniform, $\frac{3}{4}$ mm long. Sinus narrow. Testa almost smooth, at high magnification finely striate (striations rugulose).

Type specimen: DELILE, near Alexandria (n.v.).

Distribution: Between the Nile and Red Sea, Sinai, the coastal region north of Qattara depression and S. Palestine (apparently between 20° - 32° N.).

Key to the varieties

Capsules erect, usually imbricate or sometimes slightly spreading. a. var. *pruinosa*
 Capsules patent, nodding at maturity. b. var. *nutans*

a. var. *pruinosa*

Capsules erect, imbricate or sometimes slightly spreading, always directed upward.

Distribution: Area of the species.

b. var. *nutans* ABDALLAH et DE WIT, *nov. var.*

Capsula subnutans vel pendula.

Type: J. R. SHABETAI C.S. no. Z5646, Wady Qoseib, Da. sept. (= N. Arabian *Meded. Landbouwhogeschool Wageningen 78-14 (1978)*)

Desert), Egypt (CAIM, holotype).

Capsules patent, nodding at maturity.

Distribution: Arabia petraea, Northern Arabian Desert and Sinai.

Taxonomical notes: DELILE questioned whether *R. pruinosa* was identical with '*R. phyteuma* FORSKÅL'. He found it once in 'the desert near Alexandria', and he also referred to a specimen collected in Syria by BERTHE. MUELL. ARG. did not see DELILE's type, nor was BOISSIER able to trace the type, and it was not available for this present revision. Dr. F. SA'AD (no. 105, 5.III.1958; CAIM) however, collected fine specimens in the coastal region (Burg el Arab), where DELILE found the type. See also sub *R. muricata*.

Obviously, *R. pruinosa* and *R. stenostachya* are very narrowly allied. They are best kept apart on account of the superior petal (transverse rim, appearance of the laciniae) and the testa (almost smooth and very glossy when ripe in *R. pruinosa*). SCHIMPER 103 is preserved in several herbaria and not homogeneous. The specimen at L was made lecto-isotype of *R. muricata* var. *muricata*, and at TL e.g. SCHIMPER 103 represents *R. stenostachya*. Experimental taxonomical research is required for a satisfactory systematy in the related taxa *R. pruinosa*, *R. muricata*, *R. stenostachya* and their varieties.

Ecological notes: *Reseda pruinosa* is a desert plant (e.g. between Quena and Quseir, SCHWEINFURTH 2321; W), preferring sandy soils and calcareous localities, occurring from sea-level to at least 800 m alt. (Wadi Askhar, SHABETAI 5178; CAIM; W. of the Gulf of Suez). It is found in very numerous wadi's all over Upper Egypt and in Sinai. It flowers and fruits in early spring (February to May). DRAR described it as an 'erect annual with delicately scented flowers (Wadi Selilo, 8 February 1932; CAIM). Young flowers were said to be pinkish (SIMPSON 689, in Wadi Rishrash near Heluan; CAIM).

It would seem that *R. pruinosa* belongs in the spring flora, and penetrates as a weed into settled areas (see also notes sub *R. amblycarpa*).

SCHWEINFURTH collected in 1878, April 21, in the desert of Middle Egypt, Arabian side, at Wadi Rigbe a monstrosity (97; W) distinguished by early developing, slenderly clavate ovaries. It was a low, woody specimen, possibly induced to abnormal growth when from the woody base (after grazing) very numerous, short, richly flowering stems arose suddenly, flush-like.

Vernacular names: *Khozama* (Wadi Askhar, S. Sinai, Abaahi tribe; generally used); *Deneban*; *umm arrad* (Sinai).

Specimens examined:

Var. *pruinosa*

Arabia petraea. Boissier s.n., III-IV.1846, Wadi Useit.

Egypt. Abdallah 1279, 1319, 1374, W. Mitikwan, Southern Arabian Desert; Abdel-Fadeel s.n., 12.XII.1952, Wadi Hof, Wadi Hamadel; Al-Far s.n., III-IV.1955, Sinai, 25 km NE St. Catherine's Monastery; Boulos 92M, Wadi El Dir, near St. Paul's Monastery; Bové 151, entre Tor et Sinai; Brown s.n., 20.III.1918, Wadi Hof; Davidson 'Stab. 232', 2.IV.1912, Husama; Drar 32, Wadi El-Abar, Geb. Ataq; id. 160, Wadi Selilo; id. s.n., 4.V.1939, S. Sinai, Feiran Oasis; Eglin s.n., IV.1908, bei Kairo; Gilbert 6238, Wadi Hof; El Hadidy s.n., spring 1953, Wadi Gerawi; id. s.n., 15.X.1953, Wadi Digla; Hedenborg 9676, Sinai Mountain; El Hilaly et Khattab s.n., 4.III.1960, Wadi Sayala, Red Sea; Imam et Abdel Fadeel s.n., 9.II.1956, N. Galala, Wadi Qiseib; id. s.n., 15.II.1956, Wadi Aber, Geb. Ataq, Suez; Kaiser 71, 228, 558, 883, Sinai; Kassas s.n., 5.II.1958, Wadi Rishrash; Khattab s.n., 24.X.1956, Geb. Elba, Wadi Khanssirob; ?Kneuska s.n., 15.IV.1902, Wadi Hof bei Helouan; Lord s.n., V.'68, Sinai, Wadi Farran; Muschler 266, Ismailieh, Ruauddes Timsah-Pcees; id. 2064, Willcocks Fall bei Heluan; Sa'ad 105, 15.III.1958, Burg el Arab, W. Alexandria, type locality; Sabet et Nayal s.n., 5.IV.1929, Wadi Hof; Schweinfurth 2316, between Keneh and Kossier, near Kavur and Benat; id. 2321, *ibid.*, Wadi Siresj; Shabetai Z3537, Wadi Askhar, S. Galala; id. Z4165, Sinai, Wady El Sheikh; id. Z5218, Wady Um El Rûs; id. Z5618, Wady Um Jusr, Râs Gharib; id. Z5718, Naqb Zammât, Wady Askhar, S. Galala; id. Z5745, bed of Wadi Askhar; id. Z5839, W. Qoseib; id. Z6420, Bir Deheiba, Wady Noöz, N. Galala; id. Z6435, Bir Odeib to entrance of Wady Noöz; id. Z6444, Wady Um Hammad, S. Galala; id. Z6507, Wady Qoseib, N. Galala; Seiber s.n., ?1841, Kenna; Simpson 217, Wadi N. of Wadi Hof; id. 225, Wadi Abu Rokham; id. 689, Wadi Rishrash; id. 2654, Wady Um Gerafan, W. No'oth, N. Galala; id. 5829, Wady Arabah; id. 6540, near Gebel Hôf; V. Täckholm s.n., 12.XII.1952, Wadi Hammat near Wadi Hof; Täckholm c.s. s.n., 4.IX.1960, Hurg-hada distr., foot of Mt. Hakkara; id., 4.II.1961, Wadi el Hankalia near Gold Mine; id. 52, Red Sea Coast, Wadi El-Ghadir; id. 122, *ibid.*, Wadi El Sokkari; id. 301, *ibid.*, Wadi Gemal; id. 413, *ibid.*, Mouth of Wadi Ranga; id. 605e, Gebel Dawi, Qosseir-Keft Road; id. 669, 63 km W Qosseir; id. 1004, Wadi el Faraid, Red Sea Coast; id. s.n., 27.I.1962, Gebel Elba, Wadi Haiteem; id. 677, *ibid.*, Wadi Oolak; id. 677, *ibid.*, Wadi Serimtai; id. 880, Wadi Mawaw; Volkens s.n., 17.XII.1884, Heluan, Wadi Hof; id., III.1885, *ibid.*

Palestine. Aaronsohn 350, Engeddi, au-dessous du mont. de mines; Franz s.n., à 1837, Mt. Garizen.

Var. *mutans*

Arabia petraea. Neergaard s.n., vere 1868.

Egypt. Abdallah 1106, S. Sinai, Wadi El Sheikh; El-Hadidy s.n., 13.V.1956, Wadi el Raha, Sinai; Shabetai c.s. Z5646, Wady Qoseib, Da. sept. (= N. Arabian Desert).

41. *Reseda sa'adae* ABDALLAH et DE WIT, *nov. sp.*

Fig. 74

Planta ?annua, 50–80 cm alta, glabra vel sparsiter pilosa. Caulis erectus, solitarius, striato-sulcatus. Folia omnia integra, subcarnosa, inferiora spathulata, media et superiora anguste ovato-elliptica vel -oblonga, omnia sensim in petiolum attenuata, 4–7 cm longa, 1–2 cm lata, acuta, leviter undulato-marginata. Inflorescentia simplex, laxiflora, florifera c. 20 cm longa. Bracteeae deciduae, anguste lineares, 10–20 mm longae, c. 1 mm latae, acutae. Pedicelli leviter sulcati, floriferi c. 8 mm longi, demum subnutantes. Sepala 7–9, ?persistentia, lineari-spathulata, 4 mm longa, $\frac{2}{3}$ mm lata, rotundato-obtusa. Petala alba, c. 4 mm longa; petali superioris appendix lato-ovata, 3 mm longa.

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2 $\frac{1}{2}$ mm lata, excedens lamina. Lamina 3-secta, lobus centralis longior quam laciniis laterales, attenuatus apicem versus; lobus lateralis irregulariter c. 5-partitus, laciniis linearibus, attenuatis. Limbus petalorum lateralium minus divisus. Petalus anterior in 3-sectus laciniis subulatis. Discus infundibuliformis, in extensione semilunata unilateraliter munitus. Stamina c. 28, exserta; filamenta decidua, 4 mm longa, sparsiter pilosa; antherae oblongo-ellipsoideae, 1 $\frac{1}{2}$ mm longae, minutissime asperulae. Ovarium ellipsoideum, stipitatum glaber, 3-dentatum; ovula numerosa (c. 30–35 per placenta), 4–5 serialia. Capsula matura ignota tamen immatura nutantes.

Typus: P. SINTENIS 759, 'Iter Orientale 1889', Armenia turcica's Kharput, in declin. mont. Karadasch versus Peknik, 12.VI. (LD: holotype; K, W, WU = isotype).

?Annual, erect, not branching, (pale) green, very sparsely pilose to glabrate herb, 50–80 cm tall in flower; taproot slender.

Stems solitary, up to the inflorescence densely leafy, glabrous at base, sparsely pilose above, 3–7 mm thick, ribbed, pith disintegrating, (internodes widely tubular).

Leaves all entire, shortly attenuate into a semipetiole, (up to 1 $\frac{1}{2}$ cm long), subfleshy, often very sparsely pilose, narrow ovate-ellipsoid, sometimes -obovate or -oblong (lower leaves spatulate), obtuse, rarely acute, margin entire, rather undulate, obscurely pallid.

Flowers white, on patent to horizontal pedicels. Raceme erect, slender, laxly flowered, ca. 20 cm tall in flower, peduncle ribbed, very sparsely pilose. Bracts deciduous, setaceous and comose at raceme-tip, glabrous, narrowly linear, 10–20 mm long, $\frac{1}{2}$ –1 mm wide, acute, margin narrowly pallid. Pedicels obscurely sulcate, \pm sparsely pilose, in flower 7–10 mm long, patent, curving downwards during maturity of fruits, \pm 10 mm long in just developing fruits.

Sepals 7–9, ?persistent, reflexed in fruit, obscurely foveolate, linear-spathulate, 4 mm long, $\frac{2}{3}$ mm wide, obtuse, margin narrowly pallid.

Petals 4 mm long. Limb of superior petal 3-sect. (two central incisions down almost to base, lateral lobes multipartite), central lobe much exceeding the adjacent lobes; $\frac{3}{4}$ –almost as long as the appendage, lacinia linear-ovate narrowing towards the top, changeable in width and length; appendage broadly ovate, 3 mm long, 2 $\frac{1}{2}$ mm wide, free upper rim continuous, $\frac{3}{4}$ mm wide, entire, margins minutely papillose. Limb of lateral petals variously reduced, of anterior petal deeply 3-partite, laciniae linear, acutish.

Disc infundibuliform, rim extended posteriorly, 2 mm high, 3 mm wide; extension wide-semilunate, 1 mm wide, membranous, margin shortly papillose-ciliate.

Stamens ca. 28, in 2 irregular rows, exceeding petals. Filaments deciduous, glabrous (or almost so), 4 mm long. Anthers oblong-ellipsoid, 1 $\frac{1}{2}$ mm long, asperulous.

Ovary ellipsoid, 4 mm long, 2 mm wide, long stipitate, smooth, obtusely 3-angled, below mouth slightly constricted, 3-toothed, teeth turgid, conical, ca. $\frac{1}{4}$ as long as the ovary. Ovules 30–35 per placenta, in 4–5 rows, imbricate. Capsule unknown.

Distribution: The type locality.

Taxonomical notes: *R. sa'adae* is closely allied to *R. armena* BOISS. Reasons for segregating it as a new species from the latter one, are: its deciduous bracts, the smooth, large and more numerous sepals, the central lobe of superior petal at least as long as or (much) longer than the adjacent lateral lobes, the high number of the stamens and the more numerous ovules. When ripe fruit of *R. sa'adae* will become known, other differential characters may appear to be present in the capsule and the seed.

On the other hand, there exists a close affinity to *R. balansae* MUELL. ARG. Differences are: the more numerous ovules (in more than two rows), the deeper incisions limiting the central lobe of the upper petal, and the more numerous sepals, the deciduous bracts and the leaves being all entire.

Finally, it has to be pointed out that clear affinity to *R. lanceolata* LAG. exists; differences are: the relative width of the ovary (and nodding capsules), the smooth capsule and, very likely, the seeds (size, shape, testa). If it is considered that the number of sepals, the central lobe of the limb of superior petal being as long as or longer than the lateral lobes, the more numerous stamens and ovules present in *R. sa'adae* are also characteristic of *R. lanceolata* (a species of very limited distribution in NW. Africa and SE. Spain), this Caucasian species can be seen as a morphological link between *R. lanceolata*, *R. armena* and *R. balansae*.

The holotype bears a label carrying the name '*Reseda integrifolia* HSKN. n. sp.' in writing. It was impossible to find any evidence that this msc. name has ever been published.

Ecological note: The type was flowering and had young fruits, on the 12th of June, 1889.

Note: *Reseda sa'adae* is named after Dr. FATIMA SA'AD, (Dokki Herbarium (CAIM), Min. of Agric., Egypt), wife of Dr. M. ABDALLAH, who assisted him during several years in his research and also contributed valuable studies to the taxonomy and botanical collections of the Mediterranean and Egyptian flora's.

Enum. Pl. Hort. Berol. 1, 1809, p. 499; Spreng., Syst. Veg. 2, 1825, p. 463; Webb et Berth., Phyt. Canar. 1, 1837, p. 103, tab. 10; Walp., Rep. 2, 1843, p. 751; Muell. Arg., Mon. Rés. 1857, p. 163, tab. 8, fig. 112 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 573; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 185; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689.

Annual to perennial, erect (almost) glabrous, glaucescent to light green, spartioid suffrutex or herb, (20-)30-50(-100) cm tall; taproot lignescent.

Stem sometimes solitary, diffusely branching, olive green, (at base) yellow-grey and striate; branches leafy, glabrous, finely ribbed; pith disintegrating.

Leaves light green, thick, all entire, linear-subulate, 4-6 cm long, 1-1½ mm wide; margin narrowly pallid, entire.

Flowers pale yellow, on long pedicels. Raceme up to 20 cm long in fruit; peduncle ribbed. Bracts often long persistent, comose at top of raceme, foliaceous, glabrous, downwards gradually changing into stem-leaves, linear-spathulate, up to 2(-more) cm long, 1 mm wide; margin narrowly pallid, entire. Pedicels stiff, filiform, ribbed, ribs finely scabrous, in flower 4 mm long, in fruit 7-10 mm long.

Sepals 6(-7), (tardily) deciduous, olive green, fleshy, glabrous, narrowly obovate to linear, 1½-2½ mm long, ¾ mm wide; margin narrowly pallid, entire.

Petals 3½ mm long. Limb of superior petal appearing multipartite (3-sect; lateral lobes dimorphic, irregularly 6-8(-20)-multipartite resembling a cock's comb, shorter than central lobe), decidedly shorter than the appendage, central lobe linear-spathulate, 1½ mm long; appendage greenish on dorsal nerve, obovate to rectangular, 2 mm long, transverse rim continuous in front of limb, ½ mm wide, glabrescent. Lateral petal slightly smaller, anterior lobe usually missing, lobes and incisions similar to superior petal. Anterior petal smallest, limb 3-sect.

Disc 1 mm high, ⅔ mm wide, glabrous or thinly puberulous; margin revolute, nearly entire.

Stamens 18-20, deciduous, twice as long as petals. Filaments 3-4 mm long. Anthers oblong to ovate, 1 mm long, asperulous.

Ovary ellipsoid, stipitate, glabrous, 3-toothed, teeth very short, ⅓ or less as long as ovary. Ovules 30-40 on each placenta in 3-4 rows.

Capsule not stipitate, cylindric to -obovate, 10-13 mm long, 4 mm wide, ± falcate, glabrous; mouth slightly contracted beneath the teeth, teeth triangular, acute, up to 1 mm long.

Seeds brownish-black, glossy, ?obovoid reniform, ± 1 mm long. Sinus wanting, represented by a shallow groove. Testa smooth (delicately tessellate under high magnification).

Type: BROUSSONET, Teneriffa (holotype: WILLDENOW no. 9227, B; I.D.C. microfiche nr. 1057/11).

Distribution: Canary Islands.

Taxonomical notes: WILLDENOW, basing a new species, *Reseda scoparia* on a single specimen collected by BROUSSONET (Enum. Pl. Hort. Berol. 1, 1809, p. 499) in Teneriffe, declared that it was allied to *Reseda glauca* (Sp. Pl. ed. WILLD. 2(2), 1800 (1799), p. 877). MUELLER (Mon. Rés. 1857, p. 163) accepted *R. scoparia* as a good species.

In the WILLDENOW Herb. is conserved a sheet (B, no. 9227; Film 1057/11) carrying a specimen labeled '*Reseda scoparia* Teneriffe (BROUSSONET)' which is accepted as the holotype of *Reseda scoparia* BROUSS. ex WILLD.

Ecological notes: E. ASPLUND (425; UPS) found *R. scoparia* on Teneriffe near the road between Guïmar and the harbour of Guïmar. BOURGEOU (1251; C, GOET, PR, UPS, US, W, WAG) found it in the same region; it flowers and bears fruits in February–April. BURCHARD (209; E) observed it in dry stations near Porta de Abona, near the sea.

On Gran Canaria it grew on dry hills near Las Palmas (BORNMUELLER 2092; L, LD, PR, PRC, WRSL, WU), on slopes in the Garden St. Catalina (FLEISCHER & FLEISCHER-HAIGHTON 19,20; U).

KAI LARSEN (s.n., 24.V.1927; C) collected it on Gomera (Pta de S. Cristobal) on dry coastal rocks, where it flowered and bore fruit in May.

Summarizing it appears that *R. scoparia* is an endemic on a few islands of the Canary Archipelago and that it occurs at low altitudes not far from the sea, often on dry stony or volcanic soils or rocks.

A specimen in UPS is said to have come from Tanger ('WEBB, Pl. can.'). This record needs confirmation; it may be due to an error. There are also records from Madeira; one specimen collected by LOWE is said to come from Madeira (NY). It is an unnumbered LOWE-plant, accompanied by nearly completely obscure handwriting. Another specimen recorded from Madeira is Dr. W. HILLEBRAND 26/IV.1882 (Reliquiae Hillebrandianae) preserved at WRSL. This record is rejected because a second specimen collected by HILLEBRAND, preserved in the same herbarium, is noted to have been collected on Gran Canaria, on 27/IV.1882. It is impossible that HILLEBRAND could have collected on 26/IV on Madeira and on 27/IV on Gran Canaria there being no means of transport in 1882 to move so quickly.

KAI LARSEN noted $2n = 30$ chromosomes for *R. scoparia*, cult. no. 31, originating from Gomera, near San Sebastian (Can. Isl.; specimen in C).

Specimens examined:

Canary Isls. Gomera Isl. Larsen s.n., 24.V.1927, at Pta de S. Cristobal.

Gran Canaria: Børgesen 637, Las Palmas; id. 660, 679, Pá Sène Bakker ved Las Palmas b. Hotel Metropol; Bornmüller 2092, Las Palmas; Cook 92, near Mt. Galdar; Cool et Tex 557, Isleta; Fleischer et Fleischer-Haighton 19, 20, Las Palmas, Vega St. Catalina; Gelert s.n., IV. 97, Las Palmas; Hillebrand s.n., 27.IV.1882, s.l.; Kuntze s.n., 1.88, Isleta; Lanjouw 2, Las Palmas; Vahl s.n., 21.VIII.1902, Puerto de la Luz.

Teneriffe. Asplund 425, inter Guímar et Puerto de Guímar; id. 812, Punto de Teno; Bolle s.n., à 1851, s.l.; id. à 1854, Sta Cruz; Bornmüller 2094, inter S. Cruz et S. Andrés; Bourgeau 81, ad castellum Poso alto S. Cruz; id. 1251, Guímar, Chinico; Burchard 125, inter Sanctam Crucem et Sanctam Andream ten; id. 209, near Port Abona; Krause s.n., 27.III.1893, Adeje; Perraudière s.n., 10.III.1855, near Sta Cruz; id. 19.VI.1895, s.l.; Petrak s.n., 18.V.1926, St. Cruz, S. André; Pitard 42, Barranco de Bufadero; Sventenius 35, Nivaria, Guímar; Webb s.n., à 1845, s.l.

43. *Reseda sphenocleoides* DEFLERS

Fig. 76

In Bull. Soc. Bot. Fr. 42, 1895, p. 298, tab. 3; Blatt., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 48.

Low, pale green, up to 1 m tall shrublet.

Stems woody at base, solitary or branching above, branches stiff, sparsely leafy, glabrous or hardly pilose, delicately ribbed; pith solid.

Leaves all entire, petiolate, fleshy, \pm punctate, (ob)ovate to -oblong, attenuate towards the petiole, 5–9 cm long (incl. petiole), $1\frac{1}{2}$ – $2\frac{1}{2}$ cm wide (petiole ca. 1 cm long), glabrous or hardly pilose, obtuse or short acuminate; margin narrowly pallid, entire.

Flowers (pale) yellow, aromatic (ex FITZGERALD 15998/i), small, on short erect pedicels. Raceme dense and rather rigid, up to 15 cm long in fruit, flowers and fruits erect; peduncle glabrous. Bracts deciduous, comose at the top of the raceme, linear to narrowly ovate, gradually tapering towards apex, 3 mm long, $\frac{1}{3}$ mm wide, pale green to yellow-hyaline, except the dorsal nerve; margin entire, sometimes minutely denticulate-serrulate. Pedicels erect, stiff, rough or smooth, $1\frac{1}{2}$ – $2\frac{1}{2}$ mm long in flower, $3\frac{1}{2}$ mm long in fruit, almost $\frac{1}{2}$ as long as the capsule.

Sepals 6, (tardily) deciduous, pale green, glabrous, punctate, oblong to -obovate, $1\frac{1}{2}$ mm long, $\frac{2}{3}$ mm wide, acutish; margin widely pallid, entire to \pm undulate.

Petals $2\frac{1}{2}$ –3 mm long, widely exceeding the sepals. Limb of superior petal ca. 7-palmati-partite, (obscurely 3-sect), longer than the appendage, flabellate, lobes linear-spathulate (distinctly widened towards top), appendage obovate, $1\frac{1}{4}$ mm long, nearly 1 mm wide, transverse rim narrow, $\frac{1}{4}$ mm wide, often interrupted at the middle, densely and shortly papillose-ciliate. Lateral petal

smaller, anterior part of the limb usually missing, remainder similar to superior petal in shape and incisions. Anterior petal smallest, limb simple.

Disc $1\frac{1}{2}$ mm high, $1\frac{1}{4}$ mm wide, minutely papillose; posterior extension curved downwards, minutely papillose or velvety.

Stamens ca. 20. Filaments (tardily) deciduous, glabrous, $2\frac{1}{2}$ mm long. Anthers oblong-obovoid, 1 mm long, minutely asperulous or smooth.

Ovary clavate, stipitate over the disc, glabrous, obtusely 3-angled, 3-toothed. Ovules 15–20 per placenta, in 3 rows.

Capsule erect, stipitate, cylindric to obovoid, abruptly stipitate, 10–12 mm long, $2\frac{1}{2}$ –3 mm wide, glabrous, reticulate, side walls shallowly grooved, angles rounded, mouth constricted beneath teeth, widely gaping, teeth inflated, tip notched.

Seeds dark-brown, dull(ish), globular-reniform, $\frac{2}{3}$ mm long. Sinus narrow. Testa evenly, rather laxly, regularly papillose (papillae in rows following the contour).

Type: DEFLERS 530, It. ann. 1889–90, in Wadi Dhabab, prope Haifan (Bilad Hadjerya; S. Arabia; K).

Distribution: S. Arabia (e.g. Hadramaut, Aden).

Taxonomical notes: *R. sphenocleoides* DEFLERS was described (in Bull. Soc. Bot. Fr. 42, 1895, p. 298) from a number of DEFLERS' specimens (290, 433, 484, 530, 838, 1131, collected in 1889–90, and a specimen s.n., in 1894). The specimens originated from various places in S. Arabia, rocky valleys at medium altitudes.

DEFLERS declared that this species resembled by its habit and leaves *Sphenoclea* and it was allied to *R. microcarpa* MUELL. ARG. from which it seemed to differ by its broader leaves, very unequally lobed petals, and a shorter stipe to the capsule.

The present study proved it to be different from *R. microcarpa*.

Ecological notes: Dr. ST. PAULAY found it on rocky places all over the coastal region near Râs Fartak (S. Arabia). It had ripe capsules in March.

DEFLERS found it frequent up to 1500 m (433, K), in Wadi Eybad, near Schoukra and el Nakhaï et el 'Atreys (Bilad Fodhli), where it flowered and fruited in early spring. RAUH (HEID 13078) confirms this (at Laudar).

Vernacular name: *Kharwa* (Arabic; fide DEFLERS).

Specimens examined:

Arabia. Deflers 433, Pays Fodhli, Revers S. de Gebel el 'Atreis (30 km à l'E.NE. de Schughra); id. 530, Arabie Sud, Wadi Dhabab, type; Greirson 217, Aden, Wadi Jeshbaum; Guichard KG/HAD/73, Arabia Wadi Serr, N. of Shibam; Hein s.n., 21-27.III.1902, Hadramaut, Amhir, Umgebung von Gischum; Hemming 530, Arabia, Wadi Haderamat, W. Qatu; Kerfoot 3026, Hadramaut, Wadi Idim; id. 3076, Hadramaut, East Aden, Wadi Idim; Lunt 126, Hadramaut; Paulay s.n., 7-8.III.1899, Hadramaut, Râs Fartak; Popov GP/382, Arabia, Risut, Dhofor; Popov, Jillin et Gilliland 4225, S. Arabia, N. Jol near Zamuk; Stewart 691, Arabia (E. Aden), Wadi Sanau, 51° 00' E - 17° 45' N; Rauh s.n., 6-3-1964, HEID 13078, Laudar; Vezey-Fitzgerald 15998/1, Arabia, Wadi Ibn Hashabil 18° 20' N - 42° 40' E.

44. *Reseda stenobotrys* MAIRE et SAMUELSSON

Fig. 77

In Arkiv. Bot. Stockh. 29A(11), 1939, p. 15, fig. 3a, c, e, et tab. 1; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016.

Annual, ascending herb, ca. 20 cm tall, much branching at base; taproot slender.

Stems few, branching at base, densely leafy, sparsely scabrid, ribbed; pith disintegrating.

Leaves usually laxly covered with minute hairs, partly entire, gradually attenuate into an indistinct petiole. Basal leaves entire, spatulate, ca. 3 cm long, 8 mm wide; middle and upper leaves trifid or bi-trifid, ca. 5 cm long, terminal lobe much longer and larger than the laterals, narrow-obovate, obtuse; margin usually undulate, minutely scabrid.

Flowers white. Raceme ovoid, densely flowered, up to 12 cm long in fruit. Peduncle ribbed, scabrid. Bracts persistent, not comose, scabridulous, linear (-obovate), $2\frac{1}{2}$ mm long, $\frac{1}{2}$ mm wide, short acuminate; margin pallid, scabridulous. Pedicels sulcate, scabrid, 3 mm long in flower and spreading, 5 mm in fruit (less than $\frac{1}{2}$ as long as the capsule), \pm curving downwards.

Sepals 6, persistent, slightly accrescent, \pm reflexed in fruit, oblong-obovate, $3\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide, in fruit ca. $4\frac{1}{2}$ mm long, top round-obtuse, midrib scabridulous; margin narrowly pallid, scabridulous.

Petals $2\frac{1}{2}$ -3 mm long. Limb of superior petal apparently ca. 25-partite (actually incisions separating central lobe down to nearly limb-base; of lateral lobes down to $\frac{2}{3}$ of lobe), longer than the appendage; central lobe $\frac{2}{3}$ as long as and narrower than the adjacent laciniae of lateral lobes, linear-spatulate, obtuse; lateral lobe ca. 10-partite, laciniae narrow-spatulate, obtuse. Appendage rectangular, $1\frac{2}{3}$ mm long, transverse rim continuous, ca. $\frac{1}{2}$ as wide as the appendage, margin densely ciliate-papillose. Lateral petal smaller, anterior lobe missing, lobes and laciniae similar to those of superior petal. Anterior petal smallest, limb entire.

Disc $\frac{1}{2}$ mm high, 2 mm wide, velutinous; margin reflexed.

Stamens ca. 22. Filaments deciduous, dilated beneath the anthers, 2¹/₂ mm long. Anthers ellipsoid, 1 mm long, ± apiculate.

Ovary ovoid, rounded at base, (sub)sessile, ribs scabrid, 3-toothed, teeth ca. ¹/₅ as long as ovary. Ovules 9–12 in 3 rows.

Capsules patent or nodding, (sub)sessile, cylindrical, rounded at base, 1¹/₂ cm long, 4 mm wide, acutely angled, ribs scabrid, mouth constricted beneath the teeth, teeth broad-triangular, notched, ca. 1 mm long.

Seeds reddish-brown, glossy, reniform, 1¹/₂ mm long. Sinus wide, filled with carunculate tissue. Testa laxly papillose (papillae widely spaced and in rows following seed contour).

Type: MAIRE et SAMUELSSON 6531, 6.IV.1936. Sous: Oued Massa, in rupibus quartziticis ad ripam dextram juxta pontem viae inter Agadir et Tiznit, circ. 100 m s.m. (lectotype).

Distribution: Morocco, an endemic.

Taxonomical notes: The lectotype was designated from the syntypes quoted below. MAIRE and SAMUELSSON rightly stressed affinity to *R. phyteuma*; actually *R. stenobotrys* is the only species in the group of species allied to *R. phyteuma*, viz. sect. *Phyteuma*, with papillose testa.

Ecological notes: MAIRE et SAMUELSSON declared that *R. stenobotrys* grows on siliceous and calcareous ridges in the southern part of Morocco Region, where it flowers in spring.

They based the original description of *R. stenobotrys* on a specimen (no. 6531, 6.IV.1936; l.c. tab. 1 and fig. 3a, c, e) collected at Oued Massa, in quartzite rocks on the right river bank which is near and just behind the road between Agadir and Tiznit, ± 100 m alt. A specimen of 'MARDOCHÉE in Herb. Coss.' (Anti-Atlas on the mountain 'Idaou-Semlal') and 'MAIRE, s.n., 12.IV.1934' collected at Sidi-el-Ghiat between Assaka and Kerdous on rocky chalky grounds at ± 400 m alt., were also quoted in the protologue.

Specimens examined:

Morocco. Maire et Weiller 148, Anti-Atlas, Kerdous in *Capidsis arenacus* 1000–1100 m.

Diag. Pl. Or. Nov. Ser. 1, 1(1), 1842, p. 5; Walp., Rep. 2, 1843, p. 754; Muell. Arg., Mon. Rés. 1857, p. 156, tab. 8, fig. 108 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 431; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 580; Post, Fl. Syr. Palest. Sin. 1896, p. 113; Blatt., Fl. Arab. in Rec. Bot. Surv. Ind. 8(1), 1919, p. 48; Dinsm. in Post, Fl. Syr. Palest. Sin. ed. 2, 1, 1932, p. 139; Täckh., Stud. Fl. Egypt 1956, p. 334; Coode in Davis, Fl. Turk. 1, 1965, p. 504, fig. 20 (12–13); Zohary, Fl. Palaest. 1, 1966, p. 336, tab. 490.

R.s. var. *stenostachya* Zohary, l.c.

R.s. var. *eilatensis* Plitm. et Zoh. in Zohary, l.c., Appendix, p. 343 et p. 336.

Annual to biennial, erect, pale green herb, 10–40(–60) cm tall; taproot rather slender.

Stems usually solitary or branching, strict, erect or ascending, densely leafy, pruinose (papillae colourless, wart-like), finely ribbed; pith obscurely disintegrating.

Leaves fleshy, glaucescent, strict, laxly pruinose-muricate, glabrescent, basal and usually upper leaves entire, linear, 1–1½ cm long, 1–2 mm wide, median leaves deeply 3-partite, often 2(–3) cm long, 1–2 mm wide; margin narrowly pallid, scabrid.

Flowers white. Raceme strict, 10–15 cm long when fruiting; peduncle distinctly ribbed. Bracts deciduous, very rarely persistent, comose on stem top, narrowly ovate, 4–6 mm long, gradually tapering, ± acute, margin widely pallid, scabrid. Pedicels ribbed, ribs scabridulous, 1–2 mm long in flower, up to 3 mm long in fruit, and much shorter than capsule.

Sepals 6, deciduous, very rarely tardily deciduous, scabrid, narrowly ovate, 1½–2 mm long, ½ mm wide, acute; margin pallid, scabrid.

Petals 3½ mm long, exceeding sepals. Limb of superior petal 7–9-palmate-partite, flabellate (central lobe longest) up to as long as the appendage, lacinae linear-spathulate, obtuse; appendage obovate, 2 mm long, 1½ mm wide, transverse rim narrow, ¼ mm wide, usually erose; margins thickly papillose to erose. Lateral and anterior petals gradually more reduced; anterior petal entire or 2–3-partite.

Disc 1 mm high and 1 mm wide, glabrous; margin membranous, papillose, crenate-lacerate.

Stamens ca. 17, exserted. Filaments (very rarely tardily) deciduous, 4 mm long. Anthers ± obovate, 1¼ mm long.

Ovary cylindrical to -clavate, smooth or, often, with hyaline coarse papillae, 3(–4)-toothed, teeth inflated, ¼ as long as ovary. Ovules ca. 30 on each placenta, in 4 rows.

Capsules erect to slightly spreading, stipitate, cylindrical to -obovate, 6–8 mm

long, 3 mm wide, side-walls flat, delicately reticulate, glabrous to papillose-squamose esp. when young, mouth widely gaping.

Seeds reddish-brown, glossy, subglobular, reniform, $\frac{2}{3}$ mm long. Sinus narrow. Testa subtiliter tessellate at high magnification.

Holotype: AUCHER, pl. exs. no. 2623; 'in Asia minore' (G).

Distribution: Sinai and Palestine (C. and S. Negev, Lower Jordan, Dead Sea area, Arava Valley).

Key to the varieties

Bracts and sepals deciduous. **a. var. stenostachya**
Bracts and sepals rarely deciduous. **b. var. eilatensis**

a. var. stenostachya

Slightly pruinose, papillose herbs. Bracts and sepals early deciduous.

Distribution: Area of the species.

b. var. eilatensis PLITM. et ZOHARY in ZOHARY, Fl. Palest. 1, 1966, Appendix, p. 343 et p. 336.

Green, glabrous herbs. Bracts and sepals tardily deciduous.

Holotype: Env. of Aqaba, Ras-el-Naqab, wadi, 1943, GLOBER 924 (HUJ).

Distribution: S. Palestine (Arava Valley).

Taxonomical notes: The holotype 'AUCHER pl. exs. No. 2623', from Asia minor is without further locality. COODE (in DAVIS, Fl. Turk. 1, 1965, p. 505) stated that 'Apart of the type, no Turkish material has been seen, so that the presence of this species in Anatolia remains in some doubt. The provenance on AUCHER's label may be wrong'. ZOHARY also doubted that AUCHER 2623 would originate from Anatolia (Pal. Journ. Bot. Jerus. Ser. II, 1940/42, p. 164). See further notes sub *R. pruinosa* and sub *R. muricata*.

Ecological notes: *R. stenostachya* occurs in wadi-beds on gravel at the southern end of the Dead Sea where EVENARI and GRIZI collected it in flower

and fruit medio December (no. 634; C, E, L, LD, NY, PRC, U, UC, UPS, US, WAG, W). MEYERS and DINSMORE observed it 390 m below 'sealevel' (Dead Sea) at Ain Jidi, in February (flowers and fruits no. 1828; F, L). It is apparently a rare plant.

Specimens examined:

Var. stenostachya

Asia minor. Aucher 2623, pl. exs. (type).

Egypt. Sinai. Rüsimeyer s.n., 21–22.II.1889, Sinai, Wadi Taibe et el Marche; Schimper 103, 10 mai 1835, Unio It., ad radices montis Sinai (p.p., TL); Zohary s.n., 7.V.1940, S. Sinai, Oasis Wadi Feiran, near Convent and the Garden; Zohary et Feinbrun s.n., 8.V.1940, W. Sinai, Wadi Feiran, near the Garden and Convent; id., 8.V.1940, *ibid.*, Wadi Sheikh, ca. 25 km N. Convent St. Catherine.

Palestine. Ankori s.n., 14.3.1962, Wadi Figra (Arava Valley); Eig. s.n., 26.VIII.1926, ?Sharon Plain, ?Hadera; Evenari et Grizi 634, S. end of Dead Sea, Wadi Figra; Feinbrun s.n., 15.XII.1923, env. Dead Sea, Sedom; Kushnir s.n., 8.X.1941, *ibid.*, Ein Gedi; id., 23.I.1944, W. Dead Sea, *ibid.*; Meyers et Dinsmore 1828, Ain Jidi, Dead Sea Distr.; Zohary s.n., VI.1938, S. Dead Sea, Wadi Figra; id. 19.IV.1946, Negev, Makhresen Wadi Ramon; id., 22.IV.1946, *ibid.*, Wadi 'Ideid, near Qa'at Greir; id., 20.IV.1954, *ibid.*, Wadi Figra; id., 6.V.1965, Dead Sea, above Ein Gedi; Zohary et Waisel s.n., 27.II.58, Arava Valley, Eilat; Waisel s.n., 16.I.58, env. Dead Sea, slope to Sedom.

Var. eilatensis

Palestine. Glober s.n., 23.VI.1943, env. Aqaba, Arava Valley, type; Grizi s.n., 18.XII.1938, S. Dead Sea, Wadi Halil.

46. *Reseda stricta* PERSOON

Fig. 79

Syn. 2, 1806 (1807), p. 10; Muell. Arg., Mon. Rés. 1857, p. 167, tab. 8, fig. 114 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 573; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 894; Batt. in Batt. et Trab., Fl. Alg. 1888–90, p. 85; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 185; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 317; Senn. et Maur., Cat. Fl. Rif Or. 1933 (1934), p. 11; Jah. et Maire, Cat. Pl. Mar. 3, 1934, p. 888; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 440; Yeo in Tutin et al., Fl. Eur. 1, 1964, p. 348.

R.s. β funkii (Willk.) Muell. Arg., Mon. Rés. 1857, p. 169 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. l.c., p. 574; Lange, l.c. (= var. *funkii*).

R.s. α reuteriana (Muell. Arg.) Muell. Arg. in DC., l.c.; Batt., l.c.; Dur. et Schinz, l.c.; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1016; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 440 (= var. *stricta*).

R.s. β brachycarpa (Muell. Arg.) Muell. Arg. in DC., l.c., p. 573; Batt., l.c., p. 86; Dur. et Schinz, l.c. (= var. *funkii*).

R.s. γ gracilis (Muell. Arg.) Muell. Arg. in DC., l.c.; Batt, l.c.; Dur. et Schinz, l.c. (= var. *stricta*).

R.s. δ genuina Muell. Arg. in DC., l.c. (= var. *stricta*).

R.s. var. ?*subsessilis* Ball in Journ. Linn. Soc. Bot. 16, 1877, p. 340; Dur. et Schinz, l.c. (= var. *stricta*).

R. saxatilis Pourr. ex Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 500; Spreng., Syst. Veg. 2, 1825, p. 464; Ten., Fl. Neap. Prodr. App. 5, 1826, p. 96 (= var. *stricta*).

R. erecta Lag., Gen. Sp. Plant. Nov. 1816, p. 17 (= var. *stricta*).

R.e. β funkii Willk., Strand-, Steppengeb. Iber. Halbins. 1852, p. 104 (= var. *funkii*).

R. reuteriana Muell. Arg. in Bot. Zeit. 14(3), 1856, p. 37; id., Mon. Rés. 1857, p. 165, tab. 8, fig. 113 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858) (= var. *stricta*).

R.r. β brachycarpa Muell. Arg., ll.cc., p. 167 (= var. *funkii*).

R.r. γ gracilis Muell. Arg., ll.cc., p. 167 (= var. *stricta*).

R. gomberti Sennen, Diag. Nouv. Pl. Esp. Mar. 1936, p. 280 (= var. *stricta*).

Annual to perennial, erect or often ascending (20–)30–50(–100) cm tall herb; taproot lignescent.

Stems often solitary, sometimes branching, leafy, more or less papillose, pilose or glabrescent, delicately ribbed; pith disintegrating.

Leaves long attenuate towards base, puberulous, often glabrate or hirtellous, basal leaves entire, spatulate to elliptic, 5 cm long, 3 cm wide. Stem leaves ternately or biternately divided, up to 12 cm long with 1–3(–5) pairs of lobes, lobes ± equal, narrow, (1–)3–6(–8) cm long, (2–)7(–10) mm wide. Margins narrowly pallid.

Flowers pale yellow, on long, arching pedicels. Raceme slender, laxly flowered, up to 30(–more) cm long in fruit. Bracts deciduous, comose, yellow-green, glabrous, narrow-elliptic, 3 mm long, $\frac{1}{2}$ mm wide, acuminate; margins widely pallid, entire to scabridulous. Pedicel capillary, very finely ribbed, in flower $3\frac{1}{2}$ mm long and arching, in fruit 5 mm long, erect.

Sepals 6, persistent, often finally shed, glabrous, linear-(ob)ovate to -elliptic, $1\frac{1}{2}$ –2 mm long, ± 1 mm wide; margins pallid, entire.

Petals 2–4 mm long, exceeding the sepals. Superior petal often shorter than the others, 2–3 mm long, limb appearing 9–11-partite (incisions (nearly) to base), flabellate, as long as or shorter than the appendage, laciniae linear-spathulate, obtuse; appendage obovate, 2 mm long, $\frac{1}{2}$ mm wide, transverse rim continuous in front of limb-base. $\frac{1}{2}$ mm wide. Lateral or anterior petal 4 mm long (longer than superior petal), limb 7–9-partite, laciniae similar to those of superior petal, irregular, central lobe distinctly longer than the lateral lobes.

Disc $\frac{1}{2}$ mm high, 1 mm wide, sparsely puberulous-pilose; margin ciliate-papillose.

Stamens ca. 18, long exerted. Filaments deciduous, in upper part pilose-papillose, $3\frac{1}{2}$ –4 mm long. Anthers ellipsoid, 1 mm long, asperulous.

Ovary ellipsoid, glabrous, to minutely puberulous, obtusely 3-angled, ribs scabridulous, mouth hardly constricted, 3-toothed, teeth $\frac{1}{5}$ (-less) as long as ovary. Ovules ca. 14 on each placenta in 1 row.

Capsules erect, shortly stipitate, cylindric(-clavate), often obovoid, (6–)10–15(–18) mm long, 3–5 mm wide, walls glabrous to obscurely puberulous, 3-angled, ribs often minutely scabrescent, mouth truncate, gaping, often slightly contracted, minutely 3-toothed (teeth blunt, rounded).

Seeds dark-brown, very glossy, ovoid, $1\frac{1}{4}$ mm long, $\frac{4}{5}$ mm wide, ecarunculate; sinus wanting, represented by a shallow groove. Testa smooth.

Holotype: Hb. PERS. '*Reseda stricta* Syn. pl.' (L, sheet n. 908.185-128).

Distribution: Spain, in the eastern part, Algeria, Morocco and Tunisia.

Key to the varieties

Capsules cylindric to -clavate, 10–15 mm long. **a. var. stricta**
Capsules obovoid to broadly ellipsoid, 6–8(–9) mm long. . . . **b. var. funkii**

a. var. stricta

Capsules cylindric to cylindric-clavate, 10–15 mm long.

Distribution: Area of the species.

b. var. funkii (WILLK.) MUELL. ARG., Mon. Rés. 1857, p. 169.

Capsules obovoid to broadly ellipsoid, 6–8(–9) mm long.

Holotype: FUNK, at Baza, Spain (G).

Distribution: Spain, Algeria and Tunisia.

Taxonomical notes: In Index Kewensis (2, 1895, p. 697) *Reseda stricta* PERSOON is listed and 'Algeria' cited as country of origin. However, PERSOON (Syn. 2, 1807 (1806), p. 10) noted that the species is native to 'Hispania'.

In the Leiden Herbarium is a sheet from Herb. PERSOON, No. 908.185-128,

which is here adopted as having the type specimens of *R. stricta* PERSOON.

PERSOON's description exactly matches these specimens, of which the left-hand one is here designated, being slightly more complete than the right-hand specimen. The date of publication on the title-page of Synopsis Plantarum is 1807, but various authors correctly quoted 1806 (cf. PRITZEL, MUELLER, LANGE and YEO), and so 1806 has been adopted here.

Several varieties were distinguished by MUELLER (1857, 1868) and a doubtful one by BALL (1877). As the characters supposed for each variety seem to be variable and not correlated, it was decided to reject them, excepting var. *funkii*.

R. saxatilis POURR. was published by WILLDENOW (Enum. Pl. Hort. Berol. 1, 1809, p. 500), basing it on a specimen (fol. 9236, in Hb. WILLDENOW, B) collected by POURRET. MUELLER (Mon. Rés. 1857, p. 167), reduced it to the synonymy of *R. stricta* PERS. (l.c., 1806). It is to be noted that MUELLER (l.c.), cited '*R. saxatilis* POURR. in WILLD.' which is a misprint. In WILLDENOW's Enumeratio (1809) it was correctly printed '*R. saxatilis*'.

Afterwards MUELLER (in DC. Prodr. 16(2), 1868, p. 574), distinguished 5 infraspecific taxa in *R. stricta* PERS. and referred *R. saxatilis* POURR. ex WILLD. to *R. stricta* δ *genuina*. LANGE (in WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 894) also referred *R. saxatilis* to *R. stricta* PERS.

A specimen in the WILLDENOW Herb. (9236; Film 1057/5 (B)) is labeled 'no. 119. *Reseda saxatilis* caule simplicis superne ramoso foliis radicalibus simplicibus caeteris omnibus trifidis POURR.'. This is accepted as the holotype of *R. saxatilis* POURR. ex WILLD., and by this it is proved that the previous reductions by MUELLER (1857 and 1868), and LANGE (1880) are correct (= *R. stricta* PERS.).

LAGASCA stated (Gen. Sp. Plant. Nov. 1816, p. 17) that *R. erecta* occurs on chalky hills at Jumilla town in the region of Murcia and also near Aranjuez, as well as in Spain generally. He declared that *R. erecta* is a biennial plant which flowers in June and July.

No (type) specimen is mentioned. The description by LAGASCA does not show any difference from *R. stricta* PERS. Specimens answering LAGASCA's description of *R. erecta* collected near Aranjuez on chalk all proved to belong to *R. stricta*. Therefore, *R. erecta* LAG. is reduced to the synonymy of *R. stricta*. The type specimen is preserved in Hb. DC. (G), (cf. MUELL. ARG., Mon. Rés. 1857, p. 167 and in DC., Prodr. 16(2), 1868, p. 574).

MUELLER (in Bot. Zeit. 14(3), 1856, p. 37) based *R. reuteriana* on REUTER 1849, on MUNBY s.n., and on BALANSA Pl. exs. 1851, no. 23 and 1852, no. 201.

REUTER 1849 was collected in the Oran district, in sandy fields. MUNBY s.n. and BALANSA no. 201 were collected in the same region. BALANSA nr. 23 was collected in bushes near Mostaganem.

MUELLER (l.c.) referred in syn. to '*R. stricta* PERS. var. *reut.* in hb. BOISS.'. This manuscript or herbarium name has no nomenclatural standing. He also referred to '*R. stricta* MUNBY Fl. d'Alger. p. 47. non PERS.'. Finally MUELLER referred to '*R. saxatilis* BALANSA Pl. exs. 1852 no 201. non POURR.'.

The type specimen for the species is represented by REUTER 1849.

MUELLER distinguished 'var. β *brachycarpa*' which had much shorter obovoid

capsules. He based this on BALANSA Pl. exs. 1852, no. 201, preserved in Hb. BOISS. It was not a duplicate of BALANSA no. 201, preserved in Hb. DC.

A comparison of the type material and *R. stricta* PERS. proves them to be conspecific.

Reseda gomberti SENNEN was described in Diag. Nouv. Pl. Esp. Mar. 1936, p. 280, and based on a specimen collected by CRISÓGONO and C. GOMBERT near Toledo. The type specimen could not be examined but the data given in the protologue warrant reduction of *R. gomberti* to the synonymy of *R. stricta*.

Ecological notes: FAURE collected *R. stricta* on sandy grassy areas near Oran and near the sea (Algeria), at 860 m alt. end of May (fl. and fr.) in gypsaceous-calcareous soil between Chott M'Zouri and Chott Tins'ilt (s.n.; P). In Spain it grew in moist and dry fields, flowering April to June, near Almeria (PORTA et RIGO 256; BAS, BP, PR, PRC, WU), and on 'an dessin' hills near Aranjuez (Herb. A. DE RAYNEVAL), or on 'collibus gypsaceis' (LANGE), flowering in March; at Ocana (Aranjuez) on an undulating steppe, fl. in May (Stud. biol. Rheno-Trai., no. 1122; CAI, U). It grew on the spurs of Sierra de las Cabras near Murcia on calcareous soil at 500–700 m alt. (fl. and fr. in May, PORTA et RIGO 213; LD, NY, UC, W, WU). At Seo de Urgel-Organa (Sègre-ravine), it was collected at 500–800 m alt. on sandstone by RUTTEN-PEKELHARING (fl. and fr. in March). Near Gabes (Tunisia) it occurs on dry hills (KRALIK 189; GH, GOET, US, W, WRSL). In Maroc it was collected at 1000 m alt. at Guezouaja, Bu-Ilma (SENNEN et MAURICIO 9247; BRNU, NY, RAB, TL, W).

Specimens examined:

Var. *stricta*

Algeria. Alleizette s.n., IX.1920, IV.1921, Oran, Batterie Espagnole; Balansa 23, Mostaganem; id. 201, Batterie Espagnole, près Oran; Bourgeau s.n., 15.IV.1856, à Oran; Bové s.n., IV.1839, Mostaganem, Barbaria; Ceseve 6082, dép. Oran, Aïn-el Turck, cap. Falcon; Cosson s.n., 9.V.1892, Batterie Espagnole, env. Oran; Faure s.n., 28.IV.1910, 28.IV.1912, Oran, La Macta près Mostaganem; id., 13.IV.1917, 1.VII.1923, 31.V.1929, Cap. Falcon, près Oran; id., 9.IV.1926, 9.IV.1930, Ténira, près Sidi-Bel-Abbès; id., 2.V.1935, env. d'Oran; id., 31.VII.1938, Oran, Canstel; Lefebvre s.n., 24, 25.VIII.1861, prov. Alger, Bou Ismaël; Munby 76, Oran; Paris 422, between Chott M'Zouri and Chott Tins'ilt (Segnia); Reese s.n., 18.V.1932, dép. Oran, between Cristel and St. Cloud; id., 19.V.1932, Batterie Espagnole, bei Oran; Wariou s.n., 16.V.1876, prov. Oran, Miquis à Bou-Kamfes; Wariou s.n., 13.VI.68, El May (Sahara Oranais).

Morocco. Gandoger s.n., à 1910–11, El Garb; Sauvage s.n., 14.V.1962, Haut Msoun, Aknoul à Taja, Oued Termas; Sennen et Mauricio 7782, Hidum; id. 9247, Montagnes de Bu-Ilma.

Spain. Albo s.n., 3.V.1932, Santa Elma de Rindera (Cindad-Real); Bourgeau 851, Hellin; id. 1089, 1090, Roqueta près Almeria; id., 6.V.1854, Coteaux du Cerro de Aranjuez; Gandoger s.n., à 1879, Valencia; Hackel s.n., 12.VI.1876, Aranjuez; Hegelmeier s.n., 10.V.1878, prov. Alicante, Monodavo; Jerónimo 8247, Almeria, Sierra, sites frais du Cortijo Sacoste; Lange s.n., 21.V.1851–52, 19.V., 20.V, 21.V.1852, Aranjuez; id., 31.V.1851–52, Cienjiozuelos; Leresche s.n., 30.VI.1862, au dessus de l'Etange d'Oatigola près d'Aranjuez; Loscos 16, Aragon, pr. Castelseras, circumcirca El Pilon del Pilar; id., s.n., V.1884, S. Aragonia, près

Castelsérás; Loscos et Bernal s.n., 16.VI.1873, Aragonia, circa Castelserás, El Pilon del Pilar; Nilsson 544, Almeria-Roquetas, Sierra de Gador; Pau s.n., V.1897, Aranjuez, Cienporuelos; Porta et Rigo 213, Regn. Murcicum, pr. Agramon ad radices Sierra de las Cobras; Rayneval s.n., à 1824, d'Aranjuez; Reuter s.n., VI.1841, *ibid.*; Rodriguez s.n., 9.V.1954, Alrededous... Aranjuez (Madrid); *id.*, 19.VI.1954, La Maranota, San Martin de la Vege (Madrid); Rutten-Pekelharing 148, Pyrenées, Seo de Urgel-Organa, Segrekloof; Sennen s.n., 15.V.1932, Almeria, Sierra Cortijo Sacosta; Stud. Biol. Rheno-Trai. 1122 (1957), Prov. Toledo, near Ocaña; Vicioso s.n., IV.12, Aragon, Calatayud; Vogel s.n., 31.V.1853, Madrid, Aranjuez; Willkomm 554, *Castella novae centralis*, v.c. inter Horcajada et Carrascosa; Winkler s.n., 12.VI.1876, Aranjuez; de Wit 9892, 9894, Aranjuez-Titulcia-Ciempozuelos. Tunisia. Doumet-Adanson et Bonnet s.n., 22.IV.1884, Oued ?Leben; Murbeck s.n., 3.V. 1896, Dj. Regouba pre El Hamma.

Var. funkii

Algeria. Faure '55', 11.VI.1911, Oran, Quartiez du Cagneret.
Spain. Funk 9, Andal. or., Bazam-Cullar; *id.*, at Baza (type); Porta et Rigo 256, Sierra Alcaraz, Almeria, Barranco del Caballar, pr. Tornellas et Aguadulie et Sierra Alearag.
Tunisia. Kralik 189, Djebel Keroua prope Gabes.

47. *Reseda tefedestica* (MAIRE) ABDALLAH et DE WIT, *nov. comb. et stat.*

Fig. 80

Basionym: *R. pruinosa* Del. ssp. *tefedestica* Maire in Bull. Soc. Hist. Nat. Afr. Nord 20, 1929, p. 14; Ozenda, Fl. Sah. Sept. Cent. 1958, p. 276; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 440.

Annual, erect, pale green herb, 45(–more) cm tall; root unknown.

Stems solitary, sometimes branching at base, leafy, delicately ribbed, glabrous or minutely warty; pith solid.

Leaves all entire or upper ones deeply 2–3-sect, blade elliptic, entire leaves attenuate towards both ends, with petiole $4\frac{1}{2}$ –6 cm long, $1\frac{1}{5}$ – $1\frac{1}{2}$ cm wide, terminal lobe of dissected leaves the largest, $\frac{1}{3}$ longer and wider than the lateral, acuminate; margin entire, sometimes wavy. Petiole $1\frac{1}{2}$ –2 cm long, glabrous or warty and obscurely asperulous (like the main nerves).

Flowers white to cream, on erect pedicels. Raceme up to 15 cm long in flower; peduncle ribbed. Bracts deciduous, comose, linear-ovate, 6 mm long, $\frac{1}{3}$ mm wide, acutish; margin hyaline, crenate. Pedicels finely ribbed, muricately papillose especially towards top, in flower 2 mm long.

Sepals 6, deciduous, scabrid, linear to -obovate, 3 mm long, ca. $\frac{1}{2}$ mm wide, acutish, margin hyaline, minutely scabrid.

Petals $3\frac{1}{2}$ –4 mm long, exceeding the sepals. Limb of superior petal almost to base 4–11-palmate-partite or -sect, flabellate (central lobe exceeding the others), longer than the appendage; lobes narrow-oblong to linear-(sub)-spatulate, obtuse, central lobe (much) wider than the others; appendage obovate, ca. 2 mm long, ca. $1\frac{1}{2}$ mm wide, transverse rim usually interrupted at the

middle of the limb, narrow, ($\frac{1}{4}$ mm wide); margin papillose. Lateral petal smaller, laciniae of the limb less in number, often limb deeply bipartite, lobes oblong(-spathulate). Anterior petal usually simple, very rarely up to 5-partite; lobes rather wide and oblong-spathulate.

Disc $\frac{3}{4}$ mm high, 2 mm wide, minutely papillose, margin crenate.

Stamens ca. 20. Filaments deciduous, $2\frac{1}{2}$ mm long. Anthers oblong-ellipsoid, $1\frac{1}{2}$ mm long.

Ovary cylindric, short stipitate, papillose; teeth 4, sometimes 3. Ovules numerous, \pm 35 per placenta, in 4–6 rows, imbricate.

Capsule not seen.

Type: Dr. R. MAIRE 193, Iter Saharicum 1928. In montibus Tefedest, in rupestr. graniticis secus amnem Araghan, prope fontem, 1180 m, die 10 aprilis (BRNU, sheet no. 187626; isotype).

Distribution: Known from the type locality only (Algeria, Central Sahara).

Taxonomical notes: MAIRE (in Bull. Soc. Hist. Nat. Afr. Nord 20, 1929, p. 14) cited no collector's number in the protologue, but appears to refer to at least no. 193 and 194, judging from his ecological data. Here no. 193 is designated as the lectotype.

In some flowers the bilobed lateral petal appears to be represented by 2 single-lobed petals, the pair flanked by a superior petal and the anterior petal on the other side. Possibly this 'dedoublement', by which the number of petals is increased to 8, is to be seen as an abnormality.

R. tefedestica is imperfectly known in the absence of capsules (and seeds). Its place in the key, therefore, is uncertain, although it is closely placed to *R. pruinosa*, which supports the view of a close affinity expressed by MAIRE.

Specimens examined:

Algeria. Maire 193, Mt. Tefedesticae (lectotype); id. 194, *ibid.*, river Agelil.

48. *Reseda telephiifolia* (CHIOVENDA) ABDALLAH et DE WIT, *nov. comb. et stat.* Fig. 81

Basionym: *Stefania telephiifolia* Chiov., Fl. Somala I, 1929, p. 77, tab. II, f. 1, '*telephiifolia*'.

Low (sub)shrub, pale green and 50(–more) cm tall; taproot ligneous.

Stems ?few, branching, leafy, delicately ribbed, papillose-scabridulous; stems

solid or almost so.

Leaves all entire, sessile, fleshy and wrinkled when dry, glabrous, ovate, sometimes elliptic or narrowly obovate, $1\frac{1}{2}$ – $2\frac{1}{2}$ cm long, $\frac{1}{2}$ to almost 1 cm wide, attenuate into a short semi-petiole, acutish; margin entire.

Flowers white (pale yellow in dry specimens), on patent to curving pedicels. Racemes up to 20 cm long, peduncles scabridulous-papillose, rarely with few long hairs. Bracts deciduous, comose at raceme-top, narrowly linear-obovate, ca. 3 mm long, $\frac{1}{2}$ mm wide; margins pallid. Pedicels rather thick, delicately ribbed, glabrous or minutely scabridulous-papillose, 1–2 mm long, in fruit up to 3 mm long.

Sepals (5–)6, deciduous, glabrous, linear-obovate (slightly widened at top), $1\frac{1}{2}$ –2 mm long, ca. $\frac{1}{2}$ mm wide, broadly obtuse; margins minutely denticulate, pallid.

Petals 2–3 mm long, (slightly) exceeding the sepals. Superior petal longest, limb 5-palmately partite (incisions not reaching base), shorter than the appendage; central lobe slightly longer and wider than the others, lobes entire, linear-spathulate, appendage obovate, $1\frac{3}{4}$ mm long, 1 mm wide, transverse rim often interrupted in the middle, narrow, $\frac{1}{4}$ mm wide; margin papillulose. Lateral and anterior petals gradually reduced, sometimes limb of lateral petal and anterior petal very often simple.

Disc orbicular-excentric, $\frac{3}{4}$ mm high, $1\frac{1}{2}$ mm wide, glabrous to sparsely papillose, margin crenulate, minutely papillose.

Stamens ca. 12. Filaments deciduous, glabrous or rarely sparsely minutely papillose, 2– $2\frac{1}{2}$ mm long. Anthers oblong-obovoid, 1 mm long.

Ovary ovoid-cylindric, glabrous, closed, upper part inflated. Ovules 18–20 per placenta, in 3–4 rows.

Capsules patent to subpendulous, short stipitate, inflated, subglobose-ellipsoid, 7–8(–10) mm long, (4–)5–9 mm wide, more or less dull, laxly reticulate, main ribs impressed, mouth closed, bi-mucronate.

Seeds black, glossy, reniform, $\frac{3}{4}$ mm long. Sinus narrow, a funicle-remnant attached. Testa short-papillose, papillae blunt (as wide as high), comparatively wide-spaced, in regular rows.

Type: PUCCIONI and STEFANINI, 'Somalia sett.: Bacino del Darror, Halil Damólle 3.VII. (no. 1005)'.

Distribution: Northern Somalia.

Taxonomical notes: *R. telephiifolia* is allied to *R. ellenbeckii* PERK. It is easily distinguished from *R. ellenbeckii* by its scabrid stems, (almost) smooth pedicels, globular capsule, smaller seeds with less papillae and the solid pith of the stem. In the protologue CHIOVENDA used the spelling 'telefiifolia' and 'telephiifolia'; the latter was adopted being the orthographically correct one.

Ecological notes: The type was collected in the valley of Darror, in Somalia, fruiting in July. It is possible that the specimens examined come from the same region; flower and fruit in March.

Specimens examined:

Collenette 145, Hormo; Hemming 1641, Mijertein, 88 miles from Bosaso on Gado Road; Merla, Azzaroli, Fois s.n., III.1954, Migiurtinia, Valle del Darror Scusciuban; id., 19.III.1954, *ibid.*; Puccinoni and Stefanini 1005 (1110), Bacino El-Darror, Halil Damólle (holotype); Scortecci s.n., 25 Sett. 1927, Migiurtinia Settentrionale, Uadi Hoghèir.

49. *Reseda tomentosa* BOISSIER

Fig. 82

Diag. Pl. Or. Nov. Ser. 1, 1(1), 1842, p. 4; Walp., Rep. 2, 1843, p. 753; Muell. Arg., Mon. Rés. 1857, p. 149, tab. 7, fig. 105 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 432; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 576; Coode in Davis, Fl. Turk. 1, 1965, p. 505, fig. 20(14).

Annual or perennial, erect, \pm canescent herb, 30–50(–80) cm tall, sometimes branching from a rather slender taproot.

Stems erect, strict, densely leafy, laxly villose-tomentose or glabrous, (hairs white, thinly walled, ca. 2 mm long, \pm appressed), obscurely ribbed; pith disintegrating.

Leaves canescent, densely villose-tomentose to thinly puberulous or glabrous, pinnatisect (uppermost leaves tripartite), terminal lobe the largest, much exceeding the laterals, narrow-oblong or -(ob)ovate, $1\frac{3}{4}$ – $2\frac{1}{2}$ cm long, up to 1 cm wide, acute, base long attenuate, lateral lobes 3–15 mm long, 1–3 mm wide, \pm alternate, widely spaced; lobes of uppermost leaves linear, mucronate, acuminate; all margins entire.

Flowers white. Raceme up to 10 cm long when fruiting. Peduncles thinly villose-tomentose, ribbed. Bracts deciduous, comose (much exceeding flower-buds), glabrous, linear, 5–7 mm long, margin sometimes obscurely denticulate. Pedicels usually stout, ribbed, very often pilose above middle, $1-1\frac{1}{2}$ (–2) mm long in flower, $2\frac{1}{2}$ (–3) mm long in fruit.

Sepals 7–8, subsistent, \pm reflexed, punctate, glabrous, linear-spathulate, ca. 3 mm long, $\frac{1}{2}$ mm wide, obtuse; margin pallid, entire.

Petals 3– $3\frac{1}{2}$ mm long. Limb of superior petal (5–)11(–13)-palmatifid, flabellate, longer than appendage, central lobe longest, linear (\pm widened towards top), lateral laciniae linear, obtuse, limb-base papillose(-ciliate); appendage fleshy, elliptic-rectangular, ca. $1\frac{1}{2}$ mm long and wide, free rim continuous in front of limb, $\frac{1}{4}$ mm wide; margins densely ciliate. Lateral petal smaller, anterior part of limb usually missing. Anterior petal smallest, limb

simple.

Disc $1\frac{1}{2}$ mm high, $1\frac{1}{4}$ mm wide, papillose-tomentose; margin densely papillose.

Stamens ca. 28. Filaments deciduous, 3 mm long. Anthers ellipsoid, 1 mm long, slightly asperulous.

Ovary cylindric, obtusely 3-angled, 3-toothed, teeth ca. $\frac{1}{4}$ as long as ovary, sometimes with few hairs. Ovules ca. 16 per placenta, in 3(-4) rows.

Capsules erect, stipitate, cylindric, often somewhat asymmetrical, \pm 8 mm long, 5 mm wide, abruptly and short attenuate at base, side-walls sulcate, mouth constricted beneath the teeth, teeth up to $1\frac{1}{2}$ mm long.

Seeds greenish dark-brown, glossy, ovoid, $1\frac{1}{2}$ mm long, ecarunculate. Sinus wanting, represented by a shallow groove. Testa smooth.

Type: AUCHER-ELOY pl. exs. No. 2616, 2615 and 2618. 'In Cappadocia ad Euphratem' (syntypes; lectotype 2616: K).

Distribution: Turkey (Armenia).

Key to the varieties

Villose-tomentose or hirsute herb. **a. var. tomentosa**

Glabrous or thinly puberulous or very laxly pilose herb. . . . **b. var. glabrata**

a. var. tomentosa

Villose-tomentose herbs.

Distribution: Turkey, Armenia Region.

b. var. glabrata ABDALLAH et DE WIT, *nov. var.*

Herba omnino glabra vel sparsissime pilosa.

Type: P. SINTENIS 2953, 'Iter orientale 1890', Armenia turcica, Hassanova ad Kutit-tschai, in gypsaceis, 14.VII. (LD: holotype).

Distribution: Area of the species.

Taxonomical notes: The description of the colour of the seeds by BOISSIER as whitish, probably, refers to immature seeds; ripe seeds are greenish dark-brown.

In Lund Herbarium, 2 sheets of *R. tomentosa* are preserved, collected by SINTENIS. The first sheet, no. 1023, carries glabrous specimens. The second one, no. 2953, carries a specimen of which the leaves are very sparsely hairy. Both specimens are not typical, though they certainly belong in *R. tomentosa*. They represent a variety 'glabrata' characterized by the (near) absence of an indumentum.

Specimens examined:

Var. *tomentosa*

Turkey. Aucher-Eloy, Herb. d'Orient 2616, Cappadocia ad Euphratem; Coquebert de Montbret 2215, Euphrate; Reese s.n., 20.VI.1949, Asia Minor, Cataonia, Vilayet Malatya bei Darendá.

Var. *glabrata*

Turkey. Sintenis 1023, Armenia turcica, Chamá ad Euphratem, inter Tuzla et Nerskiep; id. 2953, ibid., Hassanova ad Kutit-tschai (holotype).

50. *Reseda tymphaea* HAUSSKNECHT

Fig. 83, 84

Mitt. Thür. Bot. Ver. Jena 6(1-2), 1887, p. 10; id. in l.c. N. Folge 5, 1893, p. 41; Vandas, Reliq. Form. 1909, p. 45; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 690; Yeo in Tutin et al., Fl. Europ. 1, 1964, p. 348.

R. macrosperma Rchb. β *anatolica* Fisch. et Mey., Ind. Sem. Hort. Petrop. 6, 1839, no. 2283, nomen; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 562 (= ssp. *anatolica*).

R. inodora Rchb. β *macrocarpa* Fisch. et Mey. in Flora 15, 1841, p. 119 (Ind. Sem. Hort. Petrop. 7, 1840, no. 2211), nomen (= ssp. *anatolica*).

R. i. \beta anatolica Boiss., Fl. Or. 1, 1867, p. 428; Muell. Arg. in DC., Prodr. l.c.; Coode in Davis, Fl. Turk. 1, 1965, p. 502, f. 20(1) (= ssp. *anatolica*).

R. epirotica Form. in Verh. Naturf. Ver. Brünn 33, 1895 (1894), p. 145; Vandas, Reliq. Form. 1909, p. 45 (= ssp. *tymphaea*).

Perennial, diffuse, pale green, 30-55 cm tall herb; taproot lignescent.

Stems many, arising from a crown of an often digitate taproot, branching above, densely leafy, glabrous or rarely very sparsely (papillose-)scabridulous; markedly ribbed; pith disintegrating.

Leaves glabrous or very sparsely (papillose-)scabridulous, partly tri- or pinnatisect, often subpalmatisect, long attenuate into a semipetiole. Basal leaves entire, narrowly oblong-obovate, or -spatulate, 4-5(-7) cm long, 1(-1 $\frac{1}{2}$) cm wide, obtuse; dissected leaves up to 8 $\frac{1}{2}$ (-13) cm long, terminal lobe the largest, ca. $\frac{1}{2}$ as long as the leaf-length, (ob)ovate-oblong, 4 cm long, 2 cm wide, lateral lobes narrowly oblong-(ob)ovate, $\frac{1}{2}$ - $\frac{2}{3}$ as long and wide as

terminal lobe, usually subopposite; lobes obtuse or acute, mucronate; margins narrowly pallid, asperulous.

Flowers white to pale yellow. Raceme up to 25 cm long in fruiting, occupying $\frac{1}{2}$ (-more) of the branch, flowers spreading, gradually curving downwards during ripening of the fruit, fruits hanging; peduncles ribbed. Bracts persistent, narrowly oblong to -(ob)ovate, 2-2 $\frac{1}{2}$ mm long, $\frac{1}{2}$ mm wide, up to 4 mm in fruit, acutish, margin narrowly pallid, minutely scabrid. Pedicels sulcate, angles minutely scabrid, in flower 4 mm long, in fruit up to 7-8 mm long, $\frac{1}{2}$ as long as capsule.

Sepals 6, persistent, patent to reflexed in fruit, fleshy, longitudinally punctate (margins and midrib minutely scabrid), narrowly oblong, spathulate, 2 $\frac{1}{2}$ -3 mm long and $\frac{2}{3}$ mm wide in flower, 5-8 mm long and $\frac{1}{2}$ mm wide in fruit, round obtuse, margin pallid, minutely scabrid.

Petals 3 $\frac{1}{2}$ mm long. Superior petal limb appearing 9-17-partite (3-sect, lateral lobe deeply multipartite), longer than appendage; central lobe narrowly linear-spathulate, $\frac{2}{3}$ as long as the adjacent laciniae of lateral lobes; lateral lobe deeply 4-8-partite, laciniae similar to central lobe in shape, appendage quadrangular-ovate, 1 $\frac{1}{2}$ mm long and as wide, transverse rim, continuous in front of limb, $\frac{1}{3}$ mm wide, crenate, papillose-ciliate, margins densely papillose-ciliate. Lateral petal smaller, anterior lobe reduced or (rarely) wanting; anterior petal usually entire, often the smallest, sometimes 2-3-partite.

Disc $\frac{3}{4}$ mm high, 1 $\frac{1}{2}$ mm wide, minutely puberulous, margin curved downwards, entire papillose-ciliate.

Stamens 14-20. Filaments deciduous, glabrous to minutely scabrescent, 2 $\frac{1}{2}$ mm long. Anthers ovoid-oblong, $\frac{3}{4}$ mm long, minutely scabrescent.

Ovary ellipsoid-ovoid, attenuate into a distinct stipe over the disc, turgid, entirely glabrous, rarely ribs scabrid, mouth slightly constricted, 3-toothed, teeth $\frac{1}{5}$ as long as ovary. Ovules ca. 7 on each placenta, in 2-3 rows.

Capsules pointing downwards or horizontally, distinctly stipitate over the disc, obovoid to (sub)globose, base usually abruptly attenuate, 8-15 mm long, 7-9 mm wide, submembranous, bladdery, side-walls inflated in subsp. *tymphaea*, walls glabrous, ribs often scabridulous, mouth contracted, widely opened, teeth minute, short triangular.

Seeds dark-ochreous, dull, reniform, 2 $\frac{1}{2}$ mm long. Sinus wide, filled with carunculoid tissue. Testa undulate-rugose (wrinkles interrupted), outer layer tardily detached.

Holotype: C. HAUSSKNECHT 'Iter Graecum 1885', Pindus Tymphaeus: in glareos. fl. Pindus infra Malakassi, Jul. 17 (JE; isotypes: PRC and W).

Distribution: Greece and Asia Minor.

Key to the subspecies

- Limb of anterior petal deeply 3-partite. Capsules obovoid, 12–15 mm long. **a. ssp. tymphaea**
Limb of anterior petal entire. Capsules (sub)globose, ca. 10 mm long. **b. ssp. anatolica**

a. ssp. tymphaea

Limb of anterior petal deeply 3-partite. Capsules obovoid, 12–15 mm long, bladdery, side walls inflated.

Distribution: Area of the species.

b. ssp. anatolica (BOISS.) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda inodora* Rchb. β *anatolica* Boissier, Fl. Or. 1, 1867, p. 428.

Differs in having a globose capsule (width equalling length) but the side walls not inflated, while the anterior petal has an undivided limb.

Holotype: WIEDEMANN, Anatolia, inter Safranbad et Tokat; (K; isotype: UPS).

Distribution: Greece and Asia Minor.

Taxonomical notes: In BRNM are two sheets numbered 19940/33, and a third one numbered 19939/33 carrying specimens collected by FORMÁNEK at 'Ephemiades, Epirus, 1.8.94' and from 'Dipatamos prop. Prosgali, Epirus, 4.8.94' respectively. One sheet of the number 19940/33 is accompanied by a manuscript of 3 pages, each titled 'Coll. Dr. ED. FORMÁNEK', and labeled '*Reseda epirotica*, FORM. 1894. = *Reseda tymphaea* HAUSK. 1887!'. The epithets were written in different ink.

On the other hand, in PR is preserved a sheet no 20860, originating from FORMÁNEK, collected in 'Ephemiades in Albania, 1894.VII., leg. FORMÁNEK'. This sheet is labeled '*Reseda tymphaea* HAUSK. (1887) (= *Reseda epirotica* FORM. 1894)'.
These specimens were apparently used when FORMÁNEK was describing *R. epirotica* and certainly the epithets on sheet no. 19940/33 were written later on. It seems certain that FORMÁNEK after publishing *R. epirotica* corrected himself and considered it conspecific with *R. tymphaea*, a correct decision proved by examining the material mentioned above which belongs to *R. tymphaea*.

Sheet number 19940/33 carrying FORMÁNEK'S manuscript, collected 1. VIII.94, is selected as type for *R. epirotica* FORM., though the specimen is poor.

F. E. L. FISCHER, C. A. MEYER and J. L. E. AVÉ-LALLEMANT declared (Index Septimus Hort. Bot. Imp. Petrop., in Flora 15, 1841, p. 119, Litt. Ber.) that a plant previously mentioned by them (Sem. Ind. nost. VI, 1839, no. 2283) as '*R. macrosperma* β *anatolica*' appeared to be identical with *R. inodora* β *macrocarpa* and, therefore, was different from *R. macrosperma*. They thus propose to transfer it to *R. inodora* RCHB. representing a variety β *macrocarpa*. There is no description. The name is to be rejected, but we note that the Sem. Ind. nost. VI, 1839, was untraceable and could not be consulted.

Specimens examined:

Ssp. tymphaea

Greece. Formánek s.n., 1.VIII.1894, Ephemiades, Epirus; id., 4.VIII.94, Dipotamos prope Progold, Epirus; id., VIII.1894, Ephemides in Albania; id., à 1896, Palaeo-castorn; Halácsy s.n., 8.VI.1893, Aetolia, Mt. Chalkis (Varassova Nodie) ad sinum Patranum; Haussknecht s.n., 17.VII.1885, Pindus Tymphaeus, fl. Pendeus, infra Malakassi; Heldreich s.n., 16.VII.1885, Penei circa Malakassi, ad B(c)enium; id., 8.VI.94, Achaia, in faucibus Diakophoto; Rechinger 20572, Phitiotis, Lamia occid. versus; id. 22950, Thessalia inter Kedron et Lutropigi (Smo Kovo); id. 23227, Epirus, Mt. Mitsikeli prope Joannina; K.H. et F. Rechinger 8649, Mt. Vermion prope Naussa; Sintenis s.n., 6.V.1896, Thessalia, Pindus Tymphaeus, Klinovo; id. 619, *ibid.*, valle Penei; id. 1298, *ibid.*, Karditza in pag. Bladsu.

Ssp. anatolica

Greece. Adamović s.n., V.1903, ad Thessalonicum; Velenovsky s.n., à 1902, ad Saloniki (Thessaloniki) b. Tosev, Macedonia. Dimonie s.n., IV.09, prope Vodena.

Turkey. Asia minor. Bagda s.n., 20.VI.1940, Erzincan; J. & F. Bornmüller 13744, Paphlagonia, ad opp. Çankri, vallis Çakmakli-Dera (Tschangry, Germanicopolis); Dörfner 445, Usküb (Üsküp); Godfrey et Kasapigil GH-902 prov. Eskisehir, near Sivrihisar; Reese s.n., 19.VI.1939, Galatia, Vilajet Ankara, Irmak; Simon s.n., 20.VI.1955, Vil Çankiri, W Çankiri; id. s.n., Anatolia, Vil. Çankiri, Weslich ausserhalb der Stadt Çankiri; Sintenis 3648, 3649, Paphlagonia, Wilajet Kastambuli, Tossia, prope Kawak-Tschsme; id. 4354, *ibid.*, valle Giaurtschi-Dera; Wiedemann s.n., s.d., Anatolia (type of *R. inodora* var. *anatolica*).

51. *Reseda undata* LINNAEUS

Fig. 85

Syst. Nat. ed. 10, 2, 1759, p. 1046; Murr., Syst. Veg. ed. 14, 1784, p. 468; Vahl, Symb. 2, 1791, p. 52; Murr., Syst. Veg. ed. 15, 1798, p. 368; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 726, quoad nomen; Richt., Cod. 1835, p. 463; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 558; Yeo in Tutin et al., Fl. Europ. 1, 1964, p. 347.

R.u. * *abortiva* (Muell. Arg.) Muell. Arg., l.c., p. 559 (= var. *undata*).

R. alba β L., Sp. Pl. 1, 1753, p. 449; Richt., Cod. Linn. 1835, p. 468 (= var. ?*undata*).

R.a. subsp. *gayana* (Boiss.) Maire in Jahand. et Maire, Cat. Pl. Maroc 2, 1932, p. 315, (quoad nom. (by inference)); Emb. et Maire, Cat. Pl. Maroc 4, 1941, p. 1016, (quoad nom.) (= var. *undata*).

R. gayana Boiss., Voy. Bot. Esp. 1, 1839 (1839–45), tab. 21; id., l.c. 2, p. 76; Walp., Rep. 2, 1843, p. 752; Muell. Arg., Mon. Rés. 1857, p. 111, tab. 6, fig. 89 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 892; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 688 (= var. *undata*).

R.g. *aa abortiva* Muell. Arg., ll.cc., p. 114 (= var. *undata*).

R.g. var. *brevipes* Rouy, fide Pau in Cavanillesia 4(10), 1931, p. 156 (= var. *undata*).

R. leucantha Hegelm. ex Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 892 (= var. *leucantha*).

R. fruticulosa L. var. *gayana* (Boiss.) Pau in Mem. Mus. Cienc. Nat. Barcel. Bot. 1(1), 1922, p. 27 (Nuev. Contr. Fl. Granada); Maire in Bull. Soc. Hist. Nat. Afr. Nord 24, 1933, p. 201 (= var. *undata*).

R.f. subsp. *gayana* (Boiss.) Maire in Bull. Soc. Hist. Nat. Afr. Nord 24, 1933, p. 201; Emb. et Maire, Cat. Pl. Maroc 4, 1941, p. 1016 (= var. *undata*).

R. toletana Sennen, Diagn. Nouv. Pl. Esp. Mar. 1936, p. 279 (= var. *undata*).

Tereianthes undata Rafin., Fl. Tell. 3, 1837 (1836), p. 72; Merr., Ind. Rafin. 1949, p. 132 (= var. *undata*).

Annual to ?perennial, erect to ascending, slightly glaucous herb, (20–)40–60 (–75) cm tall, branching from a rosetted leafy base and a lignescent taproot.

Stems solitary or few, erect-ascending, branching, generally leafy below and bare above, glabrous, rarely scaberulous on the ribs; pith disintegrating.

Leaves pinnatisect (incisions varying in depth), radical leaves numerous, large, stem leaves few, smaller, glabrous, 10–20 cm long, $1\frac{1}{2}$ – $2\frac{1}{2}$ cm wide; lobes 8–15(–23) on each side (fewer in stem leaves), narrow (ovate to subulate), up to 1 cm long and up to $\frac{1}{2}$ cm wide, short lobes usually alternate with long ones, acute, sometimes mucronate; margins pallid, minutely scabrid, \pm undulate.

Flowers pale yellow (sometimes deep yellow when dry), rarely white. Raceme erect, generally nodding at top, dense, up to 30 cm long in fruit, flowers gradually patent; peduncle ribbed, scaberulous. Bracts persistent, tufted at top of raceme (exceeding flower buds), finally straw-yellow, linear-ovate, $2\frac{1}{2}$ –3 mm long, $\frac{1}{4}$ mm wide, distinctly longer than flower-pedicel; margin pallid, entire to sometimes sparsely denticulate. Pedicels short, acutely ribbed, usually finely scabrid, 1–3 mm long in flower, slightly longer in fruit.

Sepals 5, rarely 6, persistent, superior sepal shorter than the others, glabrous, $1\frac{1}{2}$ – $2\frac{1}{2}$ mm long, $\pm \frac{1}{2}$ mm wide, acute; margin hyaline, \pm denticulate.

Petals $3\frac{1}{2}$ – $4\frac{1}{2}$ mm long. Limb of superior petal cuneate towards base, 3(–5)-lobed or -cleft, (incisions often ca. $\frac{1}{2}$ downwards), twice (–more) as long as appendage, irregularly flabellate or central lobe often slightly longer and

narrower than lateral. Lobes entire, linear, lateral lobe entire or \pm incised. Appendage claw-shaped, obovate, 1 mm long, $\frac{3}{4}$ mm wide, transverse rim in front of limb-base absent; margin \pm undulate, sparsely papillose. Lateral and anterior petals gradually reduced, lobes and incisions usually less than those of superior petal. Anterior petal narrow, mostly 3-lobed.

Disc 1 mm high, $2\frac{1}{4}$ mm wide, glabrous; margin membranous, curved downwards, crenate.

Stamens 8–10, not exerted. Filaments persistent, $1\frac{1}{2}$ mm long. Anthers oblong, 1 mm long, $\frac{1}{2}$ mm wide, slightly asperulous.

Ovary obconical, urnshaped, short stipitate, papillose, obscurely ribbed, 4-toothed, teeth $\frac{1}{3}$ as long as ovary, stigma obvious. Ovules ca. 12 on each placenta, in 2(–3) rows.

Capsule erect, stipitate, obovoid (to -cylindric), from the top gradually narrowing towards the base, (4–)6–8(–10) mm long, 4(–6) mm wide, bladdery, glabrous or sparsely scabrid, obtusely ribbed, ribs often scabrid, mouth slightly contracted and \pm depressed, widely gaping.

Seeds dark-brown, subglossy, globose-reniform, $\frac{4}{5}$ mm long. Sinus narrow. Testa echinate-papillose.

Caryology: KAERCHER et VALDES-BERMEJO reported (Anal. Inst. Bot. Cavanilles 32(2), 1975, p. 165–174) *R. undata* L.: $2n = 20$; $n = 10$ (and judged *R. undata* an 'endémisme ibérique').

Holotype: LINN 629.16, *undata* B.

Distribution: Spain, Morocco.

Key to the varieties

- Racemes ca. as long as bearing stems. Ripe capsule up to 1 cm long. a. var. *undata*
Racemes longer than bearing stems. Ripe capsule up to $\frac{1}{2}$ cm long. b. var. *leucantha*

a. var. *undata*

Racemes nearly as long as their bearing stems, finally rather lax. Capsules large, 6–8(–10) mm long and 4(–6) mm wide.

Distribution: Area of the species.

b. var. leucantha (HEGELM. ex LANGE) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Reseda leucantha* Hegelm. ex Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 892.

Distinguished by dense racemes, occupying $\frac{2}{3}$ of the stems; small, white flowers, pedicels short, up to $1\frac{1}{2}$ mm long; capsules small, 4(-5) mm long, 3-4 mm wide; seeds small, ca. $\frac{1}{2}$ mm.

Type: Hispania, Prov. Alicante, Orihuela, solo glareoso arido, F. HEGEL-MAIER s.n., 4.V.1878 (C: holotype !; WRS�: isotype!).

Distribution: Spain, provinces Alicante and Murcia.

Taxonomical notes: LINNAEUS described *R. undata* in 1759 (Syst. Nat. ed. 10, 2, p. 1046). The description (in the entry '6') runs as follows:

'*undata* B. R. fol. pinnatis: radicalibus dentati alternis minoribus, flor. trigynis tetragynisve, calycino dente supremo minimo'.

It would seem that the specimen LINNAEUS described was not carrying fruit.

LINNAEUS described in 1762 (Sp. Pl. ed. 2, 1, p. 644) *R. undata* for the second time. He more or less repeated his earlier description, cited 'BARRELIER (rar. 78, t. 588)', and added many more details. The main points of importance are: 'Antherae luteae, 10', and 'Capsulae hujus generis maximae'.

There is, of course, no certainty whether the specimen described in 1762 was conspecific with that of 1759. On the other hand, the description of 1762 certainly was made to include the description of 1759, and was intended to cover both specimens. BARRELIER's tabula (l.c.) cannot be identified with certainty, see also the notes to *R. alba* and *R. fruticulosa*.

In the Linnean Herbarium are 2 specimens, 629.16 and 629.17, which are accompanied in msc. by the name '*undata*' (cf. SAVAGE, Cat. Linn. Herb. 1945, p. 85), which may very well have been written by LINNAEUS (cf. JACKSON, Suppl. Proc. Linn. Soc. 1912 (1911-12), pp. 25, 125, 126).

If the characters of both specimens are combined, the Linnean data concerning *R. undata* (of 1759 and 1762: 10 stamens, and the largest fruits in the genus) are present. Therefore, it would seem, that the two specimens were used for the Linnean description of 1762; they may be adopted as the base of the 1762 description.

It is to be noted that 629.17 carries large fruits ('the largest in the genus', i.e. the 11 species recognised by LINNAEUS in 1762) and in consequence the description of 1759 must rest on 629.16 because that is without fruits. Moreover, the fruiting specimen 629.17 is not with 10 stamens in the flower. This is found in 629.16. As a result, it seems inevitable to assume that the description of

R. undata of 1759 rests on 629.16.

The specimen 629.17 represents what was afterwards named and described as *R. suffruticosa* by LOEFLING in 1766 (see *R. fruticulosa* L.). The specimen 629.16 represents what was afterwards described as *R. gayana* BOISSIER in 1839 (= *R. undata* L.). LINN 629.16 and LINN 629.17 indeed represent two different species.

It appears furthermore that *R. undata* L. dates from 1759 and that LINNAEUS's second description of 1762 leads to error, being based on two specifically different specimens. Of course, the 1759 description of LINNAEUS is entirely inadequate but by means of typification it can be clearly established what was meant by *R. undata* L. (1759).

It is to be noted that the Linnean description of *R. undata* L. of 1762 cannot be made to apply to any species of *Reseda*: the biggest-fruited *Reseda*-species definitely has more than 10 stamens to the flower. Therefore, LINNAEUS could not have made his 1762-description from one single specimen. The circumstance that two specimens are preserved in the Linnean Herbarium which together account for the 1762-description of *R. undata*, proves the view to be correct that both specimens were actually used by LINNAEUS in drafting the second description. One may well believe that when LINNAEUS obtained the second (fruiting) specimen of, as he believed, the same species, viz. *R. undata* L. (1759), he decided to complete the earlier description now he was able to. As the two specimens belong to different species a source of continued error was created in 1762.

It may be remarked that although MUELLER treated *R. undata* L. under the name *R. gayana* BOISS. in his monograph (1857, p. 111, 112), he virtually had come to the same conclusion as was explained here. He replaced *R. gayana* BOISS. by *R. undata* L., as priority demands, in 1868 (in DC., Prodr. 16(2), p. 558). On the other hand, MUELLER did not consider *R. suffruticosa* LOEFL., which is linked with the typification of *R. undata* L. The (holo)type of *R. suffruticosa* LOEFLING is LINN 629.17 (pinned to 629.16; see also *R. fruticulosa*). As a final remark it is to be noted that SAVAGE read on 629.16 'A *undata*' but, it is very difficult to interpret the first written character. It might also be accepted as a 'β' or an 'α'. B, written on the same sheet, refers presumably to B on p. 1046 (Syst. Nat. ed. 10, 2, 1759), where *R. undata* is marked 'B', which is another reason to appoint 629.16 B as the holotype of *Reseda undata* L. A written note by LINNAEUS in his personal copy of Sp. Pl. 1753 (opp. p. 449) confirms the here circumscribed concept of *Reseda undata* L. as it has no reference to large fruits.

R. gayana BOISS. was published in 1839 (Voy. Bot. Esp. 1, 1839 (1839-45), tab. 21) by reference to a picture provided with many details. A description of the species, with reference to the above mentioned tabula, was supplied by BOISSIER in volume 2 of the same work (l.c., 1839 (1839-45), p. 76). It would seem that both works were published simultaneously. In case that volume one, containing tab. 21, had been published before volume two, as the numbers of the volumes would suggest, *R. gayana* BOISS. was, according to the Code, validly published. For the years of publication of BOISSIER's Voy. Bot. Esp. see

STAFLEU, Tax. Lit. 1967, p. 41.

R. gayana was based on specimens collected near Ronda, near Igualeja, Ronda en el Tago, and between Ronda and Atajate at 2000–3000 feet.

PAU based *Reseda fruticulosa* L. var. *gayana* (BOISS.) PAU (in Mem. Mus. Cienc. Nat. Barcel. Bot. 1(1), 1922, p. 27) on *Reseda gayana* BOISS. This latter species (and the supposed variety *gayana* (BOISS.) PAU) are reduced in the present study to *Reseda undata* L.

LANGE (in WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 892) published with taxonomical doubt '*R. leucantha* HEGELM. mscr.'. When examining the type specimen(s) it appears that they belong in *R. undata* L. (1759), although representing an infraspecific taxon. Therefore, *R. leucantha* HEGELM. ex LANGE is a synonym to *R. undata* L. (1759).

Reseda toletana SENNEN was described in Diagn. Nouv. Pl. Esp. Mar. 1936, p. 279, and based on a specimen collected by H. CRISÓGONO and C. GOMBERT near Toledo. It was not possible to examine the type. The author stresses affinity with *R. gayana*, a synonym of *R. undata*, and all data he supplies match *R. undata* perfectly. *R. toletana* is, accordingly, reduced to synonymy.

Ecological notes: *R. undata* is limited to the mountainous regions in SE. Spain, in a coastal strip of generally not over 100 km wide. It penetrates, however, into Central Spain locally (Ciudad Real, Aranjuez, Madrid, and near Teruel). There is a preference for calcareous soils. It flowers in spring or early summer and has a slight tendency to become weedy on open, waste, grassy places. BOISSIER collected it at \pm 800 m alt., in the Ronda region, where it flowered and bore fruit in May and June.

Specimens examined:

Var. *undata*

?Morocco. Gandoger s.n., IV.1909, K. Zeluam; id. à 1910–11, Dj. Anna; id. à 1910–11, Guerouan.

Spain. Abbo s.n., 7.V.1932, Santa Elena de Ruidera (Cuidad-Real); Boissier s.n., à 1837, Mt. Ronda; Boissier et Reuter s.n., à 1849, Serrania de Ronda; Borja s.n., VII.1964, Almazan (Soria); Bourgeau 62, Ronda; id. 852, Hellin; id. 1088, Cartagena; id. 1694, Sierra de S. Antonio près Alcoy; id. 2275, Alcalá de Henares près Madrid; Campo s.n., à 1852, Sierra Nevada; Costa s.n., VI.1804, pr. Sanahuja; Elias s.n., 8.VIII.1906, Castilla, Mirande de Elbo; id. 3.X.1911, ibid., Miranda; Funk s.n., à 1879, Cartagana; Gandoger s.n., à 1879, Cadiz; id. VI. 1898, Serrania de Cuenca; Gautier s.n., 27.VI.1896, Prov. Almeria, près de la Gare de Dona Marin; Ginzberger s.n., 15.VII.1924, SO von Madrid, zwischen der Eisenbahn Station Vaciamardio und der Brücke über den Tarrama; Hackel s.n., 12.VI.1876, Aranjuez; Hueter c.s. 954, Granatense, Baranco del Caballar pr. Almeria; Jerónimo s.n., IV.1927, Lorda; Jover s.n., VI.1863, ?Sanahuja, Catalaunia; H. Knoche s.n., 31.III.1906, Orihuela; St. Lager s.n., 24.VI.1908, Prov. Almeria, Illar; Lange s.n., 21.V.1851–52, 20.V. 1852, Aranjuez; id. 6.V.1852, Zumbalejo pr. Jaen; id. 1 & 7.VII.1852, Parador de Villanuble pr. Valladolid; Losa 5409, Burgos, Miranda de Ebro; Nilsson 234, Murcia-Espinardo; id. 381, La Roqueta; id. 458, Almeria, La Canada; id. 507, Cabo de Gata; id. 533, Almeria,

Barranco de Caballos; id. 1485, Lagunas de Ruidera, also from La Mancha, Guadiana alto; Porta et Rigo 235, Almeria, inter Cactus et Sierra Alhamilla; id. 744 (182), Albacete pr. Almansa; Reese s.n., 24.V.1929, Prov. Cadiz, bei Gratalema; id. 5.VI.1930, Prov. Granada, between Las Vertientes and Cullera de Baza; Reverchon 541 (1890), Andalousie, Grazalema; id. 541 (1891), Prov. de Valence, Porta-Celi; id. 541 (1893) Prov. Teruel, Valacloche; id. 541, 4303 (1894), *ibid.*, Albarracin; id. 541 (1895), *ibid.*, Orihuela; id. 1167 (1899), Prov. Almeria, Velez-Rubio, Sierra del Castillon; id. Sierra de Castril; *id.*, 1413, Prov. Jaen, Sierra de Cabrilla; id. s.n., VI.1907, Prov. Grenada, Sierra Grimona; Sennen et Elias 35, Castille, Miranda et Ameyugo; Sennen et Jerónimo 7109, Murcie, Lorca et Sierra Tercia; id. s.n., 7.V.1932, Almeria, Barranco de la Majnor; Sieber s.n., 3.V.53, Ronda, Stud. Biol. Rhenotrai. 1520 (1951), Prov. Aragon, near Iuera, N. Zaragoza; id. 547 (1962), Santa Pola, S. Alicante; id. 628 ('62), Prov. Alicante, W. Puerto Lumbreras; id. 1291 (1962), Sierra de Magina, SE Jaen to Huelma; Willkomm 474, Aragonia, prope Sarrion; Winkler s.n., 13.VII.1873, 13.VII.1876, Lanjaron; *id.*, 3 & 5.IV.1876, Almeria; id. 16.VI.1876, Aranjuez.

Var. leucantha

Spain. Bicknell s.n., 24.V.1900, Alicante; Buhani s.n., 14 Jun. 1858, In Pyren. merid. Aragon.; Codorniu s.n., 2.V.1876, pr. Cartagena; Hegelmaier s.n., 4.V.1878, Alicante (Orihuela), (type!); Jerónimo 4919, prov. Murcia, Lorca, id. 8248, Almeria, Sierra, barrancos; Pau 8238, Teruel, Garrion; Sennen 837, prov. Aragon, Teruel, El Puerto, Monreal; Sennen and Jerónimo 7105, Murcie, Lorca et Sierra Tercia.

52. Reseda urnigera WEBB

Fig. 86

Frag. Fl. Aethiop.-Aeg. 1854, p. 25; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1898 (1897), p. 186.

R. boissieri Muell. Arg. in Bot. Zeit. 14, 1856, p. 37; *id.*, Mon. Rés. 1857, p. 175, tab. 8, fig. 117 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); *id.* in DC., Prodr. 16(2), 1868, p. 567; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1898 (1897), p. 181; Muschl., Man. Fl. Egypt. 1, 1912, p. 441; Ramis, Bestimm. Fl. Aeg. 1929, p. 98; Dinsm. in Post, Fl. Syr. Palest. Sin. ed. 2, 1, 1932, p. 139; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Zohary, Fl. Palaest. 1, 1966, p. 337, tab. 492 (= *var. boissieri*).

R.b. var. boissieri Zoh., Fl. Palaest. 1, 1966, p. 337 (= *var. boissieri*).

R.b. var. pendula Plitm. et Zoh. in Zohary, l.c., Appendix p. 343 et p. 337 (= *var. boissieri*).

R. cahirana Muell. Arg., Mon. Rés. 1857, p. 176 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Boiss., Fl. Or. 1, 1867, p. 430, '*R. Kahirina*'; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 181; Bolle in Engl. et Prantl, Nat. Pflz. fam. ed. 2, 17b, 1936, p. 689; Dinsm. in Post, Fl. Syr. Palest. Sin. ed. 2, 1, 1932, p. 139, '*Kahirina*'; Täckh., Stud. Fl. Egypt. 1956, p. 51, tab. 51, '*Kahirina*' (= *var. urnigera*).

R.c. β ?boissieri (Muell. Arg.) Boiss., Fl. Or. 1, 1867, p. 430, '*R. Kahirina β ?Boissieri*' (= *var. boissieri*).

R. pampaniniana Maire et Weiller in Bull. Soc. Hist. Nat. Afr. Nord 30, 1939, p. 261-262, tab. XXX, Pl. XVII (= *var. urnigera*).

R. maris-mortui Eig in Palest. Journ. Bot., Jerus. ser. 4, 3, 1948, p. 171; Zohary, Fl. Palaest. 1, 1966, p. 338, tab. 492a (= var. *urnigera*).

Annual, erect to ascending or procumbent, dark green herb, 10–40 cm tall, mostly branching from a slender taproot.

Stems many, sometimes branching, ribbed; pith disintegrating.

Leaves often dark green, glabrous to minutely scabrid-papillose, entire, upper leaves 3-lobed. Basal and middle leaves entire, narrowly (ob)ovate-spathulate, 2–3 (rarely up to 7) cm long, 1 (rarely up to 2) cm wide, (broadly) obtuse to acute. Upper leaves incised, sometimes 3-lobed or -partite, terminal lobe the largest, $1\frac{1}{2}$ –2 as long as lateral, (ob)ovate, lateral lobe linear to narrowly ovate. All leaf-bases short attenuate, margins pallid, entire, sometimes minutely papillose-scabrid.

Flowers white or almost so. Raceme up to 12 cm long in fruit, peduncle strongly ribbed. Bracts \pm persistent, sometimes deciduous under the fruit, short comose and slightly exceeding flower buds at top of raceme, usually scaberulous, 3–5 mm long, margins almost hyaline, scaberulous. Pedicels sulcate, ribs papillose-scabrid; in flower $3\frac{1}{2}$ mm long, in fruit up to 6 or 7 mm, much longer than the calyx and almost as long as capsule.

Sepals 6, persistent, dark green, \pm inflexed in flower and fruit, usually scabrid, linear-oblong to -spathulate, sometimes the lateral sepals ovate, $2\frac{1}{2}$ –3 mm long, $\frac{1}{2}$ mm wide, broadly obtuse; margin smooth to minutely scabrid.

Petals 3–4 mm long. Limb of superior petal seemingly multipartite, (3-partite and lateral lobes semilunate, either or not incised, incisions shallow or deep), flabellate, $1\frac{1}{2}$ –2 as long as appendage; central lobe narrowly linear (or -spathulate), obtuse. Appendage obovate to rectangular, $1\frac{1}{2}$ –(2) mm long, 1–(1.5) mm wide, transverse rim continuous in front of limb, $\frac{1}{2}$ mm wide, erose; margins (papillose-)ciliate. Lateral petal smaller, anterior part of the limb usually reduced. Anterior petal smallest, 2–4-partite.

Disc 1 mm high, $\frac{3}{4}$ mm wide, sometimes minutely papillose, margin curved downwards, entire or slightly erose.

Stamens (13–)17–20. Filaments usually deciduous, glabrous to asperulous, 3–4 mm long. Anthers oblong to ellipsoid, $1\frac{1}{2}$ mm long, scabrid.

Ovary obovoid-cylindric, rounded at base, long stipitate (stipe up to $\frac{1}{3}$ as long as the ovary), glabrous, 3-toothed, teeth inflated. Ovules 8–12 per placenta, in 2 or 3 rows.

Capsule erect, or rarely pendulous, long stipitate above the disc, campanulate-urceolate, to cylindric, rounded at base, 5–10 mm long, 3–5 mm wide, membranous, reticulately veined, obtusely 3-angled (ribs sometimes minutely scabrid), mouth widely gaping, teeth minute.

Seeds dark olive green, glossy, obovoid, $1-1\frac{1}{3}$ mm long, carunculate. Sinus wanting, represented by a shallow groove. Testa smooth.

Neotype: G. SCHWEINFURTH no. 254 '*Reseda boissieri* MÜLL. ARG. im obern

Wadi Dugla (= W. Dégeli), zwischen Cairo und Suez (C; isoneotypes: CORD, PR, US, W, WRSL).

Distribution: Egypt, Libya (Cyrenaica), Palestine, Jordan and Syria.

Key to the varieties

Lateral lobes of superior petal deeply ca. 5-partite. **a. var. urnigera**
Lateral lobes of superior petal crenate to shallowly lobed.
. **b. var. boissieri**

a. var. urnigera

Lateral lobes of superior petal deeply ca. 5-partite.

Distribution: Egypt, Libya (Cyrenaica) and Palestine.

b. var. boissieri (BOISSIER) ABDALLAH et DE WIT, *nov. comb.*

Basionym: *Reseda kahirina* β ?*boissieri* (Muell. Arg.) Boissier, Fl. Or. 1, 1867, p. 430.

Lateral lobes of superior petal crenate to shallowly lobed. Capsule erect.

Type: E. BOISSIER, α 1846, in Aegypto inter Cahiram et Suez (hb. Boiss.).

Distribution: Egypt, Palestine, Jordan and Syria.

Taxonomical notes: *R. urnigera* WEBB (Fragm. Fl. Aethiopicae, 1854, p. 25) is not mentioned by MUELLER in his Monograph (1857) or in the Prodr. (DC., Prodr. 16(2), 1868), and is not treated by BOISSIER (Fl. Or. 1, 1867) nor is it mentioned e.g. by POST (Fl. Syr. Pal. Sin. ed. 1, 1896 and ed. 2, 1932), ZOHARY (Fl. Palaest. 1, 1966), TÄCKHOLM (Students' Flora of Egypt 1956) or any of the Libyan Floras. It seems that DURAND et SCHINZ (Consp. Fl. Afr. 1, 1898 (1897), p. 186), are the only authors who recorded it giving 'Afr. or.-bor.: Éthiopie' as its distributional area. In fact, the name seems to have been consistently overlooked. WEBB's description ought to have been more detailed but there is reason to accept *R. urnigera* WEBB as the species that was later described by MUELLER as *R. kahirana* MUELL. (Mon. Rés. 1857, p. 176). *R. urnigera* is distinguished by the long stiped capsule, a most unusual character in *Reseda*.

A neotype is designated here, i.e. SCHIMPER no. 254. No specimen collected by WEBB on which the description was based, could be traced.

MUELLER based the description of *R. boissieri* (Bot. Zeit. 14, 1856, p. 37) on specimen(s) collected by BOISSIER in Egypt, between Cairo and Suez, in 1846, deposited in BOISSIER's herbarium.

BOISSIER expressed doubt (Fl. Or. 1, 1867, 430) as to the taxonomical status of *R. boissieri* MUELL. ARG. He supposed that *R. boissieri* was only a young stage of *R. cahirana*. He provisionally reduced *R. boissieri* to a variety in *R. cahirana* (changing the spelling of the epithet into '*Kahirina*'; see also Taxa et Nom. rej.). A large range of specimens became available after MUELLER's and BOISSIER's studies and so it was possible to establish specific identity among *R. urnigera*, *R. cahirana* and *R. boissieri*.

It appears that *R. cahirana* and *R. boissieri* cannot be segregated morphologically but together they fall into the range of variability of *R. urnigera*.

The depth of the incisions of lateral lobes of superior petals seems, however, to provide a sound criterion for a varietal segregation. Therefore, individuals with entire, crenate or shallowly incised lateral lobes of superior petals represent var. *boissieri*, while deeply incised lateral lobes of the superior petal ('petalis digitato-laciniatis') characterize the typical variety in *R. urnigera*, i.e. var. *urnigera*.

PLITMANN and ZOHARY described *R. boissieri* MUELL. ARG. var. *pendula* (Fl. Palaest. 1, 1966, App. p. 343) basing their new taxon on EVENARI 111, Arava Valley, Wadi Fuqra (HUI) in Palestine. However, the ripe capsules of *R. urnigera* (an earlier name for *R. boissieri*) may be erect or pendulous and to this no other character is correlated. There is no ground for the distinction of a variety with pendulous fruits.

MUELLER based *R. cahirana* (Mon. Rés. 1857, p. 176) on KOTSCHY's no. 534 collected in 1855 at 'Mokkatam' near Cairo ('Cahiram') (hb. BOISSIER). *R. cahirana* MUELL. ARG. is reduced here in synonymy.

MAIRE et WEILLER described *R. pampaniniana* in Bull. Soc. Hist. Nat. Afr. Nord 30, 1939, p. 261. They mentioned that *R. pampaniniana* reached 50 cm in height and *R. arabica* BOISS. was its closest ally. It was occurring on sandy banks along the streams in E. Cyrenaica. The type specimen was collected 'au S.E. de Bomba (no. 132)' (Herb. Afr. Nord Univ. Alger). A photograph of the type specimen accompanied the description 'Plate XVII'. The name refers to RENATO PAMPANINI, who collected and studied the flora of Libya. The type specimen was not seen but fortunately a very careful and detailed description made it certain that a specimen of *R. urnigera* was at hand and accordingly the name *R. pampaniniana* is reduced to synonymy.

EIG described *Reseda maris-mortui* (in Palest. Journ. Bot., Jerusalem ser. 4, 3, 1948, p. 171) and based it on 4 specimens collected 'around the Dead Sea and toward the Negev'. The description shows no difference from *R. urnigera*. EIG noted that *R. maris-mortui* was 'easily distinguished from *R. boissieri* MUELL. ARG.' (= *R. urnigera*) 'by the deeply dissected lateral lobes of the petals, by the somewhat longer calyx and more divided leaves'.

In the present revision *R. boissieri* MUELL. ARG. (and *R. cahirana* MUELL. ARG.) are reduced to *R. urnigera* and so is *R. maris-mortui*. The differences indicated by EIG fall within the variability of *R. urnigera*. A specimen collected in the type region, identified as *R. maris-mortui* (ZOHARY, 6-4-1942, Dead Sea area, 1 km west of Massada Senon hills, between stones and gravel) proves to belong in *R. urnigera* while matching fully the description of *R. maris-mortui*.

Ecological notes: The neotype was collected in the upper part of Wadi Dugla (W. Dégeli), between Cairo and Suez by SCHWEINFURTH, who found it in flower and fruit on May 3, 1879. It grew on alluvial loamy sands in Qued-Segrir, between Guerrara and Berrian (Algeria). DRAR saw it S. of El Arish (Sinai) on calcareous soil. KOTSCHY collected it at 900 m alt., fruiting in April, on dry hills near Hebran (648).

Specimens examined:

Var. *urnigera*

Egypt. Eig s.n., 2.V.1925, Sinai, 2-3 km SE El Arish; Kotschy 534, prope Cahiram, in monte Mokkatam (type *R. cahirana*); Sa'ad 34, 13.III.1957, W. El-Liblab; Schweinfurth 254, W. Dugla, bet. Cairo & Suez, neotype (C).

Palestine. Aaronsohn 5301, Khirbet es-Samra, Mere Mort; Angelis s.n., 7.III.1954, W. Dead Sea, Metsada; Eig s.n., 3.IV.1925, env. Dead Sea, Callirhoe; id., 24.III.1926, W. Dead Sea, Ein Gedi; Eig, Feinbrun et Zohary s.n., 24.III.1926, around Dead Sea and towards the Negev, Ein Gedi, type of *R. maris-mortui*; id. s.n., 2.IV.1936, Negev, 18 km S El-Kuntilla; Kushnir s.n., 3.IV.43, env. Dead Sea; Orshansky s.n., 18.III.1947, Arava Valley, W. Fugra; D. Zohary s.n., 6.IV.1942, env. Dead Sea, 1 km W. Metsada.

Var. *boissieri*

Egypt. Ascherson s.n., 16.V.1887, Wadi El Arish; id. 540, W. Hennua; Davis 8256A & 10386, Gebel Jammum el Asmar; Drar s.n., 4.IV.1935, W. Heridin, S. El Arish; id. s.n., 4.IV.1939, N. Sinai, W. Heridin and Bir Lehfen, S. El Arish; Eig s.n., 1.VI.1925, env. El Arish; Hussein s.n., 8.V.1953, W. Gerawi; Imam & Ayyad s.n., 17.III.1957, W. Liblab, near Gebel Ahmar; Khattab 19, W. Hof; Sa'ad 34A, 13.III.1957, W. El-Liblab; Shabetai Z3177, Sellum, N.; id. 577D, W. El Arish; id. 6555, Gebel Yahmum el-Asmar, E.Suez Road at km 18; Simpson 1061, Wadi leading into W. Hof; id. 1099, W. of Asdood; id. 1131 & 1137, W. Hôp, above the inscription, Ogret El-Sheikh; G. Täckholm s.n., 2.IV.1926, small petrified forest, E. Cairo; id. s.n., 21.III.1928, Sinai, Bir Lehfen, S. el-Arish; M. Zohary s.n., 2.V.1925, Sinai, W. el-Arish; M. Zohary et Orshan s.n., 4.III.1962, Arava Valley, ca. 7 km N. Yotvetta.

Jordan (Transjordan). Davis 8826, W. Zerka.

Palestine. Angelis s.n., 20.IV.1950, c. Arava valley, W.'Ajrim; id. s.n., 9.III.1954, env. Dead Sea, Ein Gidi; Baldinger s.n., 15.III.1956, S. Dead Sea, W. Fukra; Dinsmore 13331, S. Magri; Eig. s.n. 23.III.1924, Judaean Desert, env. Ein Gedi; Eig c.s., s.n., 26.III.1926, env. Dead Sea, W. Daraja to Ras Feshha; Gabrielith s.n., 26.III.1929, env. Dead Sea, W. Um Baghag, Metsada; Lorch s.n., 3.V.1956, Negev, W. Khiani; Zahavi s.n., 25.III.1950, Negev, Jebel 'Alaliq; D. Zohary s.n., 7.IV.1942, env. Dead Sea, Senon Hills, W. Metsada; id. s.n., 5.V.1951, ibid., W. Um Baraq; M. Zohary s.n., 9.I.1926, ibid., W. Metsada.

Syria. Lowne s.n., IV. 1863, W. Zeweran.

Bull. Soc. Bot. Fr. 6, 1859, p. 392; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 578; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 86; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 185; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 317; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689; Keay in Hutch. et Dalz., Fl. W. Trop. Afr. ed. 2, 1(1), 1954, p. 108; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 274, fig. 84; Quézel, Miss. bot. Tibesti, Univ. Alger Inst. Rech. Sahar. 1958, p. 140; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 440, tab. 38, fig. 1221.

R.v. var. *typica* Maire in Bull. Soc. Hist. Nat. Afr. Nord 20, 1929, p. 14.

R.v.t. forma *brachypetala* Maire, l.c. 28, 1937, p. 338.

R.v. var. *garamantum* Maire, l.c. 20, 1929, p. 14; Ozenda, Fl. Sah. Sept. Centr. 1958, p. 274.

R.v. var. *glabrescens* Maire, l.c.; Ozenda, l.c.

R. sudanica A. Chevalier in Compt. Rend. Intern. Congr. Bot. 1900 in Act. Congr. Intern. Bot. (1900) 1901, p. 273.

Biennial to perennial, erect or sometimes ascending white velutinous-villous (canescent), sometimes glabrate herb, (30-)40-80(-more) cm tall, branching at base, taproot lignescent.

Stems usually branching, densely leafy, velutinous-villose, ribbed; pith solid.

Leaves canescent, velutinous-villous to tomentose (indumentum on blades less dense than on stem and petiole), all entire or superior (deeply) 3-partite, middle leaves the largest, narrowly ovate to oblong, long attenuate at base, 6-9 cm long, 1(-1½) cm wide; leaf-lobes similar in shape to entire leaves, terminal lobe largest, usually twice as long as lateral, narrowing into midrib, to 6 cm long, up to 1½ cm wide, lateral lobes up to 3 cm long, ½ cm wide; all margins entire, subcrenate.

Flowers whitish to yellow. Raceme very densely flowered, when fruiting 30-50(-more) cm long. Bracts deciduous or not, comose (much exceeding flower-buds), pale green, pilose-velutinous, especially on the margins, linear to subulate, varying in length, margins pallid, ± crenate. Pedicels villous, in flower 4 mm long, in fruit (slightly) longer, sometimes up to 6-7 mm long.

Sepals 6, deciduous, pilose-velutinous especially at base, oblong, 3-3½ mm long, 1(-more) mm wide; margins pallid, ± crenate.

Petals 4-5½ mm long, exceeding the sepals. Limb of superior petal with a large, widely spatulate central lobe, on either side accompanied by half a dozen or more, very much smaller, irregularly shaped, superposed, short laciniae, slightly longer than appendage; central lobe uninerved and laterally with netted veins, up to 2 mm long, 1 mm wide; appendage white, rather thick, broadly rectangular, to suborbicular, 2-3 mm long, 1½-2½ mm wide, (short) ciliate-papillose in marginal zone, transverse rim interrupted at the middle,

± 0,3 mm wide, ± lacerate; all margins densely ciliate-papillose. Lateral and anterior petal smaller, limbs entire, (rarely limb of lateral petal with few minute lateral laciniae on both sides of limb), tapering towards base.

Disc $\frac{1}{4}$ mm high, $2\frac{1}{2}$ mm wide, shortly papillose-ciliate; margin entire, minutely ciliate.

Stamens 30–60, in 1–2(–3) alternating rows, exceeding the petals. Filaments ± deciduous, smooth, up to 6–7 mm long. Anthers oblong-elliptic, smooth, ca. $1\frac{1}{4}$ mm long, obscurely asperulous.

Ovary cylindric to ellipsoid, ribs carrying placenta outside ciliate, other ribs punctate, otherwise glabrous, 3-toothed, ca. $\frac{1}{6}$ as long as ovary. Ovules 30 (–more) per placenta, in 3–4(–5) rows.

Capsules erect, rarely patent, short stipitate, narrowly cylindric, 10–15(–20) mm long, 5–7 mm wide, membranous, foveolate, side-walls glabrous, sulcate, ribs pilose, mouth gaping, slightly constricted beneath the teeth.

Seeds reddish-brown, dull, reniform, 1 mm long. Sinus narrow. Testa densely papillose.

Type: L. KRALIK 21, 'Plantae Algeriensis selectae ex sicc., 1858'. In rupestribus calcaries prope Metlili, in ditione Mzab, 11–13 maii. (C: holotype; GH, GOET, W: isotypes).

Distribution: Algeria, Morocco, (Tunisia), Libya, Tchad, Sudan.

Taxonomical notes: Index Kewensis (2, 1895, p. 697) listed the name *R. tomentosa* COSS. as being a synonym to *R. villosa*. COSSON (in Bull. Soc. Bot. Fr. 6, 1859, p. 392) described *Randonia africana* COSS. and *R. villosa* COSS. and did not make any reference to '*R. tomentosa*'.

It appears that the entry in Index Kewensis (l.c.) rests on an inaccurate citation by MUELLER ARG. (in DC., Prodr. 16(2), 1868, p. 578) and most probably Index Kewensis intended to correct the error by adding the name '*villosa*', seemingly as a synonym but actually as a corrected oversight. In any case *R. tomentosa* COSS. would be a later homonym to *R. tomentosa* BOISS. (1842). COSSON himself referred to the erroneous quotation by MUELL. ARG. (Bull. Soc. Bot. France 20, 1873, p. 242).

R. sudanica was published by A. CHEVALIER (in Act. Congr. Int. Bot. (1900) 1901, p. 273), who found the type specimen in 1899, on wet sand on the edge of the pool at Gassa, between Lake Faguibine and the marches of Daouna (Timbuktu region).

PERKINS reduced *R. sudanica* A. CHEV. to *R. villosa* COSS. (in ENGL., Bot. Jahrb. 43, 1909, p. 417), followed e.g. by KEAY (HUTCH. & DALZ., rev. KEAY, Fl. W. Trop. Afr. ed. 2, 1(1), 1954, p. 108), which he declared to occur in 'Sahara, Morocco and Algeria'. The type was not seen by the present authors, but there is nothing in the description indicating a difference with *R. villosa*.

Ecological notes: In Morocco it flowered and fruited in May (Tata; RAB 14501).

In the Anti Atlas mountains it was growing in a rocky steppe characterized by *Artemisia* near Issafeu (RAB 14503); at 1500 m alt. flowering in April (RAB 14504); at 1000 m, on desert rocks it was in full flower on the Djebel-Zagora (Draa) (GATTEFOSSÉ; AMD 038512).

In Algeria LETOURNEUX observed it on calcareous hills near Beni Isguen, M'Zab (C). CHEVALIER (161) collected it in April in calcareous hills near the palm groves at Ghardaia (F).

In Algeria it flowered at El Golea in February (RAB 14500). ANDREÁNSZKY found it in stony deserts in Colomb Béchar as dwarfed plants (BP 212406), and in dry pools somewhat larger at 900 m (BP 215893).

Specimens examined:

Algeria. Alleizette s.n., V.1922, S. Oran, Ounif; Andreánszky s.n., 23.IV.1927, 2.IV.1928, Ghardaia, Chebka; id., 22.IV.1928, Colomb Béchar, Dj. Béchar; Chevalier 161 (1897, 1902), Ghardaia; id. s.n., II-IV.1899, *ibid.*; id., 23.II.1904, Oued Mya prope loc. distr. Saf-Saf; Cosson s.n., 16.V.1858, Prov. Alger, Ghardaia, dans le Mzab; Faure s.n., 25.IV.1938, S. Oran, Beni-Ounif, vers le col Zenaga; Gram 218, Mouydir Mts, Oued Sahen Que Léb; id. 321, *ibid.*, Oued Iggesselen; id. 570, *ibid.*, Oued Rbi Khi; H. Knoche s.n., IV.1906, Prov. Oran, Mekalis; Kralik 21, prope Metlili in ditone Mzab; Lauternboon s.n., 4.IV.1910, Prov. Oran, Beni-Ounif; Letourneux s.n., II.1883, inter Ghardaia ad Beni Isguen (M'Zab); ?Lhote 260, Hoggar, Oued in Essebib; Maire s.n., 27.I.1930, Prov. Mzab, Ghardaia; Moràlès-Agacino et Rungs 84, Oued el Hamra, inter Tendorf et A. ben Tili; Paris 27, Metlili, Chambass Berazeguas; Sauvage s.n., 21.I.1948, Zemmour or., Galt à 2 km NE Tringuis; Vischer s.n., 9.IV.1928, Djebel Zenaga bei Figuig.

?Libya. Abidine 26, Tinget (Assa).

Morocco. Andreánszky s.n., 27.IV.1928, Boû Arfa; Balls B 2633, Ouarzazat, Hamada de Timikrit; Davis 576, Erfoud; Emberger s.n., 19.IV.1931, Anti-Atlas, entre Igherm et Issafen; id., V.1932, Dj. ?Brni à Tatta; Garnett 48/4, N Ait Ben Haddou; Gattefossé s.n., Draa, Djebel Zagora; Humbert s.n., IV. 1927, Kasr-es Souk; Lapincy et Rungs s.n., 2.IX.41, Wadi Tata; Maire 340, circa Ouarzazat; id. s.n., 13.V.1932, Taddert in valle Dades; Reese s.n., 16.V.1934, Grand Atlas, in Tal des Ziz ab Ksar es Souk; Stocken 63/25, Goulmima, S. High Atlas; Towell s.n., 23.IV.1932, Erfoud (Tafilalet).

Tchad. Guichard KG/Tib/49, Chad distr., Trou au Natron, Tibesti.

Sudan. Popov 86, near Goodan.

54. *Reseda virgata* BOISSIER et REUTER

Fig. 88

Boiss., *Diag. Pl. Nov. Hisp.* 1842, p. 6; Walp., *Rep.* 2, 1843, p. 752; Muell. Arg., *Mon. Rés.* 1857, p. 199, tab. 9, fig. 122 (et in *Neue Denkschr. Schw. Ges. Zuer.* 16, 1858); id. in DC., *Prodr.* 16(2), 1868, p. 581; Lange in Willk. et Lange, *Prodr. Fl. Hisp.* 3, 1880, p. 896; Bolle in Engl. et Prantl, *Nat. Pflz.fam.* ed. 2, 17b, 1936, p. 688; Yeo in Tutin et al., *Fl. Eur.* 1, 1964, p. 347.

R. v. aa abortiva Muell. Arg., Mon. Rés. 1857, p. 200 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 581. (See also Taxa et nomina rejicienda sub *R. filiformis*).

Perennial, erect or ascending, glaucous herb, 30–45(–60) cm tall, densely branching at base; taproot woody, thick, its crown digitate or lobed.

Stems numerous, slender, often branching, densely leafy at base, glabrous, ribbed; pith disintegrating.

Leaves glaucous, fleshy, strict, entire, narrowly linear, 2–4(–5) cm long, $\frac{3}{4}$ –1 mm wide (usually the same width throughout the lamina), acute, mucronulate; margin entire, provided in the lower half of the leaf with (2–)4 pairs of yellowish white, subulate, 1–2 mm long, widely spaced dents.

Flowers ochraceous-white, on short pedicels. Raceme slender, 10–20(–25) cm long in fruit. Bracts persistent, not exceeding flower-buds, pale green, glabrous, linear-ovate to -subulate, $1\frac{1}{2}$ –2 mm long, $\frac{1}{2}$ mm wide at base; margin widely (especially at base) pallid, entire. Pedicels strongly ribbed, $1\frac{1}{2}$ –2(–5) mm long in flower, slightly longer in fruit.

Sepals 6(–7), persistent, narrowly ovate, $1\frac{1}{2}$ –2 mm long, $\frac{3}{4}$ mm wide near base, \pm acuminate; margin pallid, entire.

Petals $3\frac{1}{2}$ mm long, much exceeding the sepals. Limb of superior petal obovate-cuneate, nearly down to middle 3(–5)-fid, often lateral, lobes shallowly bilobed, more than twice as long as appendage. Central and lateral lobes ca. equally wide and shaped. Appendage orbicular-obovate, 1 mm long and wide; transverse rim continuous in front of limb, $\frac{1}{4}$ mm wide; margins entire, glabrous. Lateral and anterior petals simple, limb narrow-oblong to linear, appendages wanting.

Disc $\frac{1}{2}$ mm high, $1\frac{1}{4}$ mm wide, glabrous, nearly entire.

Stamens 16–18. Filaments persistent, glabrous, 2 mm long. Anthers ovoid, $\frac{1}{2}$ mm long.

Ovary campanulate, depressed, short stipitate, smooth but the side-walls sulcate, 4-toothed, as long as the ovary. Placenta forked. Ovules 8–10 per placenta, in 1 row.

Capsule erect, subsessile, obovoid-globose, 3 mm long, $3\frac{1}{2}$ mm wide, glabrous, mouth depressed and contracted at top, gaping, teeth cuspidate.

Seeds black, semi-glossy, ovoid, $\frac{3}{4}$ mm long. Sinus represented by a narrow groove. Testa obscurely tessellate at high magnification.

Type: REUTER, at margines agrorum (L, no. 908.185–126: isotype).

Distribution: Central Spain and NE. Portugal.

Taxonomical notes: BOISSIER and REUTER (Diagn. Pl. Nov. Hisp. 1842, p. 6) stated that *R. virgata* was named *R. glauca* by the botanists working at

Madrid, but that it differed from *R. glauca* LINN. They cited in the protologue as collectors: 'A. RAYNEVAL, REUTER', and as the finding locality: the Madrid region and the mountainous region of the Sierra de Guadarama. It occurred in sandy soils and on edges of cultivated fields. *R. glauca* L., from the Pyrenees, they said, differed very clearly from *R. virgata*.

Ecological notes: BOURGEAU collected *R. virgata* flowering in the beginning of May in the Madrid region (waste sandy fields at Chamartin, no. 2274; C, DR, GOET, LD, NY, PR, PRC, W, WAG). CARNEIRO (178; COI) collected it in Arredores de Bragança (Portugal), 10 May, just before flowering. A month later the plants bear fruits at Bragança; leg. FERREIRA (COI).

Specimens examined:

Portugal. Carneiro 178, Arredores de Bragança; Ferreira s.n., VI.77, Bragança, Centu; id., VI. 1879, Bragança; Moller s.n., V.1884, *ibid.*, Campo Redondo; Sampaio 1597, Margem do Douro, Regua.

Spain. Beltrán 1837, Castille, Madrid, Dehesa de la Villa; ?Belwan et Cogolludo s.n., V. 1913, Detresa de la Villoc, Madrid; Borja s.n., 22.V.1954, Chamartin de la Rosa, Madrid; Bourgeau 2274, *ibid.*; Dempster et Kuijt 2186, E. Salamanca; Hackel s.n., 6.VI.1876, Castilla Nova pr. Guadarrama; Jahandiez 44, Nouvelle Castille, Hoyo de Manzanares; Jerónimo 2413, Castille, Madrid, Dehesa de la Villa; Jullien s.n., 23.IX.1854, Madrid, Easier; Lange s.n., 25.V.1851-52, Matrits, prope fontem Castellanium; id. VI.1851-52, pr. pag. Guadarrama; id., 11.VI.1852, Galopagar, fl. Matrit; Leresche s.n., 18.VII.1862, Vielle Castille, Val Amblès, entre Avila et la Sierra de Gredos; Lima s.n., V.1882, Margem do Douro, Caldas de Matrit; Linn. herb. 629.4 ('Loefl.', left hand specimen), 629.6 'HU, *glauca*'; Pando s.n., 28.V.1880, prope Madrid; Pau s.n., 13.V.1891, 1892 et 1897, Chamartin de la Rosa, pr. Madrid; id., 14.V.1897, *ibid.*, Nova Castella; Reese s.n., 3.VI.1929, Alt-Castilien, Val Amblès, between Avila and Tass, S. Pedro di Annus; Reuter s.n., V.1841, Matriti; Uechtritz s.n., 25.V.1851, Madrid, Fuente Castellana; Willkomm 61, Salamanca; Winkler s.n., 6.VI.1876, Guadarrama.

55. *Reseda viridis* BALFOUR FIL.

Fig. 89

Proc. Roy. Soc. Edinb. 11, 1882, p. 501; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 185; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 689.

A slender shrub, ca. 150 cm tall, branching from a thick, woody root.

Stems few, erect to somewhat spreading, branching at the root crown and above, densely leafy, glabrous, finely ribbed; pith finally disintegrating.

Leaves (long) petiolate, entire, or 3-sect, glabrous, rotundate to -obovate or oblong, petiole up to 4 cm long, blade 3-5 cm long, ca. 1½ cm wide, tip ca. acuminate, margin entire. If incised, the incision reaching the midrib and run-

ning very closely to the distal side of the side nerve; petiole narrowly winged (the decurrent lamina).

Flowers white-greenish, on short pedicels. Raceme in fruit up to 18 cm long; peduncle ribbed. Bracts deciduous, (comose at top of raceme and exceeding flower buds), linear-ovate, 3–3½ mm long, 1/3 mm wide, acute, margin white, entire, slightly undulate. Pedicels rather short, finely ribbed, 2–2½ mm long, up to 3 mm in fruit.

Sepals 6–7, deciduous, glabrous, oblong-obovate, ca. 1½ mm long, ½ mm wide, obtuse, margin white, entire to slightly undulate.

Petals 3½ mm long, exceeding the sepals. Limb of superior petal up to 9-palmatifid, flabellate, almost as long as appendage, incisions ca. half way down, lateral laciniae oblong-spathulate, central lobe broader than the adjacent lateral laciniae; appendage rectangular-obovate, 1¾ mm long, 1 mm wide, narrowly continuous in front of limb, free rim 1/5 mm wide, crenate, (papillose-) ciliate, margins shortly papillose. Lateral petal smaller, lobes less in number, and similar to those of superior petal, sometimes central lobe much longer than the others. Anterior petal the smallest, limb simple.

Disc ¾ mm high, 1½ mm wide, entirely sparsely ciliate-papillose, margin slightly incurved.

Stamens 12–14. Filaments deciduous, glabrous, 2½ mm long. Anthers oblong-ellipsoid, 1 mm long, scabridulous.

Ovary obovoid, attenuate at base into a distinct stipe, glabrous, ribs sometimes papillose, 3-toothed, teeth ca. 1/5 as long as ovary. Ovules ca. 16 per placenta, in 2–3 rows.

Capsules erect, or hanging, stipitate over the disc, ellipsoid-obovoid, 8 mm long, 3 mm wide, attenuate to both ends, glabrous, membranous, reticulate, walls shallowly sulcate, mouth contracted, truncate to minutely dentate, narrowly gaping.

Seeds dark-brown, (sub-)glossy, reniform, 4/5 mm long. Sinus wide. Testa papillose.

Type: BALFOUR F. 'B.C.S.' no. 230, Socotra, in declivitatibus montium circa Gallonsir ad 1500 ped. II-III.1880 (GH: isotype).

Distribution: Socotra Island.

Taxonomical notes: *R. viridis* Balf. f. (in Proc. Roy. Soc. Edinb. 11, 1882, p. 501) was based on a specimen collected by BALFOUR, 'B.C.S. no. 230' (present in hb. Kew?). No further data about relationship of *R. viridis* with others were added.

Ecological notes: BALFOUR ('BALF. FIL.') declared that *R. viridis* occurred in Socotra on the slopes of the mountains near Gallonsir at alt. 1500 feet.

Specimens examined:

Socotra Isl. Balfour f. 144 & 230, 'type', Socotra; Bent s.n., à 1897, *ibid.*; St. Paulay s.n., 17-21.I.1899, Gabal Saleh, auf Abdal Kuri, nächst Hafea; *id.*, 29.I.1899, Ras Kattanea; Popov GP/50/113, ?Reigad (?Rligad); *id.*, GP/50/313, Limestone Plateau; Simony s.n., 18.I.99, Hafea von Abal Kuri, Gabal Saleh.

SW. Arabia. Wahab s.n., V.1904, Juheli Hills, NW. Aden 60 miles.

6. *Sesamoides* [TOURNEF.] ORTEGA

Ortega, Tab. Bot. 1773, p. 24; Rchb., Consp. 1828, p. 186; Ludw. ex O. Ktze, Rev. Gen. 1, 1891, p. 39, '*Sesamodes (oides)*'; Rothm. in Feddes Rep. 49, 1940, p. 55; R. Lit. in Candollea 11, 1948, p. 205; Heyw. in Feddes Rep. 69, 1964, p. 42; *id.* in Tutin et al., Fl. Eur. 1, 1964, p. 349; Dandy in Ind. Gen. Vasc. Pl. 1753-74, Regn. Veg. LI, 1967, p. 81.

Astrocarpus Neck., Elem. Bot. 2, 1790, p. 243; Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Rchb., Handb. 1837, p. 261, '*Asterocarpus*'; Spach, Hist. Nat. Vég. Phaner. 7, 1839, p. 96; Lecoq et Lamotte, Cat. rais. Pl. Centr. Fr. 1847, p. 90; Gren. et Godr., Fl. Fr. 1, 1848, p. 190, '*Asterocarpus*'; Muell. Arg., Mon. Rés. 1857, p. 218 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); *id.* in DC., Prodr. 16(2), 1868, p. 552; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 898; Arcang., Comp. Fl. It. 1882, p. 66; Batt. in Batt. et Trab., Fl. Alg. 1882-90, p. 82; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 151; Rouy et Fouc., Fl. Fr. 2, 1895, p. 251; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 178; Coste, Fl. Fr. 1, 1901, p. 161; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 121; Thonn., Flow. Pl. Afr. 1915, p. 229 (repr. Hist. Nat. Class. 27, 1962); Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 692; Merr., Ind. Rafin. 1949, p. 132; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 437.

Sesamella Rchb., Consp. 1, 1828, p. 186, nom.

Perennial or biennial herbs, sometimes lignescent, glaucous or minutely scabrid, 5-35(-50) cm tall; taproot usually ligneous.

Stems erect, ascending or prostrate, slender or \pm suffruticose, sometimes divaricately branching at base; pith usually solid.

Leaves entire, rosetted leaves narrow-obovate or -spathulate, stem leaves usually sparse, linear-obovate, -spathulate or obovate to orbicular, obtuse to acute, sometimes mucronate. Basal dents early deciduous, pallid.

Inflorescence a terminal, densely flowered, spike-like raceme.

Flowers solitary, subtended by a bract, bisexual, white to cream-yellow.

Sepals (4-)5(-7), differing in size, persistent, narrow-oblong to broad-triangular, obtuse to acute, sinus between sepals narrow and deep or wide and shallow.

Petals distinct, deciduous, clawed (claw provided with a transverse free rim in front of limb-base and so an 'appendage'), unequal; appendage dilated laterally. Limb of upper petal multipartite, central lobe the longest, limbs of lateral and anterior petal gradually reduced.

Disc ± cylindric, fleshy, apex dilated posteriorly into crescent-shaped extension.

Stamens 7–15; filaments deciduous, linear-subulate. Anthers ovoid-oblong, minutely verrucose, introrsely dehiscent.

Ovary apocarpous, 4–7 distinct closed carpida, usually 5–6, finger-shaped, upper part solid and fleshy, ventral side carinate, terminated by a short style and stigma. Placenta marginal. Ovules solitary, pendulous at ca. middle of each carpel.

Fruit dehiscent, carpida stellately radiating on a fleshy carpophore, dehiscence ventrally, longitudinally (sometimes also transversally) and irregular.

Seeds (greyish-)black, ovoid, $1\frac{1}{3}$ mm long, 1 mm wide, radicle ± apiculate. Sinus narrow. Testa papillose, outer layer persistent, sometimes tardily detached.

Type species: *Reseda sesamoides* L. (= *Sesamoides pygmaea* (SCHEELE) O. KUNTZE) (see HEYWOOD, FEDDES Rep. 69, 1964, p. 42).

Distribution: Portugal, Spain and W. Mediterranean up to Italy and Tunisia.

Taxonomical notes: HEYWOOD (FEDDES Rep. 69, 1964, p. 40–44) discussed the nomenclature of *Sesamoides* ORTEGA (1773), a generic name having priority over *Astrocarpus* NECKER (1790). A proposal to conserve *Astrocarpus* was rejected (Taxon 3, 1954, p. 241). As the type species HEYWOOD proposed '*S. pygmaea* (SCHEELE) O.K. (= *Reseda sesamoides* L. (1753))'.

HEYWOOD accepted 2 species in *Sesamoides* (l.c., and Fl. Eur. 1, 1964, p. 349) and listed differentiating characters. He finds it difficult to decide whether '*Astrocarpus chusii* var. *prostratus*' belongs to either *S. pygmaea* or '*S. canescens* (L.) O.K.' When large series of specimens were examined on behalf of the present revision, it appeared that the characteristics suggested by HEYWOOD (l.c.) did not hold at a species level when segregating taxa within *Sesamoides*, and so only one single, polymorphic species was admitted, comprising a number of varieties.

REICHENBACH (Consp. 1, 1828, p. 186), published the generic name '*Sesamella*' basing it on *Sesamoides* TOURNEF. in '*Resedaeae*'.

In 1830 REICHENBACH published 2 combinations in *Sesamella* (both contrary to the Code, see below page 367: *Sesamella spathulata* RCHB. and *S. tournefortii* RCHB.). It can be defended that *Sesamella* RCHB., as a genus, is a legitimate genus-name, but it is preceded, at any rate, by *Sesamoides* ORTEGA (1773) and by *Astrocarpus* NECKER (1790).

NECKER published *Astrocarpus* (Elem. bot. 2, 1790, p. 243) not '*Asterocarpus*'

(as spelt by REICHENBACH, Handb. Nat. Pflzs. 1837, p. 261 and GREN. et GODR., Fl. Fr. 1, 1848, p. 190); the spelling being corrected already in Ind. Kew. I, 1895, p. 225. *Asterocarpus* ECKL. & ZEYH. belongs in *Celastraceae* (Ind. Kew., l.c., p. 224).

Sesamoides canescens (LINNAEUS) O. KUNTZE

Fig. 90, 91

Rev. Gen. 1, 1891, p. 39, 'sub *Sesamodes (oides)*'; Rothm. in Feddes Rep. 49, 1940, p. 55; R. Lit. in Candollea 11, 1948, p. 205; Heyw. in Feddes Rep. 69, 1964, p. 43; id. in Tutin et al., Fl. Eur. 1, 1964, p. 349.

S.c. ssp. *canescens* R. Lit., l.c., by inference; Heyw., ll.cc. (= var. *canescens* quoad specimen typicum and var. *suffruticosa* sensu auct. nonn.).

S.c. ssp. *purpurascens* (Rafin.) R. Lit., l.c. (= var. *canescens* quoad specimen typicum and var. *spathulata* sensu auct. nonn.).

S.c.p. var. *spathulatum* (Moris) R. Lit., l.c. (= var. *spathulata*).

S.c. ssp. *sesamoides* (Rouy et Fouc.) R. Lit., l.c. (= var. *alpina* quoad specimen typicum and var. *firma* sensu auct. nonn.).

S.c.s. var. *alpinum* (Muell. Arg.) R. Lit., l.c. (= var. *alpina*).

S.c. ssp. *suffruticosa* (Lange) Heyw. in Feddes Rep. 69, 1964, p. 43; id. in Tutin et al., Fl. Eur. 1, 1964, p. 349 (= var. *suffruticosa*).

S. cochlearifolium (Nym.) O. Ktze, Rev. Gen. 1, 1891, p. 39, 'sub *Sesamodes (oides)*' (= var. *spathulata*).

S. minus (Lange) O. Ktze, l.c., 'sub *Sesamodes (oides)*'; Rothm. in Feddes Rep. 49, 1940, p. 55 (= var. *alpina*).

S. pygmaeum (Scheele) O. Ktze, l.c., 'sub *Sesamodes (oides)*'; Rothm., l.c.; Heyw. in Feddes Rep. 69, 1964, p. 42, '*S. pygmaea*'; id. in Tutin et al., Fl. Eur. 1, 1964, p. 349, '*S. pygmaea*' (= var. *alpina* quoad specimen typicum and var. *firma* sensu Heywood).

S.p. ssp. *pygmaea* Heyw. in Feddes Rep., l.c., p. 43; id. in Tutin et al., l.c. (= var. *alpina* and var. *firma*).

S.p.p. var. *firma* (Muell. Arg.) Heyw., ll.cc. (= var. *firma*).

S.p. ssp. *minor* (Lange) Heyw., ll.cc. (= var. *alpina*).

S. suffruticosum (Lange) O. Ktze, Rev. Gen. 1, 1891, p. 39, 'sub *Sesamodes (oides)*'; Rothm. in Feddes Rep. 49, 1940, p. 55 (= var. *suffruticosa*).

S. spathulifolium (Revel. ex Bor.) Rothm., l.c., sphalm. 'Revell. ex Bory' (= var. *spathulata*).

Reseda canescens L., Sp. Pl. 1, 1753, p. 448; id., Syst. Nat. ed. 10, 2, 1759, p. 1046; id., Sp. Pl. ed. 2, 1, 1762 et ed. 3, 1, 1764, p. 644; Richt., Codex 1835, p. 463, non L., Syst. Nat. ed. 12, 1767 (= var. *canescens*).

R. purpurascens L., Sp. Pl. 1, 1753, p. 449; id., Syst. Nat. ed. 10, l.c.; id., Sp. Pl. ed. 2 et ed. 3, l.c.; id., Syst. Nat. ed. 12, 1767, p. 330; Hoult., Nat. Hist. 2(8), 1777, p. 726; Murr., Syst. Veg. ed. 14, 1784, p. 448 et ed. 15, 1798, p. 368;

Willd., Sp. Pl. 2(2), 1800 (1799), p. 875; Delarb., Fl. Auv. ed. 2, 1800, p. 505; Brot., Fl. Lusit. 2, 1804, p. 307; Richt., Codex 1835, p. 463 (= var. *canescens*).

R. sesamoides L., Sp. Pl. 1, 1753, p. 449; id., Syst. Nat. ed. 10, 2, 1759, p. 1046; id., Sp. Pl. ed. 2, 1762 et ed. 3, 1764, p. 664; id., Syst. Nat. ed. 12, 1767, p. 330; Gouan, Hort. Monsp. 1768, p. 229; Houtt., Nat. Hist. 2(8), 1777, p. 726; Murr., Syst. Veg. ed. 14, 1784, p. 448; Ait., Hort. Kew 2, 1789, p. 132; Moench, Meth. Pl. 1794, p. 58; Murr., l.c. ed. 15, 1798, p. 368; Willd., Sp. Pl. 2(2), 1800 (1799), p. 878; Delarb., Fl. Auv. ed. 2, 1800, p. 505; Lam. et DC., Fl. Fr. ed. 3, 4, 1805, p. 725; Willd., Enum. Pl. Hort. Berol. 1, 1809, p. 449; Hornem., Hort. Hafn. 2, 1815, p. 502; St. Amans, Fl. Agen 1821, p. 187; Spreng., Syst. Veg. 2, 1825, p. 463; Richt., Codex 1835, p. 463; Moris, Fl. Sard. 1, 1837, p. 193, '*R. sesamoides oblongifolia*'; Bertol., Fl. It. 5, 1842, p. 34 (= var. *alpina* quoad specimen typicum and var. *firma* sensu auct. nonn.).

R.s. β purpurascens (L.) St. Amans, Fl. Agen 1821, p. 187 (= var. *canescens*).

R.s. β spathulata Moris, Fl. Sard. 1, 1837, p. 193, 'sub *R. s. oblongifolia*' (= var. *spathulata*).

R.s. β Bertol., Fl. It. 5, 1842, p. 35 (= var. *spathulata*).

R. stellata Lam., Fl. Fr. 3, 1778, p. 204, nom. illeg. (= var. *alpina*).

R. clusii Spreng., Mant. Prim. Fl. Hal. 1807, p. 41 (= var. *alpina*).

R. pygmaea Scheele in Flora 26(2), 1843, p. 426 (= var. *alpina*).

Astrocarpus sesamoides (L.) DC. ex Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Rchb., Ic. Fl. Germ. 2, 1837–38, p. 22, tab. 99, fig. 4441; Gay in Schultz, Arch. Fl. Fr. Allem. 1, 1842–48, p. 33, 'Gay'; Walp., Rep. 2, 1843, p. 752; Lecoq et Lamotte, Cat. rais. Pl. Centr. Fr. 1847, p. 90; Gren. et Godr., Fl. Fr. 1, 1848, p. 190, 'Gay'; Colm., Apund. Fl. Castell. 1849, p. 27, nom.; Muell. Arg., Mon. Rés. 1857, p. 219, tab. 10, fig. 130, 'Gay' (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 552; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 898, 'Gay'; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 152; Rouy et Fouc., Fl. Fr. 2, 1895, p. 251; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 178; Coste, Fl. Fr. 1, 1901, p. 161; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 121; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 315; Bolle in Engl. et Prantl, Nat. Pflz.fam. ed. 2, 17b, 1936, p. 692, fig. 427B, 428B, H-J, 432; Emberg. et Maire, Cat. Pl. Mar. 4, 1941, p. 1015; Sauv., Fl. Subér. Mar. 1961, p. 76; Claph. et al., Fl. Br. Isl. ed. 2, 1962, p. 188 (= var. *alpina* quoad specimen typicum and var. *canescens* and var. *firma* sensu auct. nonn.).

A.s. α stellata (Lam.) Duby, Bot. Gall. ed. 2, 1, 1828, p. 67; Muell. Arg. in DC., Prodr. 16(2), 1868, p. 554, '*stellatus*' (= var. *alpina*).

A.s. β purpurascens (L.) Duby, Bot. Gall., l.c.; Muell. Arg., Mon. Rés. 1857, p. 223 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 552; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 152; Dur. et Schinz, Consp. Fl. Afr. 1(2), 1897, p. 178 (= var. *canescens*).

A.s. α Salis in Flora 17(2), 1834, p. 73 (= var. *spathulata*).

A.s. β Salis, l.c. (= var. *alpina*).

A.s. var. α erecta Boiss., Voy. Esp. 2, 1839, p. 79 (= var. *canescens*).

A.s. var. β prostrata Boiss., l.c.; Muell. Arg., Mon. Rés. 1857, p. 225,

'*prostratus*' (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 899, '*prostratus*' (= var. *suffruticosa*).

A.s. α alpinus Muell. Arg., Mon. Rés. 1857, p. 221 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); id. in DC., Prodr. 16(2), 1868, p. 554; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 153; Rouy et Fouc., Fl. Fr. 2, 1895, p. 252, 'sub ssp. *sesamoides*'; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 121, 'sub ssp. *sesamoides*' (= var. *alpina*).

A.s. β gyanus Muell. Arg., Mon. Rés. (et in Neue Denkschr. Schw. Ges. Zuer.) ll.cc. (= var. *alpina*).

A.s. γ firmus Muell. Arg., ll.cc.; id. in DC., Prodr. 16(2), 1868, p. 553; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 153; Rouy et Fouc., Fl. Fr. 2, 1895, p. 252, 'sub ssp. *sesamoides*'; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 123, 'sub ssp. *sesamoides*' (= var. *firma*).

A.s. β spathulatus (Moris) Muell. Arg. in DC., Prodr. 16(2), 1868, p. 553; Terracc. in Caruel, Fl. It. 10, 1894 (1893), p. 153; Rouy et Fouc., Fl. Fr. 2, 1895, p. 254, 'sub ssp. *purpurascens β spathulifolia* Req.'; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 123, 'sub ssp. *purpurascens*' (= var. *spathulata*).

A.s. ssp. sesamoides Rouy et Fouc., Fl. Fr. 2, 1895, p. 252; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 121 (= var. *alpina* quoad specimen typicum and var. *firma* sensu auct. nonn.).

A.s. ssp. minor (Lange) Rouy et Fouc., Fl. Fr. 2, 1895, p. 253 (= var. *alpina*).

A.s. ssp. purpurascens (Rafin.) Rouy et Fouc., Fl. Fr. 2, 1895, p. 253; Briq., Prodr. Fl. Cors. 2(1), 1913, p. 123; Jah. et Maire, Cat. Pl. Mar. 2, 1932, p. 315; Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1015; Sauv., Fl. Subér. Mar. 1961, p. 76; Quéz. et Santa, Nouv. Fl. Alg. 1, 1962, p. 438 (= var. *canescens* quoad specimen typicum and var. *firma* and var. *spathulata* sensu auct. nonn.).

A.s. ssp. prostratus (Boiss.) H. Lindb. in Act. Soc. Sc. Fenn. n.s.B. 1(2), 1932, p. 67 (= var. *suffruticosa*).

A. purpurascens (L.) Rafin., Fl. Tellur. 3, 1837 (1836), p. 73; Walp., Rep. 2, 1843, p. 754, 'DC.'; Merrill, Ind. Rafin. 1949, p. 132 (= var. *canescens*).

A. chusii (Spreng.) J. Gay in Schultz, Arch. Fl. Fr. Allem. 1842-48, p. 33, nom. illeg.; Boiss., Voy. Bot. Esp. 2, 1839, p. 79, 'sub *A. sesamoides*' et 2, 1845, p. 721; Gren. et Godr., Fl. Fr. 1, 1848, p. 190, 'sub *Asterocarpus*'; Muell. Arg., Mon. Rés. 1857, p. 222, tab. 10, fig. 131 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 899; Arc., Comp. Fl. It. 1882, p. 66; Batt. in Batt. et Trab., Fl. Alg. 1888-90, p. 82; Senn. et Maur., Cat. Fl. Rif Or. 1933, p. 11 (= var. *canescens* quoad specimen typicum and var. *alpina* and var. *firma* sensu auct. nonn.).

A.c. β spathulaefolius (Moris) J. Gay, l.c.; Boiss., Voy. Bot. Esp. 2, 1845, p. 721; Gren. et Godr., Fl. Fr. 1, 1848, p. 191, 'sub *Asterocarpus*'; Muell. Arg., Mon. Rés. 1857, p. 225, 'Gren. et Godr.' (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858); Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 899, 'Gren. et Godr.'; Arc., Comp. Fl. It. 1, 1882, p. 66, 'Salis' (= var. *spathulata*).

A.c. γ scaber J. Gay, l.c. (= var. *canescens*).

A.c. var. α erectus Boiss., Voy. Bot. Esp. 2, 1839, p. 79, 'sub *A. sesamoides*' et

2, 1845, p. 721; Muell. Arg., Mon. Rés. 1857, p. 223 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858) (= var. *canescens*).

A.c. var. *β prostratus* Boiss., Il.cc.; Muell. Arg., Il.cc., p. 225; Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 899 (= var. *suffruticosa*).

A.c. var. *suffruticosus* (Lange) Texid., Apunt. 1869, p. 22, fide Lange in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 899, nom. in syn. (= var. *suffruticosa*).

A.c. var. *serrulatifolius* Senn. et Maur., fide Emb. et Maire, Cat. Pl. Mar. 4, 1941, p. 1051, nom. in syn. (= var. *canescens*).

A. spathulaefolius Revel. ex Bor. in Mém. Soc. Acad. Maine-et-Loire 1, 1857, p. 87, sphalm. 'Revell. ex Bor.' (= var. *spathulata*).

A. interruptus Bor. in Mém. Soc. Acad. Maine-et-Loire 8, 1860, p. 7 (= var. *alpina*).

A. cochlearifolius Nym. in Ofver. Vet. Akad. Stockh. 18, 1862 (1861), p. 191 (= var. *spathulata*).

A. minor Lange in Kjoeb. Vidensk. Meddel. 1866 (1865), p. 85, tab. 4, fig. 1; id. in Willk. et Lange, Prodr. Fl. Hisp. 3, 1880, p. 898 (= var. *alpina*).

A. suffruticosus Lange, l.c., p. 83, tab. 4, fig. 2, h-q; id. in Willk. et Lange, l.c., p. 899 (= var. *suffruticosa*).

A. latifolius Merino in Bol. Soc. Espan. Hist. Nat. 1, 1901, p. 116 (= var. *spathulata*).

Sesamella spathulata Rchb. in Flora 13(1), 1830, p. 130, nom. (= var. *spathulata*).

S. tournefortii Rchb., l.c., nom. (= var. *alpina*).

Perennial or biennial, green or glaucous, sometimes lignescent herbs, 5–35 (–50) cm tall; taproot usually \pm ligneous.

Stems erect or ascending, sometimes prostrate, occasionally basal parts like a rhizome and usually digitately branching and sometimes \pm suffruticose, often leafy, glabrous or minutely scabrid, ribbed; pith usually solid.

Leaves entire, radical leaves (densely) rosetted, narrow-obovate or -spathulate, 1–4(–7) cm long, 2–3(–5) mm wide; stem leaves linear, linear-obovate or -spathulate, sometimes obovate to spathulate or orbicular, 5–15(–40) mm long, 1–2(–10) mm wide; obtuse or acutish.

Flowers white, on short pedicels, in terminal racemes. Racemes slender, usually dense, up to ca. 30 cm long, peduncles ribbed, sometimes scabrid. Bracts persistent, triangular to oblong, ca. 1 mm long and $\frac{1}{2}$ mm wide; margins pallid, entire. Pedicels (sub)sulcate, occasionally minutely scabrid, ca. 1 mm in flower, sometimes slightly longer in fruit.

Sepals (4–)5(–6), persistent, subequal (sometimes posterior sepal less than $\frac{1}{2}$ as long as the others), connate to ca. $\frac{1}{4}$ – $\frac{1}{2}$ of the calyx-length with sinuses narrow or wide, narrow-oblong or broad triangular, sometimes \pm (ob)ovate, 1–1 $\frac{1}{2}$ mm long, $\frac{1}{4}$ – $\frac{3}{4}$ mm wide, obtuse to acute, margin narrowly pallid, entire.

Petals 2–3 mm long, much exceeding the sepals. Limb of superior petal 5–9-partite (incisions often to base, sometimes irregular), central lobe the longest; ca. $1\frac{1}{2}$ – $2\frac{1}{2}$ times as long as the appendage, laciniae often variable in length, oblong-spathulate or -obovate, round-obtuse, rarely acutish; appendage with a transverse free rim at limb-base or without rim (becoming a claw), obovate-triangular, 1 – $1\frac{2}{3}$ mm long, $\frac{3}{4}$ – $1\frac{1}{2}$ mm wide, transverse rim up to $\frac{1}{2}$ mm wide, usually denticulate, margins minutely papillose to ciliate. Lateral petals usually the longest, but lobes reduced, sometimes entire. Anterior petal-limbs entire.

Disc $\frac{1}{2}$ –1 mm long, 1 mm wide, lengthening to a cylindrical carpophore, glabrous to hispidulous, margin papillose to crenulate.

Stamens (7–)8–14(–15). Filaments deciduous, glabrous or \pm hispidulous, up to 2 mm long. Anthers ovoid-oblong, ca. 1 mm long, minutely verrucose.

Carpels (4–)5–6(–7), free, unilocular, closed, glabrous or minutely scabrid to hispidulous especially at base and on the ventral side, ventral side \pm carinate and hyaline, upper part solid and fleshy, lower part leathery; ovoid – boat-shaped, 1 mm long, $\frac{1}{2}$ mm wide; style terminal or lateral, up to 1 mm long, stigma obscurely lacerate. Placenta marginal. Ovules solitary, pendulous, attached to the middle of carpel.

Capsules erect to patent, stellately radiating above the carpophore, glabrous or \pm scabridulous to hispidulous especially at base, $1\frac{1}{2}$ mm long, $\frac{3}{4}$ mm wide, ventral side irregularly dehiscent, sometimes transversely dehiscent, cusps ca. $\frac{3}{4}$ mm long.

Seeds (greyish-)black, ovoid, $1\frac{1}{3}$ mm long, radicle \pm apiculate. Sinus wanting, represented by a shallow groove. Testa papillose, papillae dense, outer layer tardily detached.

Type: *Reseda canescens* L. (LINN 629.10, neotype).

Key to the varieties

1. Stem-leaves orbicular-spathulate or broadly spathulate. **d. var. spathulata**
1. Stem-leaves linear to narrowly (ob)ovate.
2. Calyx-lobes broad-triangular (or some broad-oblong), usually acute, less than (or almost) half as long as the calyx, as a rule with broad sinuses.
3. Biennials or perennials, occasionally with \pm woody base. Stems not woody, simple or slightly branching. **a. var. canescens**
3. Small shrublets or woody perennials. Stems woody, 2–3 times branching. **e. var. suffruticosa**
2. Calyx-lobes oblong, mostly obtuse, more than half as long as the calyx, with narrow sinuses.
4. Stems ca. (20–)30 cm tall. **c. var. firma**
4. Stems ca. 5–15 cm tall; usually with \pm woody base. . . . **b. var. alpina**

a. var. canescens

Biennial or perennial plants with \pm woody base and lax rosette. Stems not woody, simple or slightly branched, with linear, -(ob)ovate or narrow-(ob)ovate leaves. Calyx-lobes acute, broad-triangular or obtusish, broad-oblong and usually up to half as long as the calyx, wide sinuses.

Distribution: Western Mediterranean Region including Italy, France, Iberian Penins., Morocco, Algeria, Isls of Corsica and Sardinia and ?Germany.

b. var. alpina (MUELL. ARG.) R. LIT. in *Candollea* 11, 1948, p. 205.

Pygmy plants up to ca. 15 cm tall, usually with \pm woody base and dense rosette. Stems not woody, with linear, -(ob)ovate or narrow-(ob)ovate leaves. Calyx-lobes narrow-oblong, obtuse, more than half way as long as the calyx, with narrow sinuses.

Type: Coscione (Corsica; cf. Muell. Arg., *Mon. Rés.*, p. 221, at Rolondo, BERNARD in *Hb. DC.*, neotype).

Distribution: Iberian Peninsula, France, Italy and the Isles of Corsica and Sardinia.

c. var. firma (MUELL. ARG.) ABDALLAH et DE WIT, *nov. comb.*

Basionym: *Astrocarpus sesamoides* J. Gay γ *firmus* Muell. Arg., *Mon. Rés.*, p. 221, 1857.

Similar to var. *alpina* in all characters but stems ca. 30 cm tall.

Type: Mont Dore (Auvergne, France; cf. MUELL. ARG., *Mon. Rés.*, p. 222, LECOQ 281, *Hb. DC.*).

Distribution: France, Italy and Portugal.

d. var. spathulata (MORIS) R. LIT. in *Candollea* 11, 1948, p. 205.

Like var. *canescens* but differs by having orbicular-spathulate or obovate-spathulate stem-leaves.

Type: 'circa Arizzo' (Sardinia; cf. MUELL. ARG., *Mon. Rés.*, p. 225, in *Hb. DC.*).

Distribution: Iberian Peninsula, Italy and the Isles of Corsica and Sardinia, especially on maritime sands.

e. var. *suffruticosa* (LANGE) ABDALLAH et DE WIT, *nov. comb. et stat.*

Basionym: *Astrocarpus suffruticosus* Lange in Kjöb. Vidensk. Meddel. 1865 (1866), p. 83, tab. 4, fig. 2, h-q.

Similar to var. *canescens* in all characters but differs by being a woody perennial to a small shrub, and the woody, 2–3 times branching stems.

Type: LANGE s.n., 18-8-1852, in ericetis ad Santiago de Compostela (C).

Distribution: Iberian Peninsula, France and NW. Africa including Tunisia.

Taxonomical and ecological notes: A host of names has been assigned to taxa in *Sesamoides*. A study of the literature shows, first of all, that no two authors were fully agreed as to a correct segregation of taxa.

Having examined in detail well over one thousand specimens, covering the whole of the area of distribution of *Sesamoides*, and having failed to discover any constancy of 'distinguishing' characters, either solely or in correlation, we have been forced to admit that MUELL. ARG. (in DC., Prodr. 16(2), 1868, p. 552) was right when he decided that the genus consisted of one single species only.

The species is wide-spread. It is polymorphous and it occurs in widely varying climates and habitats (which accounts for many of the names, which were proposed after a study of specimens from a restricted area). If it is so desired, one can distinguish the larger and woodier specimens, as are often seen in NW. Spain as var. *suffruticosa*, the small plants from high altitudes as var. *alpina*, and specimens from the coastal areas, which often have a majority of broadly obovate or orbicular-spathulate leaves as var. *spathulata*, but there are intermediate specimens in abundance connecting these varieties or forms with one another.

LINN '5 *sesamoides* Monsp.' (SAVAGE 629.9) represents what was named *S. pygmaea* (SCHEELE) O.K. sensu HEYWOOD (in FEDDES Rep. 69, 1964, p. 42). There is, however, pinned to 629.9, a sheet without Linnean handwriting (SAVAGE 629.10) which represents *S. canescens*, according to HEYWOOD's segregation (l.c., p. 43). A third sheet 629.11 has in verso written *Reseda sesamoides* ROYEN sub 12, which also belongs to *S. canescens* in HEYWOOD's systematy.

SAVAGE 629.7 '4 *purpurascens*' has in verso '398 LOEFL. 5-gyna Loeffl.' and this also represents *S. canescens* sensu HEYWOOD.

SAVAGE 629.3 '*canescens*' represents *Caylusea hexagyna*; there is no specimen of '*R. canescens*' belonging in *Sesamoides* (see Notes to *Caylusea hexagyna*, p. 44).

HEYWOOD (l.c.) referred to Sp. Pl. 1753, p. 449, where LINNAEUS stated that the habitat of *R. sesamoides* is 'Monspeli in Horto Dei' while quoting 'TOURNEF. inst. 424' ('*Sesamoides fructu stellato*') as a literature reference to his descriptive phrase.

It is suggested by HEYWOOD that 'Hortus Deus' is situated in the Cévennes (Hort de Dieu, Mt. Aigoual) and as in the Cévennes, says HEYWOOD, only var. *firma* (MUELL. ARG.) HEYW. occurs, one would expect to find that the Linnean holotype belonged in that variety. Now this clearly is not the case. The Linnean holotype to all appearances might be believed to have originated from e.g. the Pyrenees. HEYWOOD finds it impossible to trace the type-locality.

HEYWOOD noting that the combination *Sesamoides sesamoides* is contrary to the Code, accepted the next legitimate name *Reseda pygmaea* SCHEELE (Flora 26(2), 1843, p. 426) for the correct epithet, as was adopted already by O. KUNTZE (*Sesamoides pygmaeum* (SCHEELE) O.K., Rev. Gen. 1891, p. 39).

If one wishes to follow HEYWOOD's systematy in recognizing 2 species in *Sesamoides*, it follows that the first one, representing the type-species of *Sesamoides*, viz. *Reseda sesamoides* L., ought to be named *R. pygmaea* (SCHEELE) O.K. (1891), although it is to be considered whether the name *R. clusii* SPRENGEL, a legitimate name of 1807 should not have preference over *Reseda pygmaea* SCHEELE (1843). However, in this present revision only one species being admitted, it follows that the correct name ought to be *Sesamoides canescens* (L.) O. KUNTZE (1891), based on *Reseda canescens* L. (1753).

Reseda canescens L., Sp. Pl. 1753, p. 448 is listed in Ind. Kew. 2, 1895, p. 696. LINNAEUS appears to have had no specimen at his disposal when he published *Reseda canescens* in 1753 (l.c.; see also above p. 44). The protologue runs as follows:

RESEDA foliis subulatis sparsis. *Sauv. monsp.* 48.
Reseda foliis simplicibus oblongis integris. *Guett. stamp.*
1. p. 225.
Reseda alba minor. *Bauh. pin.* 100.
Sesamoides salmanticum parvum 2. *Clus. hist.* 1. p. 296, t. 295.
Habitat in Salmantica.

SAUVAGES (Meth. Fol. Pl. Monspel. 1751, p. 48) published as follows:

183 RESEDA linariae folio C.B. *Sesamoides*
fructu stellato. *T. A. l'Esperou. Res.*
foliis sparsis subulatis.

Obviously SAUVAGES had a plant which he described. It was found 'A l'Esperou'. The literature references make it reasonably certain that he had a *Resedacea* with few or scattered subulate (very narrow) leaves, also that SAUVAGES considered a plant described by CASPAR BAUHIN as identical (C. BAUHIN, Pinax 1623, p. 100, lib. III, sect. I, 'III').

BAUHIN noted that III, *Reseda linariae folio* had been described in the Prodomus (1620, p. 41) and he questioned whether '*Reseda candida*, Lugd.' and '*Sesamoides Salmanticense parvum alterum*, CLUS. hisp. & hist.' could be identical.

LINNAEUS, however, cited C. BAUHIN's '*Reseda linariae foliis*' as *R. glauca* (Sp. Pl. 1 ed., p. 449). TOURNEFORT's '*Sesamoides fructu stellato*' was referred by LINNAEUS to *R. sesamoides* (Sp. Pl. 1 ed., p. 449).

It follows that the Linnean name *Reseda canescens* (1753) rests as to its first literature citation on SAUVAGES' description only (l.c.).

GUETTARD described: *Reseda foliis simplicibus oblongis integris* (Obs. Pl. 1, 1747, p. 225) and referred to TOURNEFORT (Inst., p. 424) who had '*Sesamoides flora albo foliis canescentibus*'. GUETTARD further described a white substance which coloured the leaves and stems white and which was easily removed when the plant was touched. It grew in the sands of the Sologne and he declared to have observed it in various places between Thouars and Reaumur. This can only be *Sesamoides*; *Caylusea* is not found in central France whereas *Sesamoides* is frequently observed there.

TOURNEFORT also quoted *Sesamoides salmanticum parvum 2*. CLUS. Hist. 296, as identical.

It seems that LINNAEUS did not interpret GUETTARD's literature references differently and GUETTARD's publication can be referred to *R. canescens* L. (1753).

The 3rd citation is to CASPER BAUHIN (Pin. Theat. Bot. 1623, p. 100). This is actually a reference to CLUSIUS (Hist. I, 1601, p. 295, 296) because BAUHIN's text is as follows:

'IV. *Reseda alba minor*.
Sesamoides parvum Salmanticum, Clus. hisp.
& hist. Lob. Tab. Ger.'

BAUHIN may have had a specimen at his disposal because he changed the CLUSIUS name and gave a kind of description '*alba minor*'.

The 4th reference is to CLUSIUS '*Sesamoides salmanticum parvum 2*.' (Rar. Pl. hist., Lib. III, 1601, p. 295 (cum tab.) and 296), which cannot be identified with certainty.

It is finally to be observed that the specimen in the Linnean Herbarium labeled as *Reseda canescens*' (cf. SAVAGE, Cat. 1945, p. 85) cannot be accepted as the type of *R. canescens* L. (1753), because it represents *Caylusea*.

In 1964, HEYWOOD discussed the identity of *R. canescens* (FEDDES Rep. 69, p. 40-44) and his conclusion fully agrees with the present, which was reached after consideration of some more data and details. HEYWOOD appointed *R. sesamoides* as the type species of *Sesamoides* (FEDDES Rep. 69, 1964, p. 42), which makes it desirable to appoint *R. canescens* L. (1753), LINN 629.10, as the neotype of *Sesamoides canescens*.

HEYWOOD (l.c.) also discussed the identity of *R. purpurascens* L. (Sp. Pl. 1753,

p. 449). He appears to be convinced that it is the same species as *R. canescens* L. (1753), but only added the taxon to the synonymy of *R. canescens* L. (1753) in Fl. Europaea 1, 1964, p. 349.

LINNAEUS appears to have had a specimen of *R. purpurascens* at his disposal. In the Linnean Herbarium are 2 specimens, 629.7 and 629.8, of which the former carries the name *purpurascens* 4, apparently in the handwriting of LINNAEUS. It belongs in *Sesamoides* and was collected by LOEFLING (Hisp. 398); it is designated here as the holotype.

MUELL. ARG. at first, distinguishing two variable species in *Sesamoides* (= *Astocarpus*) combined *R. purpurascens* and *R. canescens* (1753) both in synonymy to *A. clusii* J. GAY (Mon. Rés. 1857, p. 222). Later on, (in DC., Prodr. 16(2), 1868, p. 552–553), he only accepted one single species in *Sesamoides* and so declared *R. purpurascens*, *R. canescens*, and *R. sesamoides* (all of 1753) to belong in one species, even in one variety '*A. sesamoides* DUBY α *purpurascens* DUBY'.

HEYWOOD, on the other hand, concluded to two species in *Sesamoides* and referred *R. purpurascens* to the synonymy of *R. canescens* L. (1753), under *Sesamoides canescens* (L.) O. KUNTZE, as was explained above.

MORIS published (Flora Sardoia 1, 1837, p. 193) a variety ' *β spathulata*' in '*Reseda sesamoides oblongifolia*'. Nomenclaturally the name is of doubtful standing but as he clearly intended to use the name '*spathulata*' for a variety, R. LITARDIERE's decision to adopt it was followed here (cf. Candollea 11, 1948, p. 205).

LAMARCK (Fl. Franç. 3, 1778, p. 204), when publishing *R. stellata* cited as a synonym '*R. sesamoides* LINN. Sp. Pl. 664', meaning to refer to LINNAEUS, Sp. Pl. 2nd ed., 1762, or 3rd ed., 1764, p. 644. *R. stellata* is a superfluous name and has no standing.

Reseda clusii SPRENGEL is based on a specimen collected by HECHT on hills in Spain (Mant. Prima Fl. Hal. 1807, p. 41). SPRENGEL pointed out that *R. clusii* differed from *Reseda canescens* L. (1767). He cited CLUSIUS, Hist. 3, t. 295, '*Sesamoides parvum Salmantic.*' and stated that CLUSIUS pictured *R. clusii* perfectly. He referred to FORSKÅL (Fl. Aeg.-Arab. 1775, p. 92) and also remarked that VAHL (Symb. 2, 1791, p. 52) already had guessed that *Reseda canescens* L. (1767) differed from *R. clusii*.

LINNAEUS referred *Sesamoides parvum Salmanticum* 1 to *Reseda purpurascens* L. (Sp. Pl. 1753, p. 449) and *Sesamoides parvum Salmanticum* 2 to *Reseda canescens* L. (Sp. Pl. 1753, p. 448–449). Both *R. purpurascens* L. and *R. canescens* L. (1753) are here referred to *Sesamoides*.

MUELLER makes no reference to *R. clusii* SPRENGEL in his monograph (1857), nor in DC., Prodr. 16(2), 1868, p. 548–589. We have been informed by the Curator of the Halle Herbarium that no specimens of SPRENGEL's are present there.

SCHEELE described *Reseda pygmaea* SCHEELE (in Flora 26, 1843, p. 426) occurring at the very top of 'Monte rotondo' at \pm 2800 m alt., Corsica. He gave no description of the fruit or flower and only referred to a 6-lobed calyx and

added some data concerning the habit of the plant. MUELLER reduced *R. pygmaea* to a variety in '*Astrocarpus sesamoides* J. GAY'; viz. var. α *alpinus* 'SALIS' (Mon. Rés. 1857, p. 221) and later to *A. sesamoides* DUBY var. *alpinus* 'SALIS' (in DC., Prodr. 16(2), 1868, p. 554).

MUELLER had access to SCHEELE's type and is followed here as regards the varietal status of SCHEELE's taxon. From a nomenclatural point of view, however, MUELLER's citation of a variety in *Astrocarpus sesamoides*, named '*alpinus*' by SALIS, is unfounded. SALIS-MARSCHLINS gave no name (cf. Flora 17, Beibl. 2, 1834, p. 73). He only began the description of his variety ' β ' by the word '*alpinus*', denoting its growing locality. The correct quotation should be '*Astrocarpus sesamoides* var. *alpinus* MUELL. ARG.' (based on *Astrocarpus sesamoides* var. β SALIS, l.c.); (cf. also Index Kew. 2, 1895, p. 697, '*R. pygmaea*').

J. GAY (in F. SCHULTZ, Arch. Fl. Fr. Allem. 1, 1842-48, p. 33) published *Astrocarpus sesamoides* and referred to '*Reseda sesamoides* LINN.' in the protologue. GAY's specific name was preceded by *Astrocarpus sesamoides* (LINN.) DC. ex DUBY (Bot. Gall. ed. 2, 1, 1828, p. 67). GAY's name being a homonym has no standing nomenclaturally. The generic name *Sesamoides* has priority.

MUELLER based the variety ' *β gayanus*' (Mon. Rés. 1857, p. 221) on specimens occurring at high altitudes in the Pyrenees. The varietal name was published on the same page as the varietal name '*alpinus*'. Later on, MUELLER reduced var. *gayanus* to var. *stellatus* (in DC., Prodr. 16(2), 1868, p. 554). Here var. *alpinus* and var. *gayanus* are considered to be one single variety, for which the name '*alpina*' is accepted, this latter name being based on *Reseda alpina* SALIS (in Fl. ratisb. 2, 1834, p. 73).

In selecting a type for *S. canescens* var. *firma* the specimens quoted by MUELL. ARG. in the protologue must be considered. They are Mont Dore, LECOQ no. 281 in Hb. DC., and Pic de Sancy, SCHULTZ no. 419, in Hb. DC. (collected by LAMBERTYE). Because MUELL. ARG. (Mon. Rés. 1857, p. 222) indicated LECOQ 281 as an excellent specimen and because a duplicate of LECOQ 281 is at S, this was selected as the lectotype.

J. GAY based a new combination *Astrocarpus clusii* (in F. SCHULTZ, Arch. Fl. Fr. Allem. 1, 1842-48, p. 33) on *Reseda clusii* SPRENG. (Nov. pl. cent. in Mant. prim. fl. Halensis 1807, p. 41). He referred in the protologue to *Reseda canescens* L., *R. purpurascens* L., *R. sesamoides* ALL., etc. By quoting the Linnean species of 1753, GAY's combination becomes an illegitimate one.

He (l.c.) distinguished the variety ' *β spathulaefolius*' and treated both *Astrocarpus sesamoides* SALIS (in Flora 17, Beibl. 2, 1834, p. 73) and *Reseda sesamoides β spathulata* MORIS (Fl. Sardoia 1, 1837, p. 193) as synonyms to his variety. GAY's combination is contrary to the Code. J. GAY declared that ' *β spathulaefolius*' occurred in maritime sandy places in Corsica and Sardinia. He based the variety ' *γ scaber*' (l.c.) on a specimen collected by 'RAMBUR', from the sides of the mountains of Granada in Sierra Nevada.

NYMAN described *A. cochlearifolius* in Ofver. Vet. Akad. Stockh. 18, 1862 (1861), p. 191. It is different, NYMAN stated, in having cordate to subcordate, rosetted leaves, which prove it to be referable to var. *spathulata*. This is further

confirmed by the type specimen of '*A. cochlearifolius*' Dom. G. L. SJÖGREN, 9-1855, collected in Portugal, in collibus arenosis, ad Sines Lusitanica (S). NYMAN stated wrongly 'August' as the collecting date, and believed 'Sines' to be a mountain; it is, of course, an indication that '*A. cochlearifolius*' was collected near the seashore, the usual habitat of var. *spathulata*.

A. minor was based by LANGE (in Kjoeb. Vidensk. Meddel. 1866 (1865), p. 85, tab. 4, fig. 1, a-g) on a single specimen collected by him on 10th July between corn fields near the pass of Manzanal in NW. Spain; it is here reduced to var. *alpina*.

A. suffruticosus was based by LANGE (in Kjoeb. Vidensk. Meddel. 1866 (1865), p. 83, tab. 4, fig. 2, h-q) on a single specimen, collected near Santiago de Compostela on Aug. 18, in the heath. It is here reduced to var. *suffruticosa* and is distinguishable by its woody habit.

R. P. BALTASAR MERINO S. J., described *A. latifolius* (in Bol. Soc. Espan. Hist. Nat. 1, 1901, p. 116) stating that this plant was cultivated in the botanical garden of le Colegio de la Guardia (Pontevedra). It originated from sandy areas on the beach. This belongs in var. *firma* (P. MERINO S. J. s.n.; WAG, isotype).

Sesamella spathulata REICHENBACH was published (in Flora 13(1), 1830, p. 130) without any description though accompanied by '*Reseda purpurascens* LINN.?'.

This citation of an earlier name cannot be accepted as replacing a description because the reference is given with doubt. If, however, it would be accepted as an earlier name in spite of expressed doubt, the combination ought to have been *Sesamella purpurascens*. For these reasons *S. spathulata* RCHB. has no standing under the Code. The illegitimate name was proposed for a plant collected by 'Apotheker HOLL' in Portugal. Most probably a specimen belonging in *Sesamoides canescens* var. *spathulata* was at hand.

REICHENBACH published *S. tournefortii* (in Flora 13(1), 1830, p. 130) as a new combination for *Reseda sesamoides* L. He did not give further details except that *S. tournefortii* is a plant of Portugal collected by 'Apotheker HOLL'. The new combination is contrary to the Code and *Sesamella tournefortii* RCHB. rejected.

Specimens examined:

Var. *canescens*

Algeria. Alleizette s.n., V.1914, Col de Ferni, près Fliman; Battandier s.n., V.1882; Bricchi s.n., 19.V.1909, Vialar; Durando s.n., V, VI.1883, environs de Teniet-el-Had; Faure s.n., 29.VI.1932, environs de Tiaret, Broussailles; id. s.n., 30.VI.1933, Terny, à Ain-Ghoraba, Broussailles; Letourneux s.n., 15.VI.1888, prope Teniet-el-Had; Suringar s.n., 20.IV-7.V. 1881, Teniet-el-Had; Warion 30, prov. Alger, Teniet-el-Had.

Corsica Isl. Marsilly s.n., VI.1862, promontoire de Castellaccio.

France. Beaudouin s.n., 22.III, 25.V.1888, 28.VI.1892, Le Mans (Sarthe); Bordère s.n., VII. 1866, Ht. Pyr., près Gèdre; id. s.n., VII.1869, 21.VI.1875, VII.1878, VI.1880 & 3.VII. 1880, Basses Pyr., Bayonne; id. s.n., VII.1869 et VI. 1895, ibid., Biarritz; Coilliot s.n., 7.V., dépt. Sarthe, circa Cenomanen; Delaunay s.n., Indre-et-Loire, arr. de Chinon, Bois sablon-

neuse de Couziers; id. s.n., VI.1852, *ibid.*, landes des Toutaillers, Cne. d'Ambillon; id. s.n., *ibid.*, la Roche; id. 826 a, *ibid.*, entre St. Martin-le-Beau et Azay; Desvaux s.n., VII.1849, Dépt. Loir-et-Cher, Pruniers; Dufour 682, Souan près Bourdeaux; Duterte s.n., VI. 1884 & VI. 1886, Sarthe, le Mans; Endress s.n., V.1831, Dépt. des Landes, landes de Moncut et de Bertranotte près Dax; Galavieles s.n., 14.VII.1892, Mt Aigoual (Gard); Gay s.n., 12.IX. 1812, Dépt. du Loiret, Briare; Le Grand s.n., 12.VII.1878, Cher, pr. Vierzon; Guépin 615, environs d'Angers; Guérin s.n., 21.VIII.1890, pic de Sancy près du Mt Dore, Puy de Dôme; Le Haillan s.n., V.1939, Gironde, env. de Bordeaux; Jarris s.n., 9.1877, Leognan (Gall. occid.); Jeanpert s.n., 20.VIII.1894, dépt. de la Sarthe, La Flèche; id. s.n., VII.1898, Seine-et-Marne, Malesherber; Koster 23, Le Mont Dore, grande Cascada; Kralik s.n., VIII.1848, Meung-sur-Loire, près d'Orléans; Lange s.n., 23, 29.IX.1851, Bayonne; id. s.n., 3.VIII.1852, Valdomare; Lassimonne 139, Paray-le-Frésil; Lecoq '101.1', s.d., Pic de Sancy; Letourneux s.n., 22.VI.1875, Maine et Loire, coteaux schisteux; Lloyd s.n., 28.V.1868, Loire inf., Auchenin; Maire 512, Loiret, Sologne près Lailly; Martin s.n., 27.VI.78, Villefranche (Cher); Méhu 36, 36 ter., Saône-et-Loire, Digoïn, 'Sarreguemines'; Motelay s.n., 10.VI.1868, Gironde, M. Courbin, sur le bord de la Leyre et le Bourg de Mios; Moureau s.n., VIII.1877, *ibid.*, Landes; Neyraut s.n., 2.VI.1889, *ibid.*, la Ceste; id. s.n., 19.VII.1891, *ibid.*, Lamothe-du-Tech, le long de la Leyre; id. s.n., 20.VIII.1895, *ibid.*, Bordeaux, Parc de la Voie; De la Perlaudière 826, Paas (Sarthe); Poisson s.n., I.VI.1874, Loire-et-Cher, env. de Romorantin; Rouy 210, dépt. Cher, Vierzon; St. Amand s.n., 17.VIII.1918, Salbris (Loir-et-Cher); Tourlet s.n., 10, 20.V.1875 & 20. VIII.76, Chinon.

Germany. Dahuke s.n., VII.1927, Mecklenburg, Parchuis; Parchim s.n., 15.VII.1927, Mecklenburg.

Italy. Baglietto s.n., 11.VI.1875, prope Genova; Ferrari s.n., Prov. d'Alessandria, fra Acqui e Sassello; Giannone s.n., autumn 1861, Dintorni di Coumneglia; L. et F. Hegelmaier s.n., 23.V. ?1874, Borghetto; Moreau s.n., 18.VI.1863, Angere Schiften; Piccone 36 bis, Ligurie occid.; id. s.n., 24.V.1861 & 4.VI.1874, Arenjano; Reverchon s.n., 3.VI.1868, Hautes Alpes, Mont Viso à Juillestra.

Morocco. Andreánszky s.n., 16.V.1928, Rabat, Forêt de Mamora; id. s.n., 29.V.1930, Arraouï; Emberger s.n., 4.VI.1926, Gharb, between Larache and Lalla ?mimonha; id. s.n., 12.VI.1931, Moyen Atlas, Eboulés du Dj. Tazekka (Mt. Tazza); Emberger et Molinier s.n., 31.III.49, CS. Lande, Oued Zem, à Charistian; Font Quer 244, Sok-et-Tnin (Beni-Hadifa); Gandoger s.n., IV.1908, O. Queret; Jahandiez 130, Chaouia, Boulhaut, bords de Dayas; id. '223', 29.IV.1924, Dar Salem (Mamora); Maire s.n., 21.IV.1924, prope Boulhaut; Paulsen s.n., 2.IV.1936, Forêt de la Mamora; Pavon 13786, Ktama, vallée de Lovet Tast; Reese s.n., 28.V.1932, Tazzella near Taza; Samuelsson 6310, 10-15 km ad orient a Sale, Mamora; id. 7175, Atlas Medius, Taza, Bab Ferrich; Schousboe s.n., à 1831, Tanger; Sennen et Mauricio 9277, Atlas Rifain, Meseta de Isaguen (Beni Seddat); Stomps s.n., 2.IV. 1936, Rabat-Mekues; Vischer s.n., 24.IV.1928, Mambra-Wald, westl. Sidi Slimane; Wall s.n., 22.V.1934, Atlas Medius, Djebel Tazekka; id. s.n., 24.V.1934, Oued Baht, ost om Meknes; id. s.n., 30.IV. 1936, Atlas Medius, austr. opp. Taza, el Endser.

Portugal. Anthunes var Serra s.n., Cavilha, Unhaes da Serra; Ball s.n., IV.1879, prope Olyssiponen; Barbosa s.n., V.1887, Coimbra, Cidral; Bourgeau 1781, Algarve, Lagos; Braun-Blanquet s.n., 10.IV.1920, Marvão, Serra de S. Mamde; Buchtien s.n., VI.1891, Porto; Cardoso s.n., VI.1883, Cartaxo; Carrisso et Mendonça 1097, Serra da Peneda; Carveiro s.n., VII.1890, arred. de Coimbra; De Carvalho 37, Coimbra; Christensen et Lange 217, Serra Estrella, Goureira; Cortezão s.n., V.1883, Mt. Montargil; Da Cunha 125, Alfeite, arred. de Lisboa; Dempster et Kuijt 2094, N. Grandola; Fernandes c.s. 6809, Estrada, Covilhã-Fundão, posto da Emissora Nacional; Ferreira s.n., VII. 1885, Guarda and Celorico da Beira; id. s.n., VI.1890, Almeida, Junça; id. s.n., VII.1893, arred. da Figueira da Foz, ?Quiaios; id. s.n., V.1913, Louza, Alforcheiro; id. s.n., VIII. 1914, Serra da Estrella, Sabuqueiro; Garcia 10, Arrifana (Guarda), Chao do Pombal; Garcia et Sousa 1116, Vendas Novas, Poligono; Heurig s.n., IX.1882, Caldas do Gerez; Henriques s.n., IV.1878, Cabeceiras de Basto; Hummel s.n., 31.V.1960, Serra da Estrela, Posada S. Lourenço; Lopes s.n., V.1921, Margens do Rio Maças; Matos s.n., 28.IV.1948, Coimbra, Calhabé; id. s.n., 3.VI.1954, *ibid.*,

Casal do Frade; Matos et Marques s.n., 30.IV.1954, *ibid.*, Pinhal de Marrocos; id. s.n., 3.VI.1954, *ibid.*, Casal do Frade; Matz s.n., 6.V.1899, *ibid.*, bei Sto. Antonio; Moller s.n., V.1880, Centra o Barreira e Lavradio; id. s.n., V.1882, Cabo de Espichel; id. s.n., VIII.1883, Gerez, Borrageiro; id. s.n., V.1884, Bragança, monte de S. Barthema...; id. s.n., VI.1884, Gerez, Barrozao and Torgo; Munay (?Murray) s.n., VI.1887, Caldad do Gerez; id. s.n., 6.VI.1887, Oporto; Nilson s.n., 28.IV.1931, Estremadura, Serra da Cintra; Ochôa s.n., IV.1890, Arred. d'Alfandega da Fé Ste. Justa; Paira c.s. 8136, entre o Extremo e Paredes de Coura; Pimentel s.n., V.1884, Pinhal de Leiria; id. s.n., VI.1887, Marinha Grande; Rainha 3058, prov. Ribatejo, Samora Correia, prox Porto Alto; Sequeira s.n., VIII. 1883, Arred. de Braga, Monte do Castro; M. da Silva 1172, prov. Ribatejo, Azambuja (Cruz Campo); P. da Silva 4066, prov. Estremadura, distr. de Setubal Vidigal, NW de Vendas Novas; Sjögnen s.n., VII.1855, prov. Portum, in Monte Serra; Stud. Biol. Rheno-Trai. 680, Gran-dula-Alcaçardo Sol; Tavary s.n., V.1907, Gerez (Thermas); Welwitsch 18, Covão do Urso pr. Sabugueiro in Serra do Estrella; id. 1114, pr. Coimbra; id. 1142, Transtag; Winkler s.n., 4.V.1876, Siner, Süd Portugal; Zimmerman s.n., 1901, S. Fiel.

Sardinia Isl. Reverchon s.n., 26.V.1882, arrondissement de Tampin, Marais d'Asfossato.

Spain. Ball s.n., IX.1880, Cantabrica, Picos de Europa, supra Potes; Boissier s.n., V.1837, Rondae, '*Reseda sesamoides* L. var. *erecta* Boiss.'; Boissier et Reuter s.n., VII.1858, Sierra de Guadarrama; Bourgeau 61, Tajo de Ronda; id. 2397, Vallée de Gerte, près Placencia; Bourgeau et Cosson '52', 13.IV.1849, Puerto Real; Del Campo s.n., VI.1864, Granada; Deverall et Flannigan 281, Sierra de Gredos, El Arenal; Dresser 908, distr. Avila, Sierra de Gredos, near Club Alpino; Dupuy s.n., 7.X.1868, Adouv, circa Barcelonne; Funk '51', VI. 1848, Granada, Cerro del Sol; id. s.n., VII. 1848, circa Alcaraz; Hackel '27', 15.VI.1876 & 22.VI.1876, pr. San Roque et pr. Toledo; Huber-Morath 3581, Prov. Cadiz, bei Puerto Higuera unweit San Roque; id. 3583, *ibid.*, Ronda-Grazalema, 8 km towards Jerez; Huter c.s. 141, regnum Granatense, prov. Nalacitana, inter Casarabonola et Alora; Lange s.n., 2.V.1851, Granada; id. s.n., 20.III.1851-52, Sierra Morena, Valde Huestas; id. s.n., III. 1851-52, Corboba; id. s.n., 10.VII.1851-52, Benavent Cast.; id. 18, 19.IV.1852, Barranco Bermejo; id. s.n., 18.VI.1852, Escorial; Leresche s.n., 5.VII.1862, Monts de l'Escorial; Léribaud s.n., VI.06, Catalogne, Cap Rosas; Linnaeus 629.7 (= 398 Loeffling), s.l.; Losa 7462, Burgos, Castrillo de la Reina; De Morarredi s.n., 2.VI.1873, Madrid, prope el Escorial; Nilsson 853, Yunguera; id. 1164, Sierra de Carbonera, Algeciras; id. 1164b, Estramadura Almorchon; Porta et Rigo 247 = 147, prov. Alcaraz et Sierra Nevada, a la Laguna de Yegua, Albacete; Raunkiaer 975, 1022, Galeroza; Reese s.n., 15.V.1929, prov. Malaga, Sierra de Aguas, bei Carratraca; id. s.n., 24.V.1929, prov. Cadiz, near Grazalema; id. s.n., 27.V.1929, Alhambra, Granada; Reverchon 32, prov. Teruel, Sierra del Pinar d'Albarracin; Roivainen s.n., 1.V.1952, prov. Malaga, Tolox, Rio Caballos; id. s.n., 1.VI.1952, *ibid.*, San Pedro de Alcantara, Cuz-Cuz; Rothmaler 122, prov. Léon, Part. Ponferrada, El Bierzo prope Ponfer-rada; id. 123, prov. Orense, Sierra Camporoma, Part. Valdeorras; Sennen 36, Castille, Val-ladolid, Spanowsky s.n., 1.VIII.61, Sierra Nevada, Alberge Universitaria; St. Lager s.n., 25.VI.1910, prov. Malaga, Tolox; Stud. Biol. Rheno-Trai. 811, Andalusia, prope Punta Mala, 15 km of Algeciras; id. 1044, Sierra de Carbonera, N. Gibraltar; id. 1333, 1362, prov. Ciudad Real, Sierra Morena, Desfiladerode Despenaperos, 45 km S. Valdepenas; id. 1530, 1544, Sierra Delas Cuerdas, 3 km Canete, E. Cuencas; id. 1631, road Teruel-Zaragoza, 61 km of Zaragoza; van der Vecht V/69, pr. Jaen, Las Correderas; Vicioso s.n., 10.IV & 15.VI. 1907, Calatayud, Mt. Calatayud; id. s.n., 25.VI.1909, *ibid.*; Mrs. Welti-Hug 34, Balearen, bei Escorial; Winkler s.n., 19.IV.1873, St. Roque, p. Gibraltar; id. s.n., 25.V.1873, prov. Malacitana, Alora; id. s.n., 10.VI.1873, Granada; id. s.n., 25.VI.1873, *ibid.*, valle Dorro; id. s.n., 22.VII.1873, St. Geronimo, Nevada; id. s.n., 22.IV.1876, St. Roque, p. Algeciras; id. s.n., 9.VI.1876, El Escorial; id. s.n., 15.VI.1876, Toledo; Wöhler s.n., 10.VI.1947, prov. Madrid, between Guadarana and Escorial.

Var. *alpina*

Corsica Isl. Burnouf s.n., 7.VII.1878, Mt. Cardo; Müller s.n., 1.VIII.1906, Mt. Rotondo; Reverchon 16, Bastélica, Mt. Renoso; ?Ronto s.n., 4.VII.38, Mt. d'Oro; Schibler s.n.,

5.VI.1905, Col di Vergio; Segal 539, Mt. Cinto; Serafino s.n., III.1828, Mt. Coscione; Skřivánek s.n., 29.VI.1932, Vall Tavignano; Spencer s.n., 2.VII.1912, Col di Vergio; Stud. Biol. Rheno-Trai. 762, *ibid.*

France. Amshoff s.n., 24.VII.1963, Auvergne, Rocher d'Aigle; Aunier s.n., 11.VIII.1840, Barreger, Pic du Midi; Barkman 4925, Auvergne, Puy-de-Dôme, Puy Ferrand, Puy de Sancy, Mont Dore; Boissier et Reuter s.n., 5.VII.1870, Pyrénées, Pic du Midi de Bigorre; Bordère 1020, Haute Pyrénées, vallée de Héas, près de Gèdre; *id.* 3473, *ibid.*, Gèdre; *id.*, 210, s.n. à 1868, s.n. à 1872, s.n. à 1884, s.n. à 1903, *ibid.*, Col de Bué à Gèdre; Bubani s.n., 14.VII.1836, Pyr. or., supra Mt. Louis; Buffet s.n., 26.VII.1856, Pic de Sancy, Mt. Dore; Chassagne s.n., VIII.1903, Auvergne, Mts. Dore; Donk E150, Pyr. or., Les Bouillouses; Fabre s.n., 9.VI.88, Les Vigan (Gard); De Franqueville 1616, Htes. Pyr., Pic du Midi de Bigorre; Gandoger s.n., VII.1898, Léon, Cervera; Huet de Pavillon s.n., 29.IX.1852, *ibid.*, Tourmalet, au-dessus de Barrège; Jouffray s.n., 6.IX.1852, Pyr. centr., Bigorre; Lange s.n., 7.VII.1851, Vallée de Lys, pr. Bagnères de Luchon; Lardièrre s.n., VII.1891, Puy de Sancy, Puy de Dôme, Linnaeus 629.9, Monsp. (Montpellier); Louis 1899, Puy Dôme, Puy Ferrand aux Mts. Dore; Meebold 964, Pyr. or., Font Romeu, Mt. Louis; Pellat s.n., 21.VIII.1890, Puy de Dôme, Mt. Dore; Schustler s.n., 21.VII.1922, dép. Puy de Dôme, Mt. Puy de Ferrand pr. Besse; Segal 572, 685, Pyr., Mt. Louis, along road to Bouillouse; Simon s.n., 5.VI.1952, Pyr. or., Col de Puymorens, plateau near Passhöhe; *id.* s.n., 29.V.1953, *ibid.*, R.N.618, Mt. Louis-Font Romeu, Plateau west of Mt. Louis; *id.* s.n., 18.VII.1962, *ibid.*, Cerdagne, Massif du Carlit, vicinity of Bouillouse near Etg. del Vivé; Sleumer 1369, *ibid.*, Col de Puymorens, Pic de Font-Frède; Stud. Biol. Rheno-Trai. 812, Pyr., near Hospitalet; Thellung s.n., 12.V. 1905, Dept. du Gard, Kastenien Region des Massif de L'Aigoual (Cévennes), sur le Vigan; Vischer 5536, Htes. Pyr., Col d'Aubers (Orédor); Wolfe s.n., à 1854, Pyr., Pic du Midi de Bigorre; Zerny s.n., 12.VI.1924, E. Pyr., Chalèt du Canigou; Zetterstedt s.n., 21.VII.1856, Pyr. centr., Esquierry; Zlatnik 400, Pyr. or., forest Font-Romeu.

Italy. Huet de Pavillon s.n., VII.1854, Apennins, Mt. Gottero; *id.* s.n., VII.1854, *ibid.*, Prato à Molo supra Cheniara.

Portugal. Christensen et A. Lange 240, S. Estrella, Gouveia; Schonsboe s.n., s.d., in locis elceralis siccis Estramadura.

Sardinia Isl. Steenis 20087, Mt. Limbara, above Calangianus; Thomas '43' vel à 43, s.l.

Spain. Ball s.n., 17.VII.1862, Aragon, Panticosa; Bourgeau s.n., 3. IX.1847, Pyr., Port d'Oo, Bagnères de Luchon; Font-Quer et Rothmaler 226, Puerto de Manzanal; Lange s.n., 10.VII.1852, prope el Puerto de Manzanal, type '*Astrocarpus minor* Lange'; Lomax s.n., 7.VIII.1888, Pyr., Pic de Sauvegarde; Rutten-Pekelharing 293, Tossa, palma de Lleo; Sennen s.n., 4.IX.1913, Catalogne, Pyr., Muria à ?Nonfouts; Willkomm 355, Aragon, supra Panticosa.

Var. *firma*

France. Alleizette s.n., VII.1916 & VII. 1926, Puy de Dôme, Mt. Dore; *id.* s.n., VII.1931, *ibid.*, massif du Sancy; *id.* s.n., VIII.1933, Auvergne, Puy de Dôme, région des Mts Dore, plateau de Durbise; *id.* s.n., VII.1934, *ibid.*, Vallée des Bains; ?Aouthoused s.n., 25 (?29). VI.1877, Espero (Gard), France merid.; Billiet s.n., 3.VIII.1883, Mt. Dore (Puy-de-Dôme), Eboulis à la base Luy-Terrano; Cosson s.n., 29.VIII.1867, Puy-de-Dôme, Mt. Dore, Pic de sancy; Dancer s.n., VII.1935, Auvergne, Mt. Dore, Puy de Sancy; Gay s.n., à 81, Auvergne, Pic de Sancy; Huet de Pavillon s.n., 29.IX.1852, Tourmalet, Côte de Barrege, Hts.Pyr.; De Lambertye 40, 419 & s.n., 24.VII.1840, Auvergne, Mt. Dore, Pic de Sancy; Lecoq 281, Mt. Dore, type 'var. *firma*'; Louis s.n., 13.VIII. 1960, Puy-de-Dôme, vallée de Chaudfour au-dessous de la Croix Michel; Sennen 2226, Cerdagne, Mt. Dore; Simon s.n., 29.VII.1961, Pyr. or., Col de Puymorens, vicinity west of Passhöhe; ?Werkiewicz s.n., 2.VII. 1864, Valerangue (Gard).

Italy. Gresino s.n., 24.V.1927, Ligarda-Varasse, M. Grono; Piccone s.n., 24.V.1867, Arenjano, Liguria occ.

Portugal. Fernandes c.s. 4336, Oliviera de Frades, Quinta do Sr. Costa, a 2 km de barragem do Grela.

Var. *spathulata*

Corsica. Aellen 127, Solenzara beach; id. 1297, Stagno di Palo, Stagno; id. 1498, Strand bei Solenzara; id. 2832, Solenzara bei Scaffa Rossa; Burnouf s.n., 29.V.1878, à Porto Vecchio; Cousturier s.n., V.1917, Porto Vecchio; Gabriel 5410, dunes des Porto-Vecchio; Revelière s.n., 12.V. & 13.VI.1864, Porto Vecchio; Reverchon 280, Bonifacio, maquis de la Trinité; Rikli s.n., 11.V.1900, Golf of Porto Vecchio; Stefani s.n., 2.V.1894, environs de Bonifacio.

Gibraltar. Schott s.n., s.d.; Willkomm 652; id. s.n., VIII.1845.

Italy. Piccone s.n., 24.V.1866, Fra Arenjano e Cojoletto.

Portugal. De Carvalho 30, Cábó Mandigo; id. 1935, Buarcos; Deveau s.n., VII.1879, Cabo Carvoeiro; Fernandes c.s., 7169, Cabo Carvoeiro; Fontes et Rianha 4130, Baixo Alentejo, Alcácer do Sao Barrosinho; Gandoger s.n., V.1905, Cabrella; Kostermans et Kruyt 639, Cabo de Sao Vincente; Moller s.n., VI.1880, arred. de Buarcos; Rothmaler 14533, prov. Estremadura, Cintra Cabo de Roca; Rothmaler et Silva 14964, prov. Algarve, vila do Bispo, Cabo de S. Vicenta; Silva c.s. 4407, prov. Baixo Alentejo, Sines versus Farol; id. 4476, prov. Estramadura, Peniche pr. Farol do Caba Carvoeiro; Sjögren s.n., IX.1855, ad Sines Lusitaniae, type '*Astrocarpus cochlearifolius* Nym.'; Stud. Biol. Rheno-Trai. 811, S. of Cabo da Roca, W. of Cintra; Webb s.n., 31.III.1951, near lagoon of Albufeira; Welwitsch s.n., II.1840, Margem Esquerdo do Tejo; Winkler s.n., 9.V.1876, Cintra.

Sardinia. Major Forsyth s.n., 31.V.84, s.l.; id. s.n., 2.VI.1884, prope Touni; Goldschmidt 87, Bonifacio; Martelli s.n., 6, 13-14.VI.1895, Velta della montagna de Limiora; Reverchon 215, à 1881, Santa Teresa Gallura, par Tempio, Mâquis de Bancamino; id. 215, à 1882, arrondissement de Tempio, Marais d'Asfossado; De Sardagna s.n., 2.V.1883, M. Pino, Terranova; id. s.n., 8.VI.1883, Genargentu, Stud. Biol. Rheno-Trai. 91, prov. Nuoro, near Oliena; id. 257, along the new road from Sassari to Oschiri, 15 km from Oschiri; Vaccari 266, s.n., IV.1895, s.n., V.1895, Gallura, Porto Pollo.

Spain. Bourgeau 60, Puerto Real; Merino, s.n., s.d., inter scopulos prope Oya et Sanjian, Pontevedra, type '*Astrocarpus latifolius* Merino'; Stud. Biol. Rheno-Trai. 1228, prov. Ciudad Real, Sierra Morena, akker bij Almuradiel.

Var. *suffruticosa*

Algeria. Faure s.n., 20.VII.1940, environs de Ciaret.

France. Gaudefroy 36bis, Romorantin (Loir-et-Cher); Lange s.n., 26.IX.1851, Bayonne; Martine 1619, Romorantin (Loir-et-Cher), (WRSL).

Morocco. Bernard c.s., 1885 'Hb. Sauvage', WN. Forêt de la Mamora, El Manzeh, Station 1; Ruiz de la Torre s.n., 28.V.1957, Tenin de Sidi Liamani; Sauvage 8700, Mamora, le long de la tranché E.

Portugal. Clementi et Ferreira s.n., VI.1916, Insalde-Tarede de Couve; Couceiro s.n., IV.1883, Povoá de Lanhoso; A. Ferreira s.n., III.1879, Arredores de Coimbra, Cabrizes; M. Ferreira s.n., VII.1886, Vizeu; Moller, VI.1879, Serra de Lóuza; id. 125a, Melgaço; id. s.n., IX.1882, Caldas do Gerez; Rothmaler 13913, prov. Minho, viana do Castelo, prope Lanhelas; Silva s.n., IX.1948, prov. Beira Alta, Santa Cruz de Trapa.

Spain. Boissier s.n., VII.1837, Sierra Nevada, '*Reseda sesamoides* L. var. *prostrata* Boiss.'; Bourgeau 1092, *ibid.*, région alpine au Barranco de Benalcaza; Een s.n., 19.VI.1957, Albergue Sierra Nevada; Elias 4325, Burgos, Vitoria; Gandoger s.n., VI.1898, Valença do Minho; Merino s.n., VI.10, Sallöcia, La Suavidid de Pontevedra; Lange s.n., 18.VIII.1852, ad Santiago de Compostela, type '*Astrocarpus suffruticosus* Lange'.

Tunisia. Letourneux s.n., 17.III.1888, prope Teniet-el-Had.

TAXA ET NOMINA REJICIENDA VEL DUBIA

Astrocarpus prostratus (BOISS.) H. LINDB.

Itin. Mediterr. in Acta Soc. Sc. Fenn. n.s.B, i, no. 2, 1932, p. 67, was cited in Ind. Kew. Suppl. 9, 1938, p. 30. There was, however, no species-name published but a name for a subspecies, *Astrocarpus sesamoides* DUBY subsp. '*A. prostratus*' (BOISS.). The name is contrary to the Code, and has no status; the taxon is *Sesamoides canescens* var. *suffruticosa* (see also HEYWOOD, Fl. Europ. Not. Syst. 3, in FEDDES Rep. 69, 1964, p. 43).

Eresda boissieri var. *pachystachya* J. GAY ex LANGE

In WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 890. LANGE cited in synonymy to *R. suffruticosa* LOEFL. (= *R. fruticulosa* var. *suffruticosa*) '*Eresda boissieri* v. *pachystachya* J. GAY hb.'; accordingly this is a reference to a herbarium name, without nomenclatural standing.

Homalodiscus major BUNGE ex BOISS.

Fl. Or. 1, 1867, p. 423. BOISSIER cited '*Homalodiscus major* BUNGE pl. Pers. exs.' in the synonymy of *Homalodiscus ochradeni* BOISS. (l.c., p. 422). The name *H. major* is a cited herbarium name in synonymy and has no status under the Code. BUNGE's specimen was seen at K; it belongs in *Ochradenus ochradeni*.

Ochradenus rostratus G. EHRENB. ex MUELL. ARG.

Mon. Rés. 1857, p. 95 (et in Neue Denkschr. Schw. Ges. Zuer. 16, 1858, p. 95). MUELLER cited '*O. rostratus* G. EHRENBERG' in the synonymy of *O. baccatus* DEL. forma (' $\beta\beta$ ') *monstruosa* MUELL. ARG. The name *O. rostratus* refers to a manuscript name (and a specimen) proposed by G. EHRENBERG in 'Insula Forsan Sinus Arabici' (= Insula Farasan, 42°E., in the Red Sea), '(G. EHRENBERG in hb. Reg. Berol.)'. '*O. rostratus* G. EHRENB. ex MUELL. ARG.' has no status under the Code.

Randonia arabica COSS.

LEREDDE listed *Randonia arabica* COSS. in Trav. Inst. Rech. Sah. Ser. Tass. 2, 1957, p. 310 (Trav. Lab. Forest. Toul. 5 (3) 3, 1957, p. 310) collected at Oued Tidjamaiin-n-Tisita (Geyr). No doubt, this is a lapsus calami for *Randonia africana* COSS.

Reseda affinis KOTSCHY ex MUELL. ARG.

In Index Kewensis (2, 1895, p. 696) reference is made to *Reseda affinis* KOTSCHY ex MUELL. ARG. (Mon. Rés. 1857, p. 124). It seems that this name rests on a specimen represented by several duplicates in various herbaria (PRC, W, WU), labeled '*Reseda affinis* KÖCHEL (Msc.)'. This label further reads '*R. nova* spec. In Aegypto: ad pyramides 'Dschizeh' prope Cahiram. Legit

TH. KOTSCHY. 23 Mart. 1836'. This text comes so close to MUELL. ARG.'s data (cf. l.c. pp. 124 and 126) that it ought to be accepted as representing the specimens MUELLER had in mind when he quoted *R. affinis* KOTSCHY in synonymy. At any rate, the specimen is referable to *Reseda arabica* BOISS., as already stated by MUELL. ARG. In the Vienna Herb. is a specimen with the msc. of KÖCHEL and also accompanied by two labels of KOTSCHY, as described above, only with added written numbers 842 and 106, while an originally printed number '31' is deleted. This specimen represents *R. affinis* KOTSCHY ex MUELL. ARG.; it belongs in *R. arabica* BOISS. MUELL. ARG. (p. 124) cited '*R. affinis* KOTSCHY pl. exs. Aegypt. (1838)' while the original label has '1836'. The name *R. affinis* KOTSCHY ex MUELL. ARG. has no status under the Code, being a herbarium name cited in synonymy.

Reseda alba DELILE

Fl. Aegypt. 1813, p. 15. In Index Kewensis 2, 1895, p. 696, a reference is made to *Reseda alba* DELILÉ, though DELILE quoted in his publication (l.c.) '*Reseda alba* L.' This may have been a misidentification of one of his specimens according to MUELL. ARG. in DC., Prodr. 16(2), 1868, p. 559, but this is unimportant because *R. alba* DEL. is not a name to be considered in nomenclature, being a later homonym to *R. alba* L. (1753). MUELL. ARG. (1857, p. 109), cited *R. alba* DEL. in the synonymy of *R. eremophila* BOISS. He (1868, p. 559) reduced it afterwards as well as *R. eremophila* BOISS. to the synonymy of *R. decursiva* FORSK. (= *R. alba* var. *decursiva*).

Reseda alba RUIZ ex MUELL. ARG.

MUELLER cited '*Reseda alba* RUIZ' in synonymy to *R. bipinnata* WILLD. (Mon. Rés. 1857, p. 107). He referred to a herbarium name in B, at any rate a later homonym of *R. alba* L. (1753).

Reseda alba ST. AMANS

In Index Kewensis 2, 1895, p. 696, is cited '*Reseda alba* ST. AMANS' and it is referred to *R. jacquinii*. However, no name *R. alba* ST. AMANS was proposed or published by ST. AMANS, who only cited one or more specimens which he identified with some doubt as '*Reseda alba* L.' (Fl. Agen. 1821, p. 187). ST. AMANS's plant may belong in *R. jacquinii* RCHB. or not, but the name *R. alba* ST. AMANS has no status.

Reseda anomala J. GAY ex MUELL. ARG.

MUELLER cited '*R. anomala* J. GAY mss. ex listes mss. cl. Graves' (Mon. Rés. 1857, p. 124) as a synonym to *R. arabica* BOISS. *R. anomala* has no status under the Code, being a msc. name cited in synonymy.

Reseda arabica KRALIK ex MUELL. ARG.

Mon. Rés. 1857, p. 232. This name is nothing but a reference to an identification of a plant collected by KRALIK 'Plant. Tunetan. exs. N. 371' and correctly

identified by KRALIK as *R. arabica* BOISS. *R. arabica* KRALIK ex MUELL. ARG. has no status, being cited in synonymy of *R. praetervisata* MUELL. ARG. (l.c.). MUELLER reduced afterwards *R. praetervisata* to the synonymy of *R. arabica* BOISS. (cf. MUELL. ARG. in DC., Prodr. 16(2), 1868, p. 560).

Reseda arborea HORT. ex VILMORIN

R. arborea HORT. is cited by VILMORIN (Fl. Pl. Terre ed. 2, 1866, p. 772; errore Ind. Kew. 2, 1895, p. 696: '722') as a synonym to *R. odorata* L. var. *grandiflora* HORT. According to the Code 1961, Art. 34(4), the name *R. arborea* HORT. ex VILM. is not validly published, being cited in synonymy.

Reseda asolaich BEDEVIAN

BEDEVIAN (Illustr. Polyglot. Dict. 1936, p. 505) published *R. asolaich*. He gave only the vernacular names of it in several languages. The name *R. asolaich* BEDEVIAN has no status under the Code, being without descriptive data, and so is to be rejected.

Reseda atriplicifolia J. GAY ex MUELL. ARG.

See Taxonomical notes sub *R. alphonsi* MUELL. ARG.

Reseda barrelieri BERTOLONI

Fl. It. 5, 1842, p. 32. BERTOLONI (l.c., pp. 29, 30) referred BARRELIER's '*Reseda minor incisifolia*' (Ic. 1714, no. 587) to *R. suffruticulosa* L. (= *R. alba* L.). BERTOLONI also published '*R. barrelieri*' at the end of a detailed survey of the affinities of *R. suffruticulosa* L. He gave some descriptive details. '*Reseda minor alba dentatis foliis*' (BARRELIER, Ic. 1714, no. 588) is accepted by BERTOLONI as representing *Reseda barrelieri* (l.c.). LINNAEUS had referred to BARRELIER's Ic., no. 588, when redescribing his *R. undata* in 1762 (see sub *R. undata* L.), and cited: '*Reseda minor, foliis incisifolia*'. Now, BARRELIER's '*Reseda minor incisifolia*' is Ic. 587 whereas Ic. 588 has the legend '*Reseda minor alba dentatis foliis*'. Though BARRELIER's plates cannot be identified with certainty; it seems best to adopt the view that LINNAEUS's reference 588 is a misprint for 587. BERTOLONI rested *Reseda barrelieri* BERTOL. on a different plate, therefore, but, moreover, did not accept the name *Reseda barrelieri* definitely (l.c., p. 32). It is thus treated as a not validly published name (Art. 34).

Reseda bastitana COINCY

DE COINCY (in Journ. de Bot. 13, 1899, p. 303) gave a full description of a '*Reseda* à étamines stériles du groupe du *Phyteuma*' and added as a 'nom provisoire' *R. bastitana*. According to Art. 34(2) of the Code (1972) this name is rejected.

Reseda bipinnata LOSCOS et PARDO

Index Kewensis 2, 1895, p. 696, referred to the name '*R. bipinnata* LOSCOS et PARDO' (Ser. Imperf. 1863, p. 51). LOSCOS et PARDO (l.c.) cited actually '255, *R.*

bipinnata WILLD.', adding some synonyms, finding localities, flowering and fruiting data. It follows, that they intended only to enumerate and name their plants. Therefore, *R. bipinnata* LOSCOS et PARDO has no status nomenclaturally, being at best a homonym.

Reseda candida DALECHAMPS

R. candida DALECHAMPS (Hist. gen. pl. 1586–7, p. 1199, cum ic.) was cited by MUELL. ARG. (l.c., p. 100) and with doubt referred to 'var. β . MUELL. ARG.'. MAGNOL (Bot. Monsp. 1686, p. 221) mentioned '*Reseda foliis calcitrapae, flore albo*', and suggested it might represent *R. candida* Lugd., and which he found at Montpellier. Surely *R. alba* L. is meant (cf. notes to *R. alba*).

Reseda canescens MILLER

Gard. Dict. ed. 8, 1768, *Reseda* no. 7. MILLER based *R. canescens* on SAUVAGE, Fl. Monsp. 1751, p. 41 and TOURNEFORT, Inst. 1700, p. 424. He makes no mention of LINNAEUS's earlier publications of *R. canescens* (1753 and 1767), possibly because he felt that *R. canescens* L. (1753) and *R. canescens* L. (1767) are different taxa (see this revision, p. 44, and notes to *Sesamoides*). Nevertheless *R. canescens* MILL. is a later homonym to *R. canescens* L. (1753).

Reseda capensis WILLD. ex MUELL. ARG.

Mon. Rés. 1857, p. 215. *R. capensis* WILLD. ex MUELL. ARG. non BURM. F. is cited in Index Kewensis 2, 1895, 'p. 214' (sphalm.), but the name is only a reference to WILLD. hb. fol. 9228, and has no status under the Code being a herbarium name cited in the synonymy of *Oligomeris dispersa* MUELL. ARG. (l.c., p. 215; see also this revision p. 77).

Reseda caudata DC. ex MUELL. ARG.

Mon. Rés. 1857, p. 154. *R. caudata* DC. was cited by MUELL. ARG. as a synonym to *R. bracteata* BOISS. and listed by Index Kewensis (2, 1895, p. 696). It is only a reference to a herbarium specimen in DC. hb. and in B. The specimen named '*R. caudata* DC.' was collected by OLIVER in his series of 'pl. exs. orient.' The name *R. caudata* DC. has not status under the Code.

Reseda chinensis LOUREIRO

Fl. Cochinchin. 1, 1790, p. 299. The characters of the stem and leaves which are assigned to this species by LOUREIRO 'Caulis quadrangus, multifolia, opposita', are not admissible in *Resedaceae*. MUELLER (Mon. Rés. 1857, p. 231) came to the same conclusion by excluding this species from *Resedaceae*. MERRILL, moreover, identified *R. chinensis* LOUR. as '*Hypericum japonicum* THUNB. Fl. Jap. 295. pl. 31. 1784' (cf. MERRILL, 'A commentary on LOUREIRO's Flora Cochinchinensis' in Trans. Amer. Phil. Soc. N.S. 24(2), 1935, pp. 38, 267).

Reseda cochinchinensis LOUREIRO

Fl. Cochinchin. 1, 1790, p. 299. The characters of the leaves and corolla

which were mentioned for this species by LOUREIRO 'Folia opposita corolla rotata ' are not admissible in *Resedaceae*. MUELLER (Mon. Rés. 1857, p. 231) came to the same conclusion by excluding this species from *Resedaceae*. MERRILL, moreover, identified *R. cochinchinensis* LOUR. as '*Hypericum japonicum* Thunb. Fl. Jap. 295. pl. 31. 1784' (cf. MERRILL, 'A commentary on LOUREIRO's Flora Cochinchinensis' in Trans. Amer. Phil. Soc. N.S. 24(2), 1935, pp. 38, 267).

Reseda crispa POURR. ex LANGE

LANGE cited '*R. crispa* POURR. hb. 'in the synonymy of *R. gayana* BOISS. (in WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 892). The name *R. crispa* POURR. ex LANGE has no status nomenclaturally, being a herbarium name cited in synonymy (cf. Ind. Kew. 2, 1895, p. 696).

Reseda crispata BERTOLONI

Fl. Ital. 5, 1842, p. 26. Index Kewensis 2, 1895, p. 696, refers to *R. crispata* BERTOL. but BERTOLONI was accustomed to begin the descriptions of the species treated in his Flora by the scientific name without stating the author's name, which was given as a first reference accompanying BERTOLONI's description. In Index Kewensis this habit was overlooked and so '*R. crispata* BERTOL.' was listed. The first reference by BERTOLONI is '*R. crispata* LINK, En. alt. 2. p. 8. n. 52' (1822). Therefore '*R. crispata* BERTOL.' ought not to be cited by Ind. Kew. (l.c.) because it was never published; *R. crispata* LINK (= *R. luteola*) was meant.

Reseda denudata DECAISNE

The label accompanying the isotype of *Ochradenus aucheri* BOISS. (W), AUCHER-ÉLOY Herbarium d'Orient No. 4178 reg. Mascate, carries in DECAISNE's handwriting the name *Reseda denudata* DCNE; as far as we are aware *R. denudata* was never published in print.

Reseda dipetala DRÈGE ex MUELL. ARG.

MUELL. ARG. referred to '*Reseda dipetala* DRÈGE pl. exs. cap. non AIT.' in the synonymy of *Oligomeris dregeana* (Mon. Rés. 1857, p. 216). The name *Reseda dipetala* DRÈGE ex MUELL. ARG. has no status under the Code. PRESL (1845) noted that *Reseda dipetala*, as a legitimate name was published by AITON (1789) and so MUELLER's name based on DRÈGE could only be a homonym (cf. PRESL in Abh. Kön. Böhm. Ges. Wiss. ser. 5, 3, 1845, p. 438 et in Bot. Bemerk. 1846 (1844), p. 8).

Reseda dipetala DRÈGE ex PRESL

In Abh. Kön. Böhm. Ges. Wiss. ser. 5, 3, 1845, p. 438 et in Bot. Bemerk. 1846 (1844), p. 8. PRESL referred to '*Reseda dipetala* DRÈGE pl. cap. exs' (ll.cc.), and in Index Kewensis 2, 1895, p. 696, '*Reseda dipetala* DRÈGE ex PRESL' is listed. DRÈGE, however, identified one of his 'Plantae capenses exsiccatae' as *Reseda dipetala* wishing, it would seem, to refer to *Reseda dipetala* AITON. PRESL added

that the specimen was not *R. dipetala* AITON, but another species, apparently new, which he wanted to name *Reseda dregeana* PRESL. Now PRESL did not describe this supposed new species, and *Reseda dregeana* PRESL is, accordingly, a nomen nudum (see also *Oligomeris dregeana*, this revision p. 75).

Reseda filiformis POURR. ex MUELL. ARG.

Reseda filiformis POURR. ex MUELL. ARG. was cited by MUELLER ARG. (Mon. Rés. 1857, p. 200) in synonymy to *R. virgata* BOISS. et REUT. and was only a reference to a name written by POURRET on a herbarium specimen (WILLD. hb. fol. 9230). *R. filiformis* POURR. ex MUELL. ARG. was listed by Index Kewensis (2, 1895, p. 697). Afterwards LANGE cited *R. filiformis* POURR., also as a herbarium name (cf. LANGE in WILLKOMM et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 896). MUELLER and LANGE both referred POURRET's *R. filiformis* to *R. virgata* BOISS. et REUTER, while MUELLER accepted it as representing an infraspecific taxon 'αα abortiva' (cf. Mon. Rés. 1857, p. 200, and in DC., Prodr. 16(2), 1868, p. 581). It was a 'hortorum filia', by which MUELLER meant to say that the plant was sterile, or generally poorly developed. The specimen is still present in the WILLDENOW herbarium and it certainly represents *R. virgata* BOISSIER et REUT.

Reseda fruticosa G. EHRENB. ex MUELL. ARG.

R. fruticosa was cited by MUELLER (Mon. Rés. 1857, p. 229) in the synonymy of *Caylusea canescens* ST. HILAIRE β *foliosa* MUELL. ARG. with the reference of a manuscript name to a specimen present in 'hb. Reg. Berol.' written by EHRENBURG. The name *R. fruticosa* EHRENB. ex MUELL. ARG. has no status under the Code (though cited in Index Kewensis 2, 1895, p. 697).

Reseda gallica RAFINESQUE

Fl. Tell. 3, cent. VII, 1837 (1836), p. 72. Name only; no nomenclatural status (see also MERRILL, Index Raf. 1949, p. 132).

Reseda gigantea POURR. ex LANGE

In WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 890, LANGE cited this msc. name in synonymy to *R. suffruticosa* LOEFL.; it has no standing nomenclaturally, though listed in Ind. Kew. 2, 1895, p. 697.

Reseda glauca BROTERO

In Index Kew. 2, 1895, p. 697, *Reseda glauca* BROT. is listed. It appears that this name is only the identification of a specimen collected by HOFFMANSEGG in Spain, identified by BROTERO (Fl. Lusit. 2, 1804, p. 307) as *Reseda glauca* L. BROTERO referred to LINNAEUS and copied LINNAEUS's description of *R. glauca* (Sp. Pl. 1, 1753, p. 449) verbatim. MUELLER quoted *R. glauca* BROT. in synonymy to *R. virgata* BOISS. et REUT. (Mon. Rés. 1857, p. 199) but appears not to have seen HOFFMANSEGG's specimen and it remains uncertain why MUELLER referred the name '*R. glauca* BROT.' to *R. virgata* BOISS. et REUT. (see also DC., Prodr. 16(2), 1868, p. 581).

Reseda glauca EICHW.

Pl. nov. Casp.-Caus. 1831, p. 24. *R. glauca* EICHW. as cited in literature, is a later homonym of *Reseda glauca* L. (1753) and so rejected. It was mentioned by LEDEBOUR (Fl. Ross. 1, 1842, p. 235) as a synonym to *R. luteola* L. and by MUELLER (Mon. Rés. 1857, p. 203), who referred to LEDEBOUR when citing *R. glauca* EICHW. in this synonymy. In 1868, MUELLER referred it to *R. luteola* L. var. *vulgaris* MUELL. ARG. (cf. DC., Prodr. 16(2), 1868, p. 584). EICHWALD (l.c.) cited '*Reseda glauca* L.' without any descriptive data; a nomen nudum. It is evident that EICHWALD only referred to *Reseda glauca* L. (probably erroneously identifying one of his specimens), and that *Reseda glauca* EICHW., as listed in Index Kewensis 2, 1895, p. 697, has no status.

Reseda glauca SIEBER ex PRESL

PRESL referred to '*R. glauca*' (no author) in his account of corrections and reidentifications of SIEBER's herbaria (in OKEN, Isis 21, 1828, p. 274). It concerned a specimen in the 'Herb. Aegypt.', so named, which ought to be renamed, PRESL declared, *R. dipetala* AIT. (= *Oligomeris*). In G is a sheet labeled '*Reseda subulata* DELILE?, *Oligomeris glaucescens* CAMB., *Reseda dipetala* AIT.?' and in print '*Reseda glauca*. L. Schiut.' In writing 'Egypte. Mr. SIEBER'. The queries were added to the names by a later hand. The specimens are *Oligomeris linifolia* (VAHL) MACBR. They are the basis of *Reseda glauca* SIEBER ex PRESL (l.c.). *R. glauca* SIEBER ex PRESL has no nomenclatural standing, though cited in Ind. Kew. 2, 1895, p. 697.

Reseda gracilis BUBANI

Fl. Pyr. 3, 1897, p. 254. Is listed in Index Kew. Suppl. 3, 1908, p. 149. However BUBANI published '*Reseda gracilis* (VAHLII) Nob.' In this way BUBANI indicated that his taxon was identical with *Reseda undata* VAHL, the first synonym he quoted in the protologue. He did not adopt the epithet '*undata*' used by VAHL because he was aware of the existence of *Reseda undata* LINNAEUS, and wished to avoid confusion. He stated 'vix L., scilicet non sine confus'. For that reason he names his plant *Reseda gracilis*, instead of *Reseda undata* VAHL. However, an earlier *Reseda gracilis* TENORE had been published (Fl. Neap. Prodr. App. Quinta 1826, p. 15, and Syll. 1831-33, p. 232; see also notes sub *R. lutea*), which was not overlooked by BUBANI, who noted that TENORE's *gracilis* was now regarded as a variety in '*Reseda vulgaris*' (= *R. lutea*). He considered for that reason the specific epithet '*gracilis*' unoccupied and used it for his taxon '*Reseda gracilis* BUBANI'. This name is to be rejected under the Code.

Reseda guichardii PAGÈS

In Bull. Géogr. Bot. 24, 1914, p. 169, PAGÈS described a plant which he discovered on the rocks at Saint-Gervais (Hérault, southern France). He stated that it was a hybrid between *R. alba* and '*R. jacquini*'. It is impossible to decide which concepts of *R. alba* and *R. jacquinii* were adopted by PAGÈS, but he stated

that all flowers of *R. guichardii* were sterile. In addition, in his description he included data concerning the ovary that, evidently, all ovules (or seeds) were deformed in 'numerous leaflets'. It is here decided to reject *R. guichardii* PAGÈS, because it is based on a deformed specimen (monstrosity; Code 1961, art. 71). Ind. Kew. Suppl. 5, 1921, p. 215, cited *R. guichardii* PAGÈS.

Reseda hexastylis FORSKÅL ex RAFINESQUE

Fl. Tell. 3, cent. VII, 1837 (1836), p. 73. RAFINESQUE mentioned, apparently in synonymy when discussing *Hexastylis* RAF. (l.c.) the name '*Reseda hexastylis* FORSK.'. This name was never published by FORSKÅL, and moreover, has no status under the Code (see also MERRILL, Index Raf. 1949, p. 132). Presumably, RAFINESQUE wished to refer to *Reseda hexagyna* FORSKÅL (see also this revision, p. 42, 43, 46).

Reseda incisa TENORE

TENORE published *R. incisa* in Prodr. Fl. Napol. 1823, p. XXVIII. He (Fl. Napol. 4, 1830, p. 258) cited *R. incisa* later in the synonymy of '*R. undata* L. Var. B. *glaucescens*', maintaining this (but without distinguishing varieties) in his 'Syll. 1831, p. 232'. He (1830, p. 257) cited 'LIN. sp. 644. WILLD. 2, 879. *R. minor alba dentatis foliis* BAR. ic. 588' as literature references to *R. undata* L., and (l.c., p. 258) '*R. minor incisifoliis* BARR. obs. 869. ic. 587' among the literature references of '*R. undata* L. Var. B. *glaucescens*'. LINNAEUS (Sp. Pl. ed. 2, 1, 1762, p. 644) referred to '*Reseda minor, foliis incisifoliis*. BARR. rar. 78. t. 588' when redescribing *R. undata*. WILLDENOW (Sp. Pl. 2, 2, 1800 (1799), p. 879) copied verbatim the protologue of LINNAEUS's *R. undata* and gave more literature references. BARRELIER (Pl. Gal. Hisp. et It. 1714, p. 78, tab. 587) has the legend '*Reseda minor incisifoliis*' and the tab. 588 has the legend '*Reseda minor alba dentatis foliis*'. These are in accordance with the entries of BARRELIER's no. 869 and 870, respectively, by LINNAEUS. It follows that LINNAEUS (1762, p. 644) followed by WILDENOW (1800 (1799), p. 879) and by TENORE (ll.cc.) cited the number of BARRELIER's '*Reseda minor foliis*' wrongly, which should be '587' instead of '588'. Moreover, TENORE (1830, p. 258), based the 'Var. B. *glaucescens*' on '*R. minor incisifoliis* BARR. obs. 869 ic. 587', the only literature reference used by LINNAEUS when redescribing *R. undata* (1762). It has been demonstrated in this revision that *R. undata* L. (1762) is a nomen ambiguum, contrary to *R. undata* L. (1759), *R. undata* L. (1762) consisting of 2 different species which are united in a single description (see sub *R. undata* L., 1759). Therefore *R. incisa* TENORE has to be rejected; it belongs in the synonymy of *R. undata* L. (of 1759), of *R. alba* L. or of *R. fruticulosa* L. By several authors *R. incisa* TEN. was referred to *R. alba* L., which occurs in Italy, while *R. undata* occurs in Spain and *R. fruticulosa* occurs in Spain and NW. Africa (see also WALP., Rep. 2, 1843, p. 753). We are unable to assign *R. incisa* to its correct place as a synonym and neither was TENORE, who reduced his *R. incisa* to an ambiguous name, *R. undata* L., 1762.

Reseda inflata G. EHRENB. ex MUELL. ARG.

Was cited by MUELLER (Mon. Rés. 1857, p. 189) in the synonymy of *R. lutea* L. var. *♀ besseriana* MUELL. ARG. He referred to a name given by EHRENBURG in manuscript to a specimen present in 'hb. Reg. Berol.' The name *R. inflata* G. EHRENB. ex MUELL. ARG. has no status under the Code although listed in Index Kewensis 2, 1895, p. 697.

Reseda kahirina BOISS.

Fl. Or. 1, 1867, p. 430. Index Kewensis 2, 1895, p. 697, referred to '*R. kahirina* BOISS.' In 1857, MUELLER published in his Mon. Rés., p. 176, '*R. cahirana*' basing it on a specimen collected in the 'Mokkatam' near Cairo, Lower Egypt, 'leg. TH. KOTSCHY N. 534 (1855) in hb. BOISS.'. This specimen, and no more, was also used by BOISSIER when he published the name '*R. kahirina*' (l.c.) with reference to MUELLER's publication. BOISSIER did no more than changing MUELLER's letters 'c' and the second 'a' of the epithet by 'k' and 'i' respectively. According to the Code (Art. 73, Notes 1, 5), the correct spelling is *Reseda cahirana* MUELL. ARG.

Reseda laciniata DULAC

DULAC (Fl. Hautes-Pyr. 1867, p. 183) cited '*R. phyteuma* L.' as a synonym to his species '*R. laciniata*'. Therefore *R. laciniata* DULAC is a superfluous name and has no status under the Code though cited in Ind. Kew. 2, 1895, p. 697.

Reseda lamottei JORD. ex NYMAN

R. lamottei JORD. is mentioned by NYMAN (Consp. Fl. Europ. 1879-82, p. 69) as a synonym to *R. lutea* L. The name was not published by JORDAN previously and it has no standing under the Code. A specimen grown from seeds supplied by JORDAN belongs in *R. lutea* (TL).

Reseda lancerotae WEBB

In DELILE, Index Sem. Hort. Monspel. 1836, p. 27; nomen illeg.

Reseda ligustica ROUY et FOUCAUD

Index Kewensis Suppl. 6, 1926, p. 172, listed '*R. ligustica* ROUY et FOUC. (Fl. Fr. 2, 1895, p. 245)'. Actually '*R. ligustica* CARUEL' was proposed as a 'forme' by ROUY et FOUCAUD (l.c.). This binomial is used not for a species but for a 'forme' which is a taxon other than a species (l.c., Aux Lecteurs pp. V-XI). See also note to *R. dimercarpa* sub *R. luteola*. It may further be observed that ROUY et FOUCAUD indicated their accepted species by bold printed capitals and the names of 'formes' in other letterpress. *R. ligustica* (CARUEL) ROUY et FOUC. has to be rejected being contrary to the Code (art. 23 & 24). In addition, the name '*R. ligustica* CARUEL (pro var.)' as published by ROUY et FOUCAUD is inaccurately cited because they refer to Fl. Ital. 10, p. 169, where *R. phyteuma* L. β *ligustica* was proposed by A. TERRACCIANO and not by CARUEL (cf. CARUEL, Fl. Ital. 10, 1894, p. 169).

Reseda litorea J. GAY ex NYMAN

Consp. Fl. Europ. 1875–82, p. 69. *R. litorea* GAY (1837) is mentioned by NYMAN as a synonym to *R. jacquinii* RCHB. The name was not published by GAY previously and has no standing under the code. It is conceivable that NYMAN wanted to refer to what is quoted as '*Reseda littoralis* J. GAY (1836) ex PROST, in hb. BOISS!' by MUELL. ARG. (Mon. Rés., p. 141) in synonymy to *R. jacquinii* RCHB.

Reseda longicalycina ST. LAGER

ST. LAGER proposed '*R. longicalycina*' in Ann. Soc. Bot. Lyon 7, 1880 (1878–79) p. 133, as an improved (more fitting) name for *R. phyteuma*. The name is superfluous and without nomenclatural standing (Art. 63).

Reseda lusitanica POURR. ex LANGE

WILLK. et LANGE, Prodr. Fl. Hisp. 3, 1880, p. 897. Ind. Kew. 2, 1895, p. 697, referred to 'POURR. ex WILLK. et LANGE'. LANGE cited the name '*R. lusitanica* POURR. ined. (?)' in the synonymy of '*R. luteola* L. β *gussonei* MUELL. ARG.'. Therefore the name '*R. lusitanica* POURR. ex LANGE' has no status nomenclaturally, being a manuscript name cited in synonymy.

Reseda macrocarpa G. EHRENB. ex MUELL. ARG.

In Mon. Rés. 1857, p. 156, *R. macrocarpa* was cited by MUELLER as a synonym to *R. stenostachya* BOISS. He referred to a manuscript name on a sheet in 'hb. Reg. Berol.' a name given by G. EHRENBURG. The name *R. macrocarpa* G. EHRENB. ex MUELL. ARG. has no status under the Code.

Reseda massae CHIOVENDA

In Atti d. Reale Accad. Italia 11(1), 1941, p. 18. Was described and based on a specimen collected by dott. MASSA, no. 708, in Eritrea (Dancalia, Arafali, febbraio 1933). As the description stated: 'Ovarium 3-loculare', it is impossible to admit *R. massae* as a species of *Resedaceae*. The possibility of an erroneous observation by CHIOVENDA remains, and so MASSA 708 might turn out to belong in *R. amblycarpa* var. *somala* or, perhaps, represent another taxon. Until the type-specimen can be examined *R. massae* must be excluded from *Resedaceae* (cf. also CUFOD., in Bull. Jard. Bot. Brux. 24 (1954), Suppl., p. 160).

Reseda mediterranea BESSER ex BOISS.

R. mediterranea BESSER is cited by BOISSIER (Fl. Or. 1, 1867, p. 428) in the synonymy of *R. inodora* RCHB. The name *R. mediterranea* BESSER ex BOISSIER is a later homonym of *R. mediterranea* L. (1771) and moreover was cited in synonymy (cf. Ind. Kew. 2, 1895, p. 697). BESSER included the name *R. mediterranea* in his Catalogues (e.g. Catal. Pl. Jard. bot. Volhynie 1811, p. 89, sub no. 2642; Catal. Cremen. 1816, p. 114, '*R. mediterranea* JACQUIN'), but did not give a description. From a nomenclatural point of view BESSER's *R. mediterranea* has no status.

Reseda mediterranea JACQUIN

JACQUIN (Coll. Bot. 1, 1786, p. 147) published a description of '*Reseda mediterranea* LINN.' and referred to 'LINN. Syst. pag. 448'. This refers to MURRAY's edition of LINN., Syst. Veg. ed. 14, 1784, p. 448, and this again added to the entry and description of *R. mediterranea* the reference 'Mant. 564', meaning Mant. alt. 1771, p. 564 (cf. also MUELL., Mon. Rés. 1857, p. 141). JACQUIN compared his plant to *R. odorata*, which he found rather difficult to segregate from it. Finally it is to be observed that no legitimate name '*R. mediterranea* JACQ.', as referred in Index Kewensis (2, 1895, p. 697), exists. JACQUIN just identified (with doubt) his plant as *R. mediterranea* L. See also notes to *R. lutea*.

Reseda mediterranea SADLER

R. mediterranea SADLER (Verz. 1818, p. 71) is a later homonym of *R. mediterranea* L. (1771). SADLER's plant was discussed by MUELLER and referred to *R. inodora* RCHB. (Mon. Rés. 1857, p. 139, 141, and in DC., Prodr. 16(2), 1868, p. 562). It was impossible to trace SADLER's Verzeichniss, but whether '*R. mediterranea* SADLER' was described in 1818 or not, it can never enter into legitimate nomenclature. SADLER fully described *Reseda mediterranea* L. (citing LINNAEUS as the author) in Flor. Com. Pest. 2, 1825-26, p. 10, and there is no reason to suspect that SADLER meant to publish *Reseda mediterranea* otherwise than as a Linnean species.

Reseda mediterranea SCHOENEFELD ex MUELL. ARG.

R. mediterranea W. DE SCHOENEFELD was cited by MUELLER (Mon. Rés. 1857, p. 124) in the synonymy of *R. arabica* BOISS. He referred to a specimen present in 'hb. Reg. Berol.', so named in msc. The name *R. mediterranea* SCHOENEF. ex MUELL. ARG. has no status under the Code.

Reseda mediterranea WILLD. ex MUELL. ARG.

In Ind. Kew. 2, 1895, p. 697, is cited *R. mediterranea* WILLD. ex MUELL. ARG. (Mon. Rés. 1857, p. 136). Actually MUELLER referred to one sheet in the WILDENOW Herb. (fol. 9239, p. 1) which he considered to represent *R. phyteuma* L. The 2nd, 3rd and 4th sheet of that folio MUELLER referred to *R. inodora* (2 and 3) and to *R. lutea* (4). *R. mediterranea* WILLD. ex MUELL. ARG. has no status under the Code. MUELLER was correct in identifying fol. 9239, sheet 1, which had been marked '*Reseda mediterranea*', as *R. phyteuma*.

Reseda micrantha O. SCHWARTZ

In Mitt. Inst. Bot. Hamburg 10, 1939, p. 75. From the description it might be believed that *R. micrantha* is synonymous with *Ochradenus spartioides* (O. SCHWARTZ) ABD. (cf. in this revision pp. 67-69). In the absence of the type this question must remain unsolved.

Reseda microphylla PRESL

In Abh. Kön. Böhm. Ges. Wiss. ser. 5, 3, 1845, p. 438, et in Bot. Bemerk. 1846
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(1844), p. 8, PRESL stated that '*Reseda* no. 7533, a DREGE, pl. cap. exs.' represented a new species, which he named *Reseda microphylla* PRESL. He did not describe it, however, and *R. microphylla* PRESL is a nomen nudum. MUELLER made in his subsequent publications (1857, 1868) no reference to *R. microphylla* PRESL.

Reseda nilgherrensis MUELL. ARG.

In Bot. Zeit. 14, 1856, p. 34. Is cited in Index Kewensis (2, 1895, p. 697) but the epithet should be spelled '*neilgherrensis*' (see notes to *R. odorata*). MUELLER pointed out that WIGHT rightly rejected spelling the epithet as '*nilagirica*' (cf. Mon. Rés. 1857, p. 131).

Reseda ochracea MOENCH

MOENCH cited '*R. undata* L.' after his diagnosis of *R. ochracea* (Meth. Pl. Marburg. 1794, p. 58). *R. ochracea* MOENCH is illegitimate, being a superfluous name, LINNAEUS's *R. undata* being quoted in synonymy. Judging from MOENCH's descriptive data his plant might belong in *R. alba* L. Ind. Kew. (2, 1895, p. 697) cited the name, erroneously, as '*R. ochracea* MOENCH', and so did MUELL. ARG. (1857, p. 100 and 1868, p. 557).

Reseda odorata GÜLDENSTÄDT ex LEDEB.

LEDEBOUR cited '*R. odorata* GÜLDENST. It. I, p. 422' (Fl. Ross. 1, 1842, p. 236) as a synonym to *R. phyteuma* L. 'Sp. Pl., p. 645'. He based the distribution of *R. phyteuma* as occurring in Southern Russia on a specimen of GÜLDENSTÄDT collected in Kachetia which was, obviously, (erroneously) named *R. odorata* by GÜLDENSTÄDT who did not publish a new name. In GÜLDENSTÄDT's 'It.' (Reisen etc., ed. PALLAS 1, 1787, p. 422) *R. odorata* is only listed as a name, without any additional descriptive data, even without any authority. Index Kewensis (2, 1895, p. 697) contains a reference to *Reseda odorata* GÜLDENST. ex LEDEB., Fl. Ross. 1, 1842, p. 236. It seems very possible that GÜLDENSTÄDT intended to refer to *R. odorata* L.; whether his specimen (not seen by us) really represented that species or not, is, from the point of view of nomenclature, irrelevant.

Reseda odorata SCHIMPER ex MUELL. ARG.

MUELLER (Mon. Rés. 1857, p. 126) cited '*R. odorata* SCHIMP. Un. Itin. pl. exs. No. 506' in the synonymy of *R. arabica* BOISS. β *stricta* MUELL. ARG. *R. odorata* SCHIMPER ex MUELL. ARG. has no status nomenclaturally, being a herbarium name cited in synonymy.

Reseda parviflora DC. ex MUELL. ARG.

R. parviflora DC. is cited by MUELLER (Mon. Rés. 1857, p. 114) in the synonymy of *R. gayana* BOISS. representing ' α *abortiva*' MUELL. ARG. It is a reference to an unpublished written name to a specimen in hb. DC. The name *R. parviflora* DC. ex MUELL. ARG. has no status under the Code.

Reseda phyteuma NECKER

NECKER (Delic. Gallo-Belg. 1, 1768, p. 210) cited LINNAEUS 'Sp. Pl. 645. no. 10 and Sp. Pl. 449', and copied almost verbatim LINNAEUS's descriptions of *R. phyteuma* L. Thus '*R. phyteuma* NECK.' has no status nomenclaturally, being a misspelt name of '*R. phyteuma* L.'

Reseda phyteuma BROTERO

'*Reseda phyteuma* BROT.' (Fl. Lusit. 2, 1804, p. 306) was listed in Ind. Kew. 2, 1895, p. 697. BROTERO identified with doubt a specimen as *Reseda phyteuma* LINNAEUS. In order to draw attention to this plant he described it fully but added that he was not certain that it was conspecific with *Reseda phyteuma* LINNAEUS. No name '*Reseda phyteuma* BROTERO' is to be considered as regards nomenclature. MUELLER (Mon. Rés. 1857, p. 133) referred *R. phyteuma* L. sensu BROTERO to *R. macrosperma* RCHB. (= *R. media* in this revision) and finally (in DC., Prodr. 16(2), 1868, p. 563) to *R. media* LAGASCA. Ind. Kew. (2, 1895, p. 697) as well as MUELLER (ll.cc.) quoted the page erroneously as '305'.

Reseda phyteuma FORSK.

In FORSKÅL's Fl. Aegypt.-Arab. 1775, p. LXVII is cited '252. *Reseda c) phyteuma*'. It seems probable, but is not certain, that FORSKÅL only intended to name his specimens as *R. phyteuma* L. However this may be, *R. phyteuma* FORSK. (listed in Index Kew. 2, 1895, p. 697) can never be accepted as a legitimate name (being homonymous to *R. phyteuma* L.) and also because *R. phyteuma* FORSK. was not described (nomen nudum).

In the FORSKÅL Herbarium at Copenhagen are two sheets. The first, nr. 609, named '*Reseda phyteuma* FORSKÅL Fl. Aegypt.-Arab. p. LXVII no. 252, in desertis Kahirensis, hodie *Reseda arabica* BOISS.' by P. ASCHERSON (1881). On the reverse is written: 'FORSKÅL circa Cairo'. The second sheet bears no number but is labeled '2 in desertis Cairi leg. FORSK.' and '*Reseda phyteuma* LINN.', and also '*Reseda arabica* BOISS. J. L. 1858'. On the reverse of the sheet 'Hb HORN.' and 'Museum Botanicum Hauniense'. The specimens on both sheets are conspecific and referred to *R. arabica* BOISS., as correctly indicated. FORSKÅL found '*R. phyteuma*' (= *R. arabica* BOISS.) in abandoned fields and the desert near Cairo.

Reseda phyteuma KRALIK ex MUELL. ARG.

Reseda phyteuma KRALIK ex MUELL. ARG. (Mon. Rés. 1857, p. 232) was cited by MUELLER in the synonymy of *R. praetervisa* MUELL. ARG. with reference to KRALIK nr. 36, present in Herb. DC. and BOISS., collected on 3.6.1854 in N. Africa near Tunis, Sfax, in uncultivated land. *Reseda phyteuma* KRALIK ex MUELL. ARG. (l.c.; cf. Index Kew. 2, 1895, p. 697) is nothing but a reference to an identification added by KRALIK to one of his specimens (nr. 36). Actually, it concerned *R. arabica* BOISS. (cf. MUELL. ARG. in DC., Prodr. 16(2), 1868, p. 560).

Reseda phyteuma L. var. vel ssp. *barcinonensis* SENN.

SENNEN (Diag. Nouv. Pl. Esp. Mar. 1936, p. 7) segregated in *R. phyteuma*, 'var. vel ssp. *barcinonensis*', basing this name on no. 6517. As he gave some finding localities, besides Barcelona (Spain), he did not cite as an earlier epithet '*aragonensis*' and did not decide upon the rank of the taxon '*barcinonensis*'. It is rejected for nomenclatural reasons.

Reseda pilosa LINK ex MUELL. ARG.

R. pilosa LINK is cited by MUELLER (Mon. Rés. 1857, p. 135) as a synonym to *R. macrosperma* RCHB. (= *R. media* in this revision), representing δ . *sub-pinnatisecta* MUELL. ARG. It is a reference to a specimen present in 'hb. Reg. Berol.' The name *R. pilosa* LINK ex MUELL. ARG. has no status under the Code.

Reseda platystachya ROUY et FOUC.

Reseda platystachya was proposed by ROUY et FOUCAUD (Fl. Fr. 2, 1895, p. 242) as a 'forme' based on two infraspecific taxa, '*R. alba* L. α *laetevirens* MUELL. ARG. a) *hexasepala* DC. ex MUELL. ARG.', and '*R. alba* α *laetevirens* b) *macrantha* MUELL. ARG.' (cf. Mon. Rés. 1857, p. 101, 102). The binomial *R. platystachya* was not used by ROUY et FOUCAUD for a species but for a 'forme' (cf. Fl. Fr. 2, 1895 'Aux Lecteurs' and notes to *R. dimercarpa* ROUY et FOUCAUD sub *R. luteola* and *R. ligustica* ROUY et FOUC.), which is a taxon other than a species. According to the Code Art. 23, only a species ought to receive a binomial and so *R. platystachya* ROUY et FOUC. has to be rejected nomenclaturally, being contrary to the Code, art. 23 & 24. It further may be observed that ROUY et FOUCAUD indicated their accepted species by bold printed capitals, whereas they printed the names for 'formes' in other letterpress. The infraspecific taxa recognised by ROUY et FOUCAUD in *R. platystachya* (l.c.), are all to be rejected (see *R. alba* in this revision).

Reseda plinii BUBANI

BUBANI published *Reseda plinii* BUBANI, Fl. Pyrenaea 3, 1897, p. 253, as a substitute to many earlier names which he considered to be doubtful or confusing e.g. *R. alba* L. and many others. He felt sure that he had discovered the *Reseda*, PLINIUS described, having collected in the Plinian type-locality. It is however clear that BUBANI ought to have applied one of the earlier existing names for his plant; he did not describe his *R. plinii*. *R. plinii* BUBANI is a superfluous name and so rejected.

Reseda pruinosa BOVÉ ex MUELL. ARG.

MUELLER (Mon. Rés. 1857, p. 156) cited with a question mark this name as a herbarium name accompanying BOVÉ, pl. exs. Sinaït. No. 151, which was a 'specimen pessimum'. There was (l.c.) another reference to DECAISNE's Fl. Sinaïc., p. 51, also with a question mark. MUELLER cited the name in synonymy to *R. stenostachya* BOISS. Evidently, '*R. pruinosa* BOVÉ ex MUELL. ARG.' has no status under the Code. DECAISNE (l.c.) correctly cited '*R. pruinosa* DELILE'. Ind.

Kewensis (2, 1895, p. 697) refers to *R. pruinosa* BOVÉ ex MUELLER ARGOVENSIS.

Reseda pruinosa SCHIMPER ex MUELL. ARG.

MUELLER (Mon. Rés. 1857, p. 159) referred to this name in the synonymy of *R. muricata* PRESL; it accompanied 'SCHIMPER, pl. exs. Un. it. N. 103'. This specimen had been adopted by PRESL as the sole basis for his *R. muricata* and is accordingly quoted by MUELL. ARG. (l.c.). It is evident that *R. pruinosa* SCHIMPER ex MUELL. ARG. has no status under the Code, but it was cited in Ind. Kew. 2, 1895, p. 697.

Reseda pseudophyteuma BROT. ex NYMAN

R. pseudophyteuma BROT. ex NYMAN is listed in Ind. Kew. 2, 1895, p. 697. It was published in Consp. Fl. Europ. 1878–82, p. 69 (not '68'!). NYMAN only referred to *R. pseudophyteuma* BROT. in the synonymy of *R. phyteuma* L. The epithet '*pseudophyteuma*' was never published by BROTERO and has no standing nomenclaturally.

Reseda quadragyna WALP.

Index Kewensis (2, 1895, p. 697) listed '*R. quadragyna* WALP. Rep. ii. 464 = *tetragyna*'. WALPERS (Rep. Suppl. 1, 2, 1843, p. 751) did not make any reference for any Resedaceous species on page '464' (l.c.) as cited by Ind. Kew. He treated the '*Resedaceae*' in Suppl. 1 of his Repert. Bot. Syst. 2, 1843, pp. 751–755. He (l.c., p. 751) cited '*R. quadragyna* FORSK. Descr. 90' in the synonymy of '*R. mediterranea* L. Syst. 448'. Obviously WALPERS wanted to change the prefix '*tetra*' (of *R. tetragyna* FORSK., Fl. Aegypt.-Arab. 1775, p. 92) into '*quadra*'. This, of course, is contrary to the Code.

Reseda recta LAG. ex G. DON

In G. DON (Gen. Syst. 1, 1831, p. 289) reference is made to *R. recta* LAG. in synonymy to *R. ramosissima* POURR. This is, obviously, a misprint for *R. erecta* LAG.

Reseda saxatilis BALANSA ex MUELL. ARG.

Index Kewensis (2, 1895, p. 697) cited '*R. saxatilis* BAL. ex MUELL. ARG.'. Actually, MUELLER (Mon. Rés. 1857, p. 165) only referred to a name accompanying a specimen of BALANSA's set 'Pl. exs. alg. N. 201 (1852)', and referred it to '*R. reuteriana* MUELL. ARG.' (= *R. stricta* PERS.). *R. saxatilis* BAL. ex MUELL. ARG. has no status under the Code. MUELLER (in DC., Prodr. 16(2), 1868, p. 573) himself reduced afterwards *R. reuteriana* to *R. stricta* PERS., maintaining the taxon '*reuteriana*' as a variety ' α ' in *R. stricta* PERS. See also notes under *R. stricta*.

Reseda schimperi PRESL

In Abh. Kön. Böhm. Ges. Wiss. ser. 5, 3, 1845, p. 438 et in Bot. Bemerk. 1846

(1844), p. 8, PRESL cited '*Reseda* Herb. arab. un. itin. n. 241—est *R. Schimperii* PRESL', and added no descriptive data. This specimen belongs in *Oligomeris linifolia*. The name is a nomen nudum, to be rejected, and dates from 1845, the Bot. Bem. appearing only in 1846 (cf. STEARN in Journ. Soc. Bibl. Nat. Hist. 3, 1954, p. 14). No. 241 ('211') is in G; collected 'in regio Hanara, Arabiae petraeae, 16 Mart. 1835', and was already by BRIQUET (1911, msc.) referred to *Oligomeris*.

Reseda schraderi BOISSIER

R. schraderi BOISS. (Diagn. ser. 2, 1, 1853, p. 49) is cited in Ind. Kew 2, 1895, p. 697, but on p. 49 of BOISSIER's publication (l.c.), no mention is made of *R. schraderi*. This name was not encountered in any of BOISSIER's publications, nor anywhere else. It seems possible that by some oversight *R. schraderi* is an error for *R. ochradeni* BOISS., published on the same page '49', the two names look somewhat similar in handwriting. MUELLER (Mon. Rés. 1857, pp. 1–239, and in DC., Prodr. 16(2), 1868, pp. 548–589) did not make any reference to '*R. schraderi* BOISS.'. Accordingly '*R. schraderi* BOISS.' was never proposed nor published. Therefore this name has no status.

Reseda sesamoides SIEBER ex MUELL. ARG.

In Mon. Rés. 1857, p. 221, and in Index Kewensis (2, 1895, p. 697) is cited *Reseda sesamoides* SIEB. ex MUELL. ARG. MUELLER (l.c.) cited under '*Astrocarpus sesamoides* J. GAY α . *alpinus* SOLIS', a specimen which had been named *Reseda sesamoides* and which was distributed as one of SIEBER's 'pl. exs. cors.' Under the Code '*R. sesamoides* SIEBER ex MUELL. ARG.' has no status.

Reseda sextilis 'POURR. in WILLD.' ex MUELL. ARG.

Mon. Rés. 1857, p. 167. *R. sextilis* POURRET in WILLD. was referred to in synonymy of *R. stricta* PERS. by MUELLER ARG. (l.c.). It is a misprint for *R. saxatilis* POURR. ex WILLD.

Reseda somalensis BAKER F.

In Journ. Bot. 34, 1896, p. 51. E. G. BAKER based *R. somalensis* on two DONALDSON SMITH specimens collected in Somaliland, Shebeli River on Aug. 24, 1894, said to be present in the British Museum, but where we could not trace it. He declared that *R. somalensis* had rather large undivided leaves and a dense spicate raceme of flowers. He added that it belonged to the section *Resedastrum*, and was allied to *R. aucheri* BOISS. and *R. atriplicifolia* J. GAY. He stated that *R. somalensis* was easily distinguishable from *R. oligomeroides* SCHINZ, from Somaliland (Bull. Herb. Boiss. 3, 1895, p. 397); *R. amblyocarpa* FRESEN., he added, was another species recorded from the same country with much narrower leaves. *Reseda somalensis* BAKER was described in some detail but segregation from various allied species is not feasible. It may belong in *R. sphenocleoides* but in the absence of type material this cannot be decided (cf. also CUFOD. in Bull. Jard. Bot. Brux. 24, 1954, Suppl., p. 161.

Reseda spartioides SIEBER ex MUELL. ARG.

Mon. Rés. 1857, p. 94. In Index Kewensis 2, 1895, p. 697, reference is made to *R. spartioides* SIEB. ex MUELL. ARG., which rests on a herbarium name 'herb. Aegypt.', cited by MUELL. ARG. (l.c.) in the synonymy of *Ochradenus baccatus* DEL. The name '*R. spartioides* SIEBER ex MUELL. ARG.' has no status.

Reseda spathulata E. MEY. ex MUELL. ARG.

Mon. Rés. 1857, p. 211. In Ind. Kew. 2, 1895, p. 697, reference is made to *Reseda spathulata* E. MEY. ex MUELL. ARG. Actually, this name concerns a reference to a herbarium name accompanying a specimen distributed by E. MEYER in DREGE's 'plant. exs.'. The name was adopted by TURCZANINOW (Bull. Soc. Nat. Mosc. 27(2), 1854, p. 330), and the specimen became the type of *Holopetalum spathulatum* TURCZ. (see this revision, p. 72, 90).

Reseda spicata HUMB. ex MUELL. ARG.

Mon. Rés. 1857, p. 136. Index Kewensis 2, 1895, p. 697, cited *R. spicata* HUMB. ex MUELL. ARG. Actually MUELLER (l.c.) only referred to a herbarium name in the WILLDENOW herb. (fol. 9238). It appears to be no. 58, on a label originating from the HUMBOLDT herbarium. The specimen is *R. phyteuma* L. The name '*R. spicata* HUMB. ex MUELL. ARG.' has no status under the Code.

Reseda spinescens O. SCHWARTZ

In Mitt. Inst. allg. Bot. Hamburg (Fl. trop. Ar.) 10, 1939, p. 76, *R. spinescens* was based on one single specimen from the coastal region of Hadramaut, mountainslopes behind Makalla (Mt. of Upper Wadi Himem, VON WISSMANN 1615). The specimen lacked flowers. All descriptive data of the protologue suggest that *R. spinescens* O. SCHWARTZ might be identical with *Ochradenus boissieri* MUELL. ARG. There remains, however, uncertainty. SCHWARTZ was well aware of the difference between *Ochradenus* and *Reseda* and it can be assumed that he had a reason to place *Reseda spinescens* in *Reseda*. On the other hand, he declared to be uncertain about its proper position. The inflorescence (in fruit) is said to be 2–5 cm long, but in *Ochradenus boissieri* it is c. 20 cm long. SCHWARTZ seems to have believed that *Ochradenus boissieri* does not occur in Mascat but in Persia; he does not include it in his Flora, and so may not have considered a possible identity. Presumably, SCHWARTZ consulted MUELL. ARG. in DC., Prodr. 16(2), 1868, p. 588, or/and BOISSIER's Flora orientalis where, indeed, *O. boissieri* (sub *Homalodiscus ochradeni*) is recorded as a Persian species (Fl. or. 1, 1867, p. 422), but in the original description ('*Reseda ochradeni*') the holotype was referred to as 'in regno Mascate vel in Persia australi'. Further decisions must wait until the type of *Reseda spinescens* can be consulted or until new collections are made in the type-locality. In any case the epithet '*spinescens*' cannot replace '*boissieri*'. The type-specimen of *Reseda spinescens* O. SCHW., in spite of many efforts, could not be traced. From the description it is impossible to decide whether a species of *Reseda* or of *Ochradenus* was at hand. In fact, it is conceivable that *R. spinescens* belongs in *Reseda ochradeni*

BOISSIER (= *Ochradenus ochradeni* (BOISS.) ABD.). See also notes to *Ochradenus ochradeni* (this revision pp. 63, 64) and to *O. aucheri*, as regards a possible distribution (this revision p. 54).

Reseda stipulacea DC. ex MUELL. ARG.

Mon. Rés. 1857, p. 200. In Index Kewensis (2, 1895, p. 697) reference is made to *R. stipulacea* DC. ex MUELL. ARG. Actually, MUELLER only referred to a msc. name in the DC. herbarium concerning a specimen which MUELLER placed in *R. virgata* BOISS. et REUT. α *abortiva*. Apparently the specimen is poorly developed, a 'hortorum filia'. The name *R. stipulacea* DC. ex MUELL. ARG. has no status under the Code.

Reseda stricta KRALIK ex MUELL. ARG.

Mon. Rés. 1857, p. 187. Index Kewensis (2, 1895, p. 697) cites *R. stricta* KRALIK ex MUELL. ARG. Actually, MUELLER referred to a herbarium name accompanying a specimen distributed as 'KRALIK. pl. exs. Tunetan.' s.n., which was placed by MUELLER in *R. lutea* L. α *crispa* (l.c.). It was intermediate between α *crispa* and γ *intermedia*. The name *R. stricta* KRALIK ex MUELL. ARG. has no status under the Code (and would have been a later homonym, anyway; cf. also MUELL. ARG. in DC., Prodr. 16(2), 1868, p. 569).

Reseda strigosa LOEFL.

Iter. hisp. 1758, p. 291. SENNEN's label to no. 3867, V. 1919 (W, 17058 à 1922) carries the printed name *Reseda strigosa* LOEFL. Now LOEFLING (l.c.) has: '*Reseda phyteuma*, communiter strigosa est (l.c., p. 291). Obviously, *R. strigosa* LOEFL. is non-existent.

Reseda subattenuata SENNEN

In Bull. Soc. Hist. Nat. Afr. Nord 23, 1932, p. 258, SENNEN published '*R. subattenuata* nov?' (l.c.) as: 'une forme assez repandue ailleurs, intermédiaire aux *R. alba* et *attenuata* BALL..... plus voisine croyons-nous de l'espèce atlantique du *Spicilegium florae maroccanae* p. 338, pl. XIV.' This shows that SENNEN did not accompany the new name by a description and that he accepted no definite rank. According to the Code the name has no standing.

Reseda suffruticulosa LIGNIER et BEY

In Bull. Soc. Linn. Norm. Ser. 5, 7, 1904, p. 145, LIGNIER et BEY published '*R. suffruticulosa*' as a name without any further data (l.c.) but stated that it was a specimen present in the General Herbarium of the University and City of Caen 'Herbier LENORMAND'. *R. suffruticulosa* LIGN. et BEY has no standing nomenclaturally.

Reseda suffruticulosa LINK ex MUELL. ARG.

Mon. Rés. 1857, p. 189. Index Kewensis (2, 1895, p. 697), makes reference to *R. suffruticulosa* LINK ex MUELL. ARG. Actually, MUELLER (l.c.) referred to

a msc. name in the Berlin Herbarium accompanying a specimen originating from Portugal, near Olisiponum (Lisboa). MUELLER made this the type specimen of *Reseda lutea* L. *ε. suffruticulosa* MUELL. ARG. (see there). The species name '*R. suffruticulosa* LINK ex MUELL. ARG.' has no status under the Code. Moreover, it would have been a later homonym of *R. suffruticulosa* L. (1762).

Reseda tournefortii ZEYHER ex REICHB.

In Flora 13(1), 1830, p. 130, REICHENBACH (l.c.) referred to '*Reseda tournefortii* ZEYH.' when discussing the affinities of *R. macrosperma* REICHB. No species-name *Reseda tournefortii* ZEYHER appears to have been published. Probably it was intended to refer to *Reseda tournefortii* SCHULTES (Obs. Bot. 1809, p. 89). MUELLER ARG. added in handwriting to a specimen labeled '*Reseda tournefortii* ZEYHER, e sem. ab ipso', the decision 'A *Reseda phyteuma* L. nullo modo diversa. J. MÜLLER 1854' (W à 1889, no. 309714). This specimen was appointed here as the (neo)type of '*R. tournefortii* SCHULT.'. '*R. tournefortii* ZEYH. ex REICHB.' has no status under the Code and so is rejected (see also *R. phyteuma*).

Reseda tricuspidata COSSON

A name cited by BATTANDIER (in Bull. Soc. Hist. Nat. Afr. Nord 12, 1921, p. 7). Presumably *R. tricuspis* COSSON was intended.

Reseda truncula G. EHRENBERG ex MUELL. ARG.

Mon. Rés. 1857, p. 191. In Index Kewensis (2, 1895, p. 697) reference is made to *Reseda truncula* EHRENB. ex MUELL. ARG. Actually, MUELLER (l.c.) only referred to a msc. name, by G. EHRENBERG, found in 'hb. Reg. Berol.'. It was quoted by MUELLER in synonymy to a varietal name, '*R. lutea* L. *υ streptocarpa* MUELL. ARG.'. The name '*R. truncula* G. EHRENB. ex MUELL. ARG.' has no status under the Code.

Reseda undata AMO

Fl. Iber. 6, 1873, p. 322. AMO Y MORA's (l.c.) entry is '*R. undata* L. Sp. pl. 644 (non DC. nec alior. Auct.)', followed by the citations 'BARR. ic. 588. *R. bipinnata* WILLD. BOISS. voy. bot. tab. 20' and a latin description. *R. undata* AMO as listed by Ind. Kew. (2, 1895, p. 697), has no status nomenclaturally being a later homonym of *R. undata* L. (1759); moreover AMO wished to identify and re-describe a plant he had as '*R. undata* L.'.

Reseda undata G. EHRENBERG ex MUELL. ARG.

Mon. Rés. 1857, p. 109. In Index Kewensis 2, 1895, p. 697, is cited *Reseda undata* EHRENBERG ex MUELL. ARG. Actually MUELLER (l.c.) only referred to a msc. name by G. EHRENBERG in the Berlin Herbarium. It was quoted in synonymy to *R. eremophila* BOISS. (the latter species afterwards reduced by MUELLER in DC., Prodr. 16(2), 1868, p. 559, to *R. decursiva* FORSKÅL). '*R. undata* EHRENBERG ex MUELL. ARG.' has no status under the Code, and at any rate would

have been a later homonym to *R. undata* L.

Reseda undata HABL.

Phys. Desc. Taur. 1785, p. 146. HABLIZL's *R. undata* obviously is a later homonym of *R. undata* L. (1759) and so rejected (cf. Ind. Kew. 2, 1895, p. 697, in which it is considered a synonym to *R. lutea*). The original publication by HABLIZL was not seen.

Reseda undulata GATERAU

Descr. pl. env. Montauban 1789, p. 87, a homonym of *R. undulata* HOUTT. (cf. also *R. undulata* GILIBERT, and sub *R. luteola*).

Reseda undulata GILIBERT

Fl. Lithuan. inch. 2, 1782, p. 210. A later homonym of *R. undulata* HOUTT. (see notes sub *R. undulata*), and so rejected. MUELLER (Mon. Rés. 1857, p. 203, and in DC., Prodr. 16(2), 1868, p. 584) cited the volumes number as 'V', while Ind. Kew. (2, 1895, p. 697) cited it as 'ii'.

Reseda undulata HOUTTUYN

Nat. Hist. 2(8), 1777, p. 728. *R. undulata* HOUTT. is listed in Ind. Kew. Suppl. 10, 1947, p. 192. HOUTTUYN (l.c.) published *R. undulata* HOUTT. and described it in Dutch and in Latin. For the Latin description, HOUTTUYN cited LINNAEUS's description of *R. undata* L. (Sp. Pl. 2, 1, 1762, p. 644), omitting the 'quinquepartis' calyx character mentioned by LINNAEUS, l.c., though HOUTTUYN referred to it in the Dutch description 'De kelk is vijfdelig'. The Linnean description of the leaves was quoted also in HOUTTUYN's Latin and Dutch descriptions, i.e. '*Reseda* Fol. pinnatis undulatis'. It is certain that *Reseda undulata* HOUTT. is entirely based on *Reseda undata* L. (1762) and not on *R. undata* L. (1759) as mentioned by MERRILL in Journ. Arn. Arb. 19(4), 1938, p. 343. On the other hand, MERRILL (l.c.) stated that *Reseda undata* HOUTT. is 'a lapsus calami'. HOUTTUYN may very well have had the opinion that LINNAEUS was inaccurate and ought to have used the epithet '*undulata*', referring to the leaf-character ('undulatis'). Accordingly, HOUTTUYN corrected or changed the Linnean epithet intentionally to '*undulata*'. It follows that HOUTTUYN's name might be considered as a superfluous name, being based on LINNAEUS's *R. undata* of 1762, and it cannot be changed in *Reseda undata* on the strength of the Code, which allows correction of orthographic error (Art. 73). Another consideration is that LINNAEUS's *Reseda undata* of 1762, is a nomen ambiguum, consisting of two different species, which are united in a single description (see sub *R. undata* L.). HOUTTUYN's *Reseda undulata* now becomes a superfluous name for an ambiguous name, because HOUTTUYN copied in the Dutch translation fully LINNAEUS's description of *Reseda undata* (1762). It seems that the Code has no clear provision whether a name burdened with the nomenclatural drawbacks as *Reseda undulata* HOUTT. is acceptable as an occupied name, involving homonymy for identical later names (see also notes to *R. fruticulosa* and *R. undata*).

In our opinion it is, and in consequence *Reseda undulata* GILBERT (Fl. Lithuan. inch. 2, 1782, p. 210) must be rejected being a homonym of *Reseda undulata* HOUTT.

Reseda undulata LINK

Handb. 2, 1829, p. 518. In Index Kewensis (2, 1895, p. 697) is entered '*R. undulata* LINK, Handb. 2. 518, sphalm. = *undata*.' We presume that the literature reference is identical with the only book we were able to find (cf. PRITZEL, Thes. ed. nov. 1872, p. 187) viz. Grundr. Kräuterkunde (WILLDENOW), posthumously edited by LINK. In volume 3, published 1831, is on p. 518, in the index found the name *R. undulata*. This entry refers to p. 324 of the same book, where is found '*R. undata* L.'. This index entry obviously is a misprint, as recorded by Index Kewensis. It follows that *Reseda undulata* LINK has no status. *Reseda undulata* LINK was never published because LINK correctly quoted *R. undata* L. (l.c., p. 324). In case of an opposite view *R. undulata* LINK would be a later homonym of *R. undulata* HOUTTUYN (see there).

Syntrophe G. EHRENBERG ex MUELL. ARG.

Mon. Rés. 1857, p. 227. *Syntrophe* G. EHRENB. ex MUELL. ARG. was never published as a genus although it is cited in Ind. Kew. 2, 1895, p. 1025 as a generic name. *Syntrophe* is only used in combination with two epithets viz. *canescens* and *hexagyna* and both combinations have no status under the Code being references in synonymy to names added in manuscript to herbarium specimens.

Syntrophe canescens G. EHRENBERG ex MUELL. ARG.

Mon. Rés. 1857, p. 227. '*Syntrophe canescens* G. EHRENBERG' was cited by MUELLER (l.c.) in the synonymy of *Caylusea canescens* ST. HIL. with reference to a manuscript name and a specimen present in hb. Reg. Berol. The name '*Syntrophe canescens* G. EHRENB. ex MUELL. ARG.' has no status under the Code.

Syntrophe fruticosa G. EHRENBERG ex MUELL. ARG.

Mon. Rés. 1857, p. 229. Index Kewensis (2, 1895, p. 1025) referred to '*Syntrophe fruticosa* G. EHRENB.'. This is obviously an error because no such name is found on the cited page but *Syntrophe hexagyna* G. EHRENB. and *Reseda fruticosa* G. EHRENB. are cited by MUELL. ARG., the two names just one above the other. It was evidently intended to refer to *Syntrophe hexagyna* G. EHRENB. This latter name is a citation of a msc. name in the Berlin Herbarium and has no standing nomenclaturally.

Syntrophe hexagyna G. EHRENBERG ex MUELL. ARG.

Mon. Rés. 1857, p. 229. See *Syntrophe fruticosa* G. EHRENB. ex MUELL. ARG.

SUPPLEMENTARY NOTES

On pp. 63–64 of this revision it was decided to follow MUELL. ARG. and BOISSIER in assuming that AUCHER-ELOY 4179, the type of *Ochradenus ochradeni* originated from 'Persia australis' and not from 'Mascot'. A particularly beautiful fruiting specimen (WIR) of which a duplicate was at W (NIKITIN s.n. 1955, 26 June), collected in Turkmenia, Kopet-dag, Servero-Zapadnie, further supports the view that the type was collected in 'Persia australis' and that there is no evidence that *O. ochradeni* occurs at all in Saudi Arabia.

According to Dr. STEARN (in litt.) *Ochradenus randonioides* ABDALLAH (cf. pp. 64–66) is a superfluous name. However, it seems that adoption of *Ochradenus somalensis* as the correct name would go against the type-method. It is therefore preferred by us to maintain *Ochradenus randonioides*.

Caylusea canescens WEBB is an erroneous entry in Index Kewensis (Suppl. VII, p. 43); see p. 44 of this revision and Hook, Nig. Fl. 1849, p. 101.

'*Reseda capensis* BURM. ex MUELL. ARG. Monog. Resed. 222' was cited in Vol. II of Index Kewensis (p. 696). Actually MUELL. ARG. did not publish this name but stated that a specimen he saw in BURMAN's herbarium annotated as '*Reseda capensis*' was not identical with '*R. capensis* BURM.' but belonged in *Astrocarpus clusii* (= *Sesamoides canescens*). MUELL. ARG. correctly identified this specimen and the name *Reseda capensis* BURM. ex MUELL. ARG. ought to be deleted from Index Kewensis.

Fig. 1, f, is incorrect (cf. Meded. Landbouwhogeschool Wageningen 67–8 (1967), p. 34). A corrected figure is added to the issue of the atlas of the *Resedaceae* to be issued in the Belmontia-series.

INDEX TO PLANT NAMES

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FIG. 18. *Reseda alba* L. a d: habit - a: $\frac{1}{8} \times$; b d: $\frac{1}{4} \times$. - a: culta (WAG); b: N.D. Simpson 5784 (CAIM); c: A. Bent et H. E. Wright 426-212 (W 15539); d: S. Murbeck s.n., 1.IV.1921, type. '*Reseda myriosperma* Murb.' (LD). - a: ssp. *alba* var. *alba*; b: ssp. *decursiva* (Forsk.) Maire var. *decursiva*; c: ssp. *decursiva* var. *propinqua* (R.Br.) Maire; d: ssp. *alba* var. *myriosperma* (Murb.) Abdallah et De Wit, nov. comb. et stat.

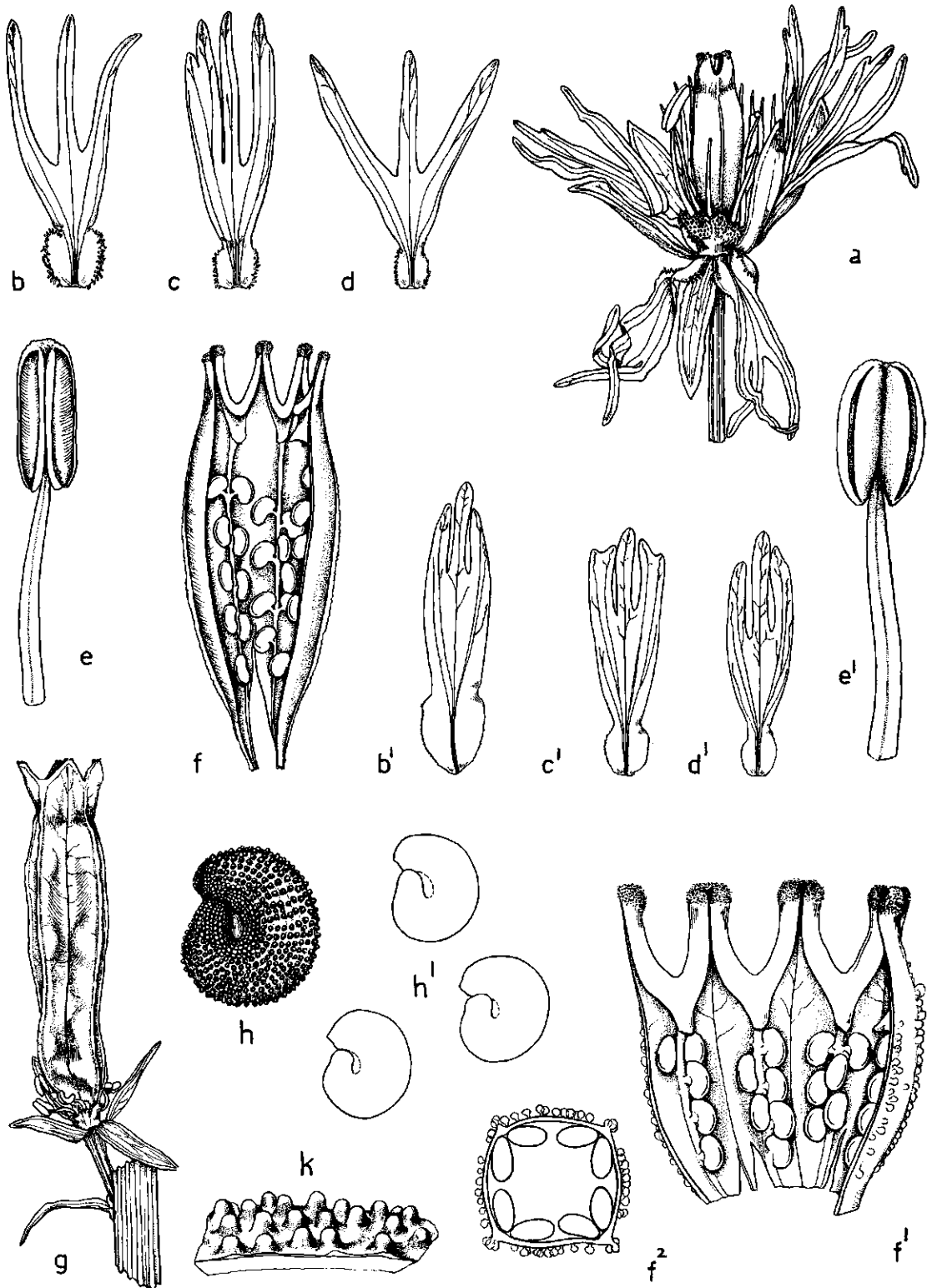


FIG. 19. *Reseda alba* L. — a: fl.; b, b¹: sup. pet.; c, c¹: lat. pet.; d, d¹: ant. pet.; e, e¹: stamens; f, f¹: ovaries (opened); f²: ovary, cross-section; g: capsule; h: seed; h¹: seeds, shape; k: testa, section. — a–d, b¹–d¹: 7½ ×; e, f, h¹: 15 ×; e¹, f¹, f², h: 20 ×; g: 5 ×; k: 65 ×. — a–k, h¹: E. Reverchon 160 (NY); b¹–f¹, f²: A. Bent et H. E. Wright 426–212 (W 15539). — a–k, h¹: ssp. *alba* var. *alba*; b¹–f¹, f²: ssp. *decursiva* var. *propinqua* (R.Br.) Maire.

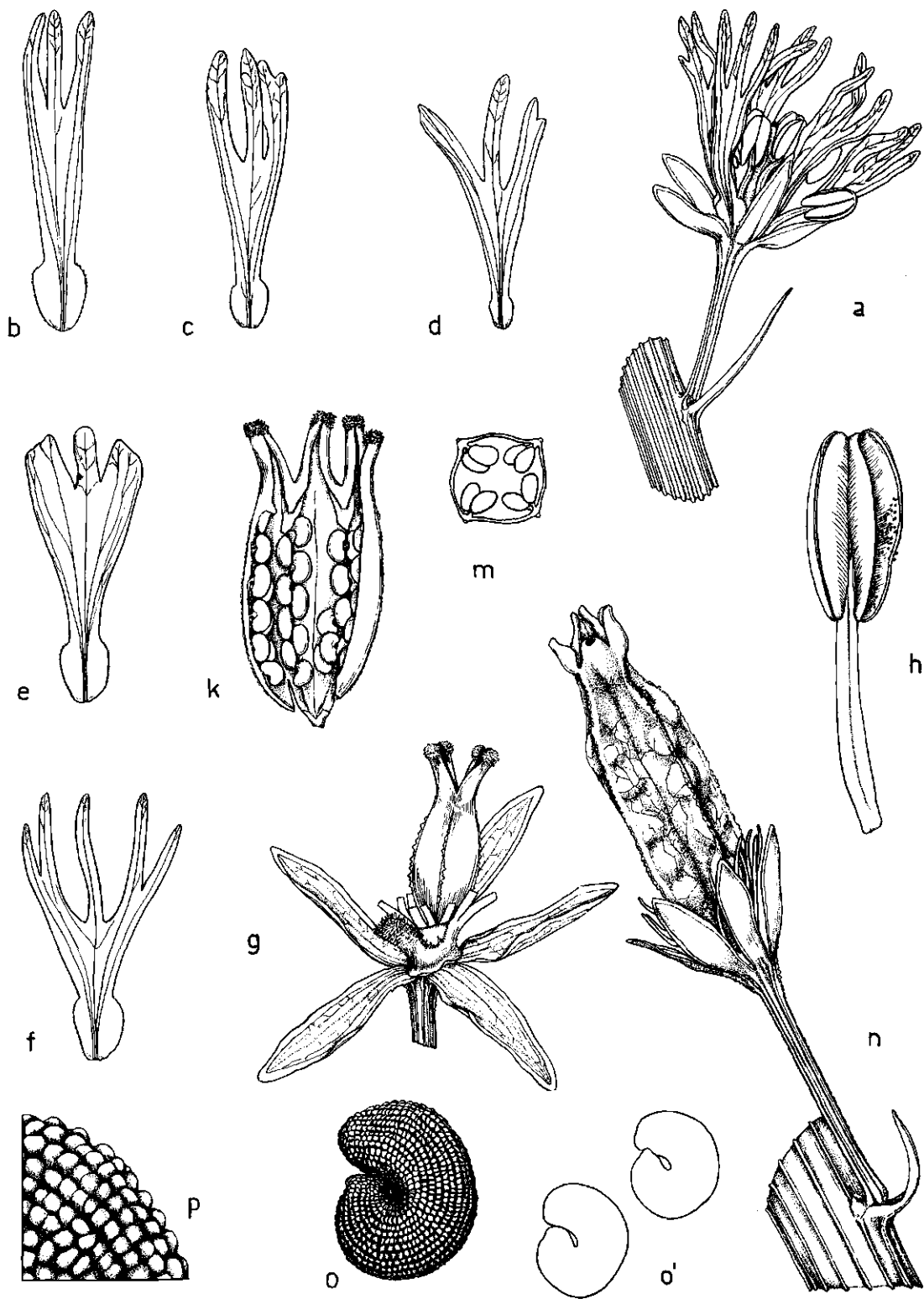


FIG. 20. *Reseda alba* L. var. *alba* — a: fl.; b, e, f: sup. pet.; c: lat. pet.; d: ant. pet.; g: fl.-disc (petals and some stamens removed); h: stamen; k: ovary (opened); m: same, c.-s.; n: capsule; o: seed; o¹: seeds, shape; p: testa surface. — a-f: 7½ ×; g: 10 ×; h, o¹: 15 ×; k, m: 15 ×; n: 5 ×; o: 20 ×; p: 65 ×. — a-d, g: Huet et Jacquin 823 (L 908.185–25); e, h: Th. Stomps s.n., 3.X.1914 (L 930.282–26 (+25)); f, k, m: ? Gorski (coll. Reichenbach fil.) s.n., s.d. (W à 1889, 309777); n, o, o¹, p: R. Palhinha et F. Mendes s.n., V.1916 (L 926.134–859).

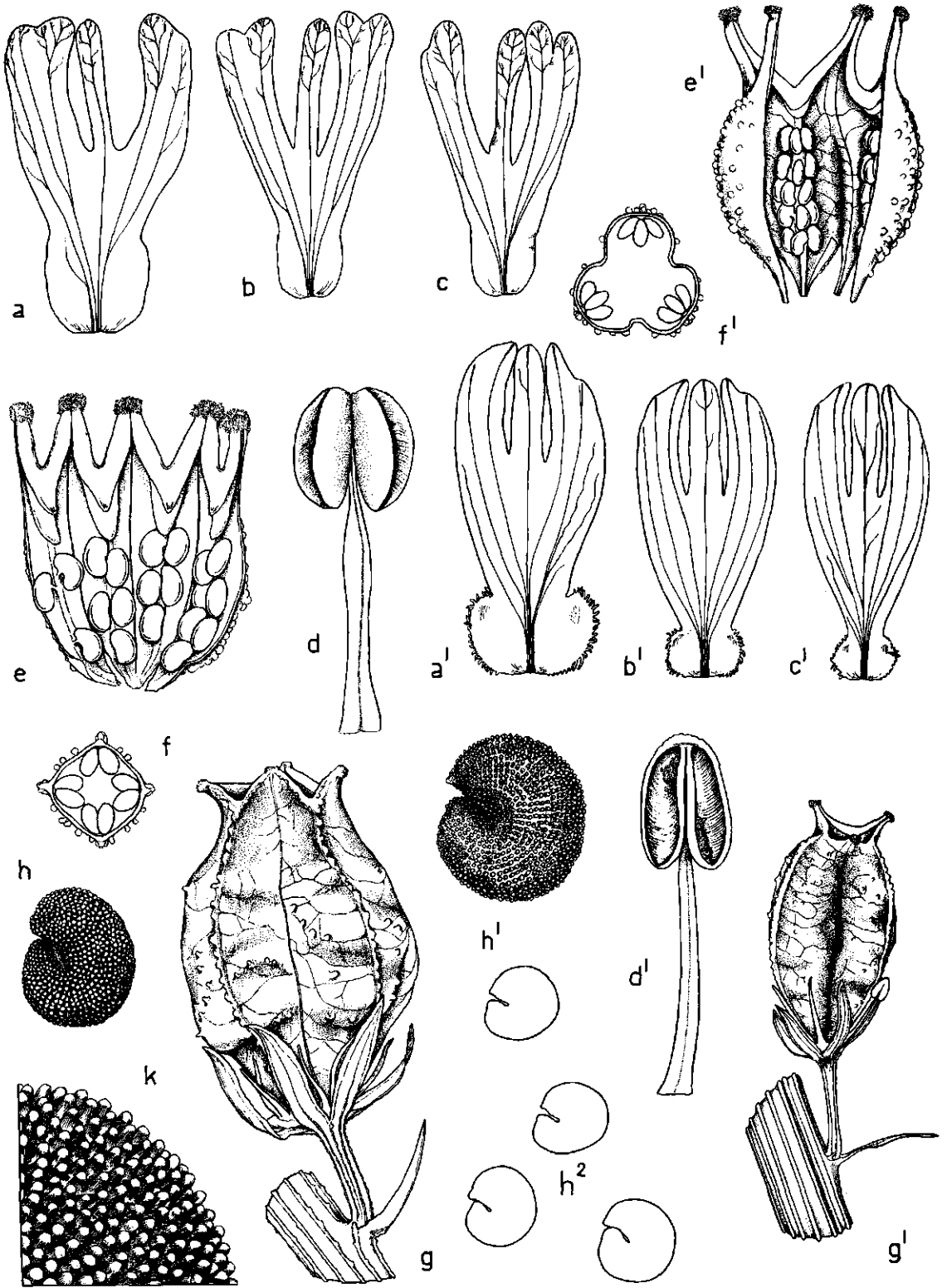


FIG. 21. *Reseda alba* L. - a, a¹: sup.pet.; b, b¹: lat.pet.; c, c¹: ant.pet.; d, d¹: stamens; e, e¹: ovaries (opened); f, f¹: same, c.-s.; g, g¹: capsules; h, h¹: seeds; h²: seeds, shape; k: testa surface. - a-c, a¹-c¹, e¹, f¹, h²: 15×; d, d¹, e, f, h: 20×; g: 10×; g¹: 5×; h¹: 30×; k: 65×. - a-f: N. D. Simpson 5784 (CAIM); a¹-h¹, h²: Sennen et Mauricio 8347 (BRNU 236413); g, h, k: H. Field et Y. Lazar 678 (F 773347). - a-k: ssp. *decursiva* (Forsk.) Maire var. *decursiva*; a¹-h¹, h²: ssp. *alba* var. *trigyna* (Batt.) Maire.

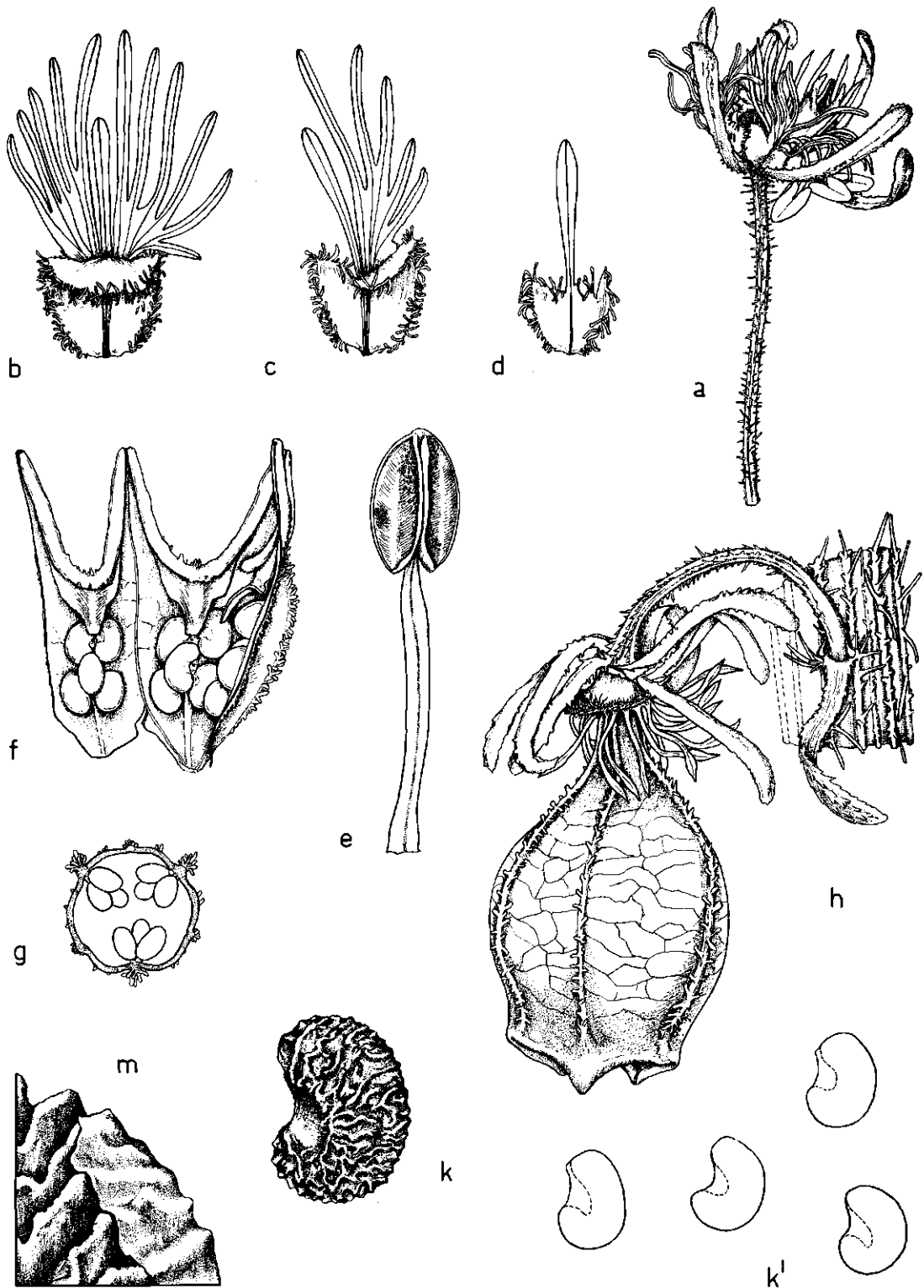


FIG. 22. *Reseda alopecuroides* Boiss. — a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c-s.; h: capsule; k: seed; k': seeds, shape; m: testa surface. — a, h, k': 5×; b-d, k: 10×; e: 15×; f, g: 15×; m: 65×. — a-g: M. Zohary, N. Feinbrun et students 633 (C); h, k, k', m: E. Boissier '51', April 1846, isotype (W 309729).

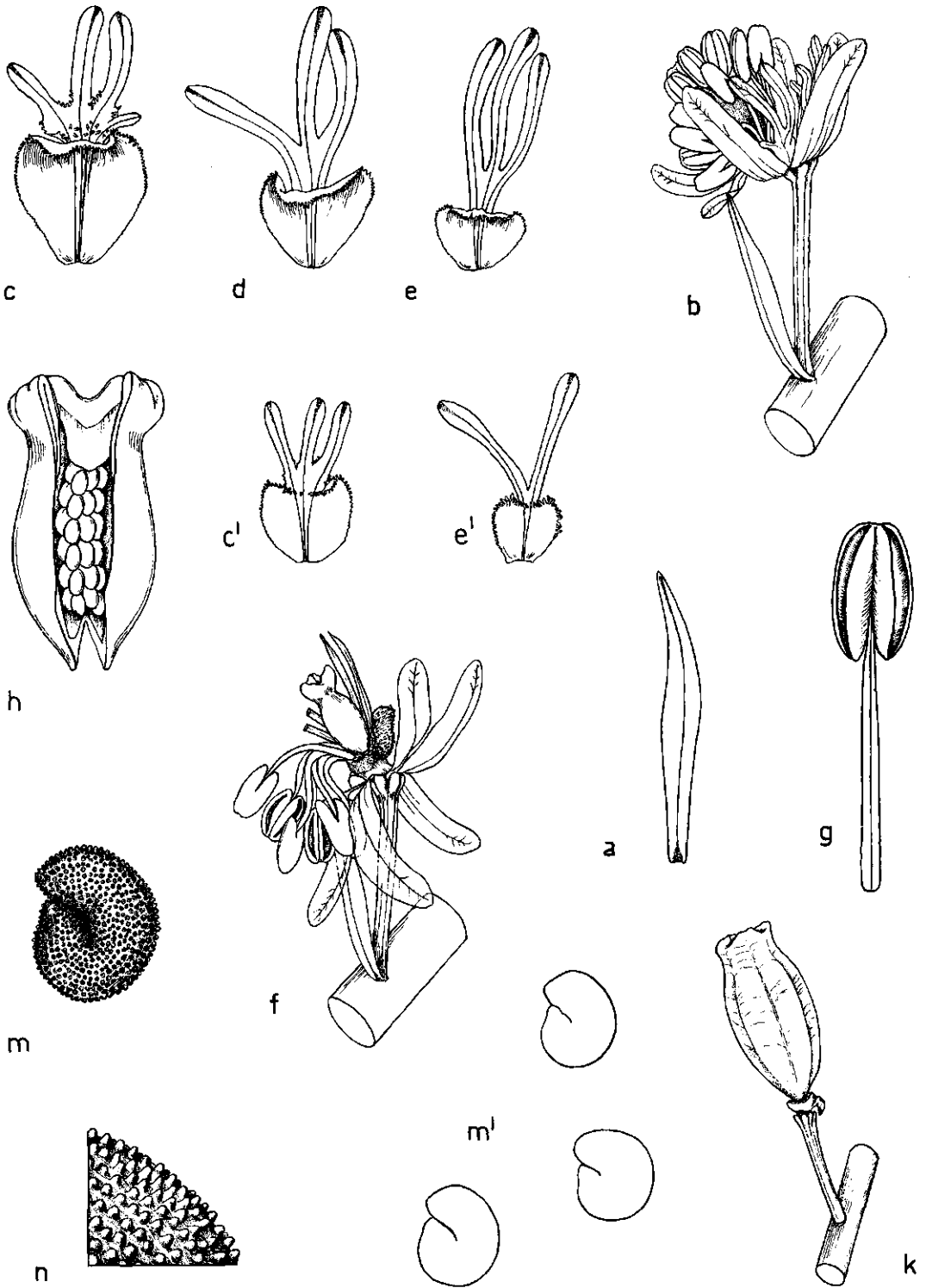


FIG. 23. *Reseda alphonssi* Muell. Arg. ssp. *alphonssi* — a: bract; b: fl.; c, c¹: sup.pet.; d: lat.pet.; e, e¹: ant.pet.; f: fl.-disc (petals and some stamens removed); g: stamen; h: ovary (opened); k: capsule; m: seed; m¹: seeds, shape; n: testa surface. — a: 7¹/₂ ×; b, f: 5 ×; c–e, c¹, e¹: 10 ×; g, h, m¹: 15 ×; k: 2¹/₂ ×; m: 20 ×; n: 70 ×. — a–k: B. Balansa 875, isotype '*Reseda atriplicifolia* J. Gay' (C); c¹, e¹: J. Ball s.n., Feb. 1880 (NY); m, m¹, n: Sv. Murbeck s.n., 4.IV.1903 (C).



FIG. 24. *Reseda amblycarpa* Fresen. - a: habit; b: gland; c: part of the stem; d, e: variation in leaves. - a, c-e: 1×; b: 7 $\frac{1}{2}$ ×. - a: H. J. Lam 7330 (L); b-e: W. Schimper 2257 (W). - a: var. *adenensis* Perk.; b-e: var. *amblycarpa*.

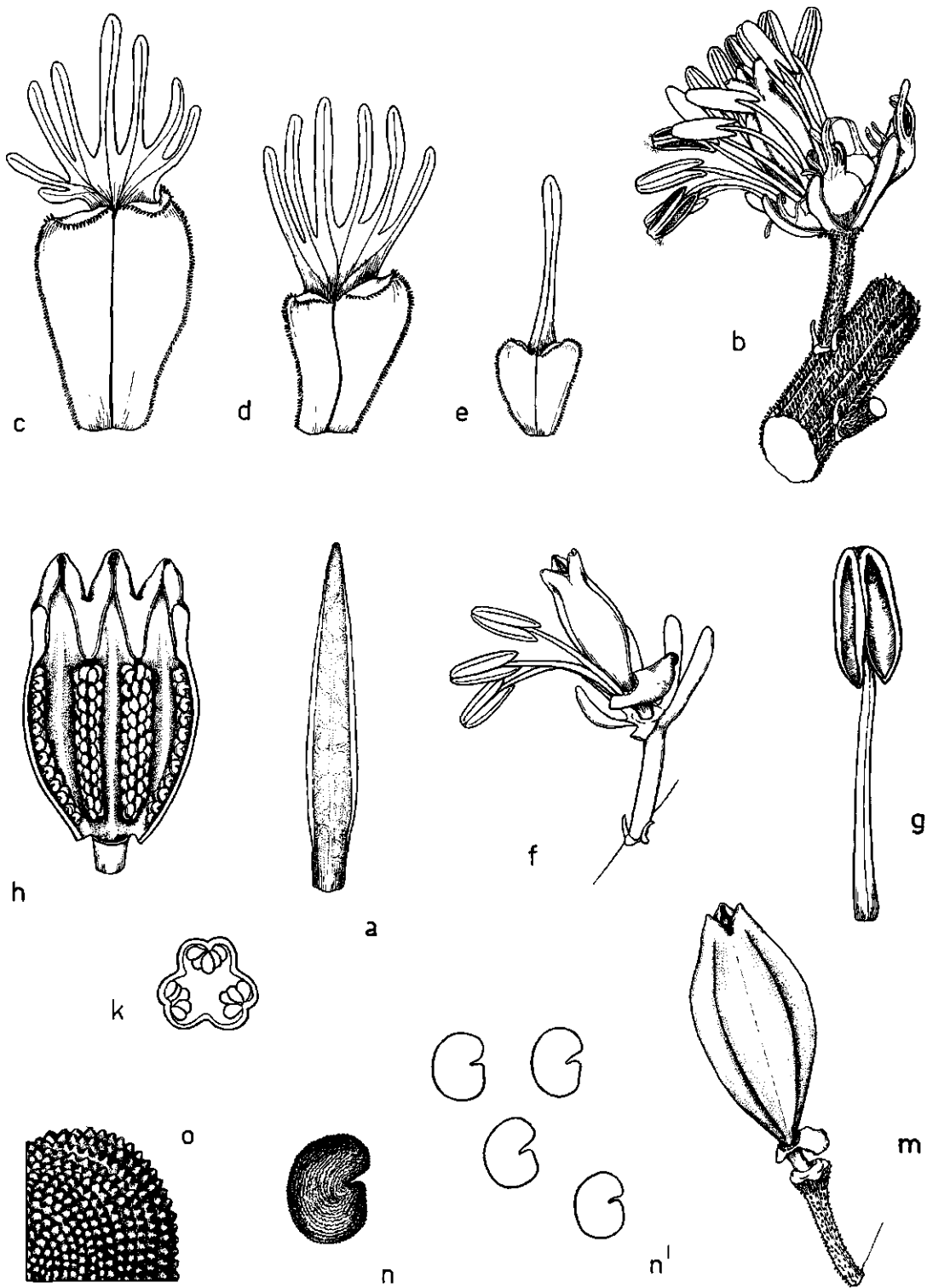


FIG. 25. *Reseda amblycarpa* Fresen. - a: bract; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: fl.-disc (petals, a sepal and some stamens removed); g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n': seeds, shape; o: testa surface. - a, c-e, n: 20 \times ; b, f, m: 7 $\frac{1}{2}$ \times ; g, h, k, n': 15 \times ; o: 65 \times . - a, c-e, g, h, k, m-o, n': H. J. Lam 7330 (L); b, f: W. Schimper 2257 (W). - a, c-e, g, h, k, m-o, n': var. *adenensis* Perk.; b, f: var. *amblycarpa*.



FIG. 26. *Reseda arabica* Boiss. - a: habit; b: infructescence; c: basal leaf; d: tripartite leaf; e: stipular gland. - a, b: 1×; c, d: 1½×; e: 15×. - a: G. Schweinfurth 260 (C) and Cosson s.n., 14.V.1858 (C); b: L. Kralik 371, syntype 'Reseda praeter-visa Muell. Arg.' (WRS�); c: Schweinfurth 260 (C); d: Th. Kotschy 127, isotype 'var. glabrescens Muell. Arg.' (W); e: A. Faure s.n., 29.V.1934 (S).

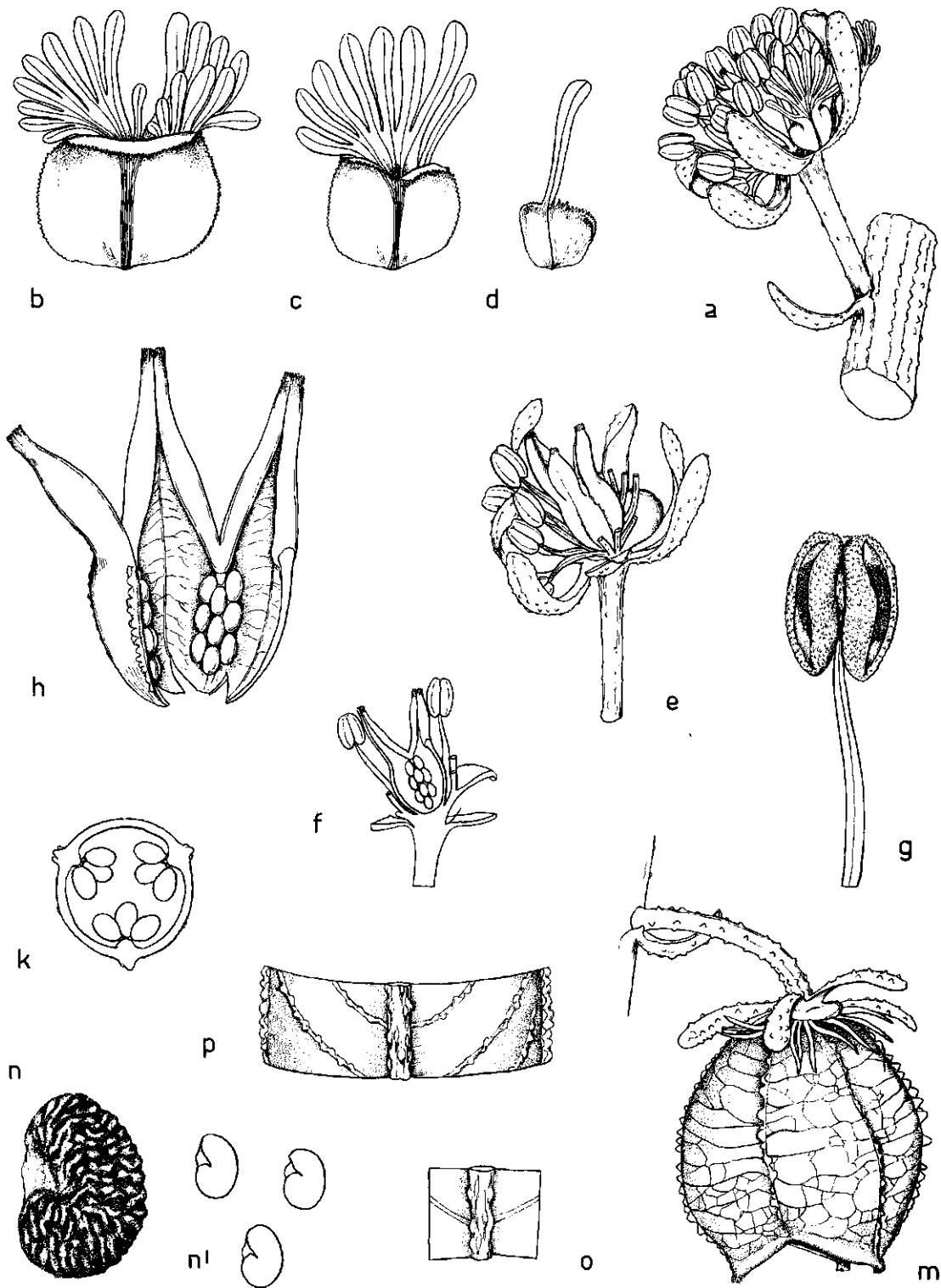


FIG. 27. *Reseda arabica* Boiss. — a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: fl.-disc (petals, a sepal and some stamens removed); f: length section of flower, note the sessile ovary; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n': seeds, shape; o: leaf-portion, upper surface; p: same, lower surface. — a, e, f, o, p: $7\frac{1}{2}\times$; b-d, n: $15\times$; g, h, k: $20\times$; m, n': $5\times$. — a, e, f, h, k: K. H. Rechinger 12822 (W); b-d, g: Th. Kotschy 127, isotype 'var. *glabrescens* Muell. Arg.' (W); m: Battandier et Trabut 414 (WRSL); n, n': Cosson s.n., 23.V.1858 (W); o, p: G. Schweinfurth 260 (C).

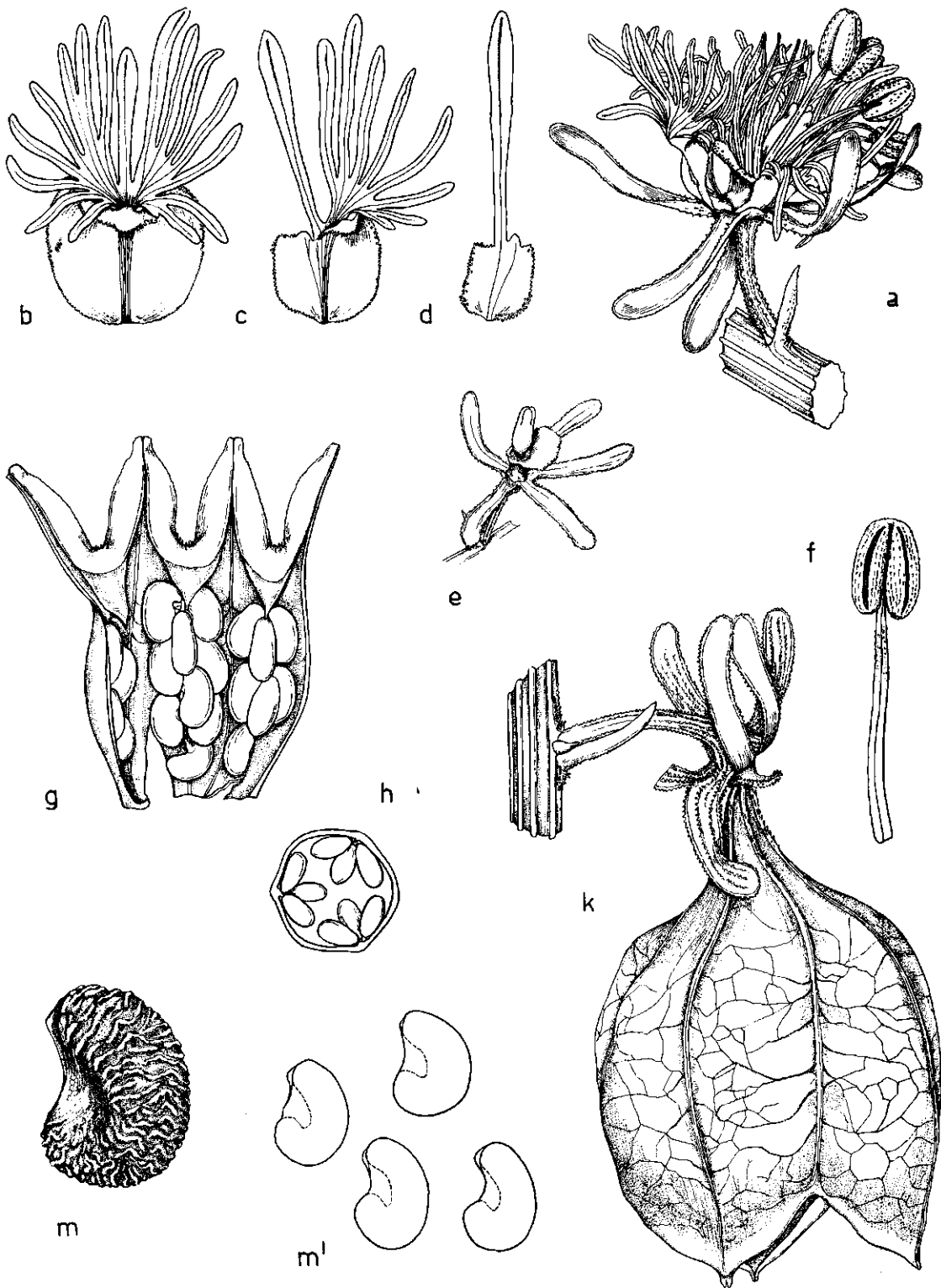


FIG. 28. *Reseda armena* Boiss. var. *armena* — a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: fl.-disc (petals and stamens removed); f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape. — a, m: 10×; b-d, f: 15×; e, k, m': 5×; g, h: 20×. — a-h: P. Sintenis 2735 (WU); k, m, m': id. (WRSL).

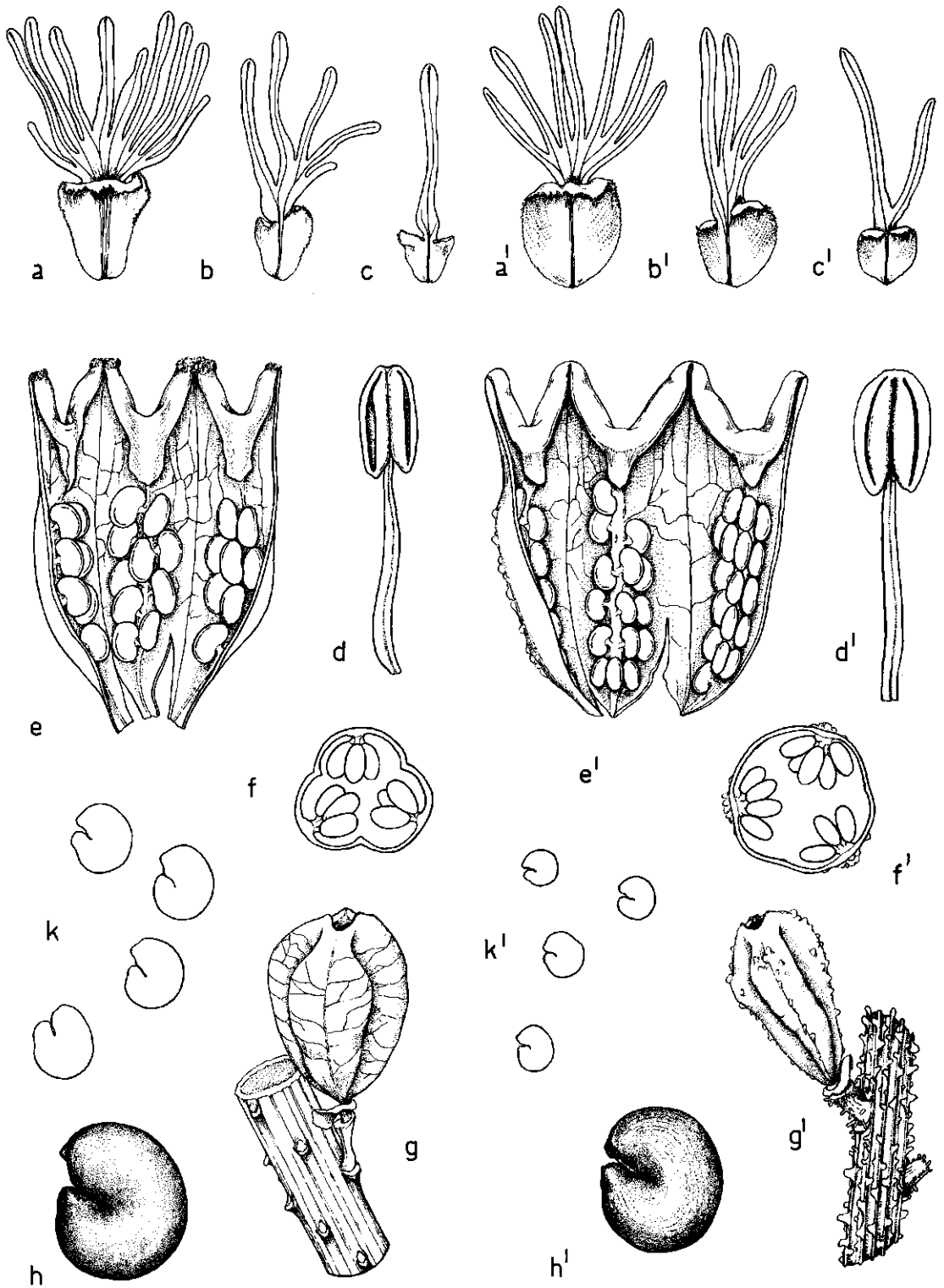


FIG. 29. *Reseda aucheri* Boiss. — a, a¹: sup.pet.; b, b¹: lat.pet.; c, c¹: ant.pet.; d, d¹: stamens; e, e¹: ovaries (opened); f, f¹: same, c.-s.; g, g¹: capsules; h, h¹: seeds; k, k¹: same, shape. — a-c, a¹-c¹, k, k¹: 10×; d, d¹: 15×; e, f: 20×; e¹, f¹, h, h¹: 20×; g, g¹: 5×; h¹: 30×. — a-f: Th. Kotschy 452 (S); g-k: Aucher-Eloy 4173, type (W); a¹-f¹: N. Polunin 55 (L 958.329-181); g¹-k¹: K. H. et F. Rechinger 3268 (US 2316254). — a-f: var. *rotundifolia* Kotschy ex Muell.Arg.; g-k: var. *aucheri*; a¹-k¹: var. *bracteata* (Boiss.) Abdallah et De Wit, *nov. comb. et stat.*

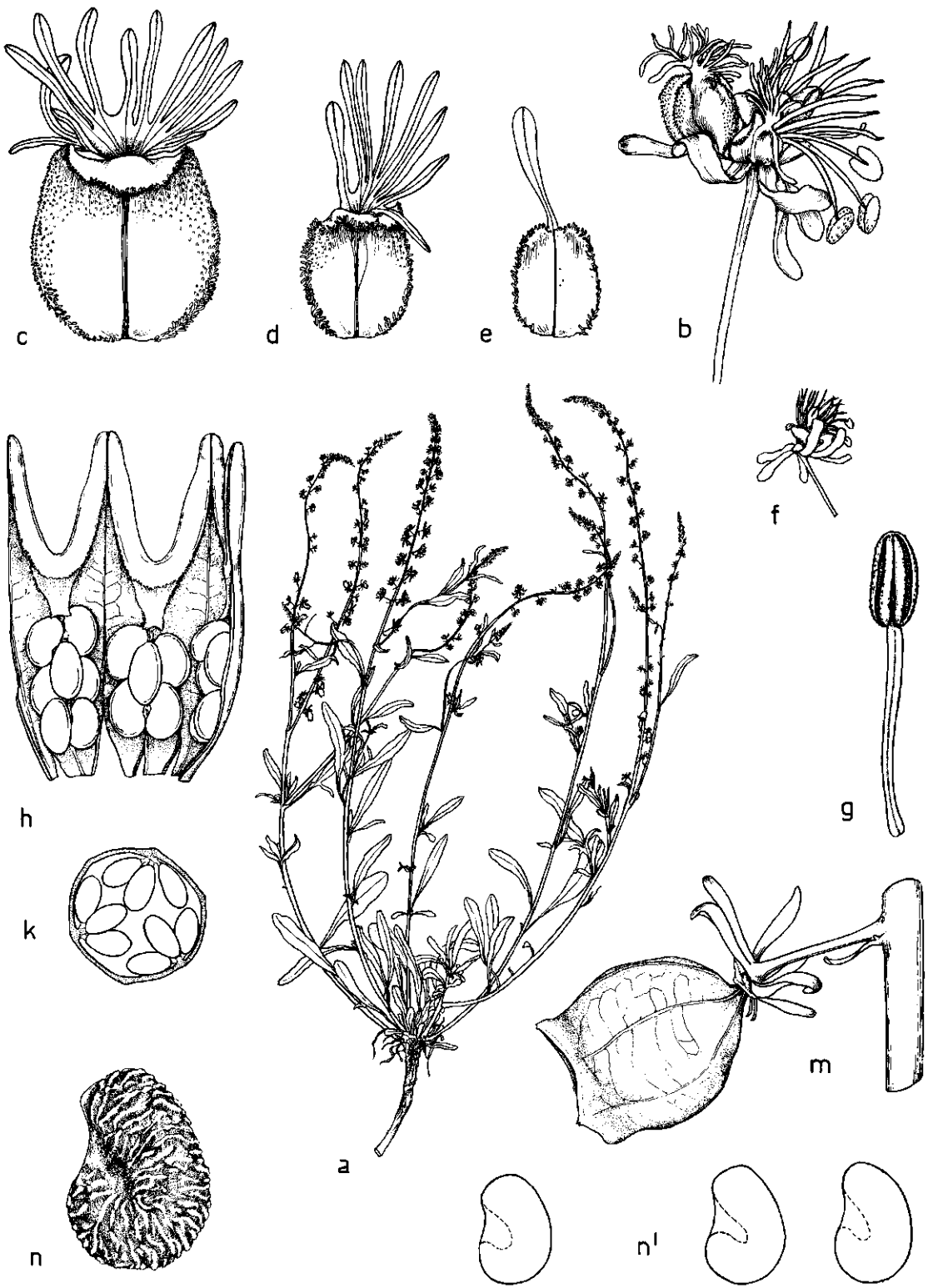


FIG. 30. *Reseda balansae* Muell. Arg. — a: habit; b: fl.; c: sup. pet.; d: lat. pet.; e: ant. pet.; f: fl.-disc (petals removed); g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n': seeds, shape. — a: $\frac{1}{4} \times$; b, n': $7\frac{1}{2} \times$; c-e, g, n: $15 \times$; f, m: $2\frac{1}{2} \times$; h, k: $20 \times$. — a: W. Siehe 93 (WU); b-k: id. (WRSL); m: B. Balansa 768, isotype (GOET); n, n': id., isotype (C).

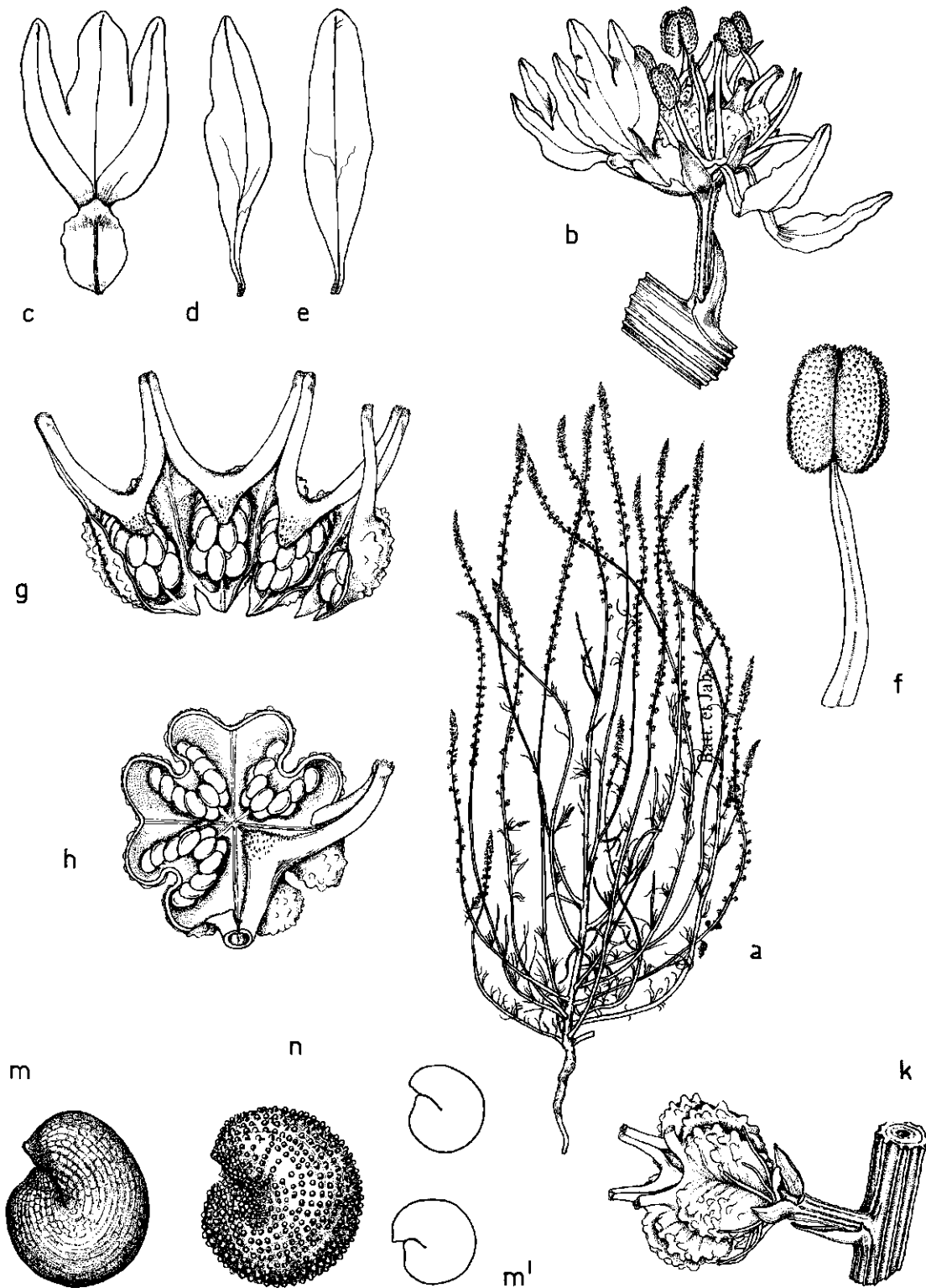


FIG. 31. *Reseda battandieri* Pitard — a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, top view with a part removed to show the biforked placentae; k: capsule; m, n: seeds; m^l: seeds, shape. — a: $\frac{1}{4}\times$; b: $10\times$; c-e: $15\times$; f, m^l: $20\times$; g, h: $25\times$; k: $7\frac{1}{2}\times$; m, n: $35\times$. — a-m, m^l: Erik Wall s.n., 8.V.34 (S); n: R. de Brettes, J. B. Panouse et Ch. Sauvage 4858 (S). — a-m, m^l: var. *battandieri*; n: var. *tuberculata* Batt. et Jah.

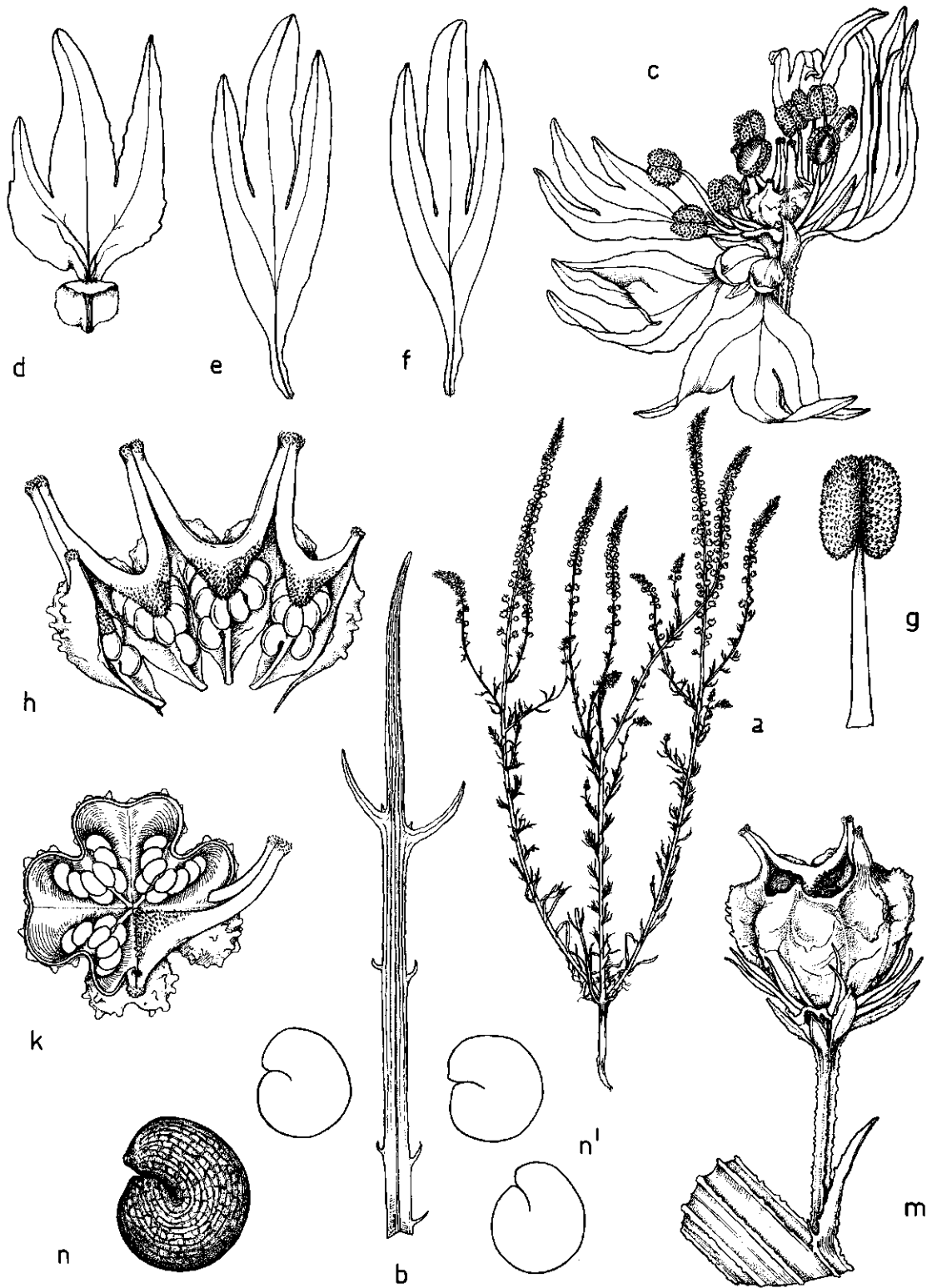


FIG. 32. *Reseda battandieri* Pitard var. *limicola* (Maire et Samuelsson) Abdallah et De Wit, nov. comb. et stat. — a: habit; b: leaf, note distribution of dents; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); k: same, top view with a part removed to show the bifurked placentae; m: capsule; n: seed; n¹: seeds, shape. — a: $\frac{1}{4}\times$; b: $2\frac{1}{2}\times$; c-f: $10\times$; g, n¹: $20\times$; h, k: $25\times$; m: $7\frac{1}{2}\times$; n: $30\times$. — a: Ch. Sauvage 9112 (BAS-SIM); b-n, n¹: J. Gattefossé 368b, type '*Reseda limicola* Maire et Samuelsson' (AMD 038501).

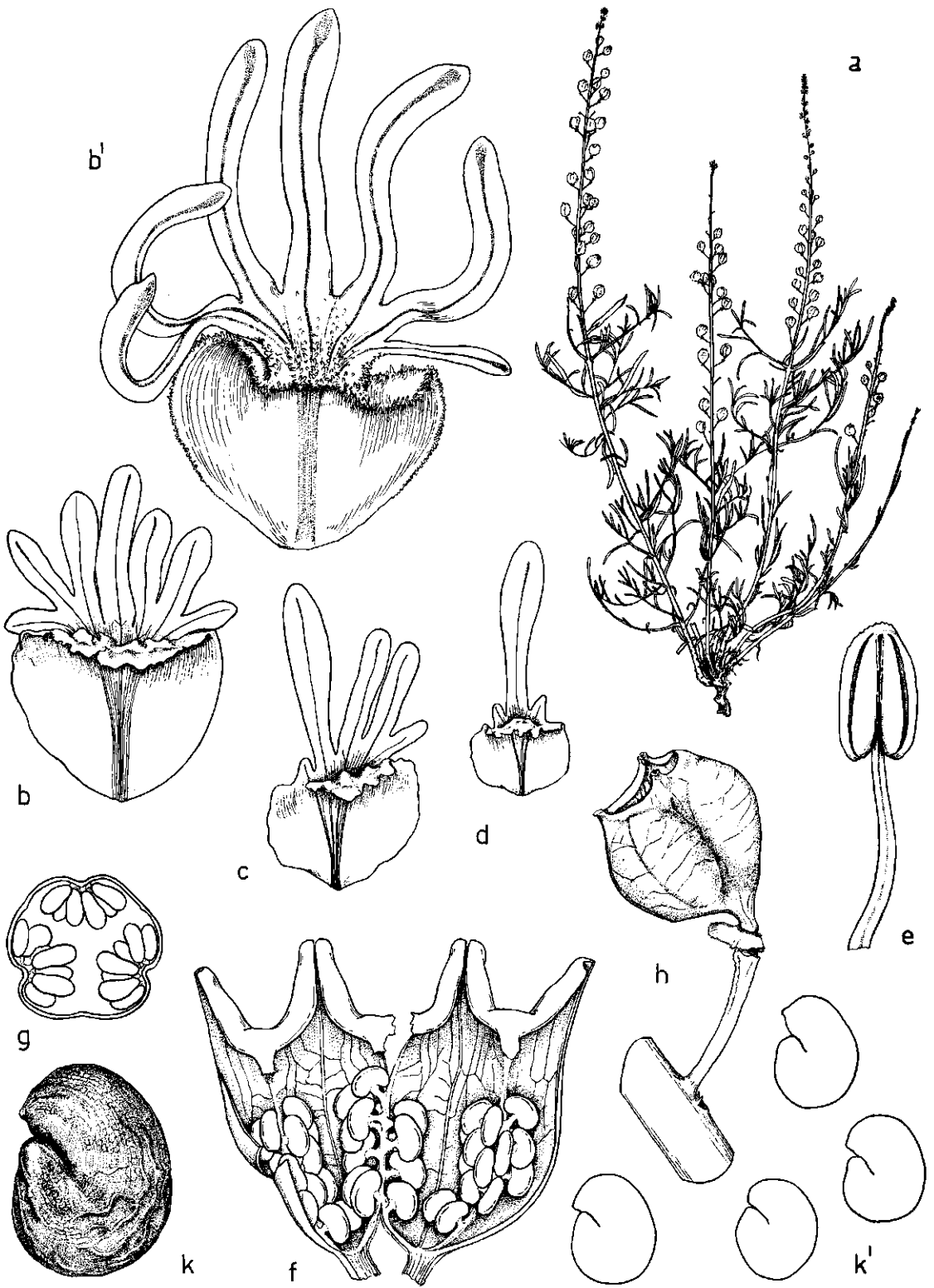


FIG. 33. *Reseda buhseana* Muell.Arg. var. *buhseana* — a: habit; b, b¹: sup.pet.; c: lat. pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape. — a: $\frac{1}{4} \times$; b-d, b¹, f, g: $20 \times$; e, k¹: $15 \times$; h: $5 \times$; k: $30 \times$. — a: Bekboudi et Aellen 6276E (W 6884); b-h: K. H. Rechinger fil. 1226 (W 319); b¹: K. H. Rechinger 16458 (W 13326); k, k¹: K. H. Rechinger fil. 1947 (S).

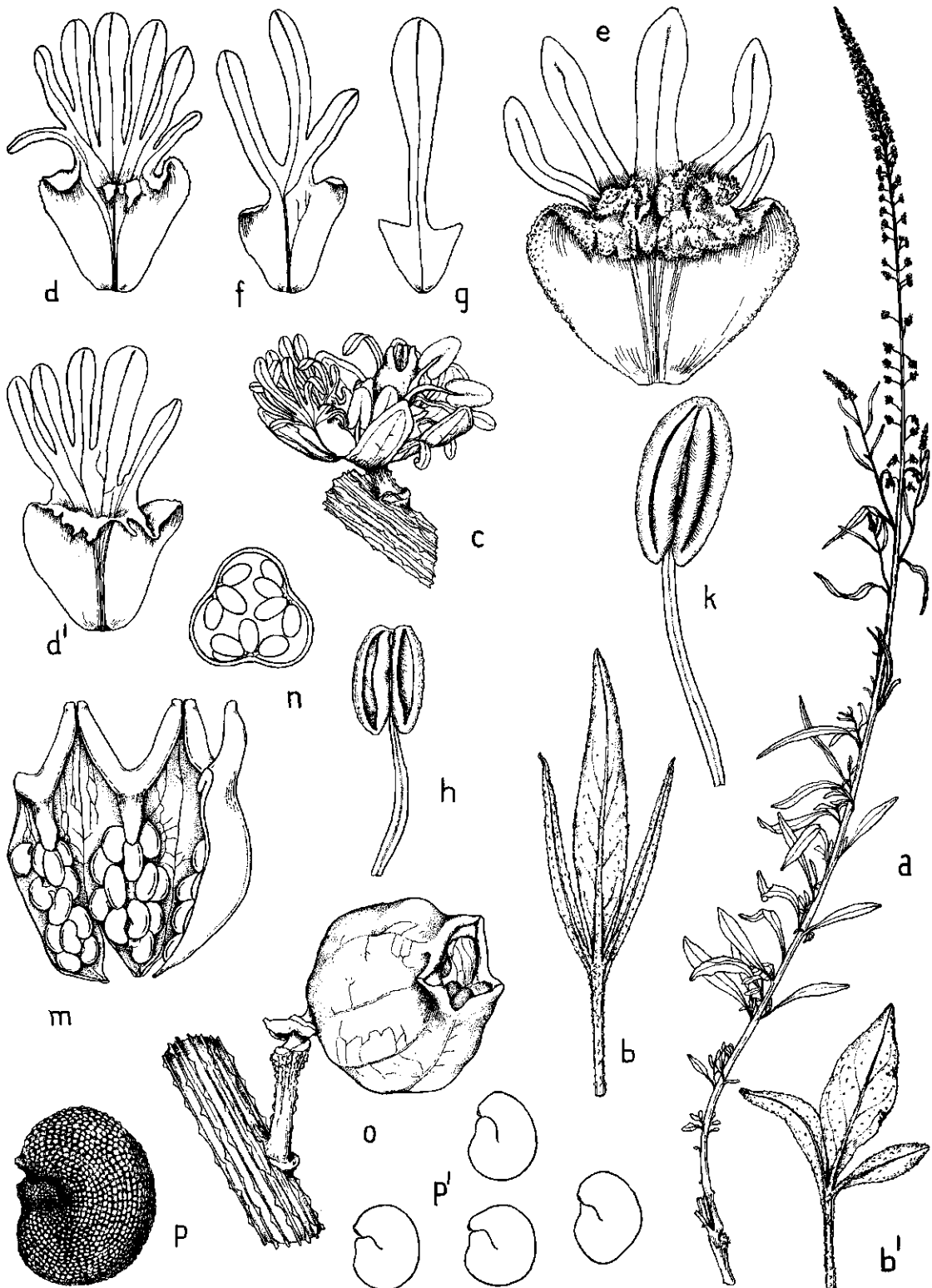


FIG. 34. *R. buhseana* Muell. Arg. — a: habit; b, b': leaves; c: fl.; d, d', e: sup.pet.; f: lat.pet.; g: ant.pet.; h, k: stamens; m: ovary (opened); n: same, c.-s.; o: capsule; p: seed; p': seeds, shape. — a: $\frac{1}{4} \times$; b, b': $1\frac{1}{2} \times$; c, o, p': $10 \times$; d, d', e-g, m, n, p: $20 \times$; h, k: $15 \times$. — a, e, k: Bowles et Scholarship 1574 (K); b, b': Androschenko s.n., 29.III.1912 (LE); c, d, d', f-h, m-p, p': Bunge s.n., April 1859 (GOET). — a, b, b', e, k: var. *dshebeli* (Czerniak.) Abdallah et De Wit, *nov. comb. et stat.*; c, d, d', f-h, m-p, p': var. *asperula* Abdallah et De Wit, *nov. var.*

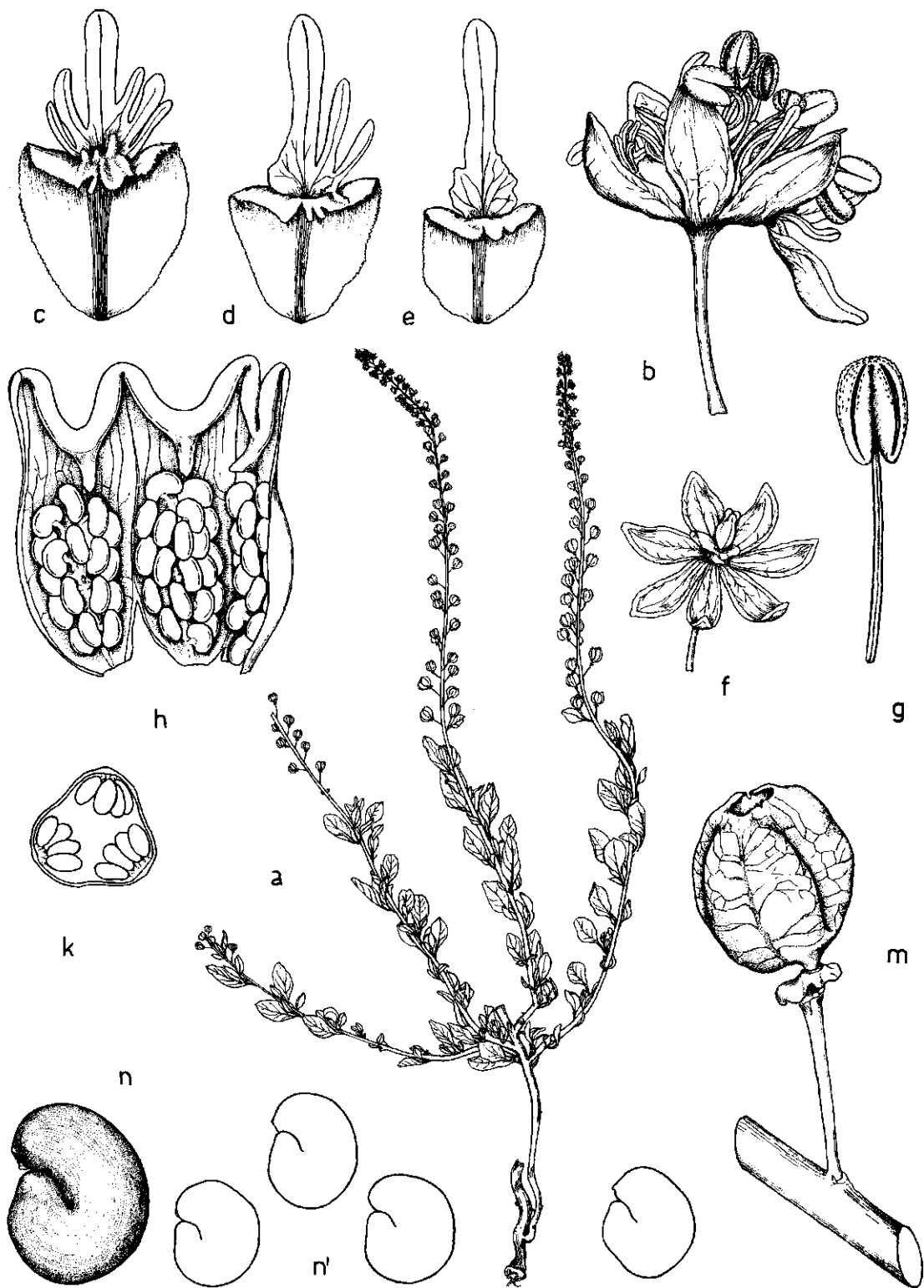


FIG. 35. *Reseda bungei* Boiss. var. *bungei* - a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: fl.-disc; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n': seeds, shape. - a: $\frac{1}{4} \times$; b: $10 \times$; c, d, e, g: $20 \times$; n': $15 \times$; f, m: $5 \times$; h, k, n: $20 \times$. - a, b, f, h-m: K. H. Rechinger fil. 999 (W acq. 1952, 315); e-e, g, n, n': id. (US 2061056).

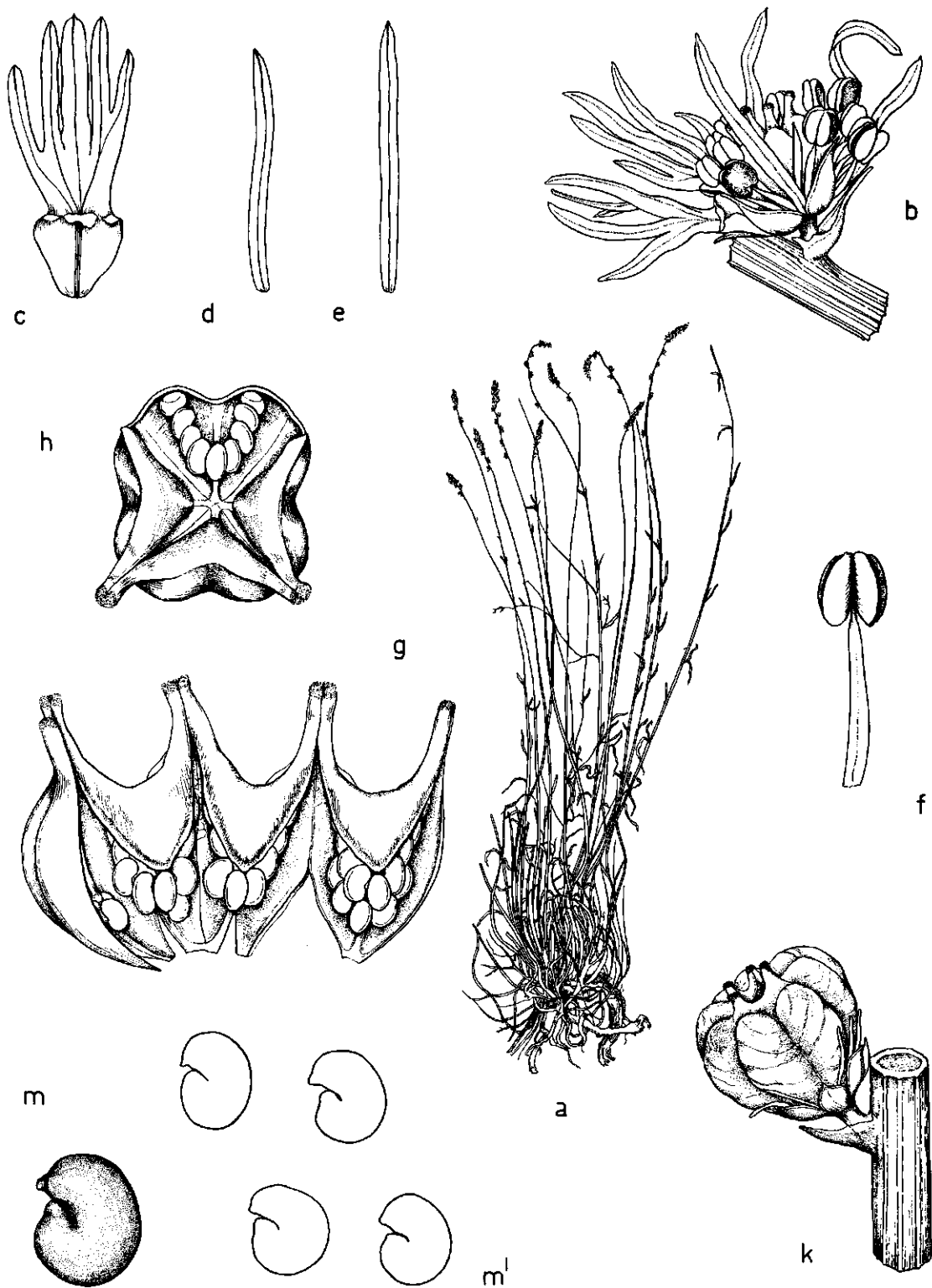


FIG. 36. *Reseda complicata* Bory – a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, top view with a part removed to show biforked placenta; k: capsule; m: seed; m^l: seeds, shape. – a: $\frac{1}{4}\times$; b–e, k: $10\times$; f: $15\times$; g, h, m^l: $20\times$; m: $30\times$. – a: M. Winkler s.n., 30.VII.1873 (WRSL); b–h: E. Bourgeau 1091 (WAG); k, m, m^l: A. Ginzberger s.n., 8.VIII.1924 (WU 2820).

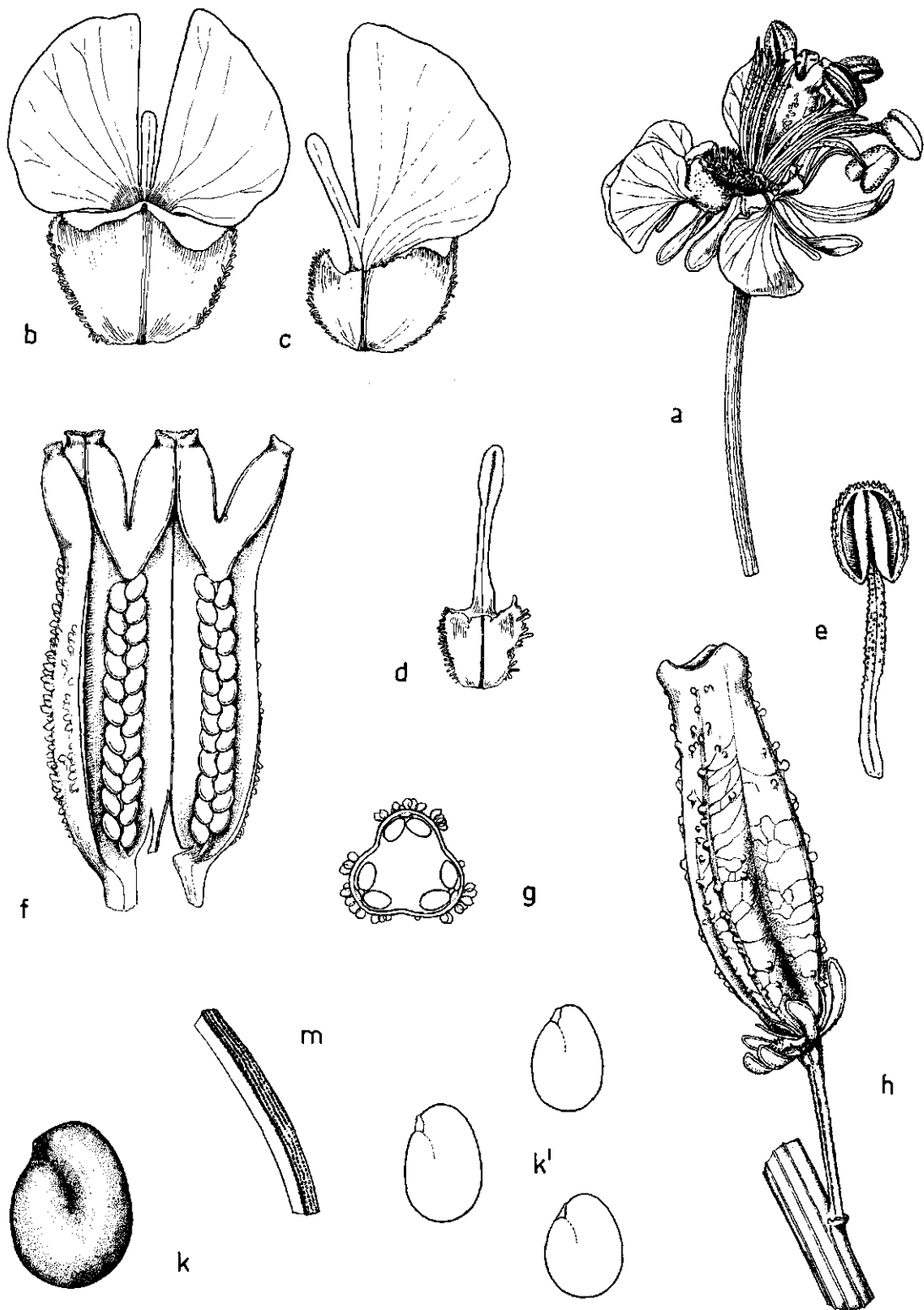


FIG. 37. *Reseda crystallina* Webb et Berth. - a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule, post mature; k: seed; k': seeds, shape; m: testa section. - a: $7\frac{1}{2}\times$; b-e, k': $15\times$; f, g, k: $20\times$; h: $5\times$; m: $65\times$. - a-g: E. Bourgeau 326 (WRSL); h-m, k, k': R. P. Murray (hb. Gelert) s.n., 25.V.1892 (C).

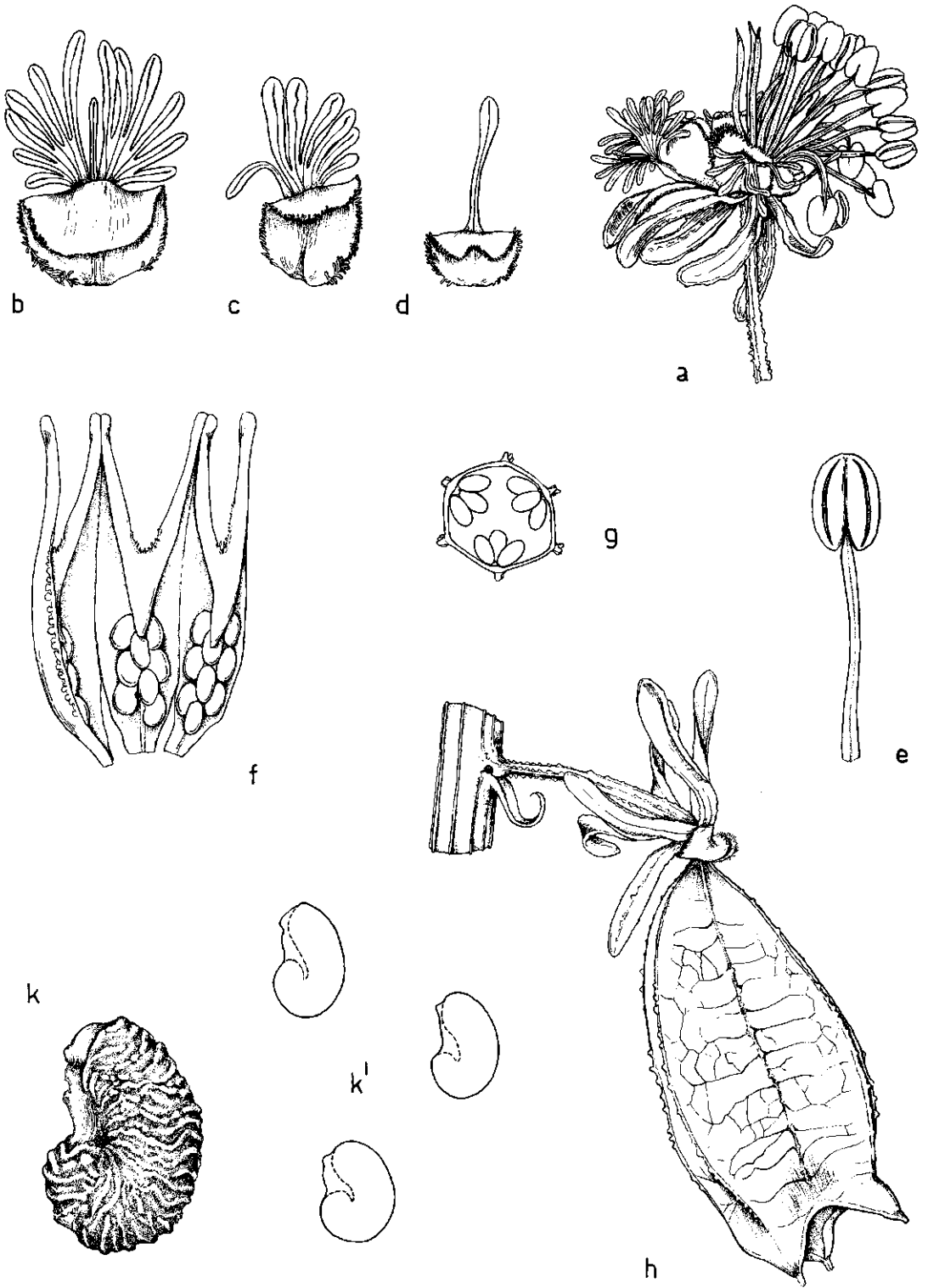


FIG. 38. *Reseda diffusa* (Ball) Ball - a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape. - a: 7½×; b-e: 15×; f, g, k: 20×; h: 5×; k¹: 10×. - All: J. Gattefossé 367 (AMD 038498).

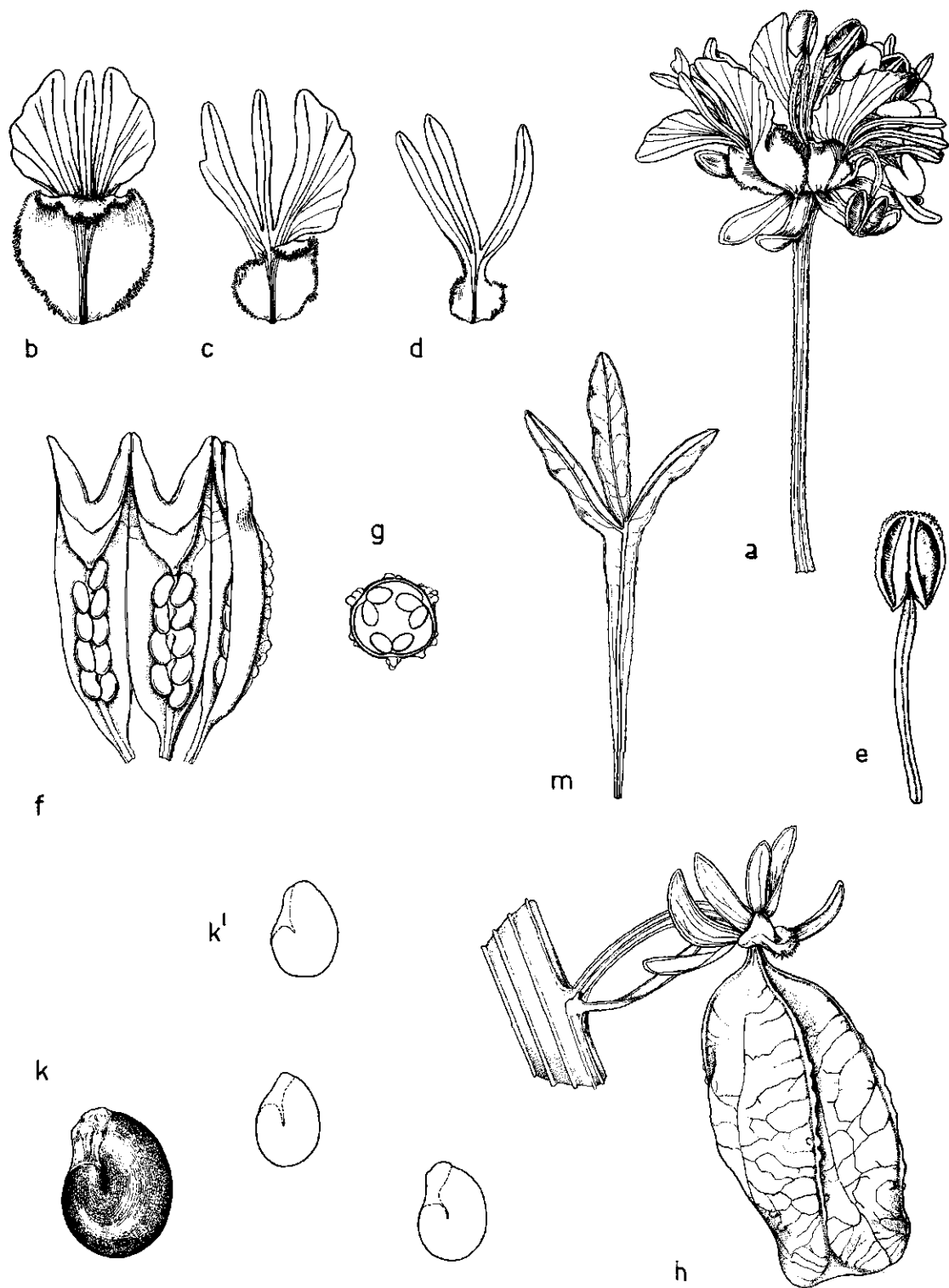


FIG. 39. *Reseda duriaeana* J. Gay var. *duriaeana* – a: fl.; b: sup.pet.; c: lat.pet.; d: ant. pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape; m: leaf. – a: 7¹/₂ ×; b–d, k¹: 10 ×; e, k: 15 ×; f, g: 20 ×; h: 5 ×; m: 1¹/₂ ×. – a–g: E. Reverchon 302 (UPS); h: id. (WU 1782); k, k¹, m: L. Kralik 372 (S).

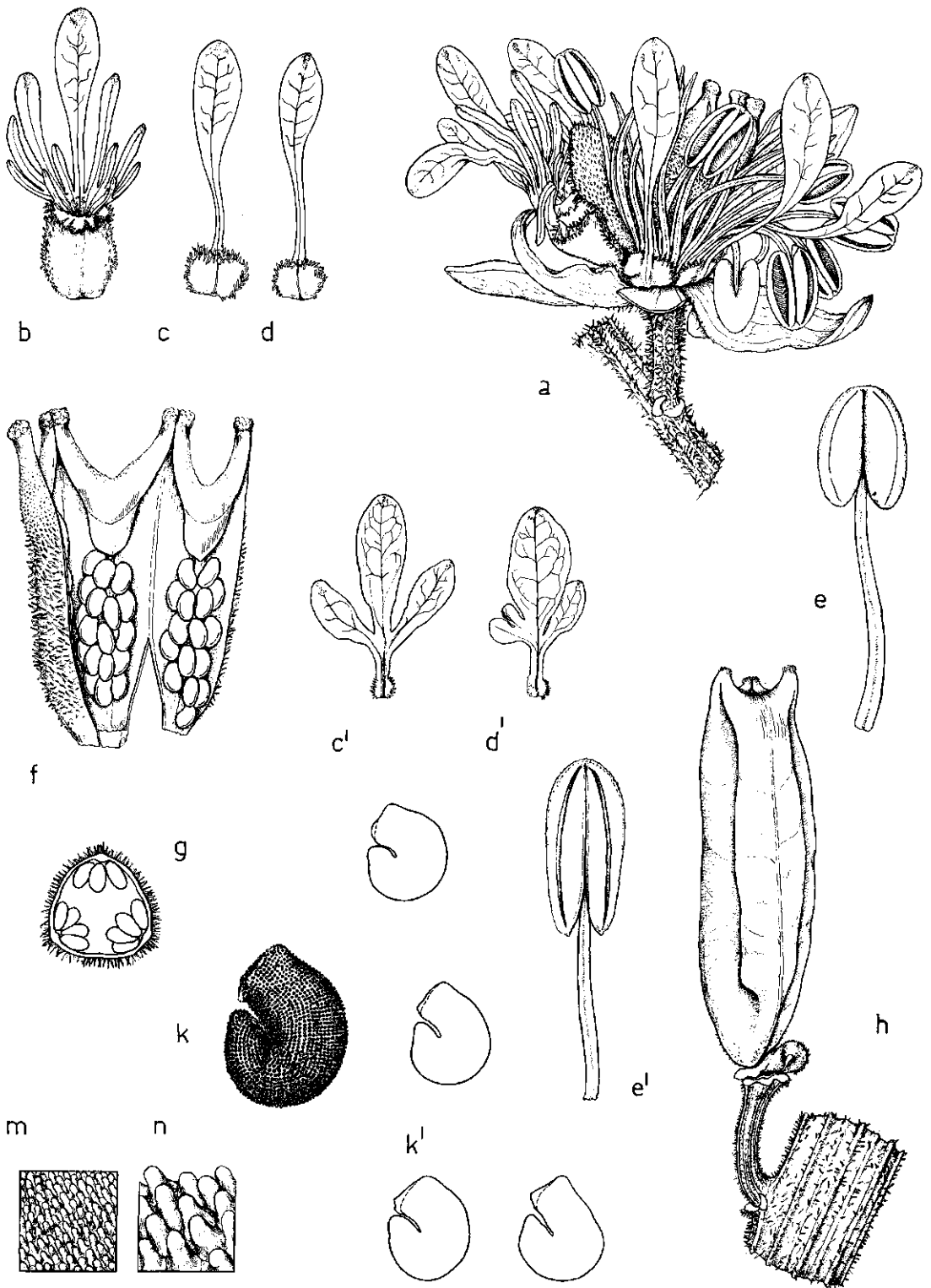


FIG. 40. *Reseda elata* Coss. ex Muell. Arg. var. *elata* - a: fl.; b: sup.pet.; c, c': lat.pet.; d, d': ant.pet.; e, e': stamens; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k': seeds, shape; m, n: seed surface. - a: 10×; b-d, c', d': 7½×; e-g, e', k': 15×; h: 5×; k: 20×; m: 65×; n: 190×. - a-g: Hooker s.n., May 1871 (GH); c'-e': R. Maire s.n., 14.IV.1925 (RAB 14284); h-n, k': id. 78, 16.VI.1939 (RAB 14283).

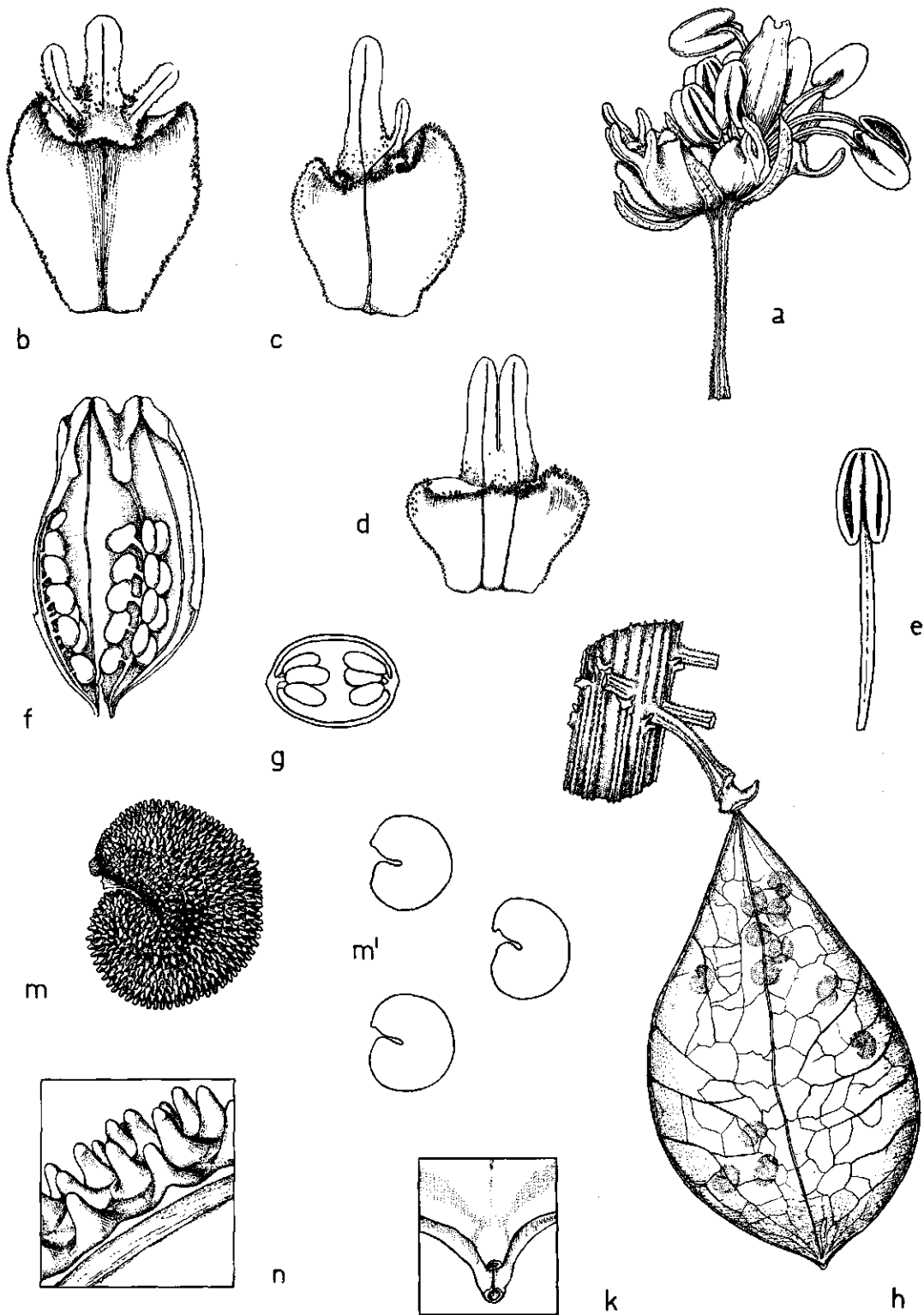


FIG. 41. *Reseda ellenbeckii* Perk. — a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: same, upper part; m: seed; m': seeds, shape; n: seed surface, section. — a: 10×; b-d, f, g, k: 20×; e, m': 15×; h: 5×; m: 30×; n: 120×. — All: Ruspoli et Riva (coll. Ruspoli) 994, type; in msc. 'Reseda ruspoli Gilg' (FI).

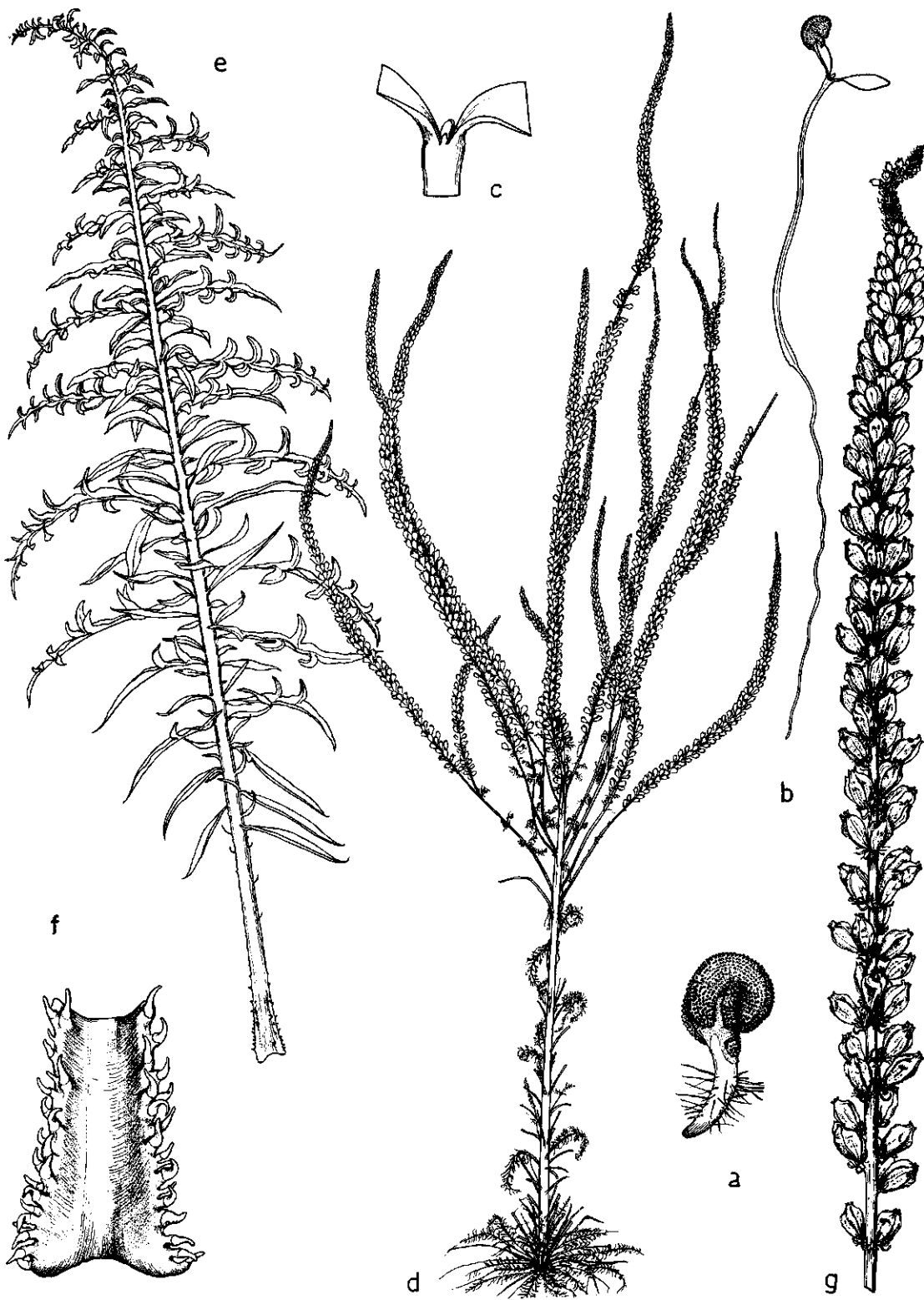


FIG. 42. *Reseda fruticulosa* L. var. *suffruticosa* (Loefl.) Abdallah et De Wit, nov. comb. et stat. - a: germinating seed; b: same, advanced stage; c: portion of upper part of seedling, note the stipular glands of the cotyledons and terminal bud; d: habit; e: leaf; f: leaf-base; g: infructescence. - a: 15 ×; b, f: 2½ ×; c: 20 ×; d: 1/8 ×; e, g: 1 ×. - a-c, e, f: Culta, 26.IV. 1968, seeds from type locality (WAG); d, g: H. C. D. de Wit 10062 (WAG).

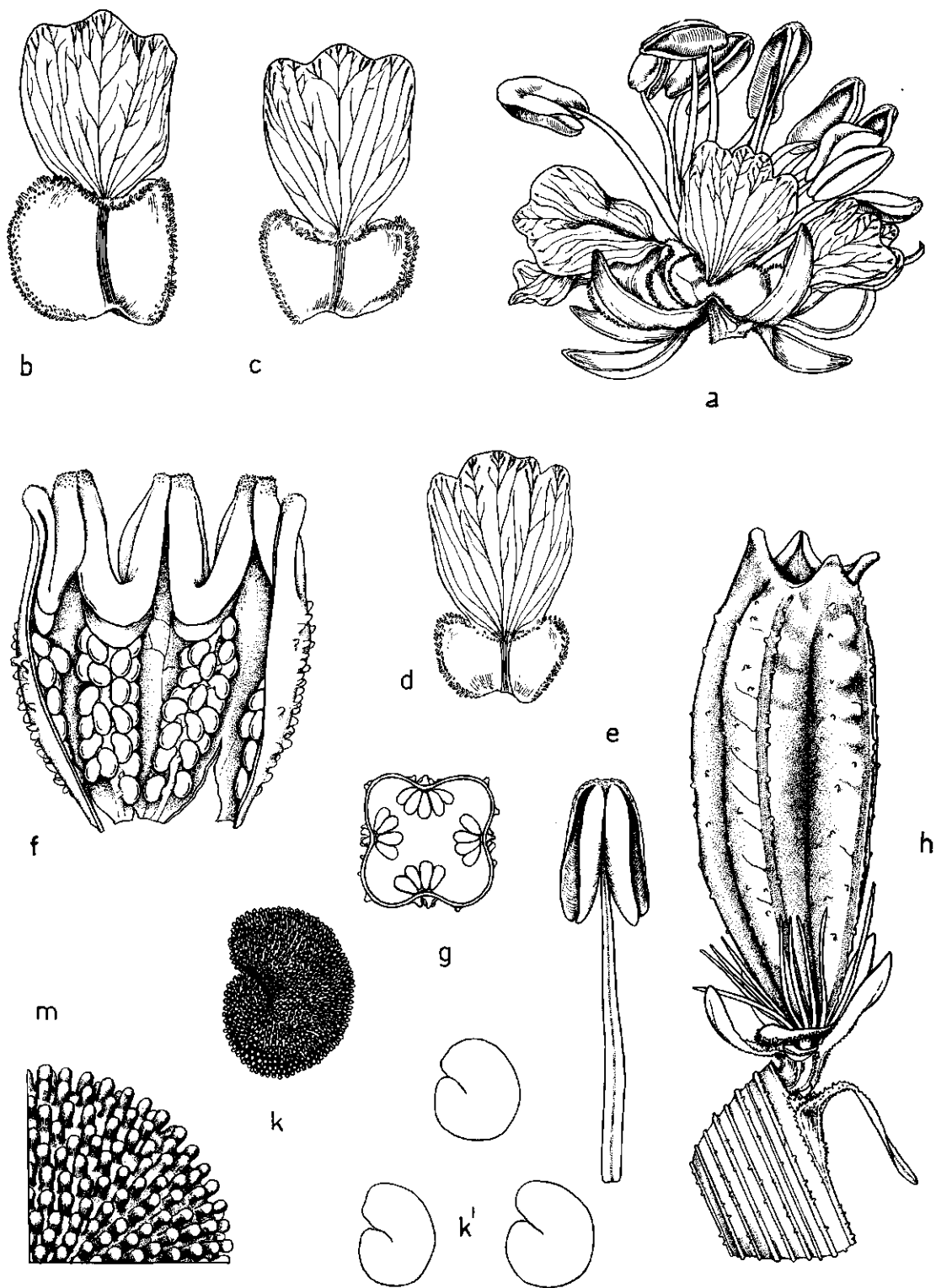


FIG. 43. *Reseda fruticulosa* L. - a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape; m: seed surface. - a: 7½×; b-e: 10×; f, g, k: 20×; h: 5×; k¹: 15×; m: 65×. - a-g: E. Bourgeau 2277 (C); h-m, k¹: M. Jimenez s.n., 30.VIII.1883 (UPS). - a-g: var. *suffruticosa* (Loefl.) Abdallah et De Wit, *nov. comb. et stat.*; h-m, k¹: var. *fruticulosa*.

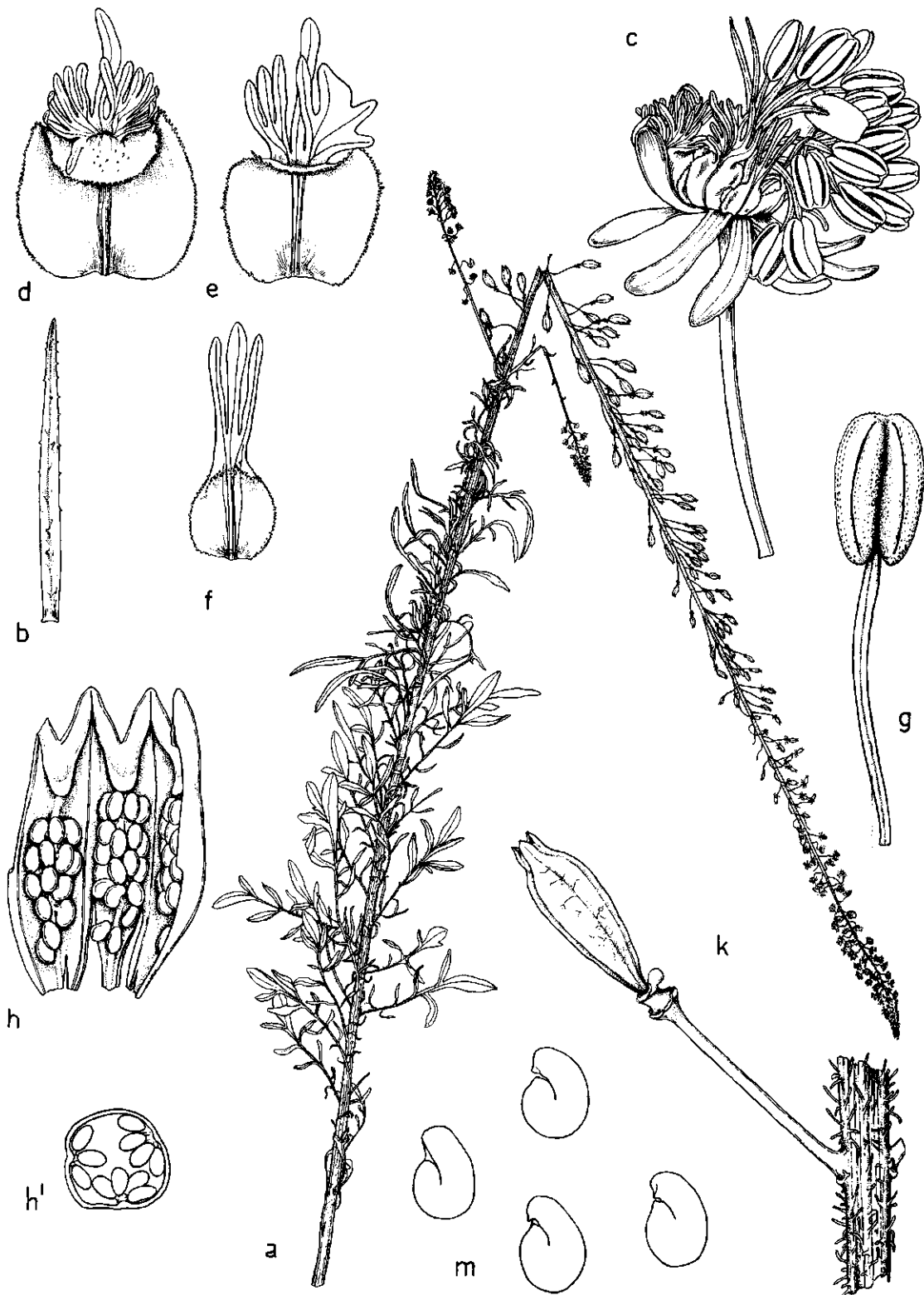


FIG. 44. *Reseda germanicopolitana* Hub.-Mor. - a: habit; b: bract; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); h¹: same, c.-s.; k: capsule; m: seeds, shape. - a: $\frac{1}{4}\times$; b, c, m: $7\frac{1}{2}\times$; d-g: $15\times$; h, h¹: $15\times$; k: $2\frac{1}{2}\times$. - All: C. Simon s.n. (Einlage 691), 29.VI.1958 (BAS-SIM).

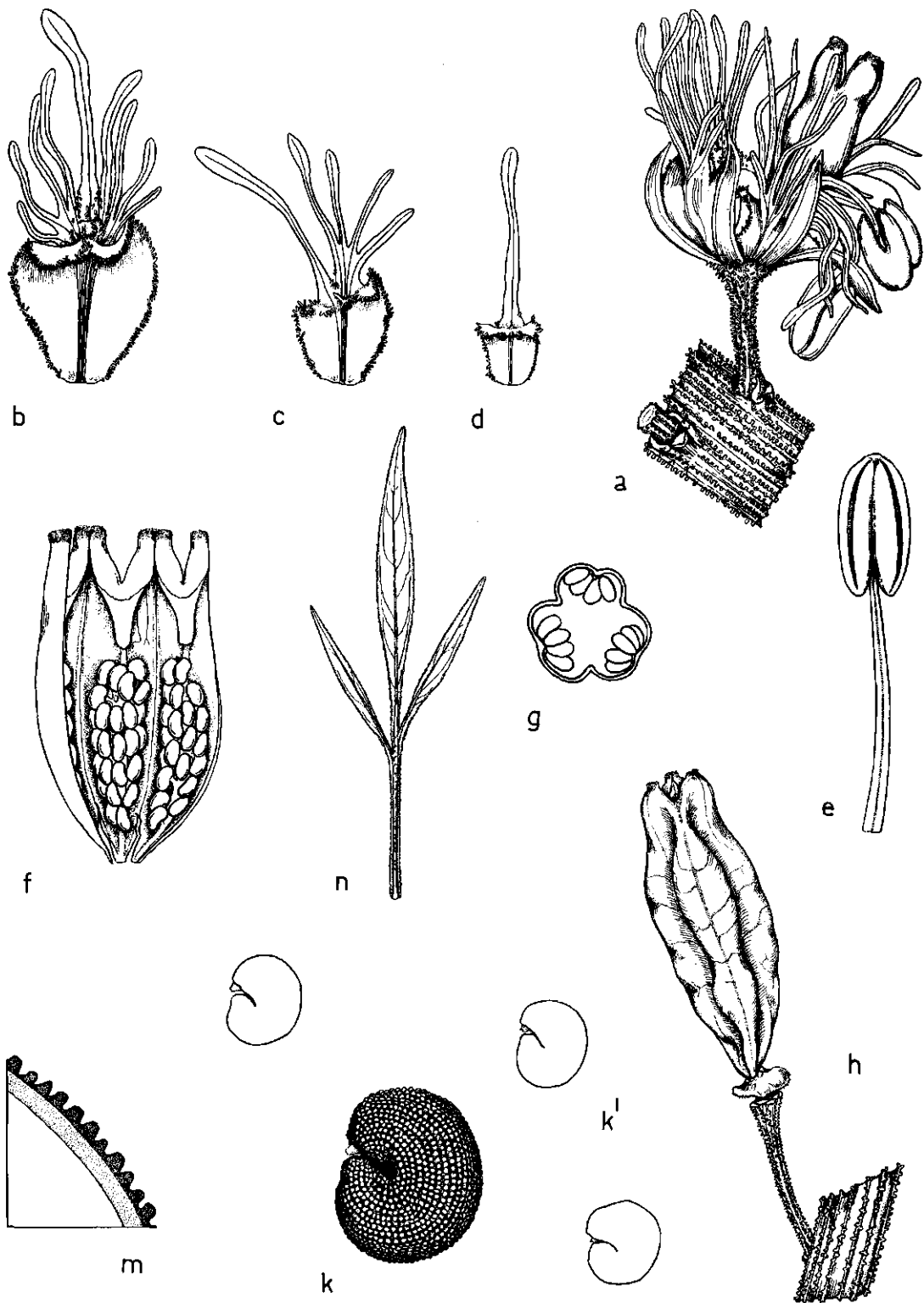


FIG. 45. *Reseda gilgiana* Perk. var. *gilgiana* - a: fl.; b: sup.pet.; c: lat.pet.; d: ant. pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape; m: testa, section; n: leaf. - a: 10×; b-g, k¹: 15×; h: 5×; k: 30×; m: 80×; n: 1¹/₂×. - a-g, n: C.F. Hemming 2345 (PRE); h-m, k¹: id. 2376 (PRE).



FIG. 46. *Reseda glauca* L. - a: habit; b: part of stem with a leaf; c: basal part of plant; d: germinating seed. - a, c: 1×; b: 2½×; d: 5×. - a, b: Th. B. Wolfe s.n., VI. 1859 (S); c: Bordère s.n., VII.1865 (F); d: Culta, à 1967 (WAG).

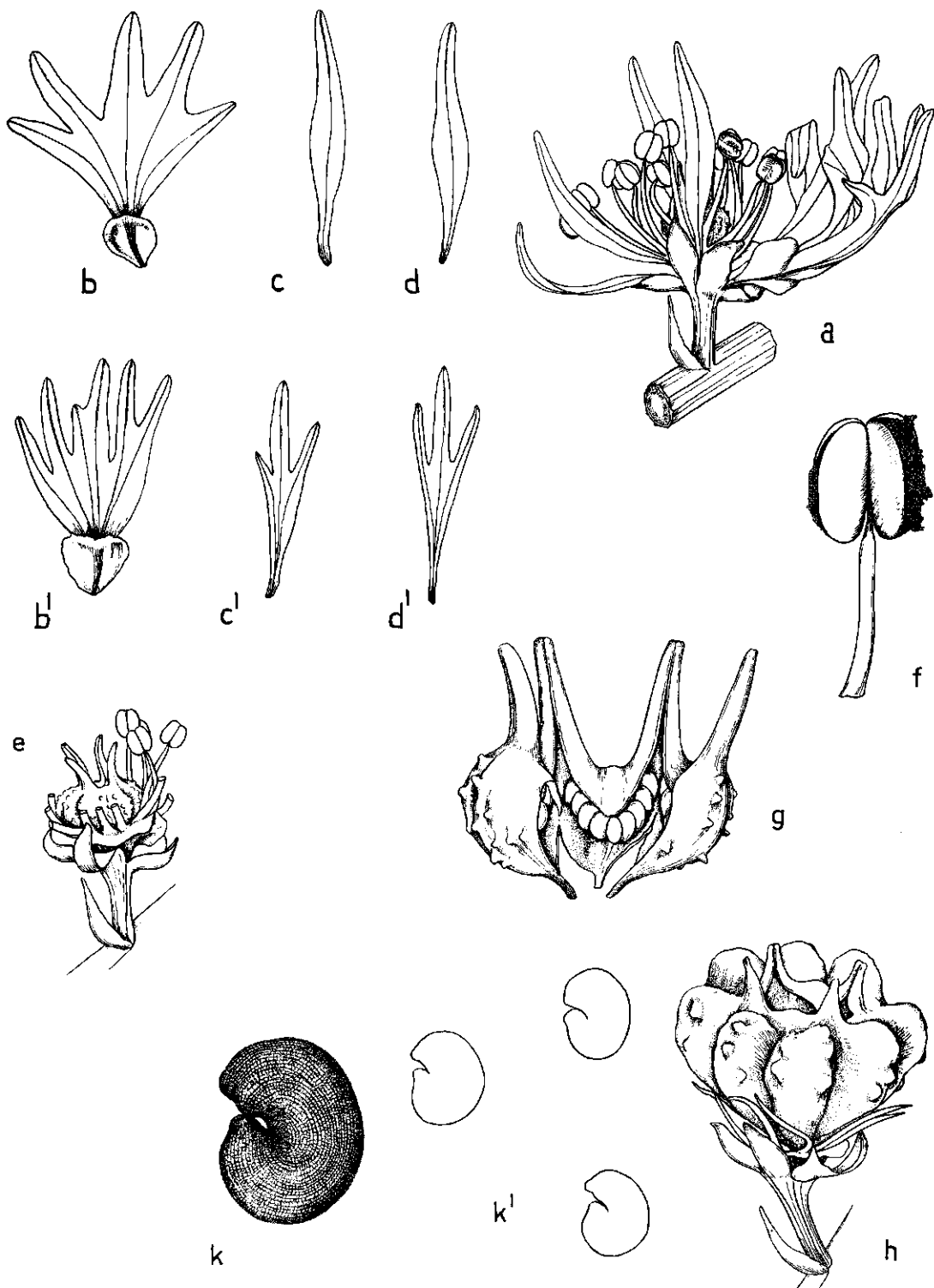


FIG. 47. *Reseda glauca* L. – a: fl.; b, b¹: sup.pet.; c, c¹: lat.pet.; d, d¹: ant.pet.; e: fl.-disc, petals and some stamens removed; f: stamen; g: ovary (opened); h: capsule; k: seed; k¹: seeds, shape. – a–e, b¹–d¹, h: $7\frac{1}{2}\times$; f, g: $20\times$; k: $30\times$; k¹: $15\times$. – a–f: Th.B. Wolfe s.n., VI.1859(S); b¹–d¹, g: A. Meebold s.n., s.d. (WRSL); h: Grenier s.n., à 1896 (UPS); k: Boissier et Reuter s.n., VIII.1858 (C); k¹: Bordère 4960 (F 55354).



FIG. 48. *Reseda globulosa* Fisch. et Mey. — a: habit; b: inflorescence; c,d: variation of leaves; e: stipular gland. — a-d: 1×; e: 7 $\frac{1}{2}$ ×. — a: R. F. Hohenacker s.n., à 1838, neotype (PRC); b, e: A. Grossheim et A. Kolakovsky 366 (UC); c: S. Fedossaff s.n., à 1899 (DR); d: A. Grossheim s.n., 15.VI.26 (BRNU).

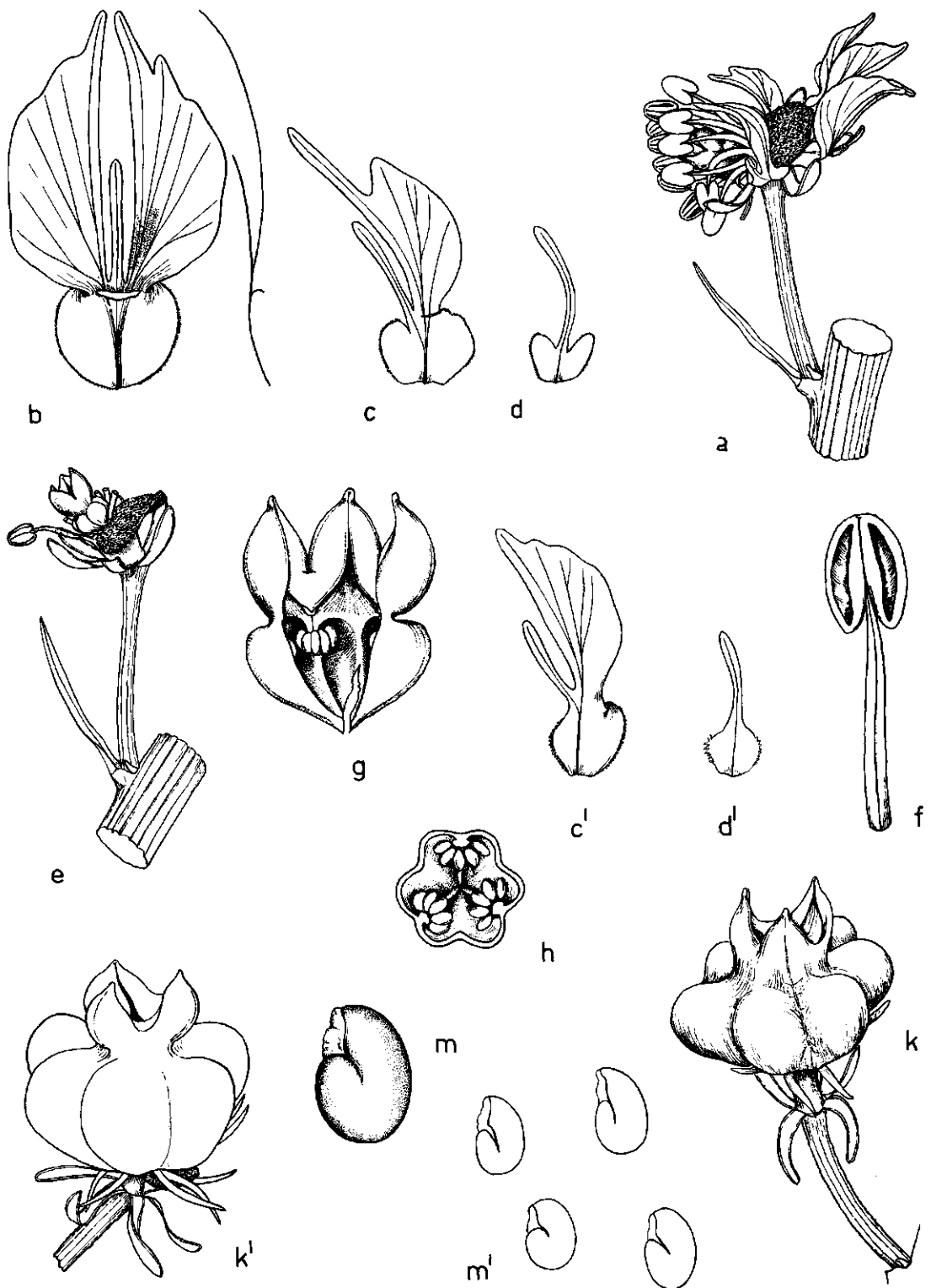


FIG. 49. *Reseda globulosa* Fisch. et Mey. — a: fl.; b: sup.pet.; c, c': lat.pet.; d, d': ant. pet.; e: fl.-disc, petals and some sepals and stamens removed; f: stamen; g: ovary (opened); h: same, c.-s.; k, k': capsules; m: seed; m': seeds, shape. — a, e, k, k', m: $7\frac{1}{2}\times$; b-d, c', d', m: $15\times$; f, g, h: $20\times$; — a, f, k, k': R. F. Hohenacker s.n., à 1838, neotype (PRC); b-d: A. Grossheim et A. Kolakovsky 366 (UC); c', d', e, m': R. F. Hohenacker s.n., à 1838, neotype (HAL); g, h: A. Grossheim s.n., 24.IV.1941 (BAK); m: B. Marcowicz s.n., 26.VI.1901 (NY).

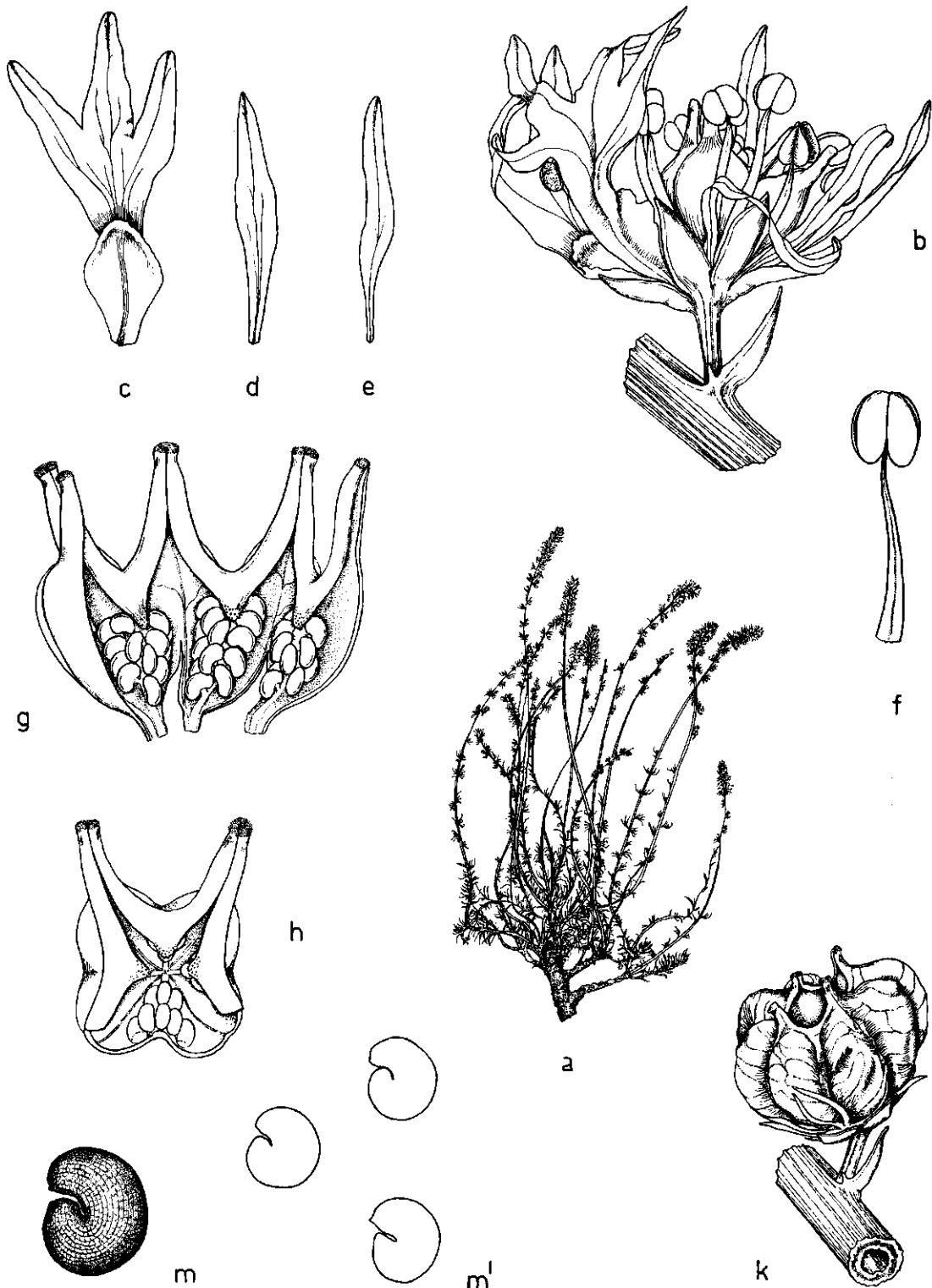


FIG. 50. *Reseda gredensis* (Cut. et Willk.) Muell. Arg. - a: habit; b: fl.; c: sup. pet.; d: lat. pet.; e: ant. pet.; f: stamen; g: ovary (opened); h: same, top view with a removed part to show bifurcated placenta; k: capsule; m: seed; m^l: seeds, shape. - a: $1/4 \times$; b-e: $10 \times$; f, m^l: $15 \times$; g, h, m: $20 \times$; k: $7\frac{1}{2} \times$. - a: E. Bourgeau 2396 (US); b-e: id. (C); f: id. (W); g, h: A. Fernandes et F. Sousa 4497 (COI); k, m, m^l: C. Pau 1120 (W).

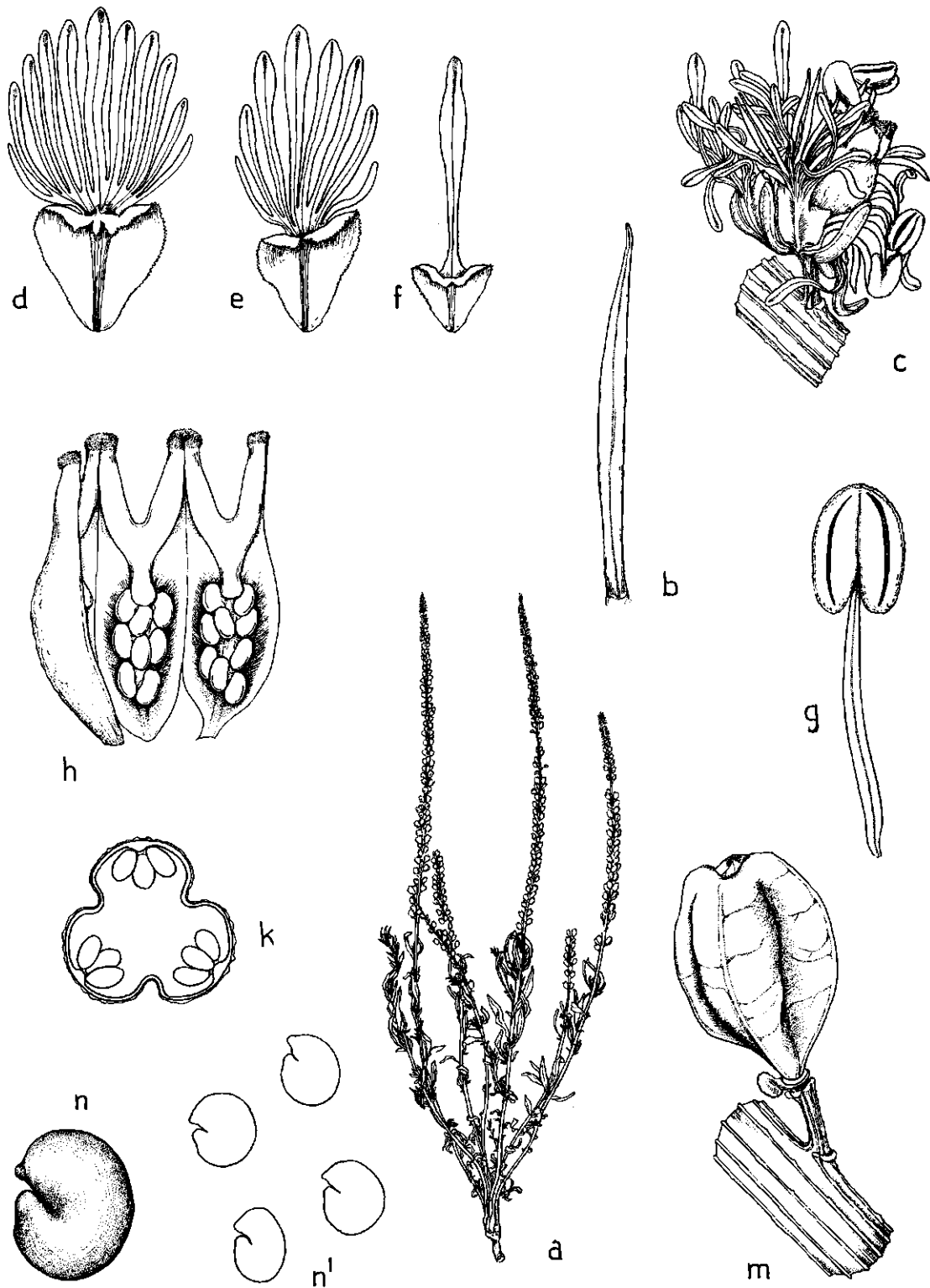


FIG. 51. *Reseda haussknechtii* Muell. Arg. - a: habit; b: bract; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n': seeds, shape. - a: $\frac{1}{4} \times$; b: $20 \times$; c: $10 \times$; d-f, n': $15 \times$; g: $20 \times$; h, k, n: $30 \times$; m: $7\frac{1}{2} \times$. - a, m: H. Field et J. Lazar 438 (US); b-k: id. (W 3145); n, n': K. H. Rechinger 9685 (W 13303).

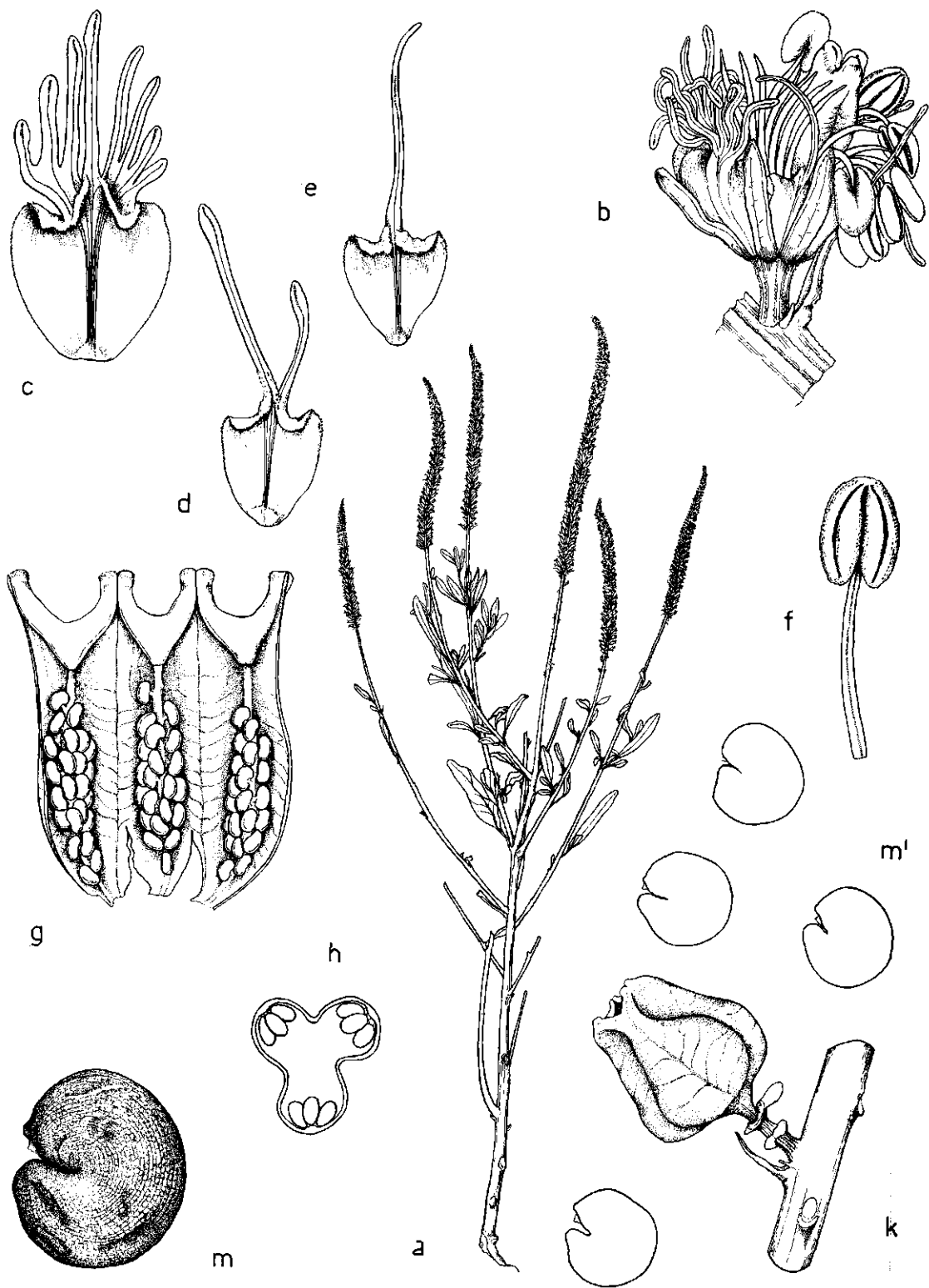


FIG. 52. *Reseda hemithamnodes* Czerniak. - a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape. - a: $\frac{1}{4}\times$; b: $10\times$; c-h: m¹: $15\times$; k: $5\times$; m: $30\times$. - a-h: I. A. Linczevski 372 (LE); k, m, m¹: A. Regel s.n., 24.VII-5.VIII. 1882 (LE).

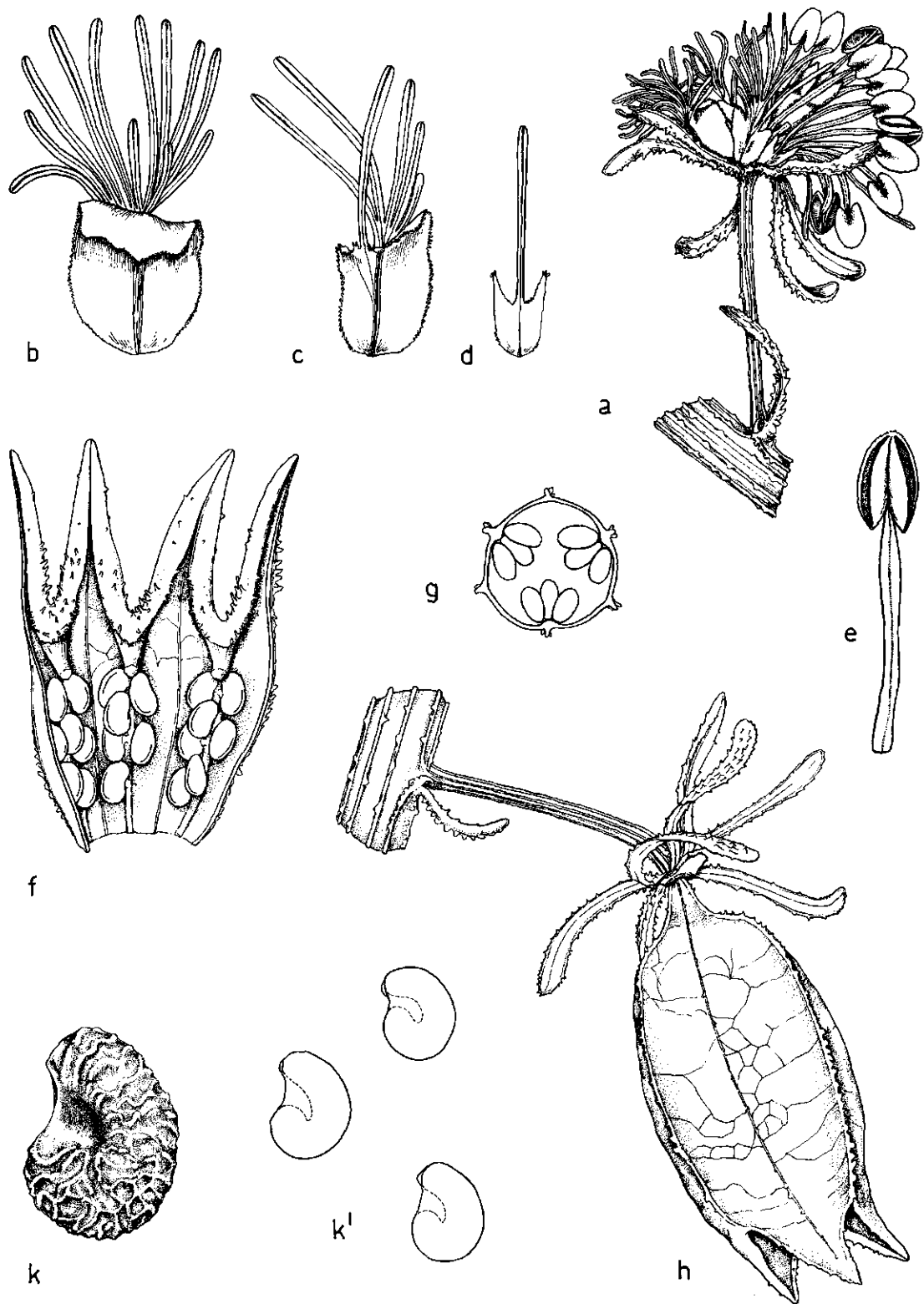


FIG. 53. *Reseda inodora* Reichenb. - a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape. - a, k¹: 7 $\frac{1}{2}$ ×; b-e: 15×; f, g, k: 20×; h: 5×. - a-h: J. Taucher s.n., 15.VII.1870 (W 2570); k, k¹: V. Szépligeti s.n., 22.VI.188. (BP 88770).

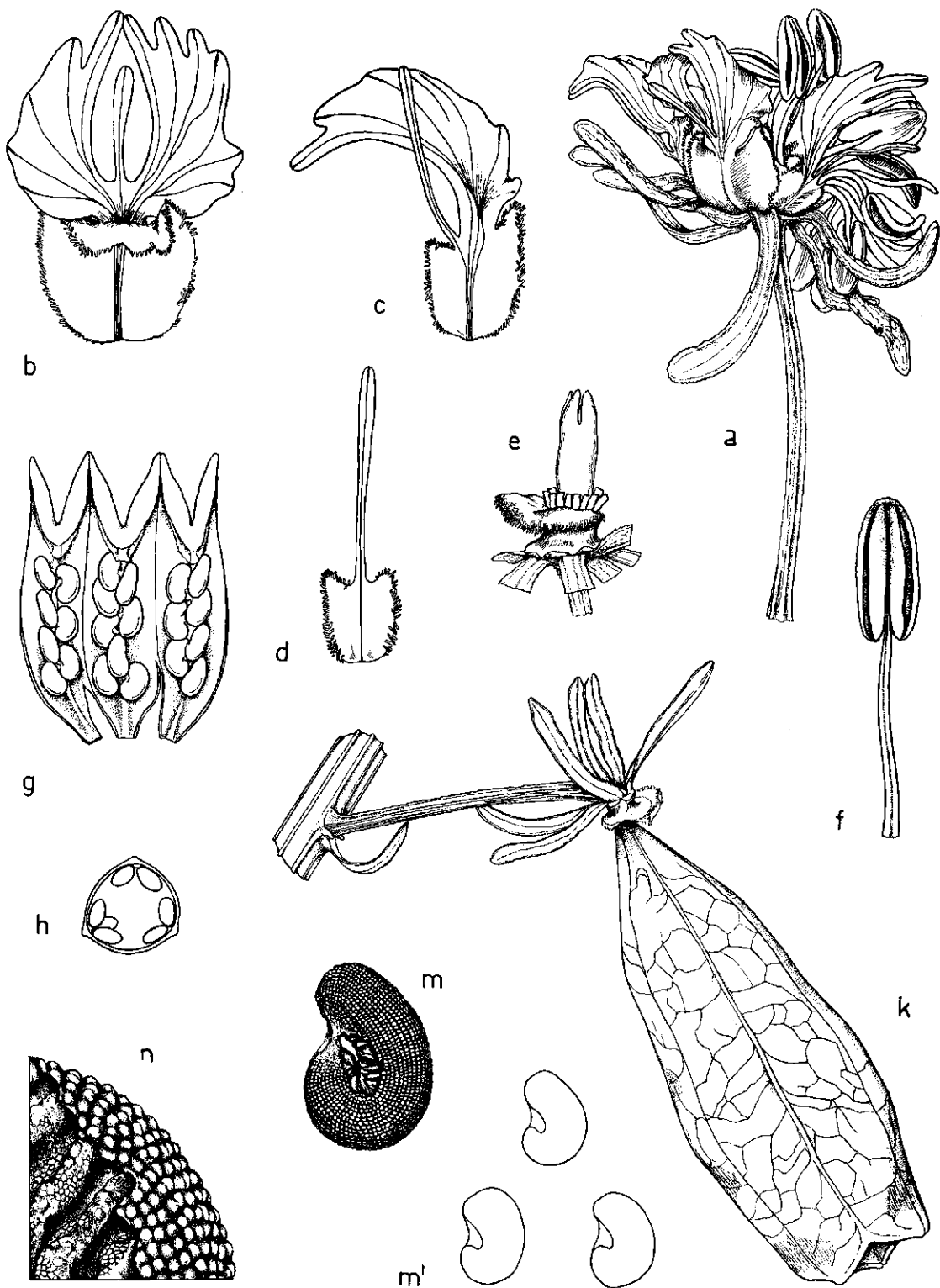


FIG. 54. *Reseda jacquinii* Reichenb. ssp. *jacquinii* - a: fl.; b: sup.pet.; c: lat. pet.; d: ant.pet.; e: fl.-disc, petals and sepals removed; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape; n: seed surface, outer layer of testa partly removed. - a, e: 10 ×; b-d, f-h, m: 15 ×; k: 5 ×; m': 7½ ×; n: 65 ×. - a-n: A. le Jolis s.n., 27.VIII.1867 (C); m': J. Dorgelo et P. A. W. J. de Wilde s.n., 18.VI.1959 (WAG).

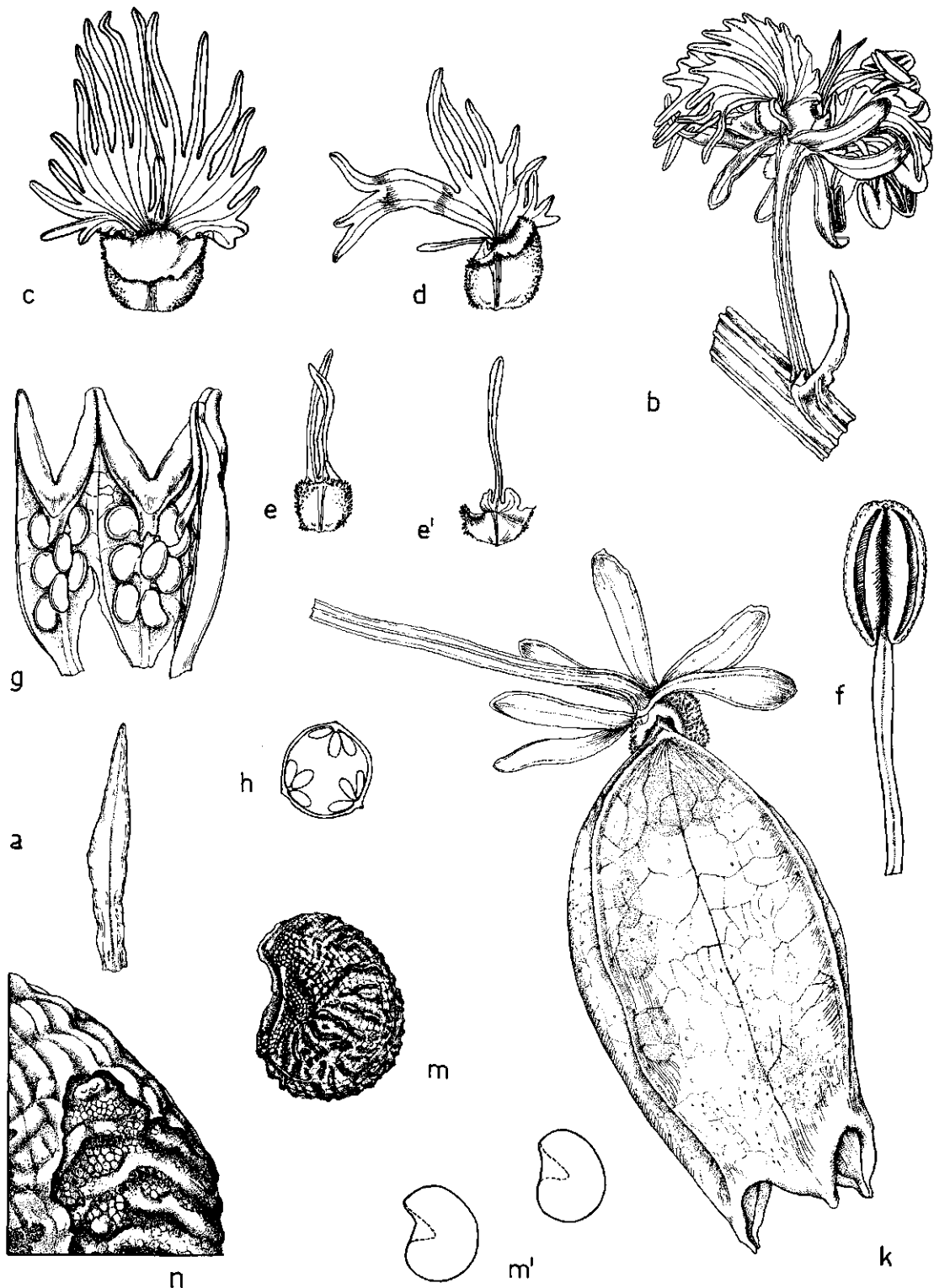


FIG. 55. *Reseda jacquinii* Reichenb. ssp. *litigiosa* (Sennen et Pau) Abdallah et De Wit, nov. comb. et stat. — a: bract; b: fl.; c: sup.pet.; d: lat.pet.; e, e': ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape; n: seed surface, outer layer of testa partly removed. — a: 10×; b, k: 5×; c-e, e', m': 7½×; f-h, m: 15×; n: 65×. — a-k, e': Frères Sennen et Septimin 5224 (US); m, m', n: id (C).

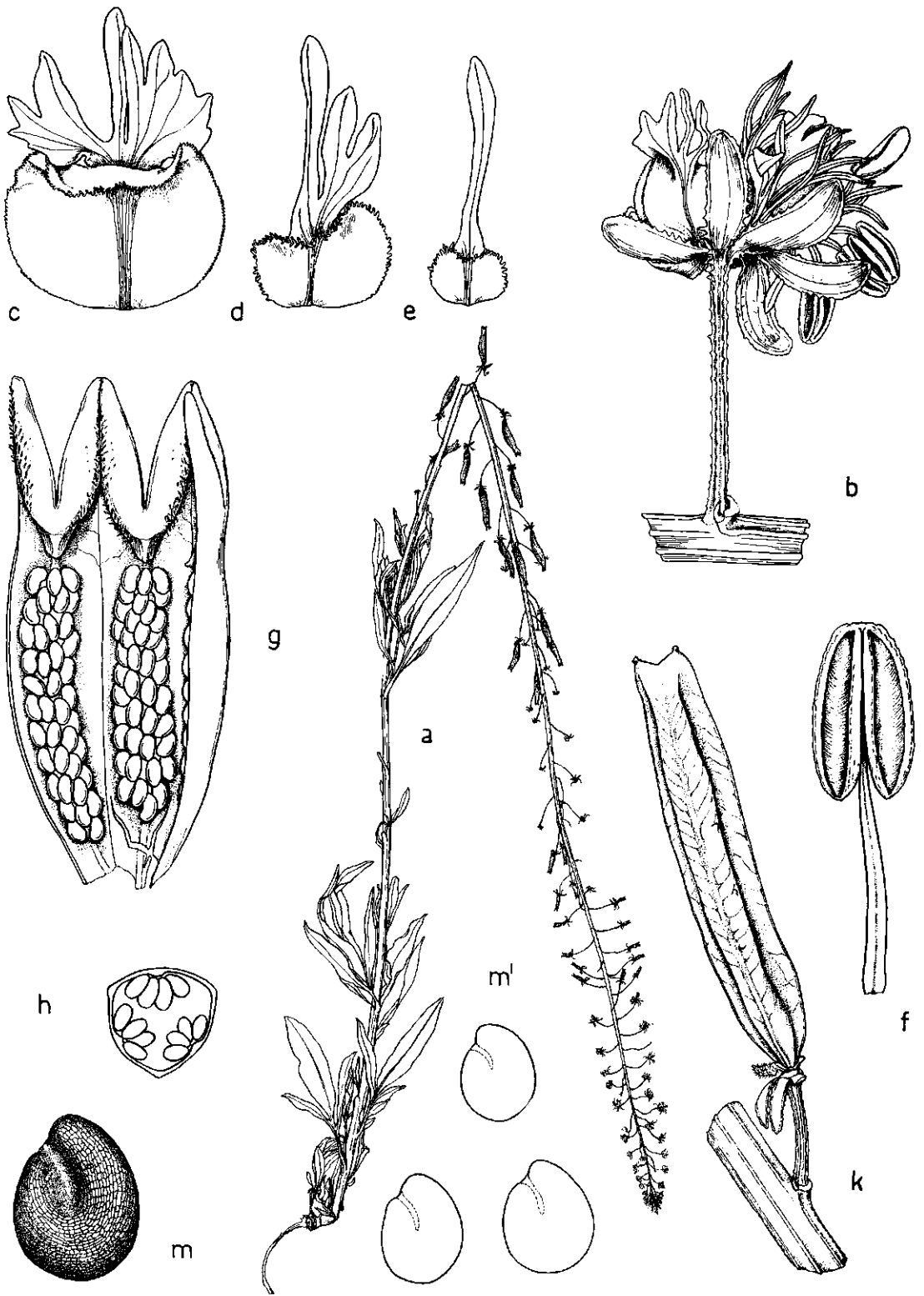


FIG. 56. *Reseda lanceolata* Lag. - a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds. shape. - a: $\frac{1}{4} \times$; b: $10 \times$; c-h, m: $20 \times$; k: $3 \times$; m': $15 \times$. - a: Joh. Lange s.n., à 1851-1852, type 'Reseda constricta Lange' (C); b-f: E. Boissier s.n., VIII. 1837 (GH); g, h: Porta et Rigo 216 (W); k, m, m': E. Boissier s.n., VIII.1837 (W). - a: var. *constricta* (Lange) Ball; b-m, m': var. *lanceolata*.

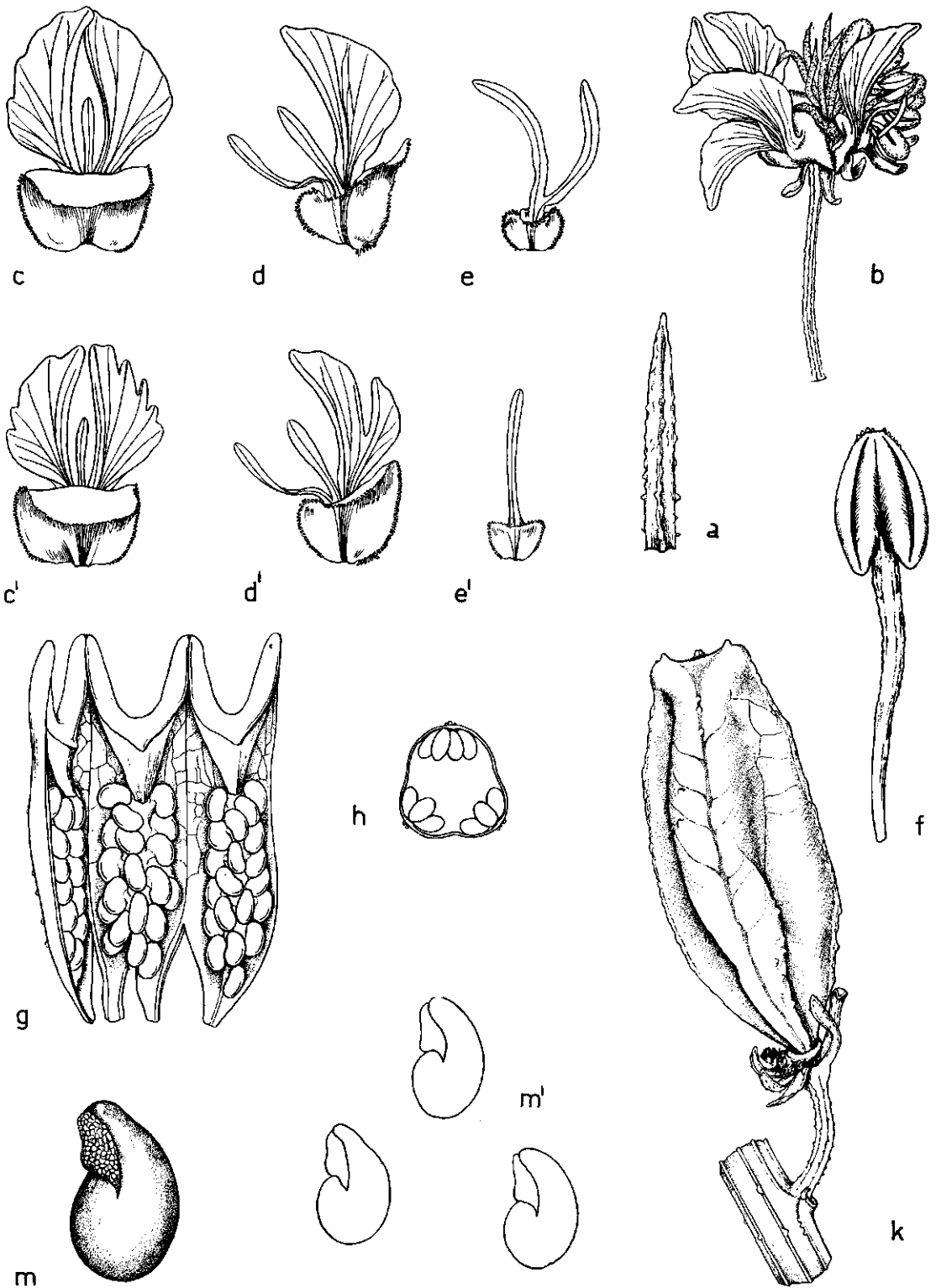


FIG. 57. *Reseda lutea* L. var. *lutea*—a: bract; b: fl.; c, c': sup.pet.; d, d': lat.pet.; e, e': ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape. — a: 10×; b: 7 $\frac{1}{2}$ ×; c-e, c'-e', m': 10×; f-h: 20×; k: 5×; m: 15×. — a-e, c'-e', g, h: E. Korb 2684 (W); f: id. 2688 (W); k: P. Sintenis 5785 (W 3674); m, m': id. 5185 (W).

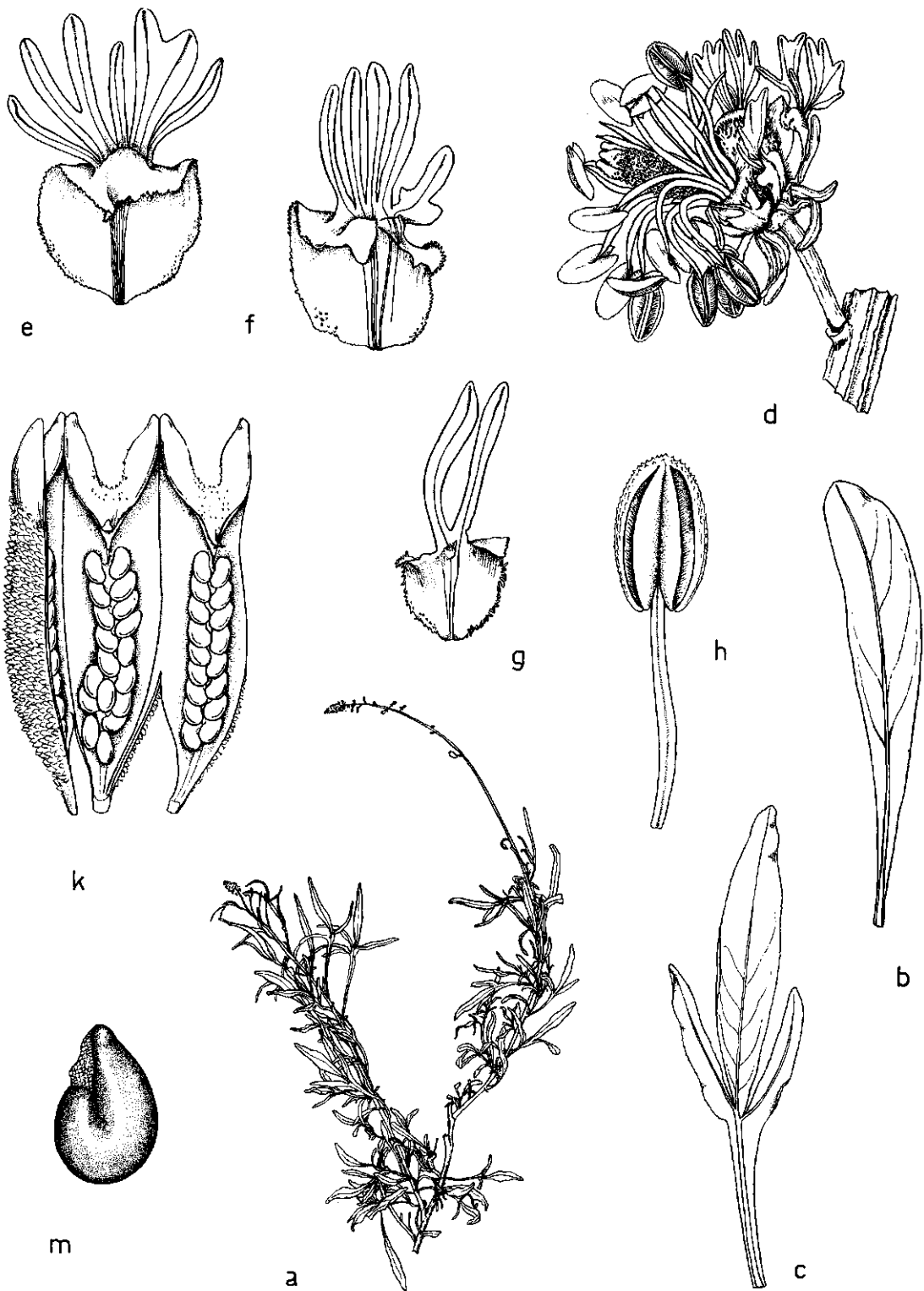


FIG. 58. *Reseda lutea* L. var. *muelleri* (Boiss.) Abdallah et De Wit, nov. comb. — a: habit; b, c: leaves; d: fl.; e: sup.pet.; f: lat.pet.; g: ant.p.; h: stamen; k: ovary (opened); m: seed. — a: $\frac{1}{4} \times$; b, c: $1\frac{1}{2} \times$; d: $7\frac{1}{2} \times$; e-h, m: $15 \times$; k: $20 \times$. — a: Nain s.n., 15.VII.1920 (RAB 14422, ? type '*Reseda nainii* Maire'); b, c, m: Ch. Sauvage 11657 '*Reseda nainii* Maire ssp. *genuina*' (RAB 14425); d-k: R. Maire et M. Weiller 544 (RAB 14427).

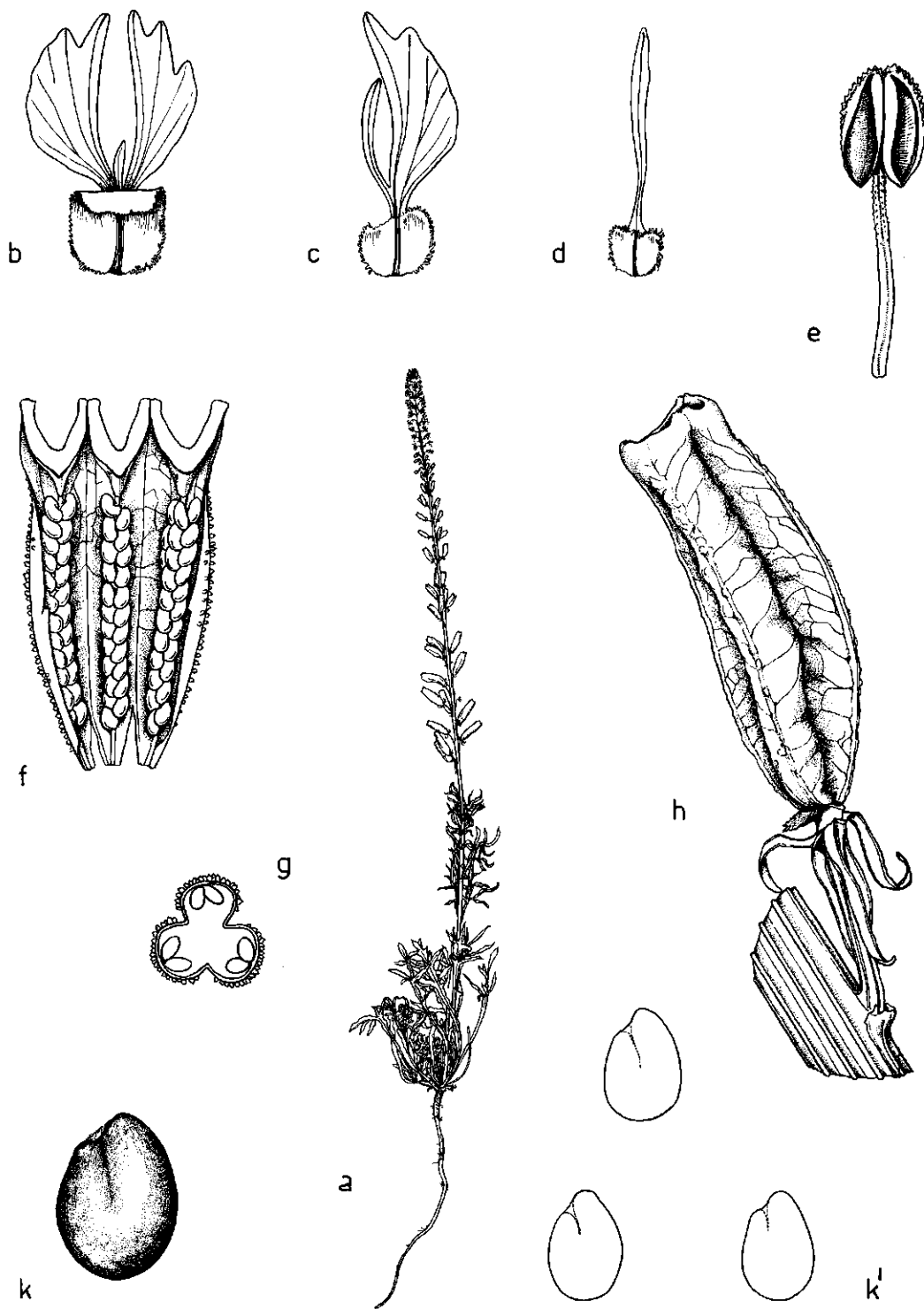


FIG. 59. *Reseda lutea* L. ssp. *neglecta* (Muell. Arg.) Abdallah et De Wit. nov. comb. et stat.
 - a: habit; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape. - a: $\frac{1}{4}\times$; b-d: $10\times$; e-g, k¹: $15\times$; h: $5\times$; k: $20\times$. - a: E. Jahandiez 154 (C); b-d, f, g: Battandier et Trabut 223 (UPS); e, h, k, k¹: id. (WRSL).

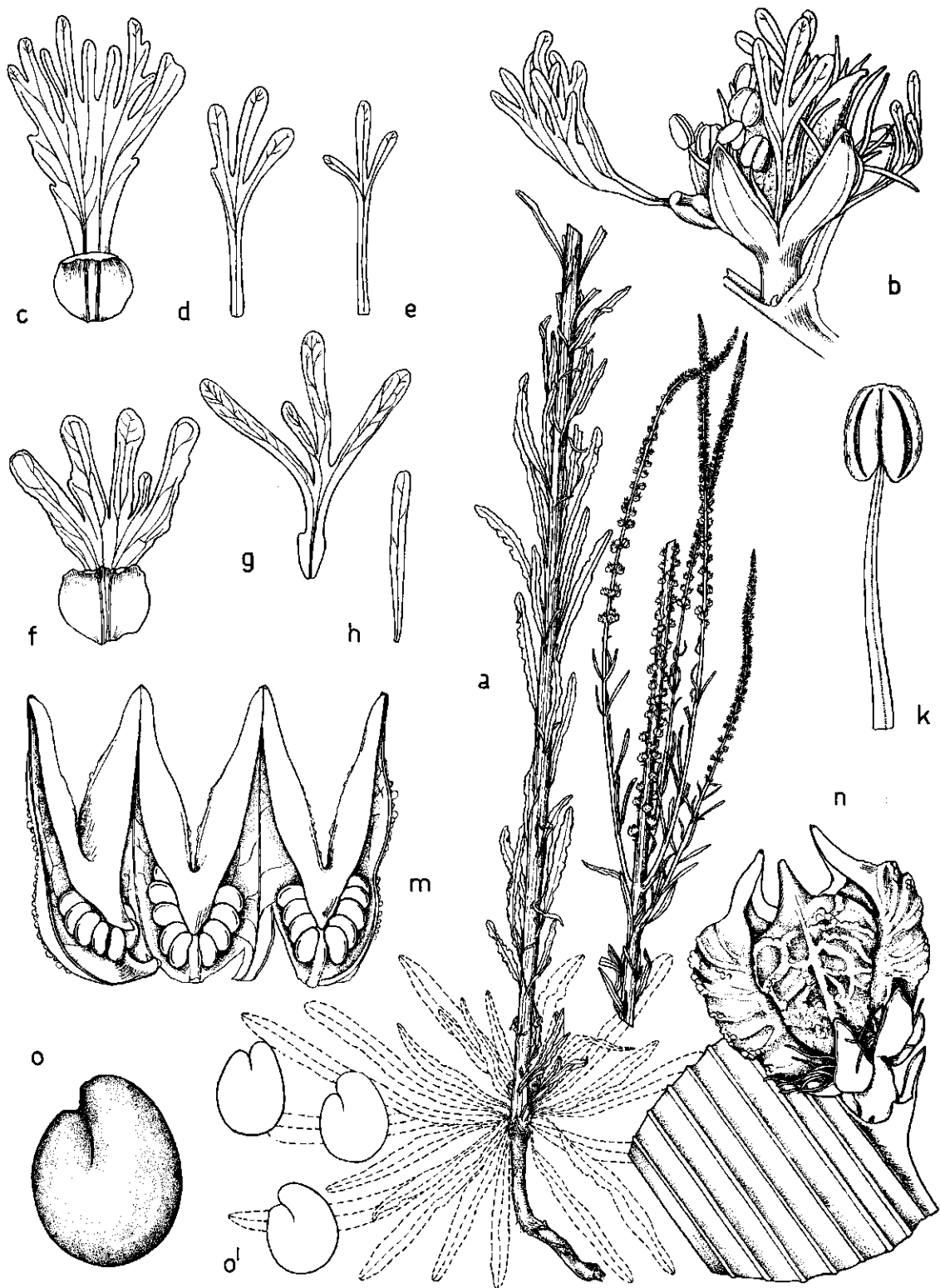


FIG. 60. *Reseda luteola* L. ssp. *luteola* - a: habit; b: fl.; c, f: sup.pet.; d, g: lat.pet.; e, h: ant.pet.; k: stamen; m: ovary (opened); n: capsule; o: seed; o¹: seeds, shape. - a: $\frac{1}{4} \times$; b-h, n: $10 \times$; k, m: $20 \times$; o: $30 \times$; o¹: $15 \times$. - a-e, k: K. H. et F. Rechinger 5238 (W); f, h, m: W. C. de Leeuw s.n., 7.IX.29(L 949. 232-169); g: J. Matos s.n., 3.VI.1954 (C); n, o, o¹: C. Haussknecht s.n., VI.1867 (W).

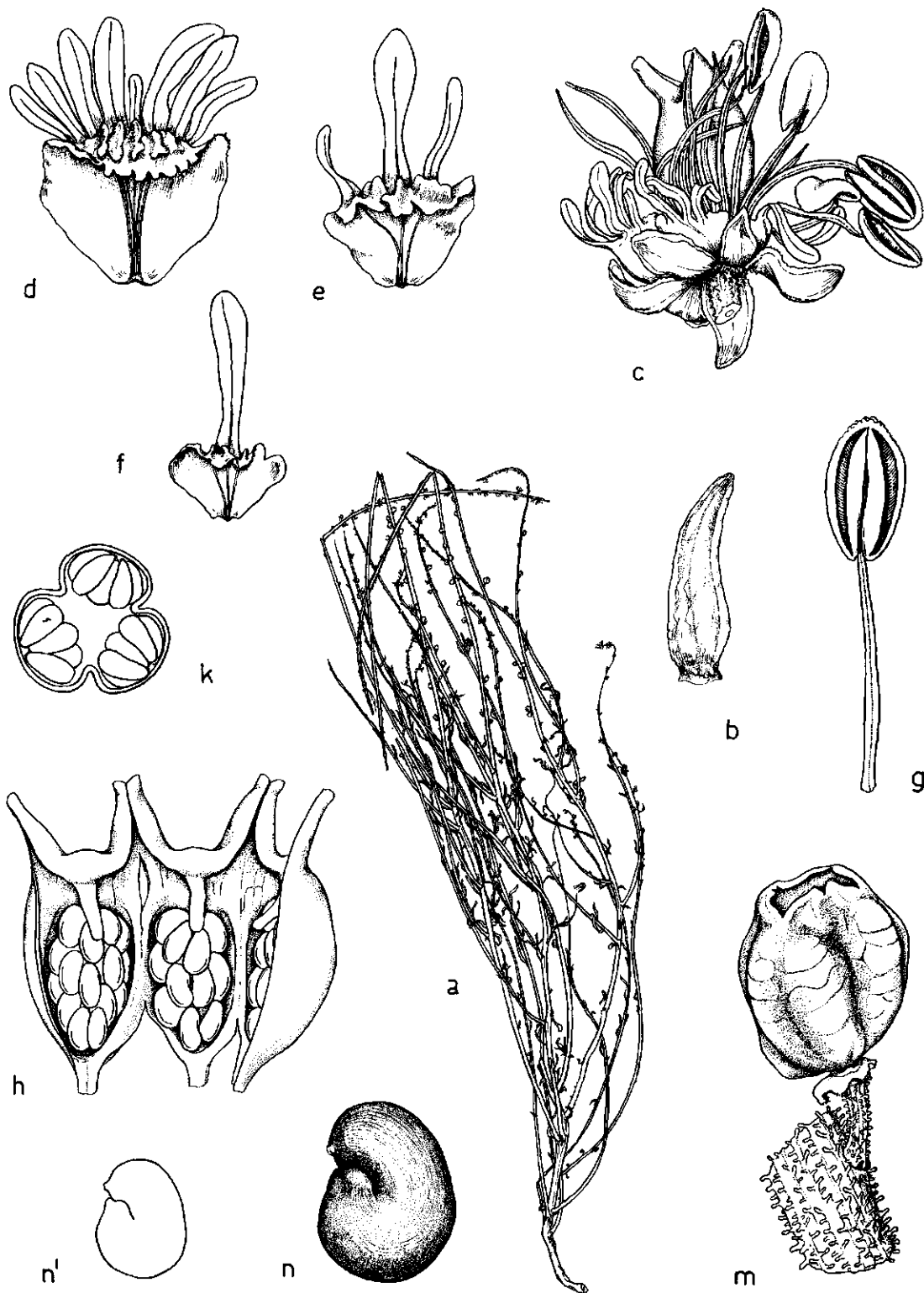


FIG. 61. *Reseda macrobotrys* Boiss. - a: habit; b: bract; c: fl.; d: sup.pet.; e: lat. pet.; f: ant.pet.; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n¹: seeds, shape. - a: $\frac{1}{4} \times$; b, d-k, n: $20 \times$; c, n¹: $15 \times$; m: $5 \times$. - a-k: Bunge s.n., V.1859 (GOET); m, n, n¹: Stapf 114 (WU).

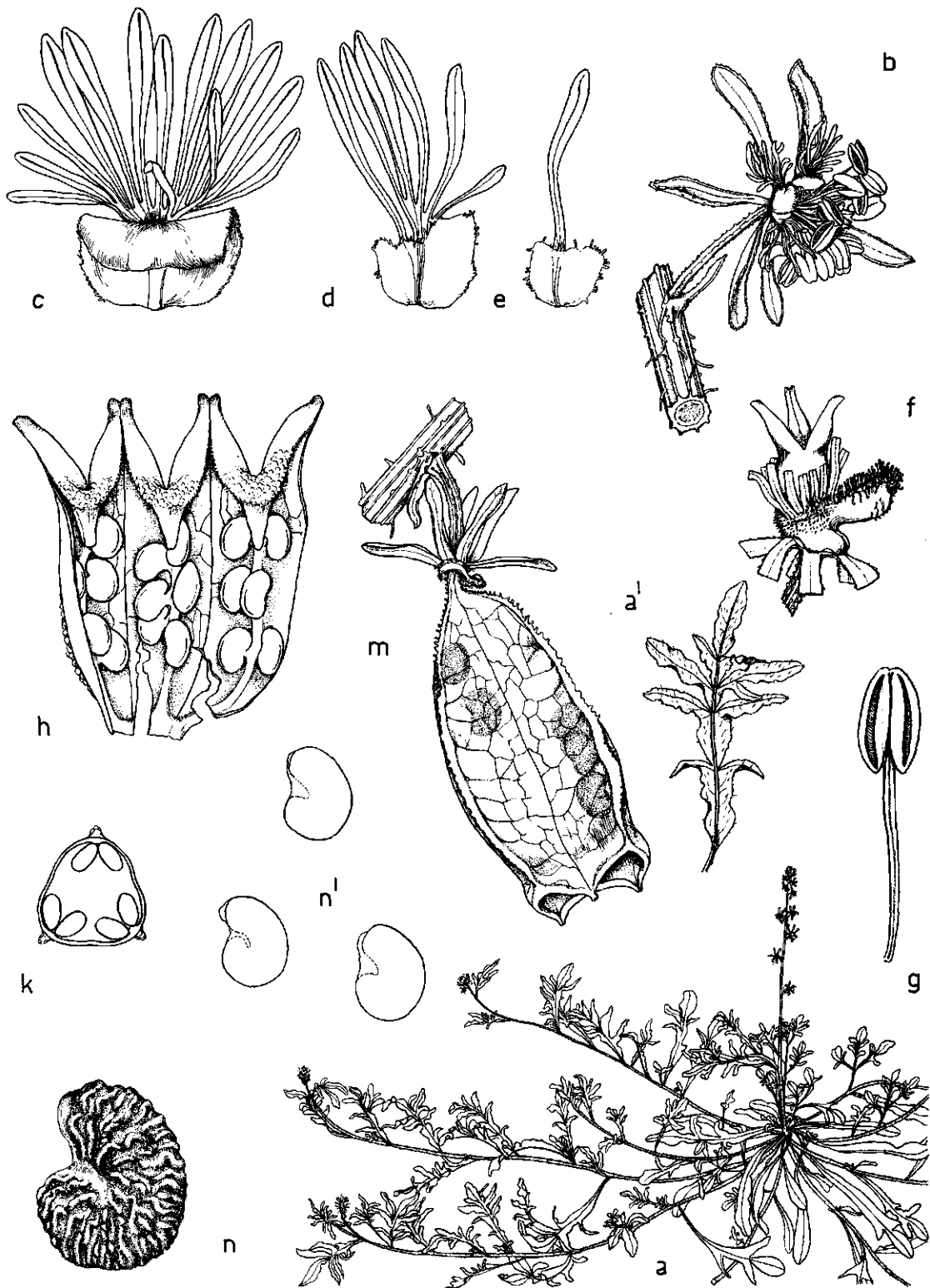


FIG. 62. *Reseda media* Lag. — a: habit; a¹: pinnatisect leaf; b: flower; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: fl.-disc, petals and part of sepals and stamens removed; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n¹: seeds, shape. — a: $\frac{1}{4}\times$; a¹: $1\times$; b: $5\times$; c-e, g, h, k, n: $15\times$; f: $10\times$; m: $3\times$; n¹: $7\frac{1}{2}\times$. — a, a¹, b, f: Culta, 30.VI.1967 (WAG); c-e, g, h, k: O. Buchtten 2574(B)P; m, n, n¹: R. Fernandes et F. Sousa 2627 (COI).

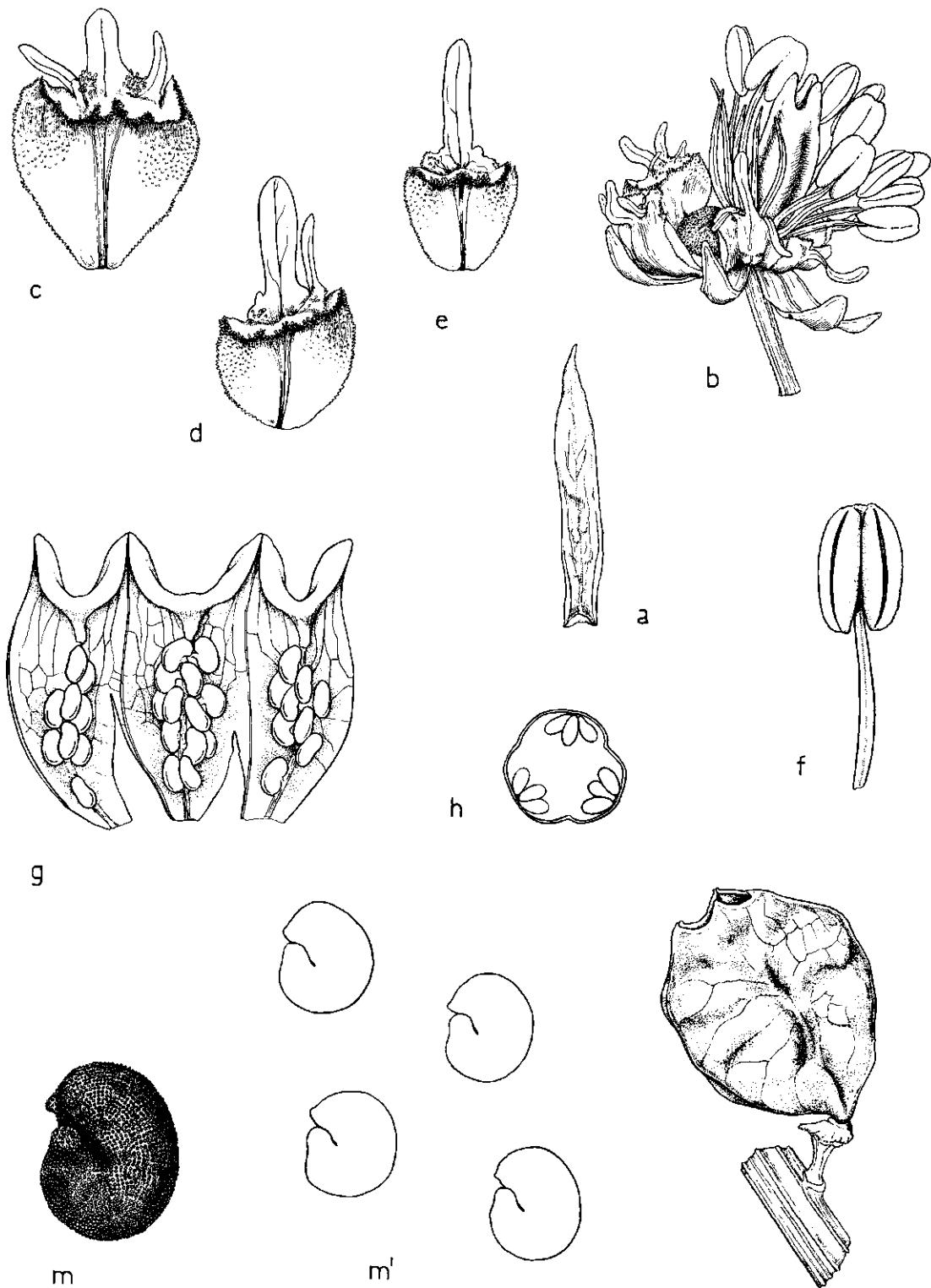


FIG. 63. *Reseda microcarpa* Muell. Arg. - a: bract; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape. - a, b: 10×; c-f, m': 15×; g, h, m: 20×; k: 5×. - a-h: L. Prilipko s.n., 23.V.1934 (WU 3048); k: id. s.n., 14.VIII.1934 (BAK); m, m': ? Yovik s.n., s.d. (WU 545).

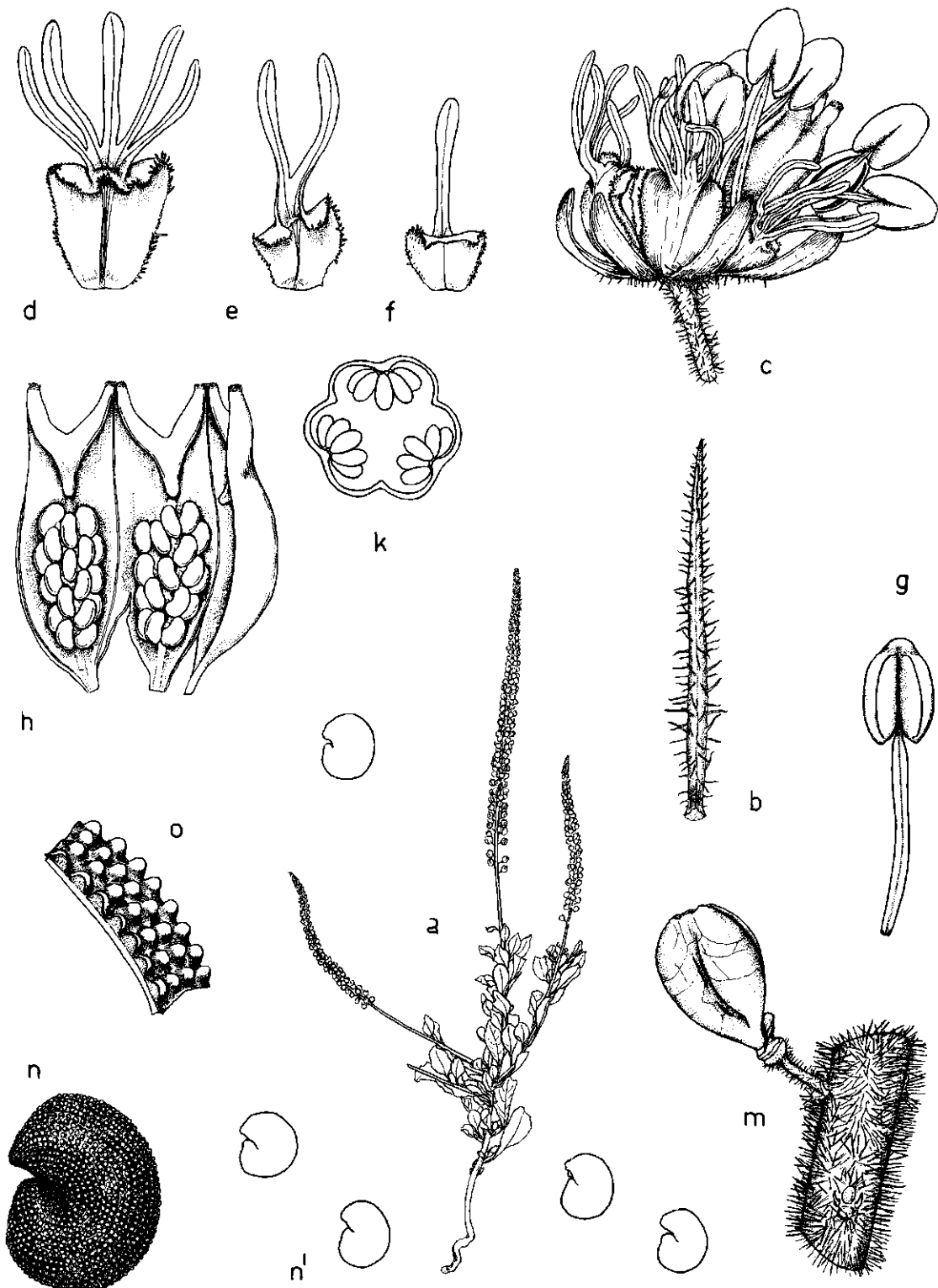


FIG. 64. *Reseda migiurtinorum* Chiov. — a: habit; b: bract; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n': seeds, shape; o: testa, section. — a: $\frac{1}{4}\times$; b: $10\times$; c-g, n': $15\times$; h, k: $20\times$; m: $5\times$; n: $50\times$; o: $190\times$. — a: N. Puccioni et J. Stefanini 644 (708), lectotype (FI); b-m, n': G. Merla, A. Azzaroli et V. Fois s.n., 27.XII.1953 (FI); n, o: N. Puccioni et J. Stefanini 620 (683), paratype (FI).

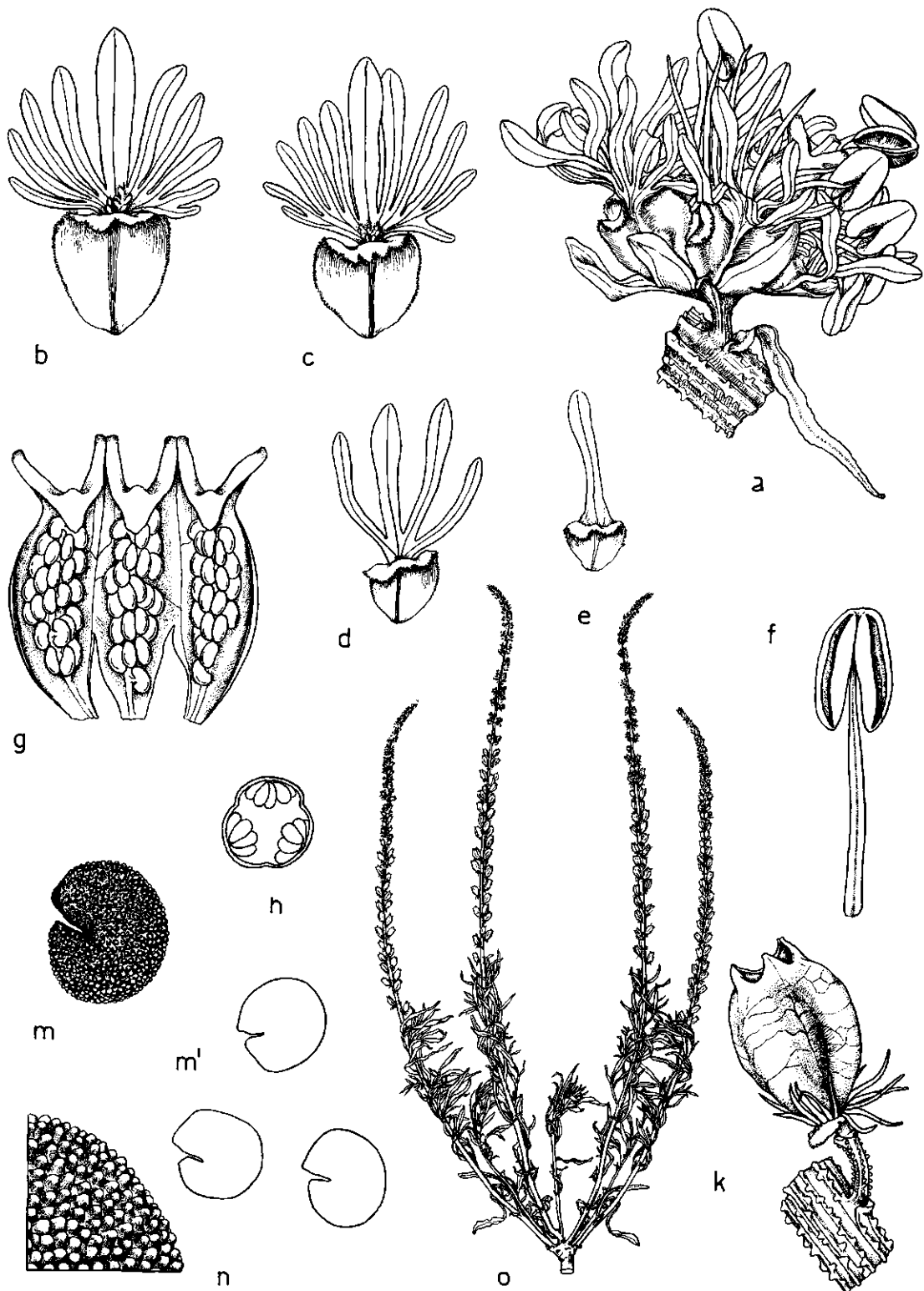


FIG. 65. *Reseda muricata* Presl var. *muricata* — a: fl.; b: sup.pet.; c: lat.pet.; d, e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape; n: seed surface; o: habit. — a-e: 10×; f-h: 15×; k: 5×; m: 30×; m¹: 20×; n: 65×; o: 1/4×. — a-h, o: W. Schimper 103 (L.908.184-1795); k-n, m¹: N. Feinbrun, C. Bernstein et J. Amdursky 245 (WAG).

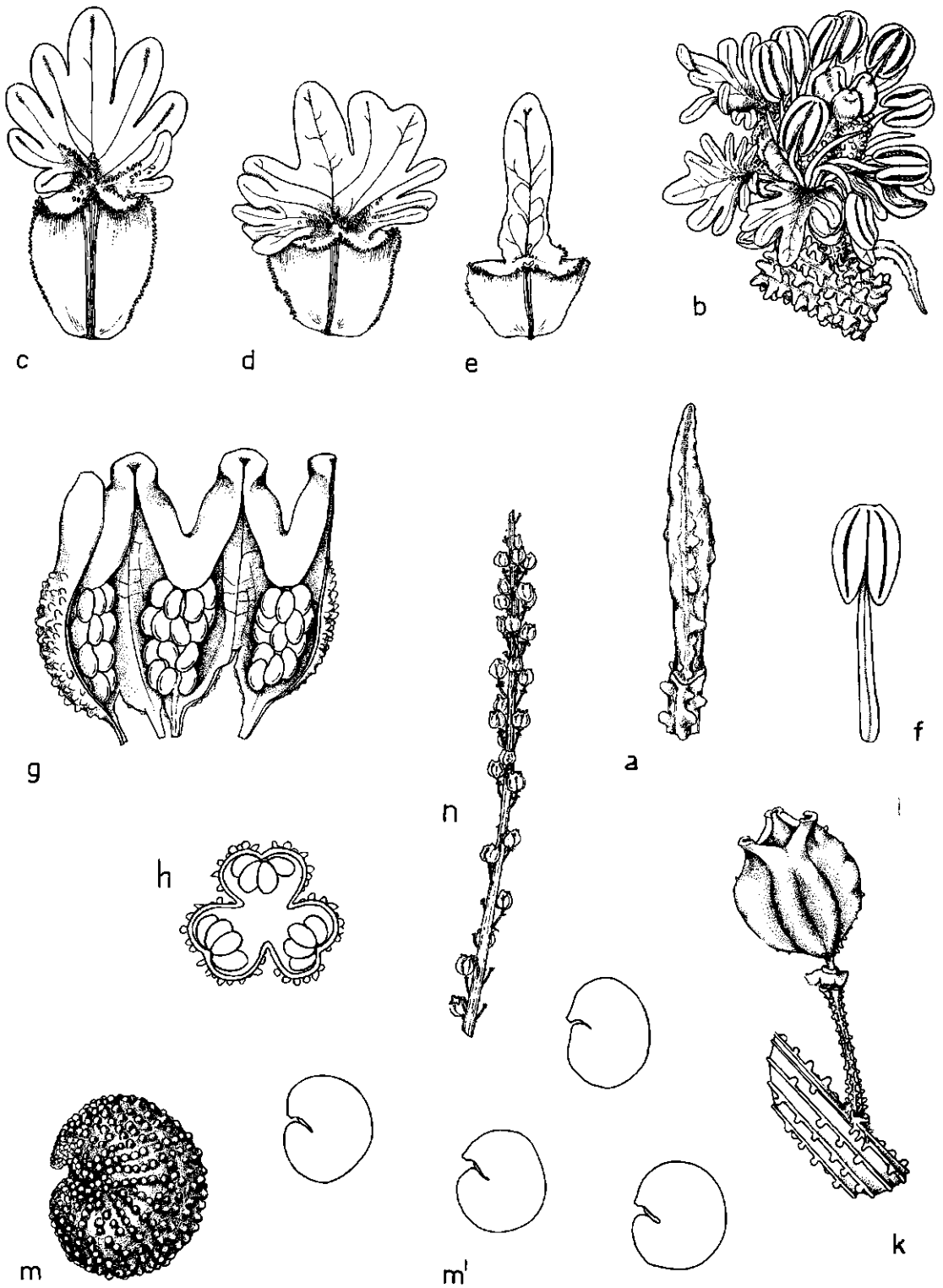


FIG. 66. *Reseda muricata* Presl ssp. *patzakiana* (Rech. f.) Abdallah et De Wit, *nov. comb. et stat.* — a: bract; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape; n: part of infructescence (post mature). — a, g, h, m': 20×; b: 10×; c-e: 20×; f: 15×; k: 5×; m: 35×; n: 1×. — All: K. H. Rechinger 9287, holotype (W 13289).

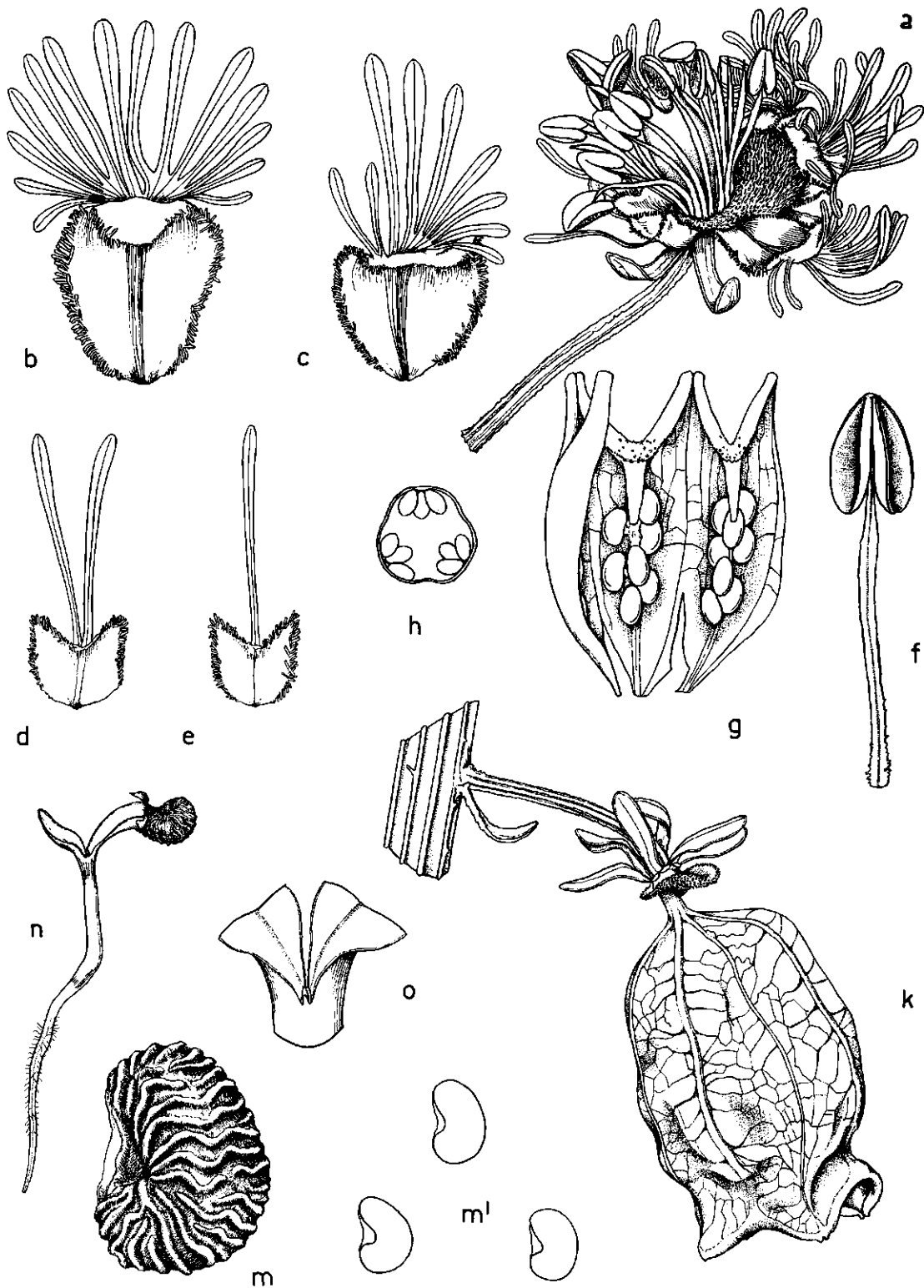


FIG. 67. *Reseda odorata* L. var. *odorata* — a: fl.; b: sup.pet.; c: lat.pet.; d, e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape; n: seedling; o: portion of upper part of seedling, note the stipular gland of the cotyledon. — a: 5×; b-e: 10×; f: 15×; g, h, m: 20×; k, n: 5×; m¹: 7½×; o: 20×. — a-h: P. J. van Breemen s.n., 5.IX.1896 (L 910.283-511); k, m, m¹: P. Tillet s.n., 14.VII.1878 (BRNU 84240); n, o: Culta 2513/67 (WAG).

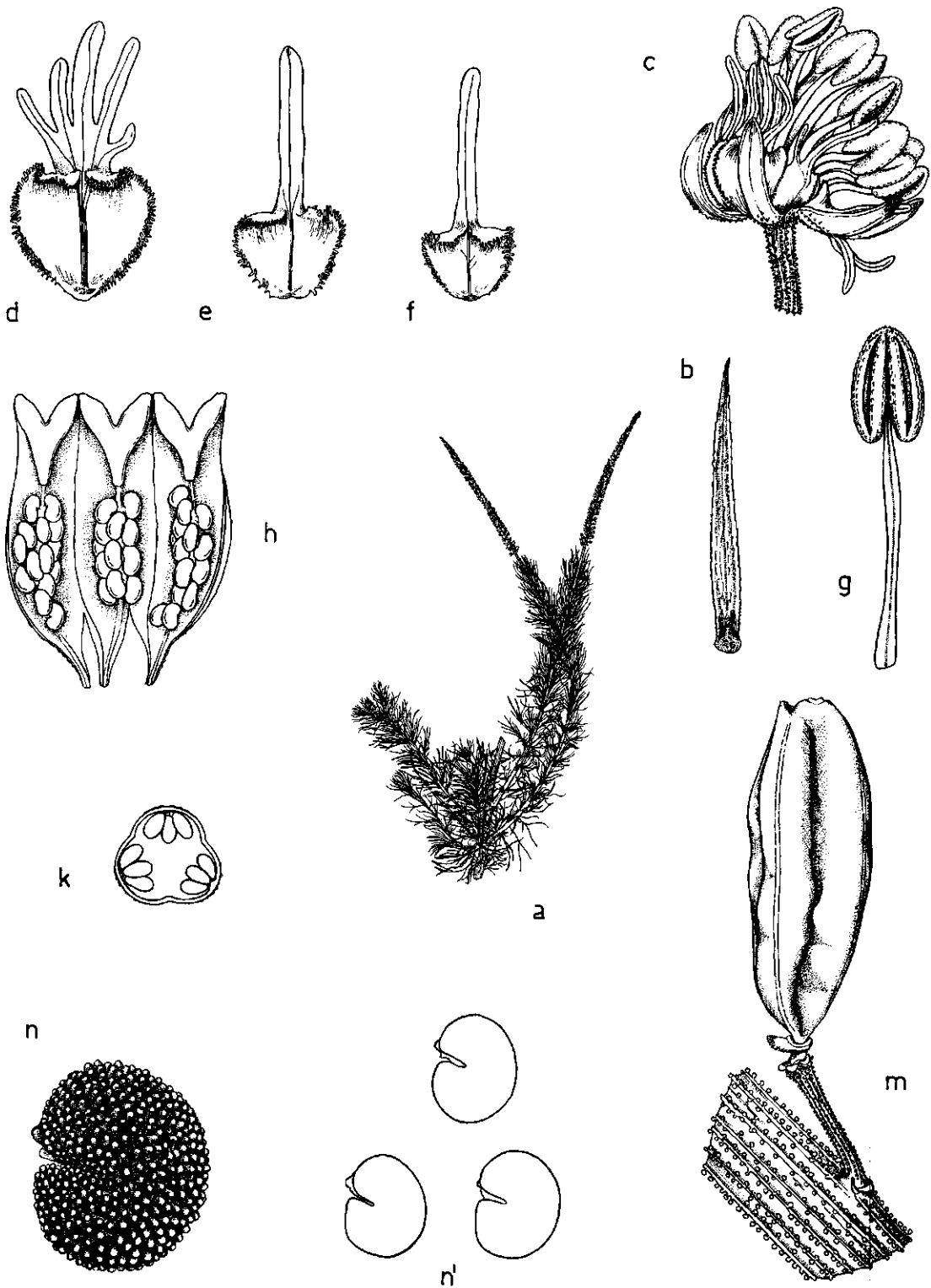


FIG. 68. *Reseda oligomeroides* Schinz - a: habit; b: bract; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n': seeds, shape. - a: $\frac{1}{4} \times$; b, c: $10 \times$; d-k, n': $15 \times$; m: $5 \times$; n: $30 \times$. - a-k: Mrs. White 84 (PRE); m, n, n': C. F. Hemming 2205 (PRE).

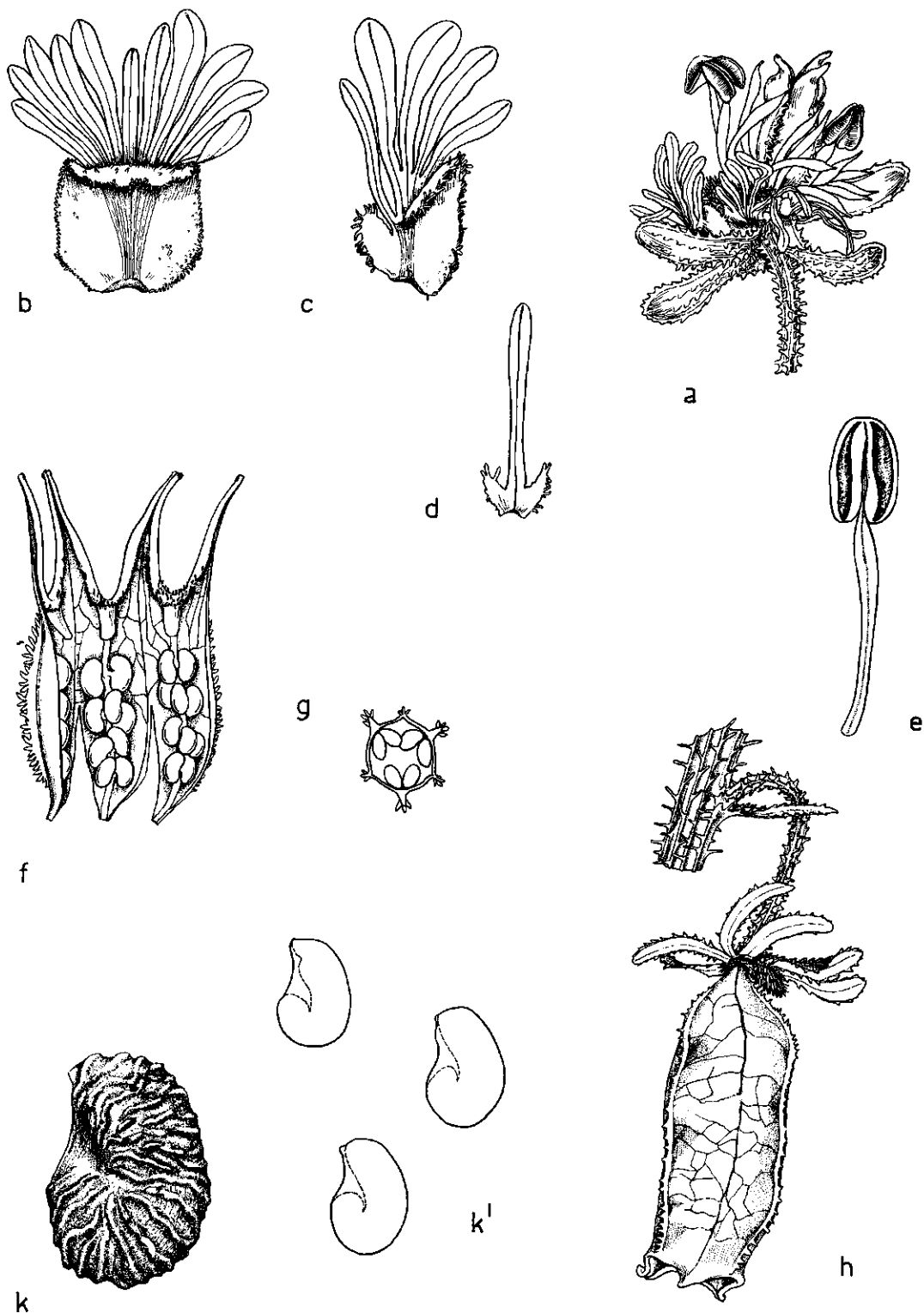


FIG. 69. *Reseda orientalis* (Muell. Arg.) Boiss. — a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape. — a, k¹: 7¹/₂ ×; b–g, k: 15 ×; h: 3 ×. — a–d: E. Boissier s.n., IV.1846, isotype (NY); e, f: id. (UPS); g: J. E. Dinsmore 1331 (L); h: N. Feinbrun, M. Zohary et D. Zoltschansky 56 (CAIM); k, k¹: id. (C).

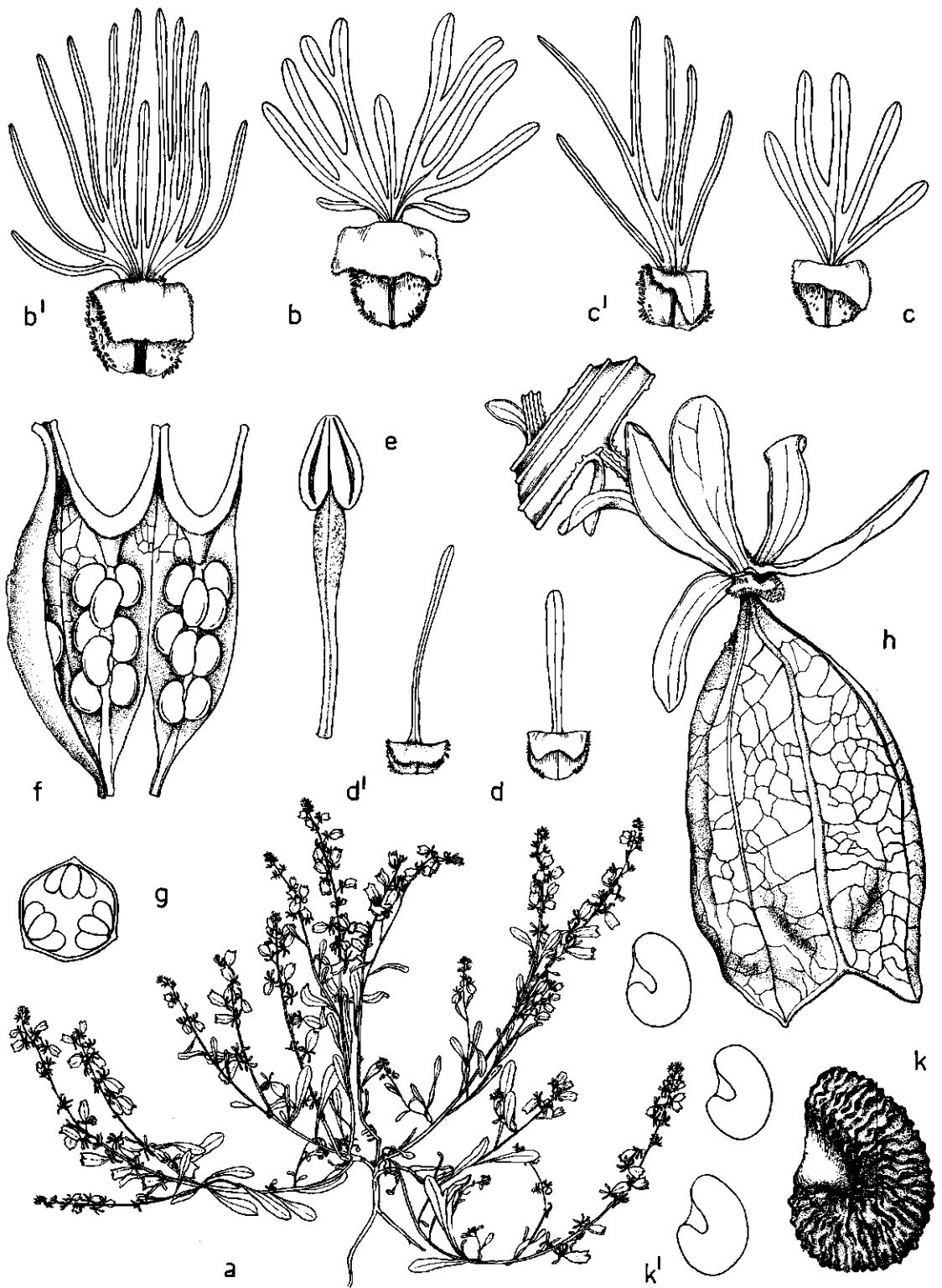


FIG. 70. *Reseda phyteuma* L. ssp. *phyteuma* - a: habit; b, b': sup.pet.; c, c': lat.pet.; d, d': ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k': seeds, shape. - a: $\frac{1}{4}\times$; b-d, b'-d': $10\times$; e-g, k: $15\times$; h: $5\times$; k': $7\frac{1}{2}\times$. - a, h, k, k': E. Korb s.n., 19.VI.1907 (W à 1952-2689); b-g: J. P. Fray 24 (W à 1892-10518); b'-d': Faure s.n., 13.V.1909 (DR).

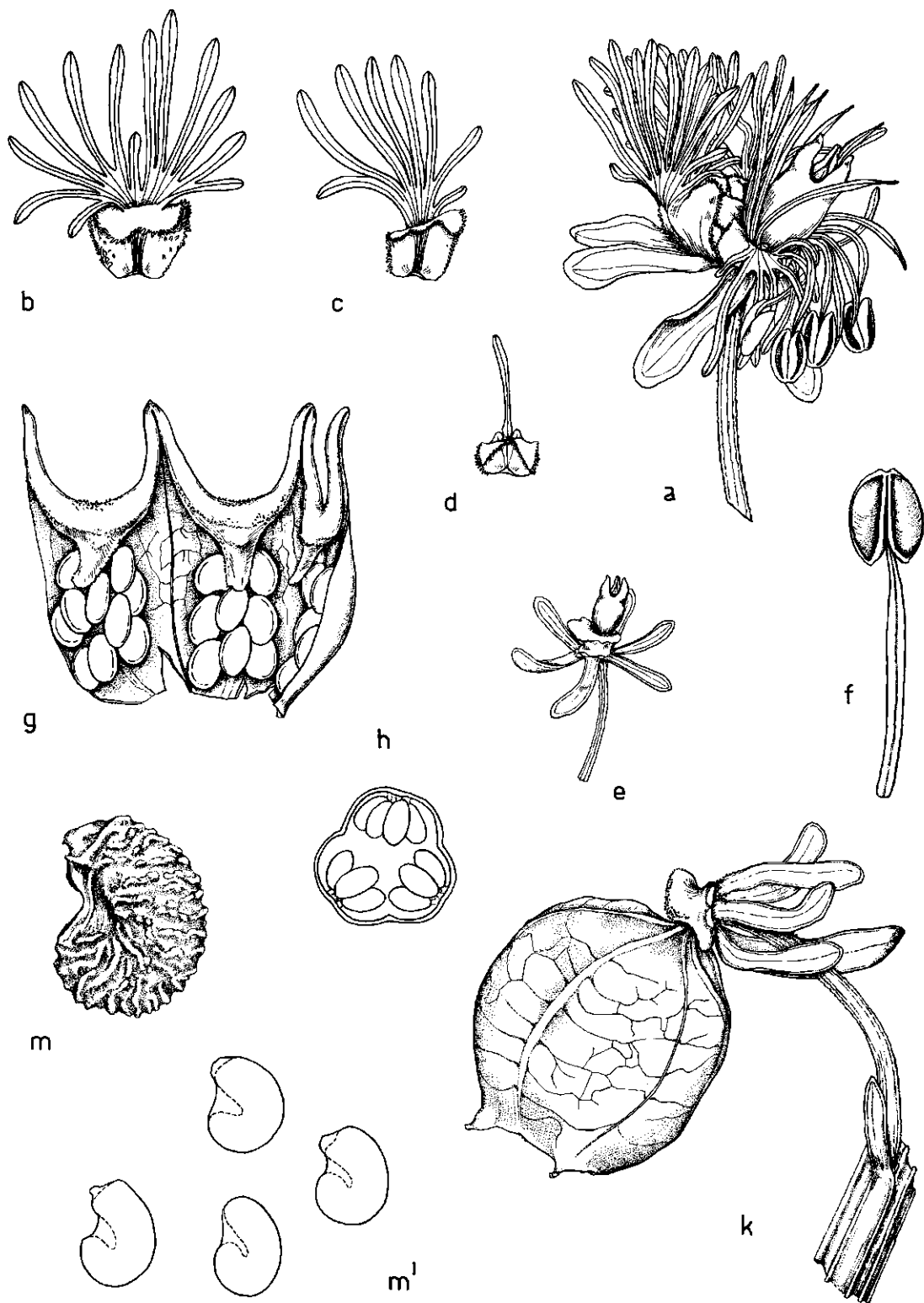


FIG. 71. *Reseda phyteuma* L. ssp. *collina* (J. Gay) Dur. et Schinz – a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: fl.-disc; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape. – a-d: 10×; e, k: 5×; f, m: 15×; g, h: 20×; m¹: 7¹/₂×. – All. B. Balansa 202 (W à 1889–99380).

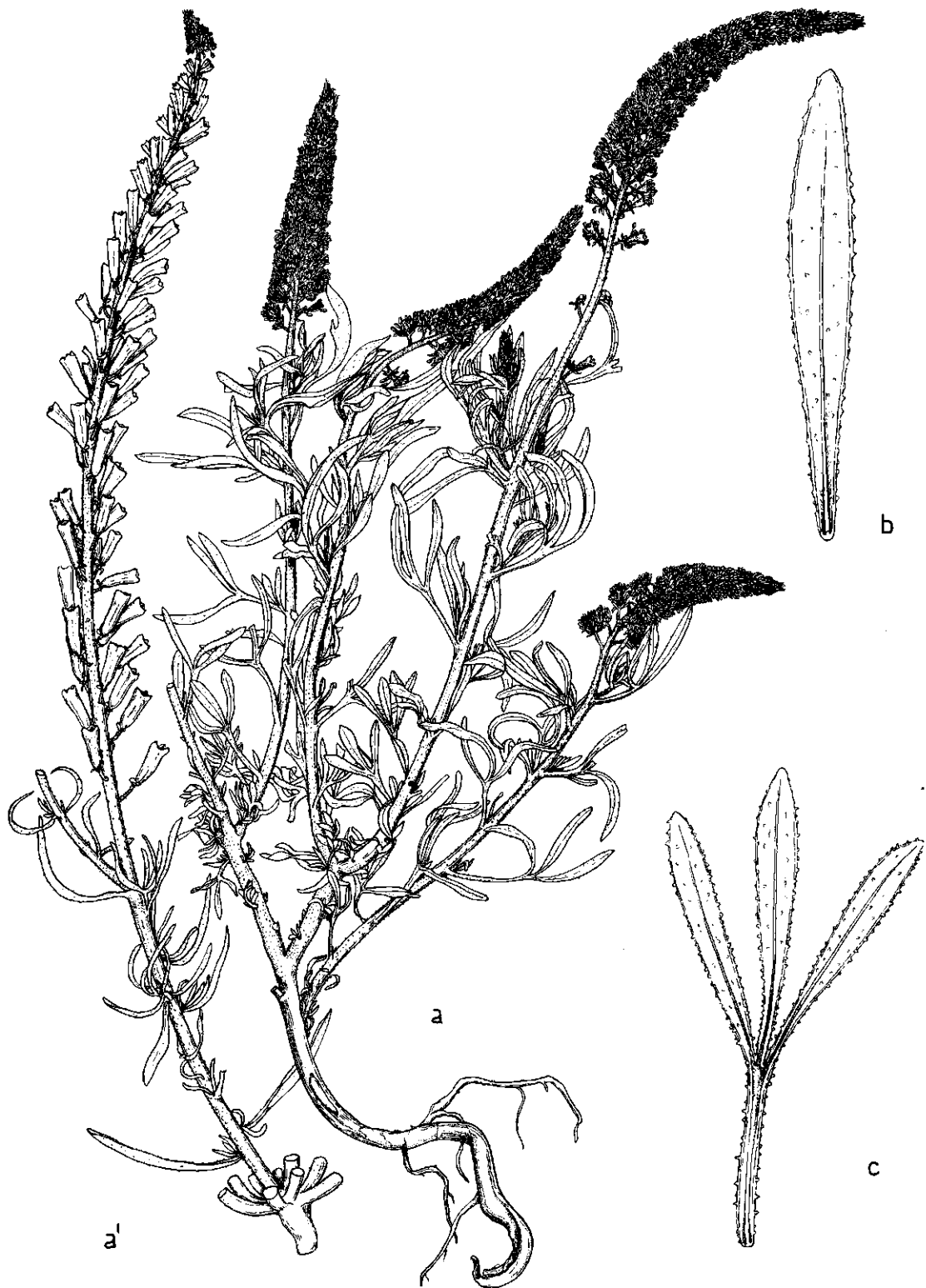


FIG. 72. *Reseda pruinosa* Del. var. *pruinosa* - a, a': habit; b, c: leaves. - a, a': 1×; b-c: 2½×. - a, c: J. R. Shabetai Z3537 (CAIM); a', b: id. Z5839 (CAIM).

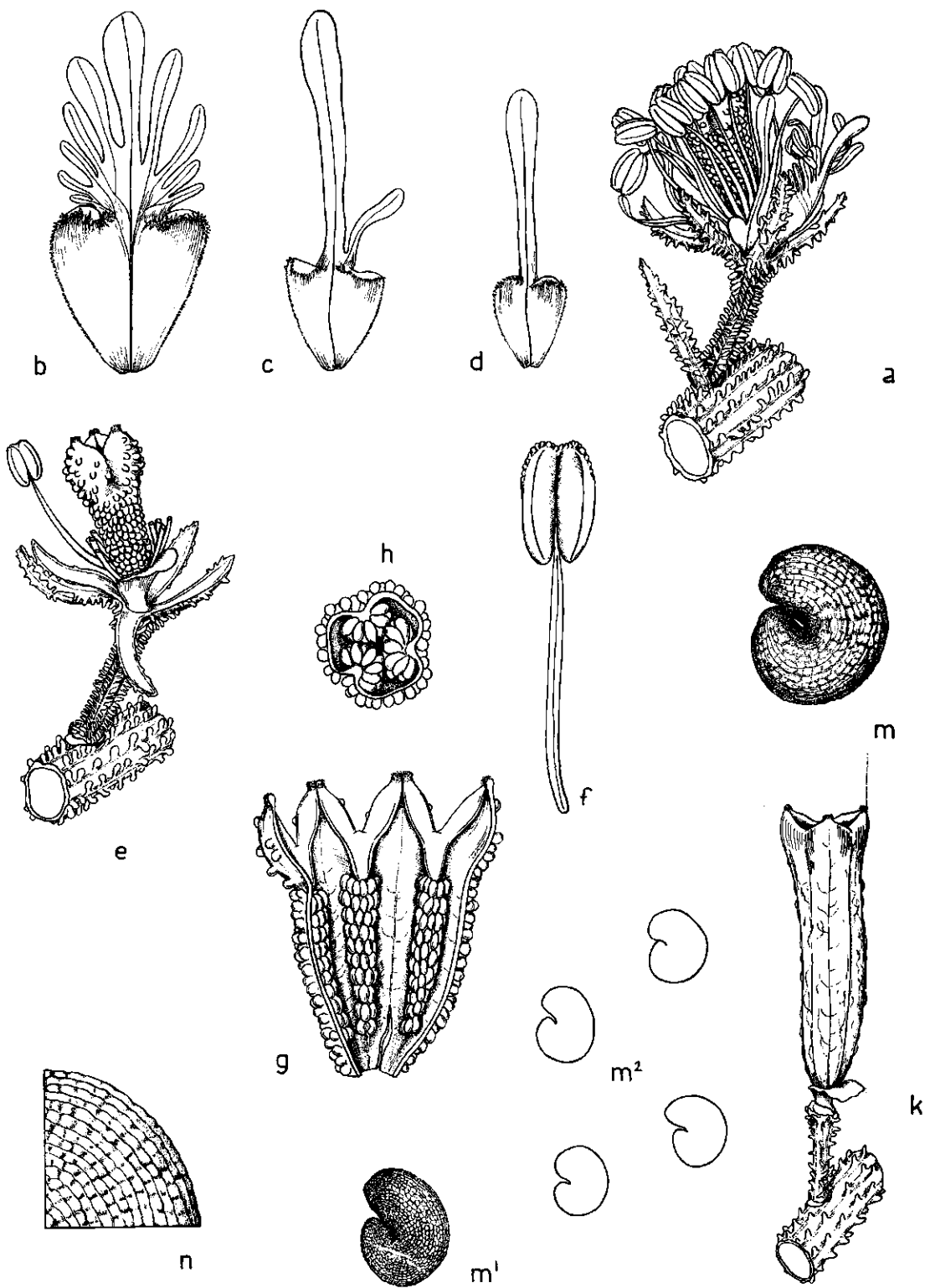


FIG. 73. *Reseda pruinoso* Del. var. *pruinoso* – a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: ovary and disc, petals and partly stamens removed; f: stamen; g: ovary; h: same, c.-s.; k: capsule; m, m¹: seeds; m²: seeds, shape; n: seed surface. – a, e: 7½×; b–d, f–h, m²: 15×; k: 5×; m: 30×; m¹: 20×; n: 65×. – a–h: J. R. Shabetai Z3537 (CAIM); k: id. Z5839 (CAIM); m–m², n: R. Muschler 266 (PRC).

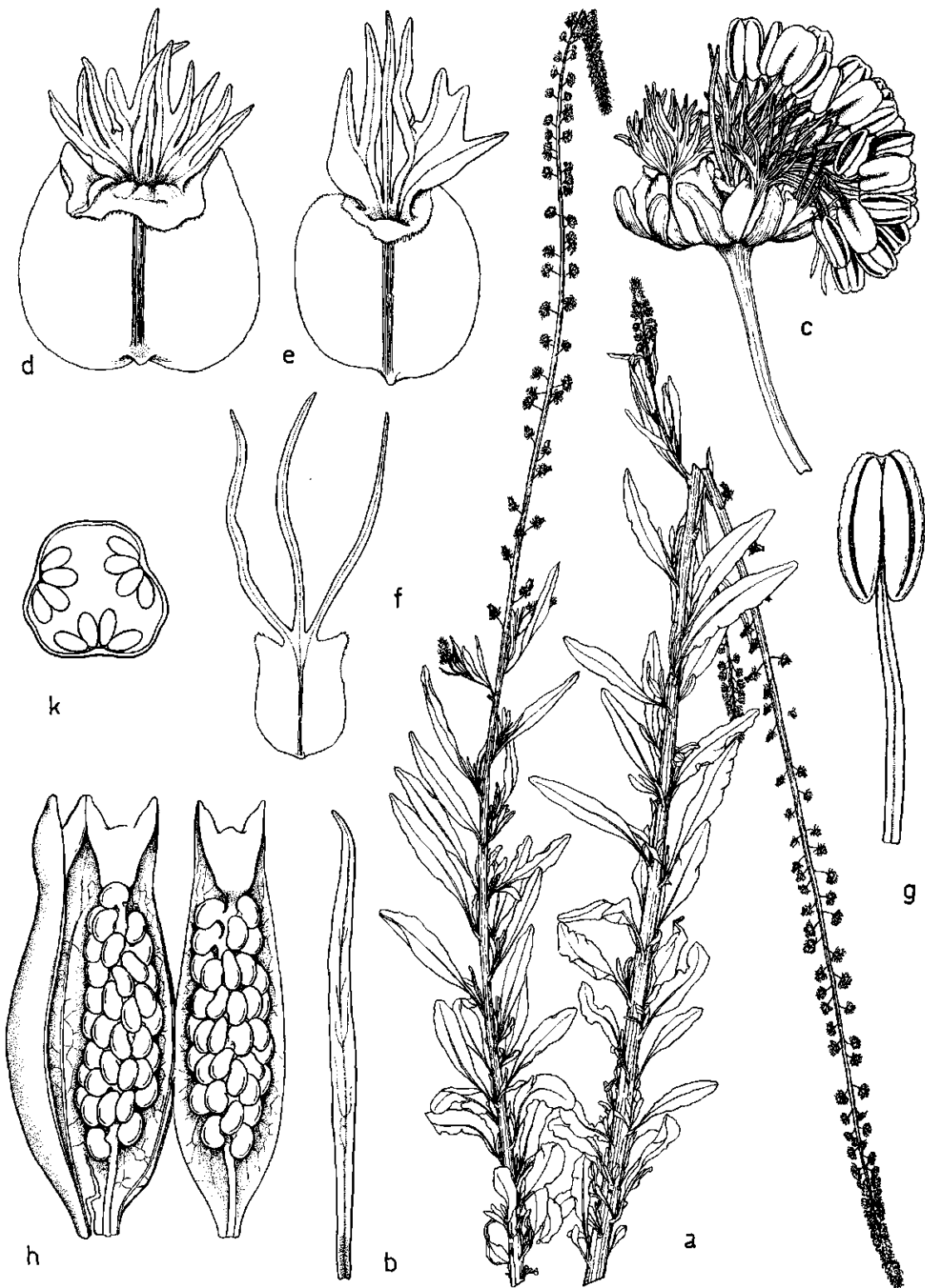


FIG. 74. *Reseda sa'adae* Abdallah et De Wit, *nov. sp.* - a: habit; b: bract; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); k, same. c.-s. - a: $\frac{1}{4}\times$; b, c: $7\frac{1}{2}\times$; d-g: $15\times$; h, k: $12\frac{1}{2}\times$. - All: P. Sintenis 759 (LD, holotype).

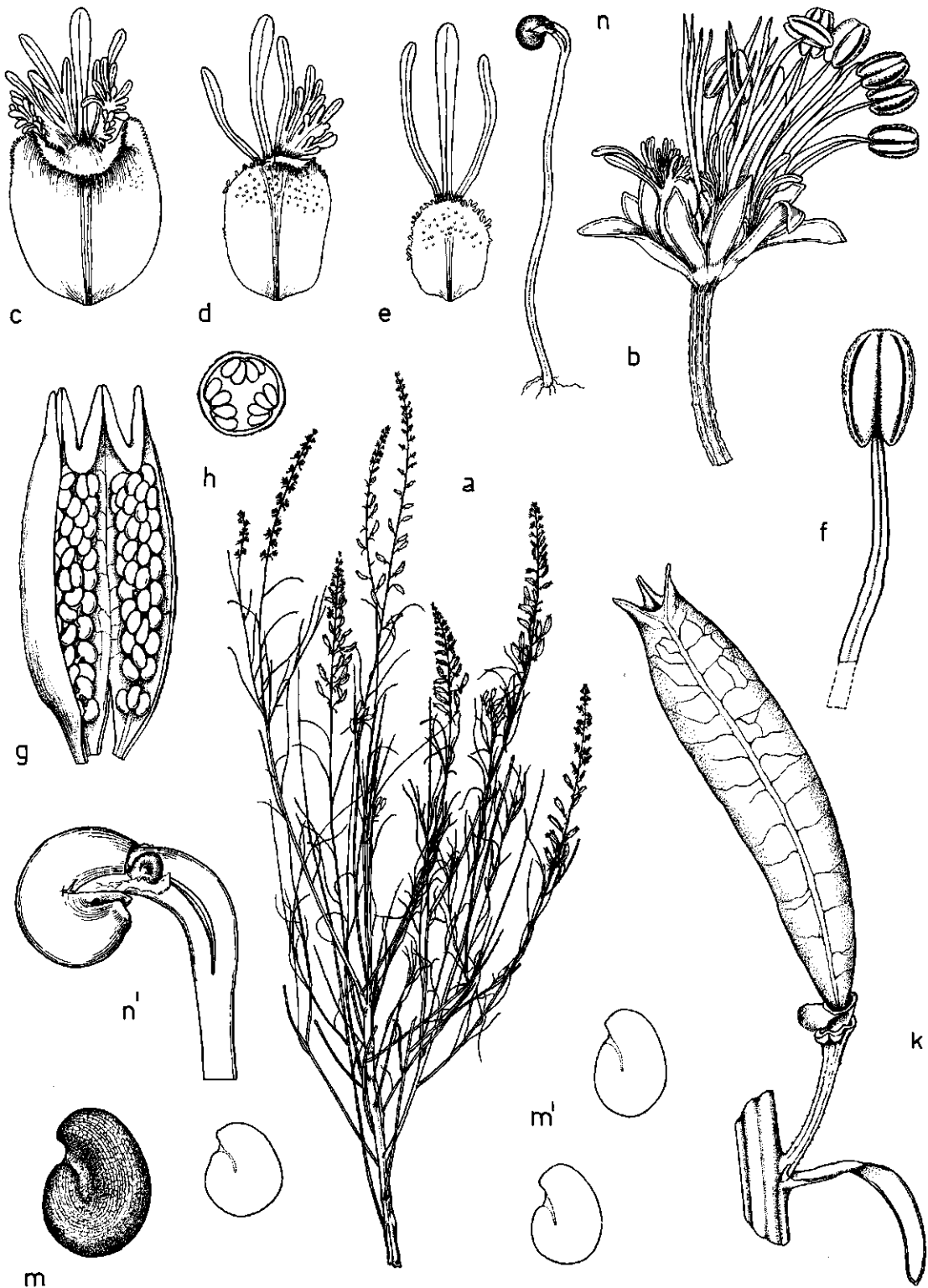


FIG. 75. *Reseda scoparia* Brouss. ex Willd. - a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape; n: seedling just before release of cotyledons; n': same, an enlarged portion. - a: $\frac{1}{4} \times$; b: $7\frac{1}{2} \times$; c-h, m': $15 \times$; k, n: $5 \times$; m: $20 \times$; n': $20 \times$. - a: E. Bourgeau 1251 (W 317846, 109997); b-h: E. Asplund 425 (UPS); k, m, m': E. Bourgeau 1251 (W); n, n': Culta (WAG).

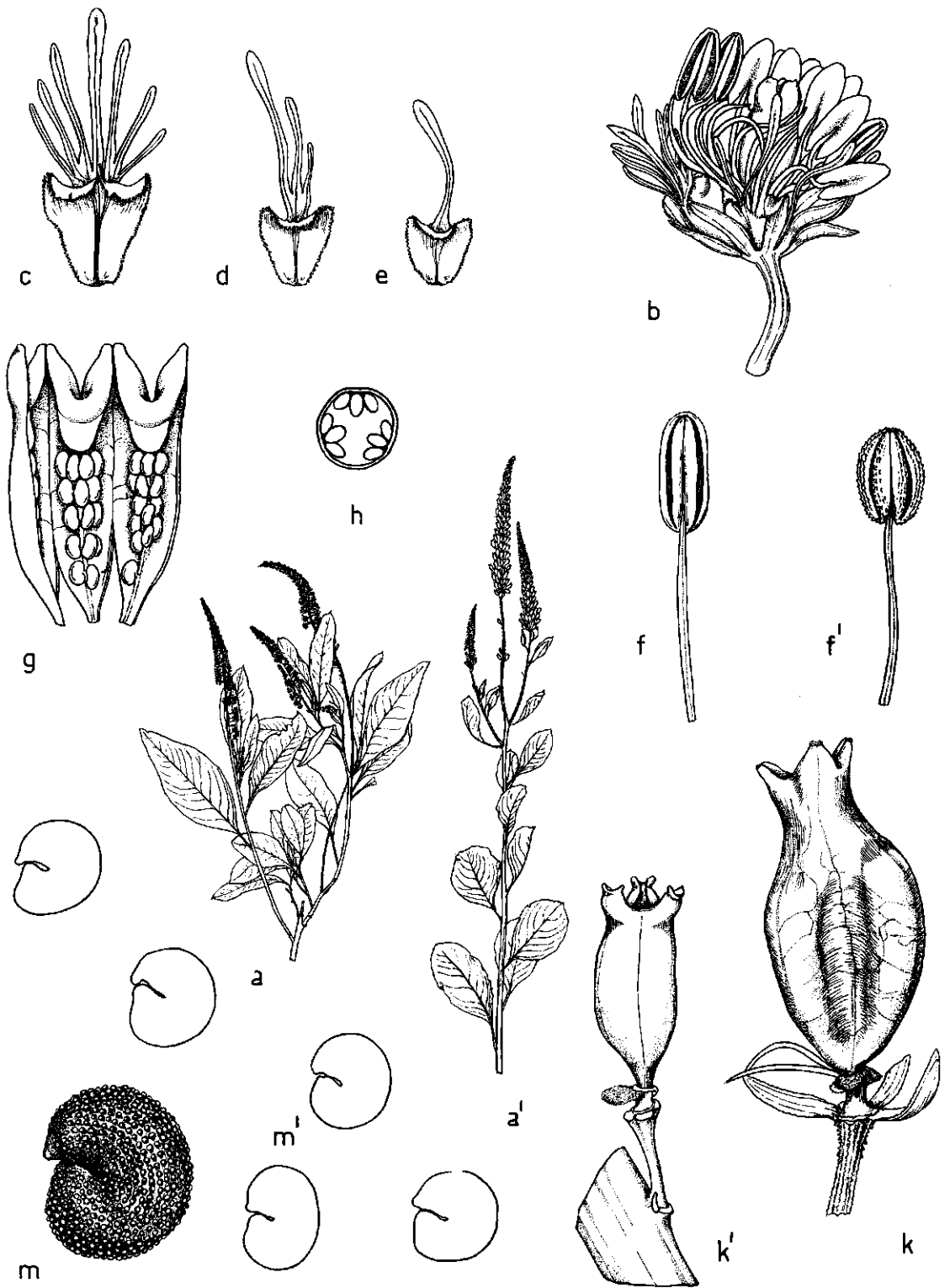


FIG. 76. *Reseda sphenocleoides* Defl. - a, a¹: flowering specimens; b: fl.; c: sup. pet.; d: lat.pet.; e: ant.pet.; f, f¹: stamens; g: ovary (opened); h: same, c.-s.; k, k¹: capsules; m: seed; m¹: seeds, shape. - a, a¹: 1/4 ×; b: 10 ×; c-f, f¹: 15 ×; g, h, m¹: 20 ×; k, k¹: 7 1/2 ×; m: 35 ×. - a, b, f: M. Defflers 530, type (K); a¹, c-e, f¹, g, h, k¹, m, m¹: St. Paulay s.n., 7-8.III.1899 (WU 2992); k: C. F. Hemming 530 (K);

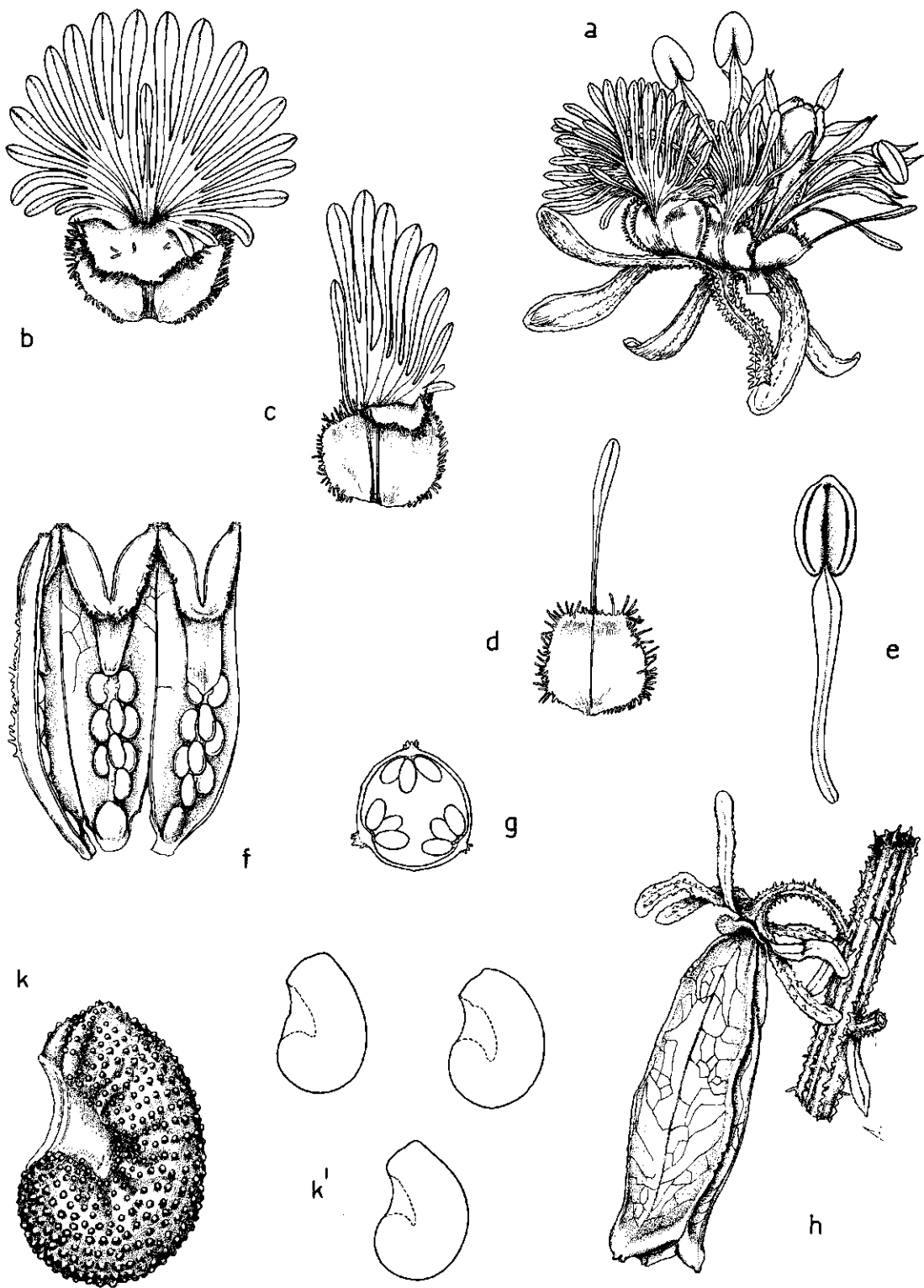


FIG. 77. *Reseda stenobotrys* Maire et Samuelsson - a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k': seeds, shape. - a: 10×; b-e, k': 15×; f, g: 20×; h: 5×; k: 30×. - All: R. Maire et M. Weiller 148 (RAB 14480).

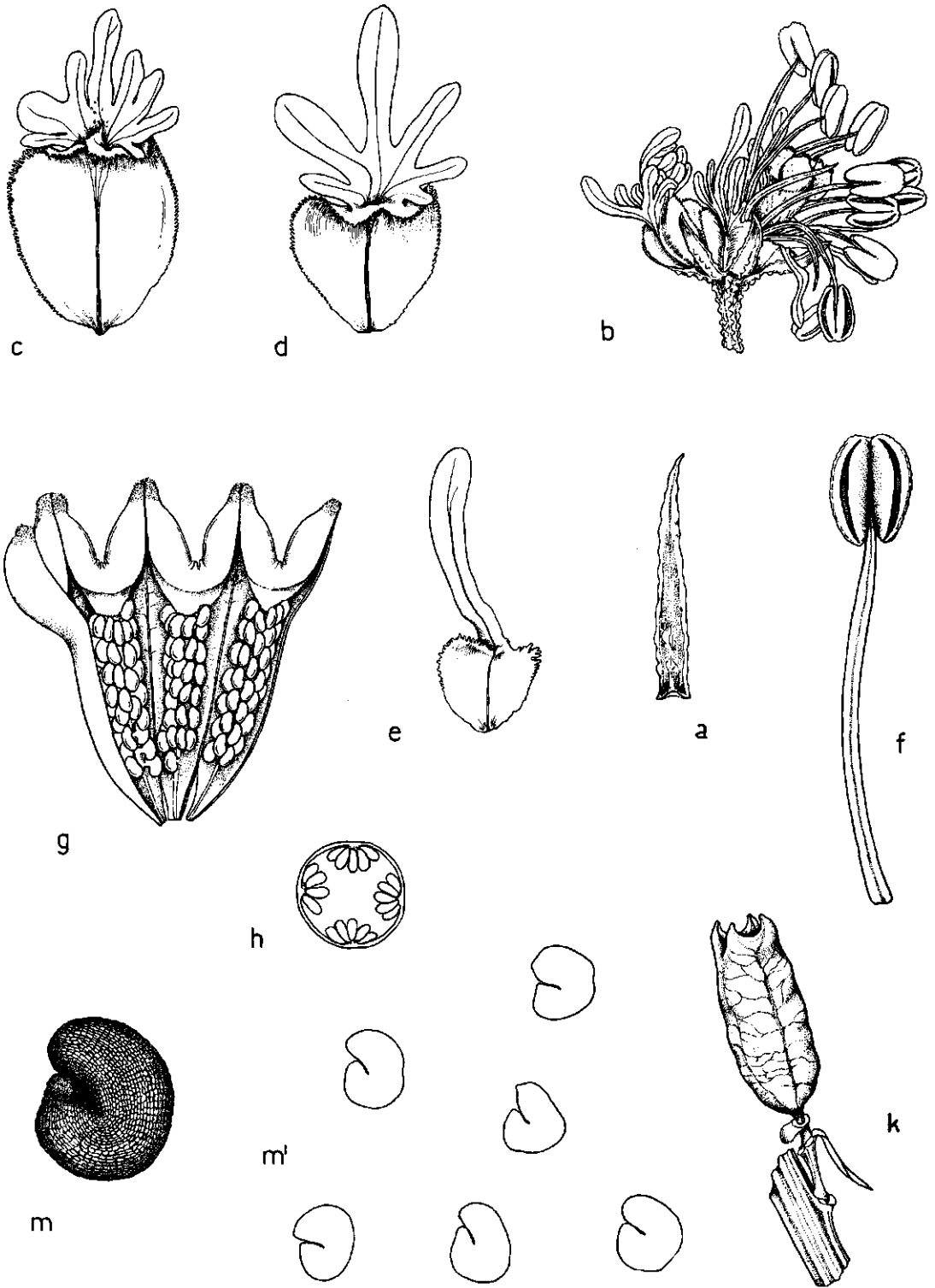


FIG. 78. *Reseda stenostachya* Boiss. var. *stenostachya* – a: bract; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape. – a, c-f, m¹: 15×; b: 7¹/₂×; g, h: 15×; k: 5×; m: 30×. – a-h: M. Evenari et A. Grizi 634 (L 959.278–038); k, m, m¹: id. (PRC).

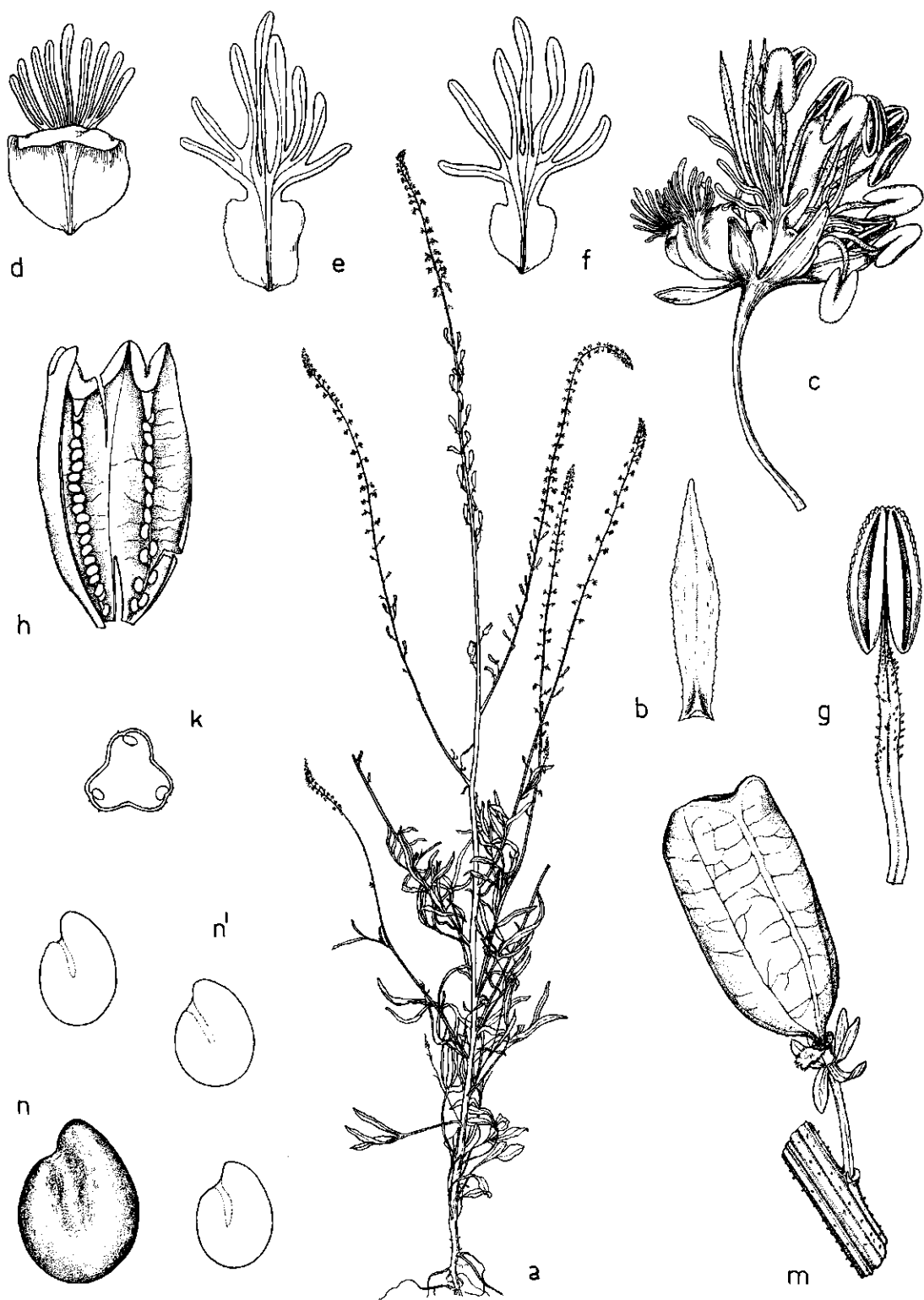


FIG. 79. *Reseda stricta* Pers. var. *stricta* — a: habit; b: bract; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); k: same, c.-s.; m: capsule; n: seed; n¹: seeds, shape. — a: $\frac{1}{4} \times$; b, d-f, h, k, n¹: $15 \times$; c: $10 \times$; g, n: $20 \times$; m: $5 \times$. — a-k: M. Winkler s.n., 12.VI.1876 (WRSL); m, n, n¹: F. Loscos 16 (WRSL).

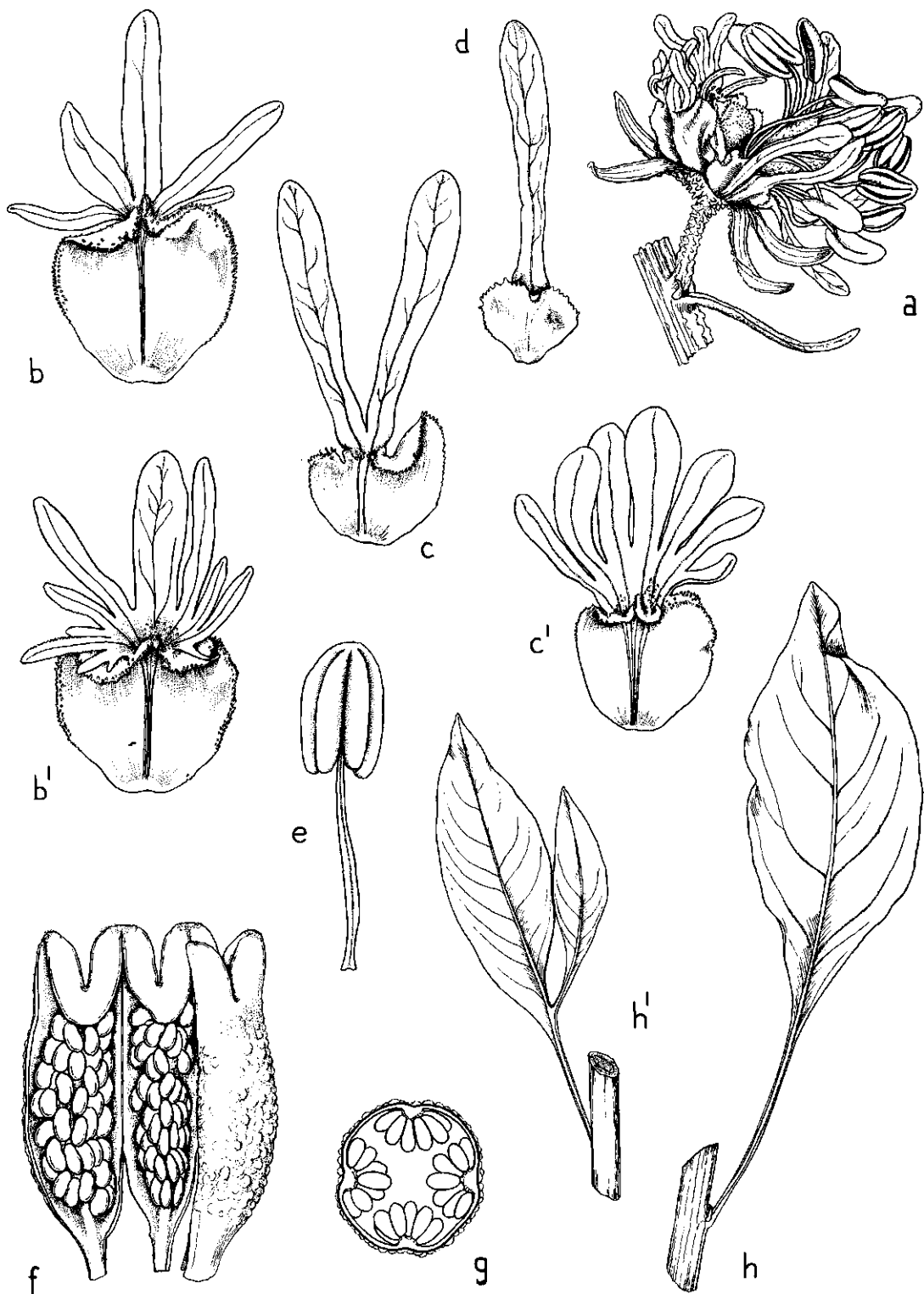


FIG. 80. *Reseda tefedestica* (Maire) Abdallah et De Wit, nov. comb. et stat. — a: fl.; b, b': sup.pet.; c, c': lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h, h': leaves. — a: $7\frac{1}{2}\times$; b-e, b', c': $15\times$; f, g: $20\times$; h, h': $1\frac{1}{2}\times$. — All: R. Maire 193, type '*Reseda pruinosa* Del. ssp. *tefedestica* Maire' (BRNU 187626).

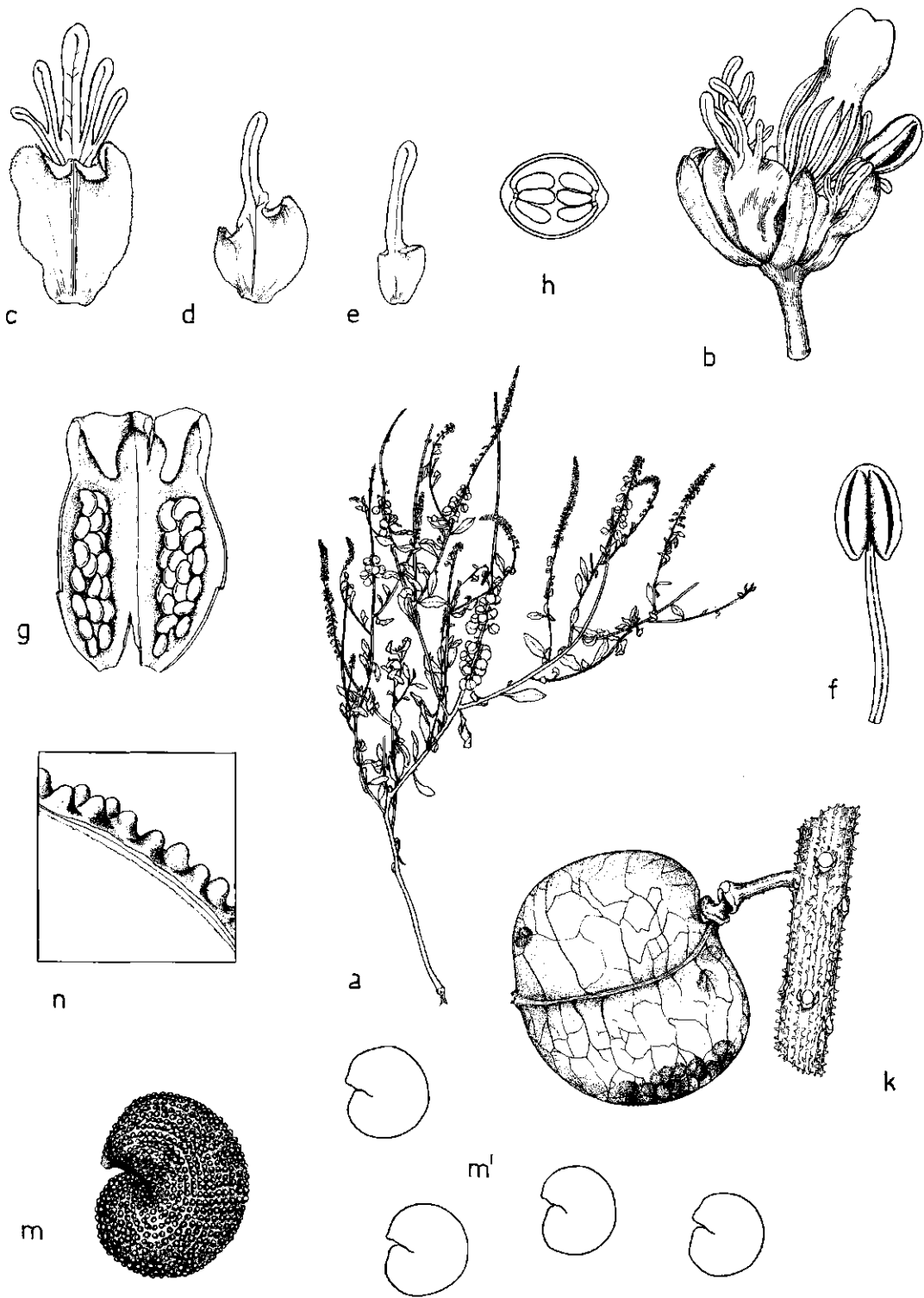


FIG. 81. *Reseda telephifolia* (Chiov.) Abdallah et De Wit, *nov. comb. et stat.* — a: flowering specimen; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape; n: testa, section. — a: $\frac{1}{4} \times$; b: $10 \times$; c-f, m¹: $15 \times$; g, h: $20 \times$; k: $5 \times$; m: $30 \times$; n: $120 \times$. — All: G. Merla, A. Azzaroli et V. Fois s.n., III.1954, type 'Stefaninia telephifolia Chiov.' (FI).

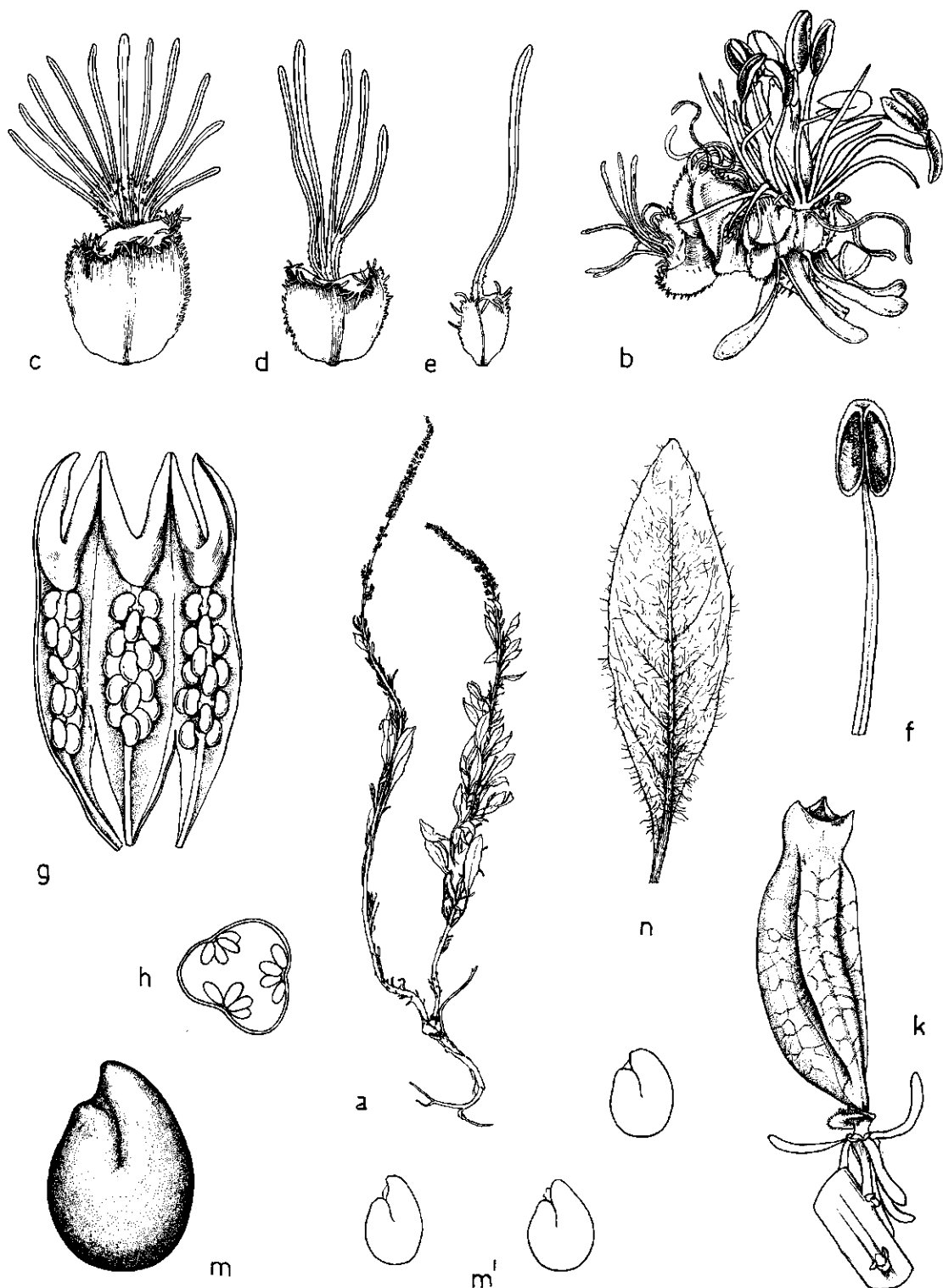


FIG. 82. *Reseda tomentosa* Boiss. - a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant. pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape; n: leaf. - a, f-h, n: Coquebert de Montbret 2215 (W 317844); b-e: id. (W 317843); k, m, m': P. Sintenis 2953, holotype var. *glabrata* Abdallah et De Wit, nov. var. (LD). - a-h, n: var. *tomentosa*; k, m, m': var. *glabrata* Abdallah et De Wit, nov. var.

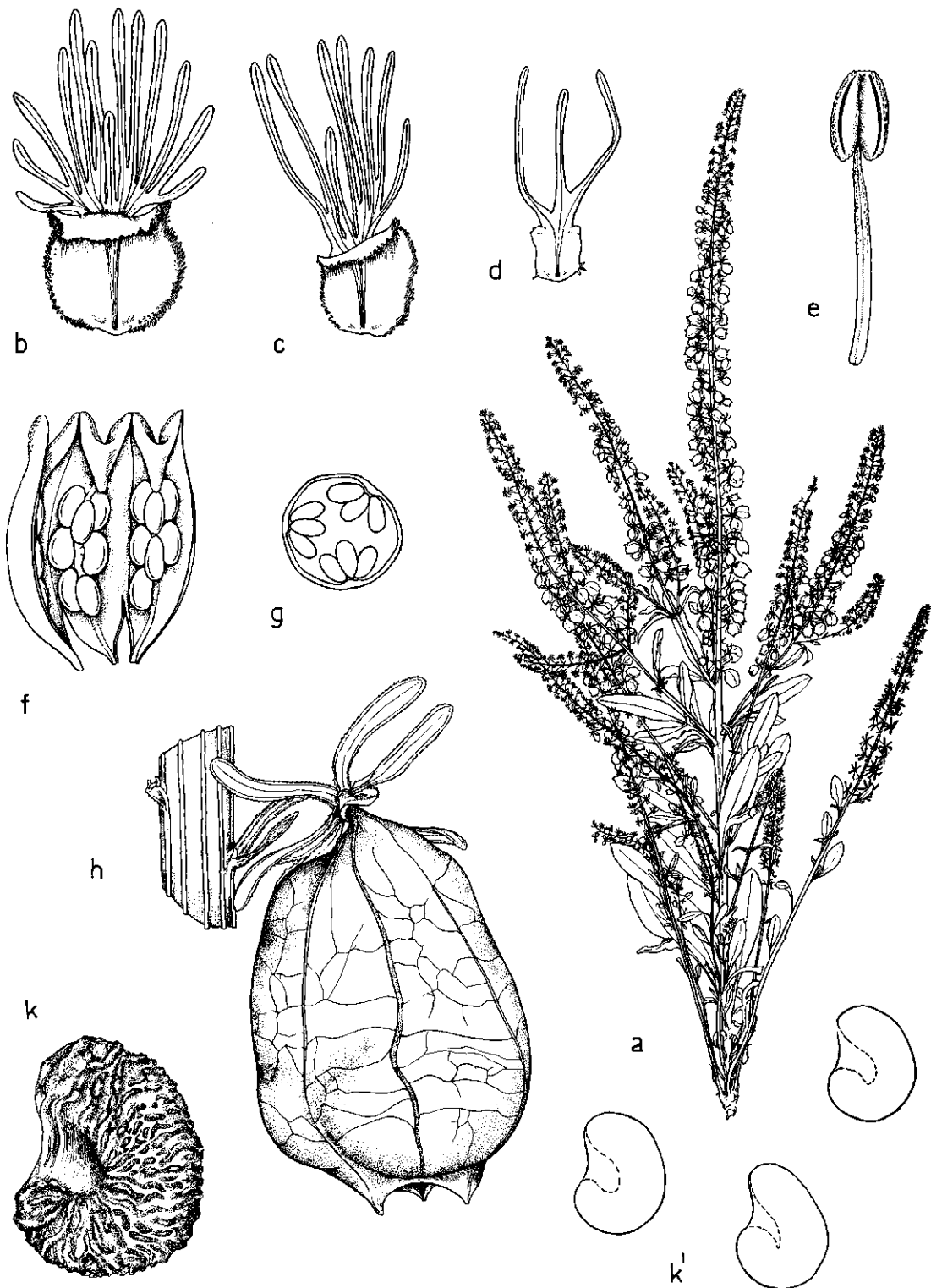


FIG. 83. *Reseda tymphaea* Hausskn. ssp. *tymphaea* — a: habit; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape. — a: $\frac{1}{4}\times$; b-e, k: $15\times$; f, g: $20\times$; h: $5\times$; k¹: $7\frac{1}{2}\times$. — a: K. H. Rechinger 23227 (W 13335); b-k, k¹: C. Haussknecht s.n., 17.VII.1885, isotype (W 304).

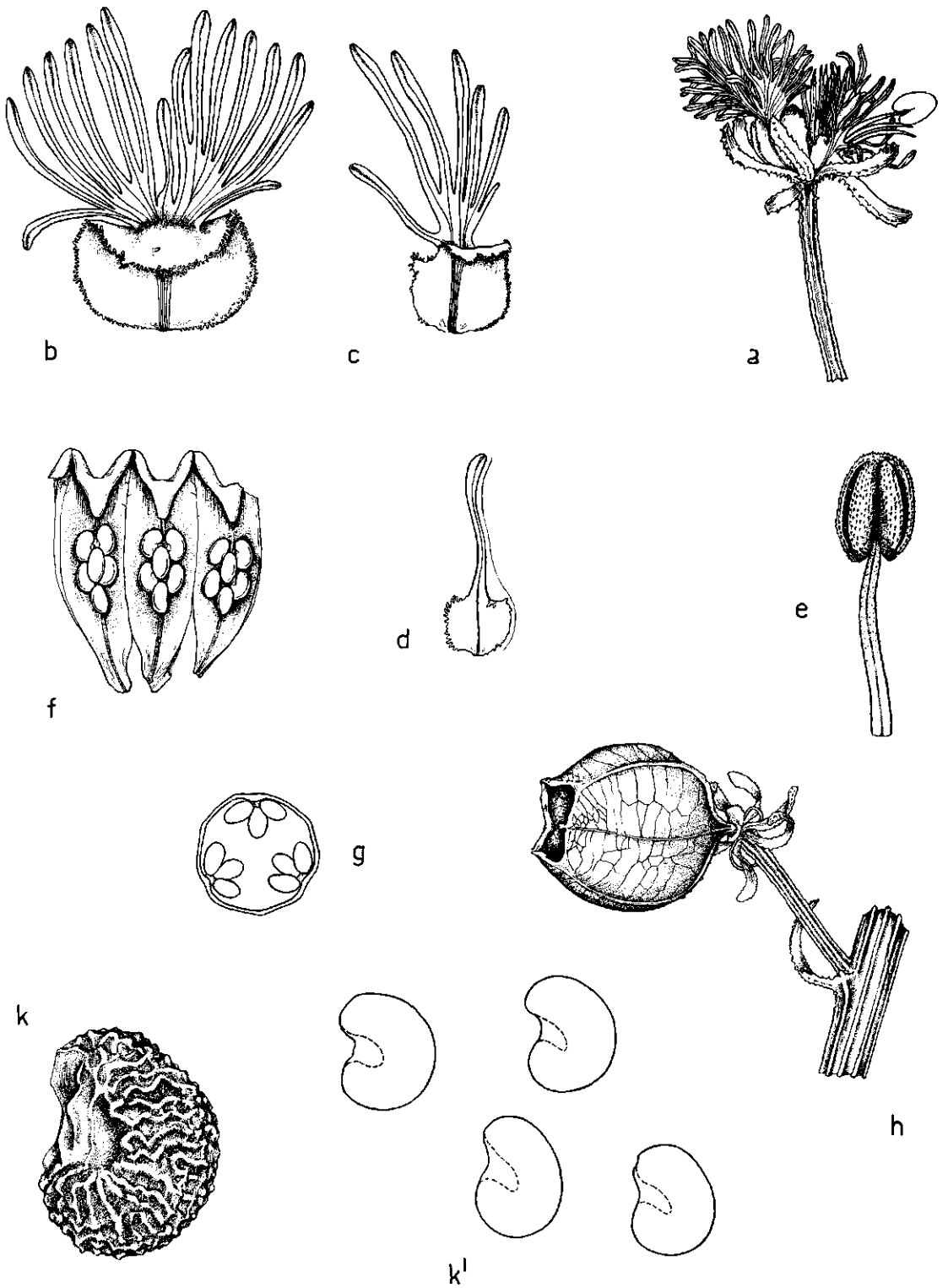


FIG. 84. *Reseda tymphaea* Hausskn. ssp. *anatolica* (Boiss.) Abdallah et De Wit, nov. comb. et stat. — a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k': seeds, shape. — a, k': $7\frac{1}{2}\times$; b-e, k: $15\times$; f, g: $20\times$; h: $2\frac{1}{2}\times$. — All: Haydar Bāgda s.n., 20.VI. 1940 (ANK).

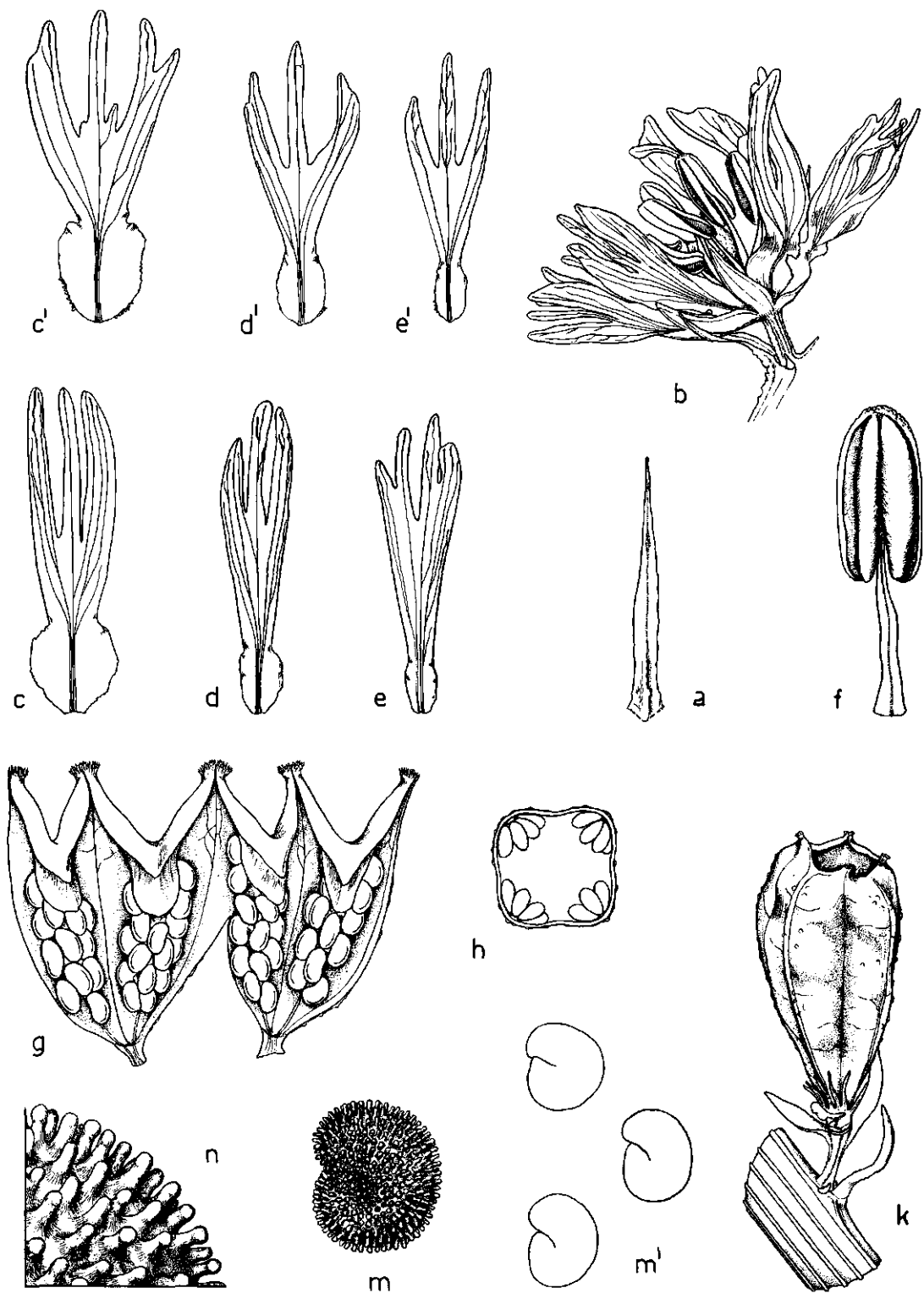


FIG. 85. *Reseda undata* L. var. *undata* – a: bract; b: fl.; c, c': sup.pet.; d, d': lat.pet.; e, e': ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m': seeds, shape; n: seed surface. – a, f, m¹: 15×; b, k: 7½×; c-e, c¹-e¹: 10×; g, h, m: 20×; n: 65×. – a-n, m¹: E. Reverchon 541 (à 1894) (WU 3125); c¹-e¹: Frères Sennen et Elias 35 (DR).

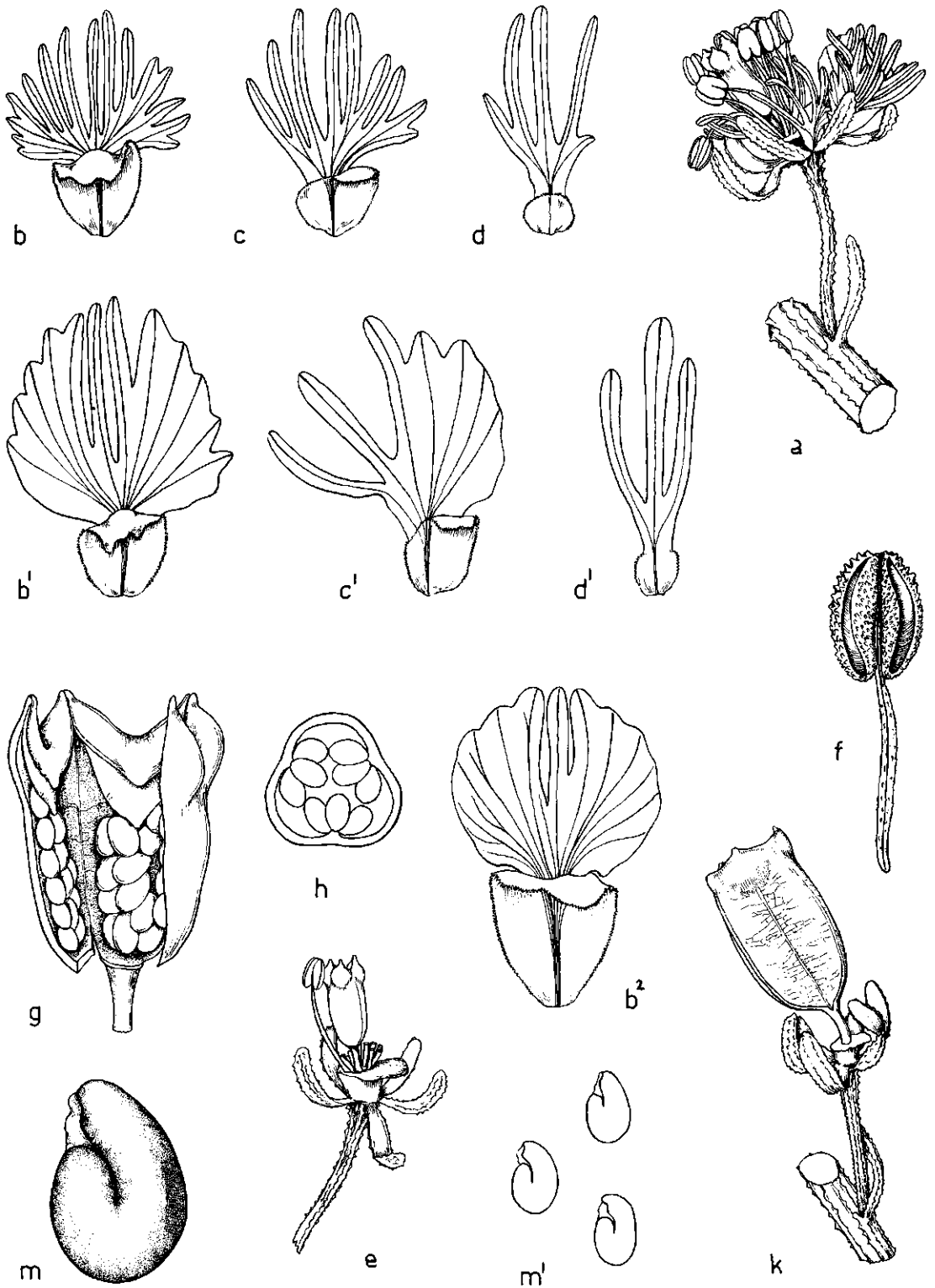


FIG. 86. *Reseda urnigera* Webb - a: fl.; b-b²: sup.pet.; c, c¹: lat.pet.; d, d¹: ant.pet.; e: fl.-disc; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape. - a, e, m¹: 7½ ×; b-d, b¹-d¹, b²: 15 ×; f: 20 ×; g, h, m: 20 ×; k: 5 ×. - a-g, k: G. Schweinfurth 254, neotype (C); b¹-d¹: Neergaard s.n., à 1868 (C); b²: G. Täckholm s.n., 21.III.1928 (C); h: id. s.n., 2.IV.1926 (S); m, m¹: M. Drar s.n., 4.IV.1939 (S). - a-g, k: var. *urnigera*; b¹-d¹, b², h, m, m¹: var. *boissieri* (Boiss.) Abdallah et De Wit, nov. comb.

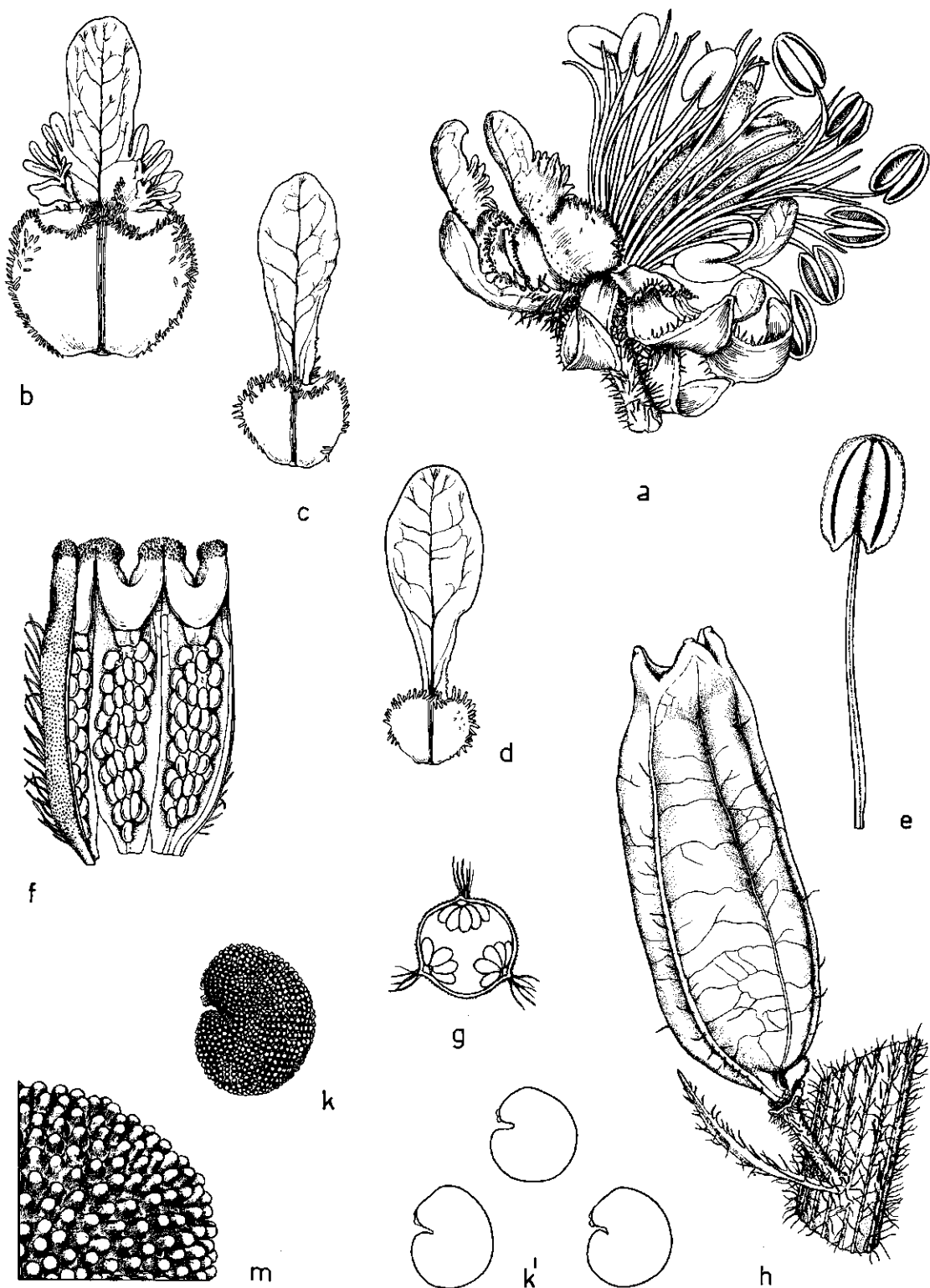


FIG. 87. *Reseda villosa* Cosson - a: fl.; b: sup.pet.; c: lat.pet.; d: ant.pet.; e: stamen; f: ovary (opened); g: same, c.-s.; h: capsule; k: seed; k¹: seeds, shape; m: seed surface. - a: 10×; b-g, k¹: 15×; h: 5×; k: 20×; m: 65×. - a-g: L. Kralik 21, holotype (C); h-m, k¹: id., isotype (W).

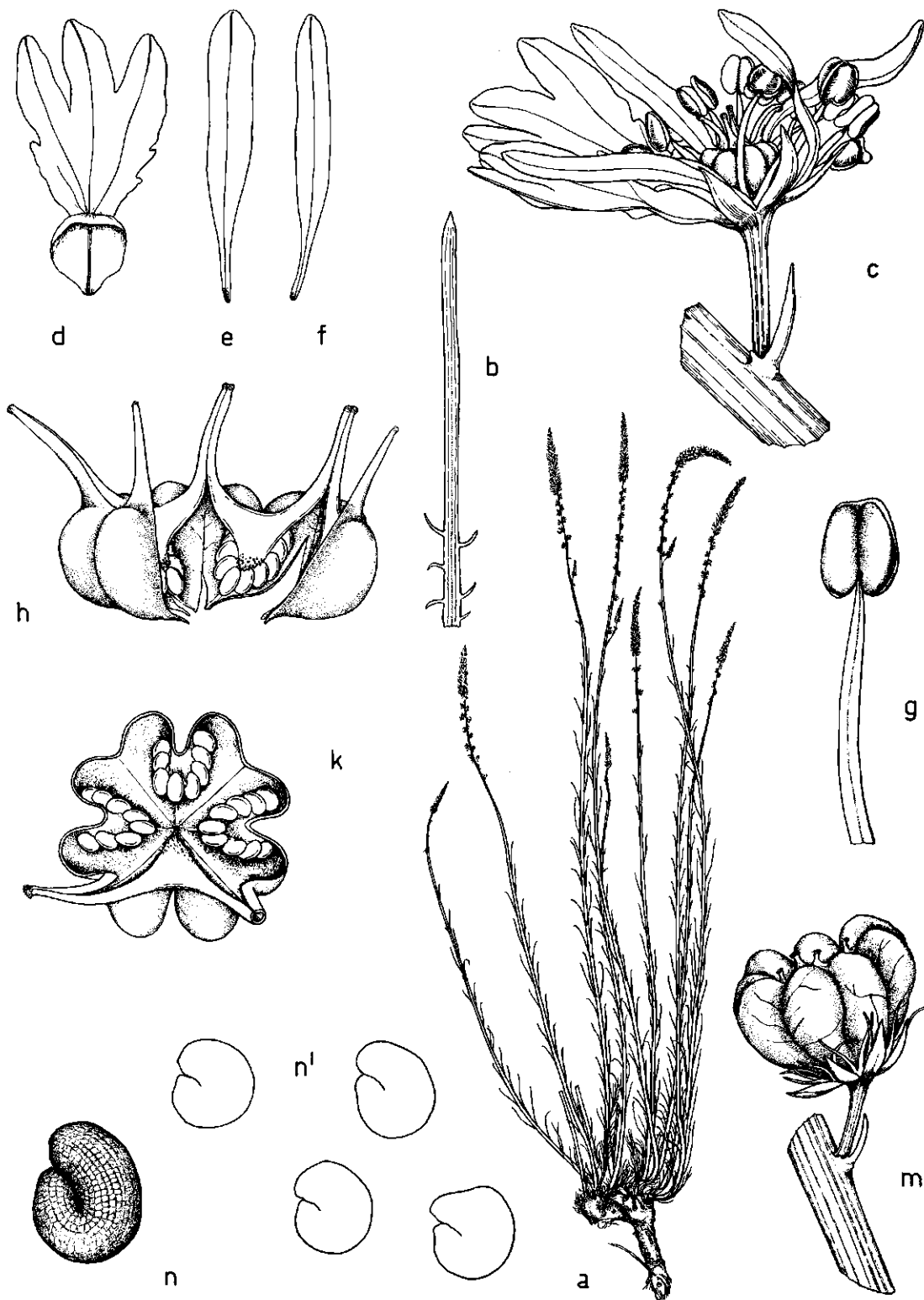


FIG. 88. *Reseda virgata* Boiss. et Reut. - a: habit; b: leaf; c: fl.; d: sup.pet.; e: lat.pet.; f: ant.pet.; g: stamen; h: ovary (opened); k: same, top view with a removed part to show biforked placentae; m: capsule; n: seed; n¹: seeds. shape. - a: $\frac{1}{4}\times$; b: $2\frac{1}{2}\times$; c-f: $10\times$; g-k, n¹: $20\times$; m: $7\frac{1}{2}\times$; n: $30\times$. - a, b: E. Bourgeau 2274 (PRC); c-k: C. Paus s.n., 14.V.1897 (W 16786); m: E. Bourgeau 2274 (C); n, n¹: T. Pando s.n., 28.V.1880 (BRNU).

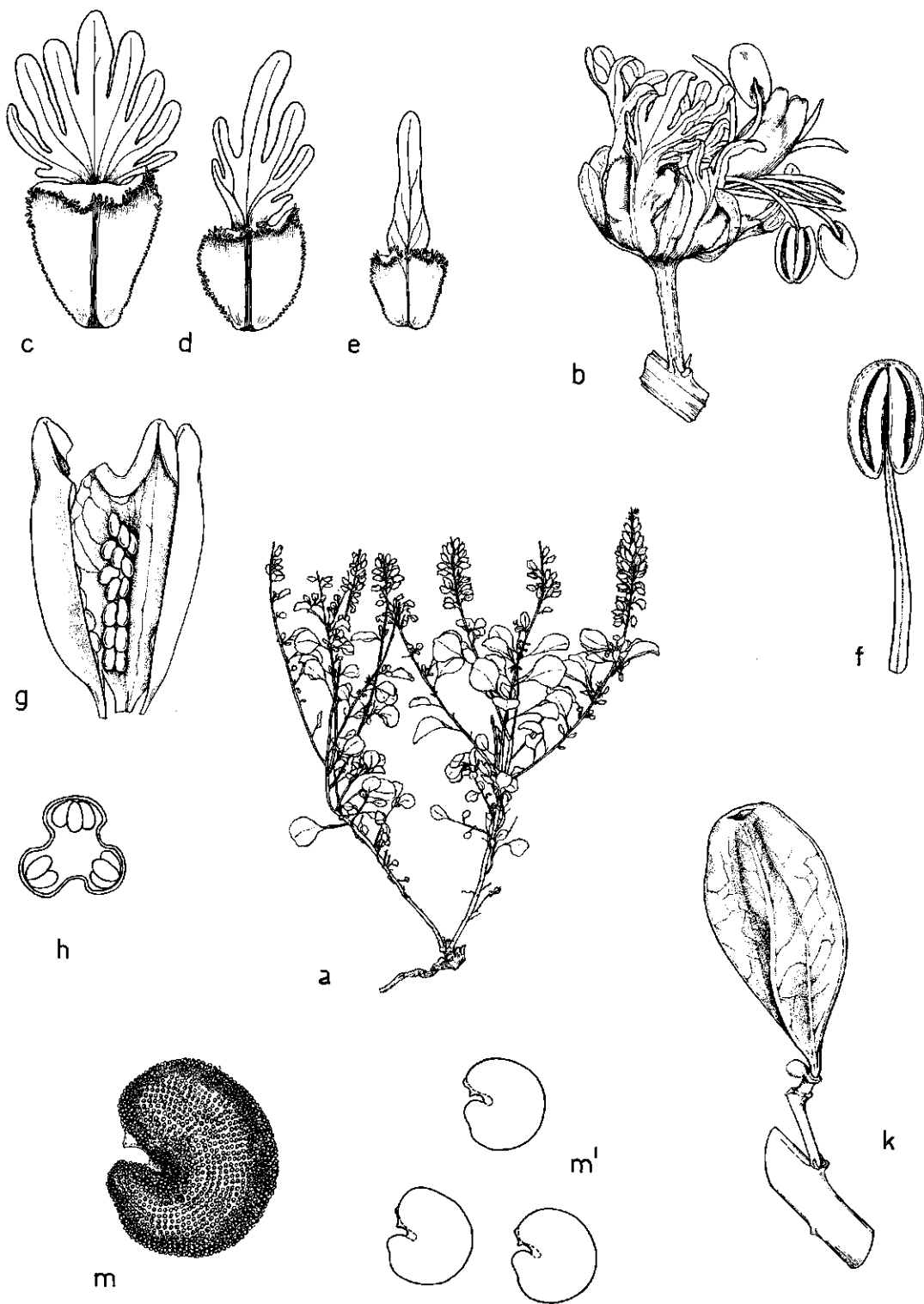


FIG. 89. *Reseda viridis* Balf.fil. - a: habit; b: fl.; c: sup.pet.; d: lat.pet.; e: ant.pet.; f: stamen; g: ovary (opened); h: same, c.-s.; k: capsule; m: seed; m¹: seeds, shape. - a: $\frac{1}{4} \times$; b: $10 \times$; c-h, m¹: $15 \times$; k: $5 \times$; m: $30 \times$. - a: St. Paulay s.n., 18.I.1899 (WU 2907); b-f, k, m, m¹: id. s.n., 17-21.I.1899 (WU 2907); g, h: id. s.n., 29.I.1899 (WU 2907).

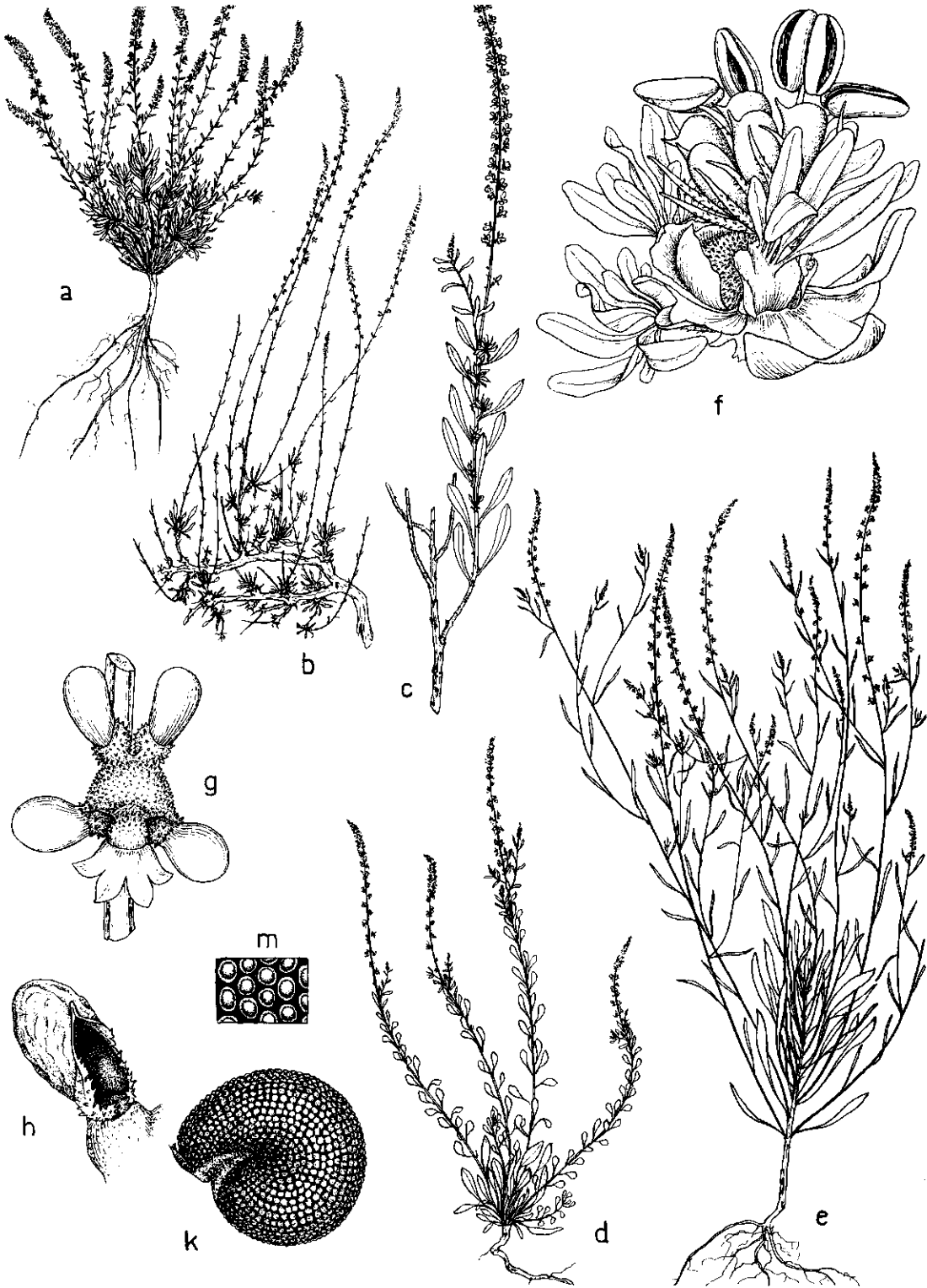


FIG. 90. *Sesamoides canescens* (L.) O. Kuntze - a, d, e: habit; b, c: fl. branches, note the woody stem in b; f: fl.; g: fr., top view; h: carpel; k: seed; m: testa surface. - a-e: $\frac{1}{3} \times$; f: $15 \times$; g, h: $10 \times$; k: $30 \times$; m: $80 \times$. - a: L. de Lambertye 419 (WAG); b: E. Bourgeau 1092 (WAG); c, h: P. Merino S. J. s.n., s.d., type '*Astrocarpus latifolius* Merino' (WAG); d: E. Bourgeau 60 (WAG); e, f: Abdallah et De Brijn 1201/64 (WAG); g, k, m: E. Bourgeau 61 (WAG). - a: var. *firma* (Muell. Arg.) Abdallah et De Wit, *nov. comb.*; b: var. *suffruticosa* (Lange) Abdallah et De Wit, *nov. comb. et stat.*; c, d, h: var. *spathulata* (Moris) R. Lit.; e-g, k, m: var. *canescens*.

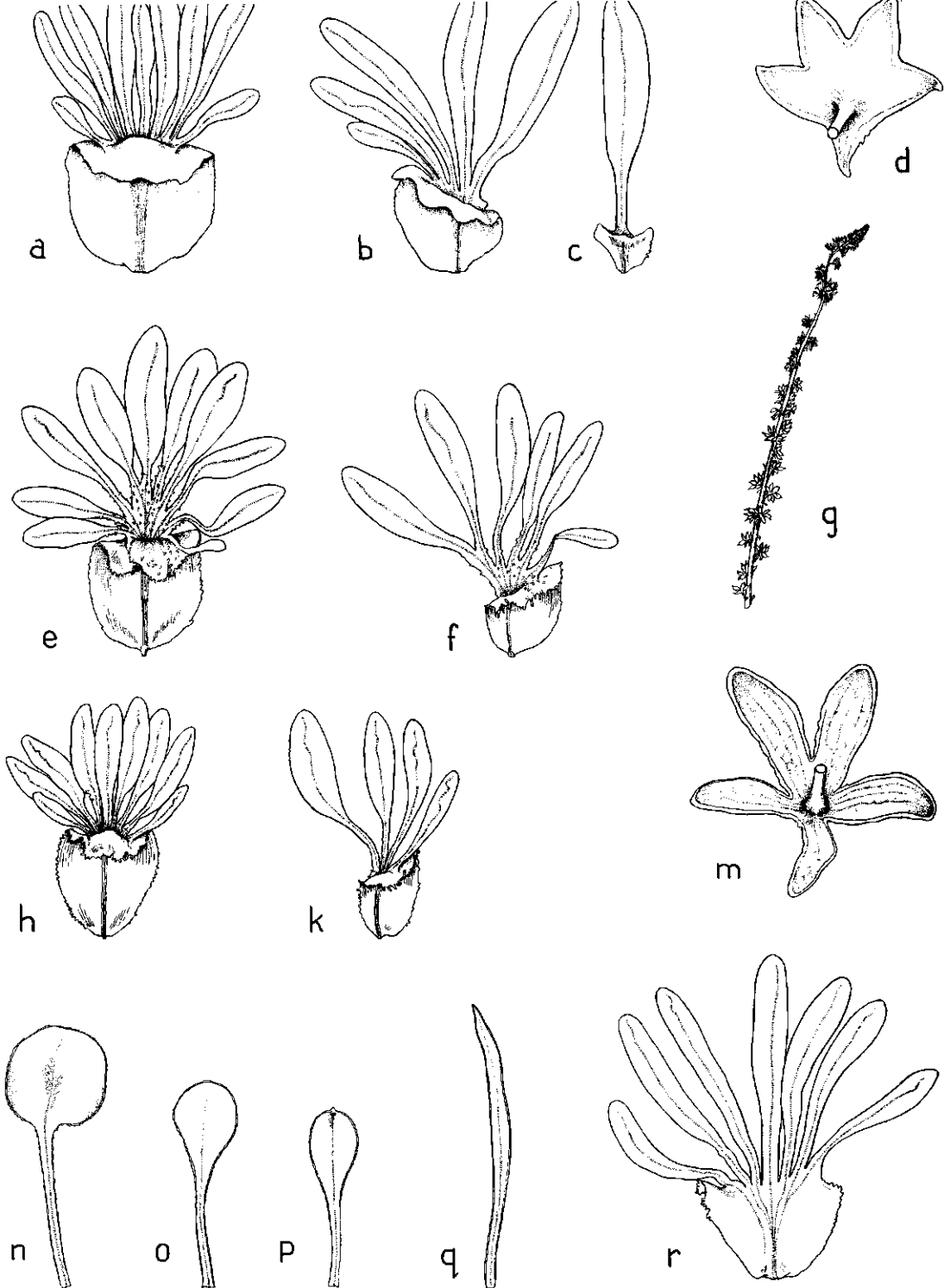


FIG. 91. *Sesamoides canescens* (L.) O. Kuntze - a, e, h, r: sup.pet.; b, f, k: lat.pet.; c: ant.pet.; d, m: calyx; g: portion of infl.; n-q: leaves. - a-c: 20×; d, m: 15×; e, f, h, k, r: 15×; g: 1×; n-q: 2½×. - a-d, q: E. Boissier s.n., May 1837, isotype 'Reseda sesamoides L. var. erecta Boiss.' (W); e-g: Joh. Lange s.n., 18 Aug. 1852, type 'Astrocarpus suffruticosus Lange' (C); h, k: id. s.n., 10 July 1852, type 'Astrocarpus minor Lange' (C); m: Willkomm 355 (C); n: G. L. Sjögren s.n., Sept. 1855, type 'Astrocarpus cochlearifolius Nym.' (S); o: A. de Carvalho 30 (COI); p: Adr. Fiori, A. Béguinot et R. Pampanini s.n., 16 April 1904 (GH); r: Joh. Lange s.n., 7 July 1851 (C). - a-d, q: var. *canescens*; e-g: var. *suffruticosa* (Lange) Abdallah et De Wit, *nov. comb. et stat.*; h, k, m, r: var. *alpina* (Muell. Arg.) R. Lit.; n-p: var. *spatulata* (Moris) R. Lit.