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THE LOGANIACEAE OF AFRICA XVIII
Buddleja L. II
Revision of the African and Asiatic species

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CONTENTS

	page
INTRODUCTION	1
GENERAL PART	2
History of the genus	2
Geographical distribution and ecology	2
Relationship to other genera	3
TAXONOMIC PART	5
The genus <i>Buddleja</i>	5
Sectional arrangement	7
Discussion of the relationship of the sections and of their delimitation	9
Key to the species represented in Africa	11
Key to the species indigenous in Asia	14
Alphabetical list of the sections accepted and species revised here	
B. <i>acuminata</i> Poir.	17
<i>albiflora</i> Hemsl.	86
<i>alternifolia</i> Maxim.	89
<i>asiatica</i> Lour.	92
<i>auriculata</i> Benth.	20
<i>australis</i> Vell.	24
<i>axillaris</i> Willd. ex Roem. et Schult.	27
<i>bhutanica</i> Yamazaki	97
<i>brachystachya</i> Diels	97
section <i>Buddleja</i>	7
<i>candida</i> Dunn	101
section <i>Chilianthus</i> (Burch.) Leeuwenberg	7
<i>colvilei</i> Hook. f. et Thoms.	103
<i>cordata</i> H.B.K.	30
<i>crispa</i> Benth.	105
<i>curviflora</i> Hook. et Arn.	111
<i>cuspidata</i> Bak.	35
<i>davidii</i> Franch.	113
<i>delavayi</i> Gagnep.	119
<i>dysophylla</i> (Benth.) Radlk.	37
<i>fallowiana</i> Balf. f. et W. W. Smith	121
<i>forrestii</i> Diels	124
<i>fragifera</i> Leeuwenberg	41
<i>fusca</i> Bak.	43
<i>globosa</i> Hope	45
<i>glomerata</i> Wendl. f.	49
<i>indica</i> Lam.	51
<i>japonica</i> Hemsl.	127
<i>lindleyana</i> Fortune	129
<i>loricata</i> Leeuwenberg.	56
<i>macrostachya</i> Benth.	133
<i>madagascariensis</i> Lam.	59
<i>myriantha</i> Diels	136

section <i>Necmda</i> Benth.	7
section <i>Nicodemia</i> (Tenore) Leeuwenberg	9
<i>nivea</i> Duthie	137
<i>officinalis</i> Maxim.	140
<i>paniculata</i> Wall.	142
<i>polystachya</i> Fresen.	64
<i>pulchella</i> N. E. Brown	67
<i>saligna</i> Willd.	72
<i>salviifolia</i> (L.) Lam.	77
<i>sphaerocalyx</i> Bak.	84
<i>yunnanensis</i> Gagnep.	146
Intermediates	148
Artificial hybrids	150
Nomina nuda	154
Doubtful species	154
Excluded species	154
Acknowledgements	155
Register	159

INTRODUCTION

The present publication is a revision of all *Buddleja* species represented in Africa including the introduced and/or naturalized ones, and all species indigenous in Asia. The study is mainly based on herbarium specimens which are fortunately mostly well prepared and richly provided with flowers. The author had the opportunity to study living plants of 21 out of the 40 species revised here, 5 of which in the wild in Africa.

Fortunately it was possible to trace almost all type specimens of the above species. The American species were included in the study as well, except for a few which very probably are synonymous with the species seen. The majority of the type specimens from this area could also be studied. As Dr. ELIANE MEYER-NORMAN is completing a revision of the American species, the only ones included here are those introduced into Africa.

For practical reasons two keys are added, one to the species represented in Africa and one to the species indigenous in Asia.

Most species are variable and several are easily confused, e.g. *B. davidii* and *B. myriantha* or *B. officinalis* and *B. paniculata*. Natural hybrids occur rarely. Some of them have been described as species, e.g. *B. alata* and *B. wardii*. A great number of artificial hybrids exist. All hybrids are listed at the end of the revision.

Cultivars are listed with the species and with the hybrids, but their list never can be complete. As e.g. *B. davidii* (syn. *B. variabilis*) is very variable. Seedlings grown in gardens are often given new cultivar names. In this case each cultivar in fact is a clone, as these plants are usually propagated by cuttings.

GENERAL PART

HISTORY OF THE GENUS

When LINNAEUS (1753) described the Genus *Buddleja* in the *Tetrandria Monogynia*, he based it on a single species, *B. americana*. Many authors added new species to it, a great number of which were later reduced to synonyms. BARTLING (1830) placed the genus in the tribe *Buddlejeae* in the *Scrophulariaceae* and was followed by G. DON (1838), ENDLICHER (1841), and BENTHAM (1846). Later, however, BENTHAM (1876) moved this tribe to the *Loganiaceae*. As BAILLON (1888) included the whole family *Loganiaceae* in the *Solanaceae*, the tribe *Buddlejeae* was also transferred to that family. SOLEREDER (1892) raised this tribe to the rank of subfamily and WILHELM (1910) even to the rank of family, but LEENHOUTS (1963), who is followed here, reduced it again to the rank of tribe.

In four cases genera were described as distinct from *Buddleja*, which are considered as synonyms here. *Chilianthus* was distinguished by its long-exserted stamens, *Adenoplea* and *Nicodemia* by their berries, which, moreover, in the former are 4-celled. Although some authors considered these genera as sound taxa, it is striking that all their type species had been described in *Buddleja* before they became the bases of distinct genera.

Since the name of ADAM BUDDLE was latinized and used for naming a plant genus, eight different spellings have been used, as enumerated by NAKAI (1950) in his publication of *B. shimidzuana*: *Buddlea*, *Buddleia*, *Buddleja*, *Buddleya*, *Budlaea*, *Budlea*, *Budleia*, and *Budleja*. Of these, the second, which is well pronounceable, has been used far more than all others. The far less popular spelling, *Buddleja*, adopted by LINNAEUS in his *Species Plantarum*, is cited in the International Code of Botanical Nomenclature and therefore also adopted here.

GEOGRAPHICAL DISTRIBUTION AND ECOLOGY

The genus *Buddleja* comprises approximately 90 species. About 50 of them occur in America from the southern United States to Argentina, 16 are indigenous in Africa (one of which also in Arabia), and 21 in Asia (exclusive of Arabia). None is indigenous in Europe or in Australia.

As far as known to the present author, only 4 species, *B. australis*, *B. davidii*, *B. dysophylla*, and *B. madagascariensis*, are cultivated in Australia and 28 in Europe, all of which in Great Britain and some in other countries. Some species are naturalized, e.g. *B. davidii* in southern England and in southern continental Europe and *B. australis* in Réunion and Australia.

Most species occur in the mountains, sometimes at higher altitude, e.g. *B. incana* in the Andes, *B. salviifolia* in eastern Africa, and *B. alternifolia* and

B. crispa in the Himalayas. They usually are a component of the scrub vegetation on riverbanks and in gullies. Besides they often occur at forest edges. As far as known to the present author, they are rarely dominant. The only case in which he saw a vegetation shaped by a species of *Buddleja* was in the vicinity of Bloemfontein in South Africa where almost all shrubs in the savanna were *B. saligna*.

No single *Buddleja* species occurs over such a vast area as some *Nuxia* and *Strychnos* species do in Africa. The most widely distributed American species is *B. americana* which is represented in Central and northwestern South America. The most widely ranging African species is *B. salviifolia*, occurring from Angola and Kenya to Cape Town. The most widely distributed Asiatic species are *B. asiatica*, known from India, southern China and the whole of tropical southeastern Asia, and *B. crispa*, ranging from Afghanistan to Kansu Province in China.

Several species are restricted to rather small areas, as far as known, e.g. *B. corrugata* has only been recorded from some localities in Baja California, *B. racemosa* from a rather small area in Texas, *B. cuspidata* from a few localities in northern Madagascar, *B. loricata* from a rather restricted area in and around Lesotho in southern Africa, and finally *B. fallowiana* and *B. yunnanensis* from some localities in Yunnan.

Distribution maps are given for all African species, usually accompanied by citations of some herbarium collections. For the Asiatic species the countries where they occur are listed. For China the provinces are reported. Most of the specimens are listed in alphabetical order, but their localities are not cited, nor are distribution maps given. The Chinese material studied is preserved in American, European, and Japanese herbaria. Among these specimens there are several duplicates of Chinese collections with high numbers. As it is probable that many collections have not been examined for the present revision, it is considered impractical to prepare distribution maps without study of additional collections.

RELATIONSHIP TO OTHER GENERA

Buddleja belongs to the tribe *Buddlejeae* which is maintained here in the same concept as in the revision of *Peltanthera* (LEEUWENBERG, 1967). In this paper a key to the genera of the tribe was published.

Buddleja is closely related to *Emorya* and *Nuxia*, less so to other genera of the tribe. The most striking relationship is with *Emorya*. In the latter genus which is monotypic and occurs in Texas and in adjacent Mexico the corolla tube is about as long as e.g. in *B. cestriflora* and *B. speciosissima* from southern South America, and the stamens are inserted in the corolla tube and distinctly exerted by their long filaments. The stamens of these *Buddleja* spp., however, are included, or slightly exerted, only when they are inserted high up in the corolla, as their filaments are very short.

In some *Buddleja* spp., like, for instance, *B. saligna* from southern Africa, the inflorescences and flowers resemble those of *Nuxia*, especially *N. floribunda*. In the latter, however, the anther cells are apically confluent, instead of discrete, and the calyces are rather long-tubular.

TAXONOMIC PART

Buddleja L., Sp. Pl. 112. 1753; Lamarck, Enc. 1: 512. 1785; G. Don, Gen. Syst. 4: 596. 1838; Endlicher, Gen. Pl. 687. 1841; Enchiridion 339. 1841; Bentham in De Candolle, Prod. 10: 436. 1846; Bentham in Bentham & Hooker f., Gen. Pl. 2: 793. 1876; Baillon, Hist. Pl. 9: 346. 1888; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 46. 1892; Prain & Cummins in Fl. Cap. 4(1): 1045. 1909; Wilhelm, Samenpfl. 90. 1910; Marquand, Kew Bull. 1930: 177. 1930; Phillips, Gen. S. Afr. Flow. Pl. 2nd ed. 576. 1951; Bruce & Lewis, Loganiaceae in Fl. Trop. E. Afr. 35. 1960; Verdoorn in Fl. S. Afr. 26: 159. 1963; Norman, Gentes Herb. 10: 60. 1967; L. B. Smith c.s., Loganiaceae in Fl. Ill. St. Catarina 4. 1976.

Type species: *B. americana* L.

Heterotypic synonyms: *Chilianthus* Burch., Trav. 1: 94. 1822; Bentham in De Candolle, Prod. 10: 435. 1846; Bentham in Bentham & Hooker f., l.c. p. 793; Baillon, l.c. p. 347; Solereder, l.c.; Prain & Cummins, l.c. p. 1042. Type species: *C. oleaceus* Burch. (= *B. saligna* Willd.). Homotypic synonym: *Semnos Rafinesque*, Sylva Tellur. 161. 1838.

Romana Vell., Fl. Flum. 1: 54. 1825, partly, as for type species. Type species: *R. campestris* Vell. (= *B. campestris* (Vell.) Walp.).

Nicodemia Tenore, Cat. Ort. Napol. 88. 1845; Bentham in Bentham & Hooker f., l.c. p. 794; Baillon, l.c. p. 346; Solereder, l.c. p. 49, 1895. Type species: *N. diversifolia* (Vahl) Tenore (= *B. indica* Lam.).

Adenoplea Radlk., Abh. Nat. Ver. Bremen 8: 406. 1883; Ber. Deutsch. Bot. Ges. 2: 255. 1884; Baillon, l.c. p. 347; Solereder, l.c. p. 48. 1892. Type species: *A. baccata* Radlk. (= *B. acuminata* Poir.).

Adenoplusia Radlk., l.c. p. 461. 1884; l.c. p. 255; Solereder, l.c. p. 48; Bruce & Lewis, l.c. p. 40. Type species: *A. axillaris* Radlk. (= *B. axillaris* Willd. ex Roem. et Schult.).

Shrubs, less often trees or suffrutescent herbs, 0.25–30 m high, monoecious or in some American species dioecious, mostly with a white or pale grey indumentum of stellate hairs (sometimes intermingled with capitate-glandular hairs) which dries usually rusty on the branchlets, the lower side of the leaves, and the inflorescences. Colleters absent. *Shrubs*: erect, spreading, sarmentose, or lianescent, 0.25–5 m high and up to about 10 m long. Bark fibrous, shallowly longitudinally fissured, often peeling off. *Trees*: up to 30 m high. Trunk up to 65 cm in diam. Bark rough, fibrous, longitudinally fissured. *Herbs* erect or spreading. *Branchlets* terete to quadrangular, in the latter case sometimes narrowly winged. *Leaves* opposite and those of a pair equal, less often subopposite, or in a few species alternate, petiolate, sessile, or – if opposite – sometimes connate-perfoliate. Stipules leafy, reduced to a line, or absent. Blade orbicular to very narrowly elliptic, entire, crenate to dentate, or sometimes even lobed. *Inflorescence* terminal and/or axillary, thyrsoid, paniculate,

or variously reduced even to a single globose head. Lower bracts mostly leafy, the others small, the uppermost sepal-like like the often present bracteoles. *Flowers* 4-merous (occasionally 5-merous in *B. asiatica* and *B. salviifolia*), actinomorphic, usually fragrant. *Calyx* green or sometimes partly coloured (often in *B. davidii*), campanulate or nearly so, less often cup-shaped or obconical, mostly glabrous inside; lobes usually subequal, from slightly longer to much shorter than the tube, erect, entire. *Corolla* cup-shaped, campanulate, funnel-shaped, or salver-shaped, variously coloured, from white to orange or to dark violet, or purple, often with an orange throat, sometimes darker at anthesis, outside with an indumentum of stellate and/or glandular hairs, but glabrous at the base which is included in the calyx tube and at the apices of the lobes, less often entirely glabrous or hairy on the entire outer side of the lobes, inside with a zone of simple hairs or with a crescent-shaped line of hairs on the lobes (section *Buddleja*); (tube cup-shaped to narrowly cylindrical); lobes usually shorter than the tube, imbricate, elliptic or suborbicular, at the apex rounded, obtuse, or emarginate, or valvate, triangular, and acute (section *Buddleja*), entire to crenate, spreading or erect. Sterile reproductive organs present in unisexual flowers, but reduced. *Stamens* inserted on the corolla, from the bottom of the tube to the mouth, with a certain degree of variation in a single species; filaments mostly short or very short, long only if stamens well-exserted (section *Chilianthus*); anthers oblong or less often suborbicular, mostly glabrous, apiculate to emarginate at the apex, mostly deeply cordate at the base, introrse; cells parallel or sometimes slightly divergent at the base (section *Chilianthus*), discrete, dehiscent throughout by a longitudinal slit. *Pistil*: ovary superior, mostly laterally compressed, mostly with stellate, sometimes, and then often at the same time, with glandular hairs, less often entirely glabrous, 2-celled or in some bacciferous species (*B. acuminata*, *B. fusca*, and *B. madagascariensis*) 4-celled; style short or long, included or exserted; stigma often large, clavate, capitate, or less often bilobed. In each cell one axile placenta with several to many ovules. *Fruit* capsular or sometimes baccaceous (*B. acuminata*, *B. fragifera*, *B. fusca*, *B. indica*, and *B. madagascariensis*), subglobose to narrowly ellipsoid, surrounded or subtended by the persistent calyx and often at the same time by the persistent corolla. Capsule bivalved, septicidal or sometimes indehiscent (*B. scordioides*); valves mostly splitting up to the middle, sometimes completely (*B. saligna*), with a revolute margin formed by the torn septum; dry oblong placentae with the seeds in the valves. *Seed* pale to dark brown, obliquely ellipsoid to obliquely fusiform or obliquely polyhedral, winged or not, laterally compressed or not, reticulate or less often smooth or ridged. Embryo straight, white, surrounded by mealy endosperm.

Distribution: About 90 species in the tropics and subtropics of America, Africa, and Asia.

SECTIONAL ARRANGEMENT

1. Section **Buddleja**

Type species *B. americana* L.

Homotypic synonyms: *Lozada* Benth. in De Candolle, Prod. 10: 436. 1846 and section *Lozada* subsection *Paniculatae* Benth., l.c., partly, only *B. americana* and its synonyms.

Aestivation of corolla valvate; lobes marked by a crescent-shaped line of hairs on the inner surface; tube slightly shorter to slightly longer than the calyx. Stamens short, inserted at the corolla mouth of the tube or just below; filaments slightly shorter to slightly longer than the anthers. Ovary 2-celled. Fruit a capsule.

Species:

B. americana L.

B. crotonoides A. Gray

B. domingensis Urb.

2. Section **Chilianthus** (Burch.) Leeuwenberg, **stat. nov.**

Basionym: *Chilianthus* Burch., Trav. 1: 94. 1822; Benth., l.c. p. 436, partly (excl. *C. corrugatus* (= *B. loricata*)).

Type species: *C. oleaceus* Burch. (= *B. saligna* Willd.).

Aestivation imbricate; corolla partly hairy inside; tube up to 1.5 × as long as the calyx, up to as long as the lobes but mostly shorter. Stamens well-exserted, inserted in the middle of the corolla tube to slightly below the mouth; filaments long, 2.5–6 × as long as the anthers. Ovary 2-celled. Fruit a capsule.

Species:

B. saligna Willd.

B. glomerata Wendl. f.

B. dysophylla (Benth.) Radlk.

3. Section **Neemda** Benth. in De Candolle, Prod. 10: 442. 1846, partly (excl. *B. madagascariensis* and subsection *Axilliflorae*).

Lectotype species: *B. australis* Vell. (syn.: *B. neemda* Link, non Buch.-Ham.).

Heterotypic synonyms: Section *Lozada* subsection *Globosae* Benth., l.c. p. 439. Type species: *B. globosa* Hope.

Section *Lozada* subsection *Verticillatae* Benth., l.c. p. 441. Type species: *B. verticillata* H.B.K. (= *B. sessiliflora* H.B.K.).

Section *Neemda* subsection *Stachyoideae* Benth., l.c. p. 442. Type species: *B. stachyoides* Cham. et Schlecht. (= *B. australis* Vell.).

Section *Neemda* subsection *Glomeratae* Benth., l.c. p. 443. Lectotype species: *B. mendozensis* Gillies ex Benth.

Section *Neemda* subsection *Thyrsoideae* Benth., l.c. p. 445. Type species: *B. thyrsoides* Lam. (as *thyrsoidea*).

Section *Neemda* subsection *Macrothyrseae* Benth., l.c. p. 445, partly (excl. *B. madagascariensis*). Lectotype species: *B. macrostachya* Benth.

Series *Gynandrae* Marquand, Kew Bull. 1930: 177, 184. 1930. Type species: *B. gynandra* Marquand (= *B. paniculata* Wall.).

Series *Alternifoliae* Marquand, l.c. Type species: *B. alternifolia* Maxim.

Series *Curviflorae* Marquand, l.c. p. 178, 185. Type species: *B. curviflora* Hook. et Arn.

Series *Rectiflorae* Marquand, l.c. p. 178, 187. Lectotype species: *B. macrostachya* Benth.

Aestivation imbricate; corolla partly hairy inside; tube shorter or longer than the calyx, as long as the lobes or more frequently longer; stamens included or slightly exerted, inserted in the corolla tube on different levels; filaments short or very short. Ovary 2-celled. Fruit a capsule.

Species (for convenience printed in two columns. The first species of the second column should follow the last of the first):

B. cordata H.B.K.

B. ovandensis Lundell ex Norman
(= prec.?)

B. euryphylla Standl. et Steyererm.

B. parviflora H.B.K.

B. nitida Benth.

B. skutchii Morton

B. iresinoides (Griseb.) Hosseus

B. longifolia H.B.K.

B. interrupta H.B.K.

B. perfoliata H.B.K.

B. misionum Kränzl.

B. blattaria Macbr. (= seq.?)

B. polycephala H.B.K.

B. lanata Benth.

B. jamesonii Benth.

B. cordobensis Griseb.

B. aromatica Remy

B. nappii Lorenz

B. globosa Hope

B. anchoënsis O. Kuntze

B. megalcephala Donn. Sm.

B. hypsophila I.M. Johnston

B. buxifolia Kränzl.

B. coriacea Remy (= seq.?)

B. pichinchensis H.B.K.

B. incana Ruiz et Pav.

B. bullata H.B.K.

B. multiceps Kränzl.

B. loricata Leeuwenberg

B. campestris (Vell.) Walp.

B. ramboi L. B. Smith

B. thyrsoides Lam.

B. soratae Kränzl.

B. diffusa Ruiz et Pav.

B. racemosa Torrey

B. chapalana B. Robinson

B. corrugata Jones

B. utahensis Coville

B. brachiata Cham. et Schlecht.

B. chenopodiifolia Kränzl.

B. cuneata Cham. et Schlecht.

B. tucumanensis Griseb.

B. sessiliflora H.B.K.

B. simplex Kränzl.

B. oblonga Benth.

B. marrubifolia Benth.

B. suaveolens Kunth et Bouché

B. hieronymi Fries

B. mendozensis Gillies ex Benth.

B. scordioides H.B.K.

B. nivea Duthie

B. candida Dunn

B. bhutanica Yamazaki

<i>B. asiatica</i> Lour.	<i>B. forrestii</i> Diels
<i>B. myriantha</i> Diels	<i>B. colvilei</i> Hook. f. et Thoms.
<i>B. albiflora</i> Hemsl.	<i>B. delavayi</i> Gagnep.
<i>B. davidii</i> Franch.	<i>B. brachystachya</i> Diels
<i>B. alternifolia</i> Maxim.	<i>B. curviflora</i> Hook. et Arn.
<i>B. crispa</i> Benth.	<i>B. lindleyana</i> Fortune
<i>B. salviifolia</i> (L.) Lam.	<i>B. japonica</i> Hemsl.
<i>B. auriculata</i> Benth.	<i>B. yunnanensis</i> Gagnep.
<i>B. pulchella</i> N. E. Brown	<i>B. australis</i> Vell.
<i>B. polystachya</i> Fresen.	<i>B. grandiflora</i> Cham. et Schlecht.
<i>B. officinalis</i> Maxim.	<i>B. tubiflora</i> Benth.
<i>B. paniculata</i> Benth.	<i>B. cestriflora</i> Cham. et Schlecht.
<i>B. fallowiana</i> Balf. f. et W. W. Smith	<i>B. longiflora</i> Brade
<i>B. macrostachya</i> Benth.	<i>B. speciosissima</i> Taub.

4. Section *Nicodemia* (Tenore) Leeuwenberg, *stat. nov.*

Basionym: *Nicodemia* Tenore, Cat. Ort. Napol. 88. 1845, as genus.

Type species: *N. diversifolia* (Vahl) Tenore (= *B. indica* Lam.).

Homotypic synonym: *Nicodemia* (Tenore) Leenh. in Fl. Males. 1. 6: 340. 1963, as subgenus.

Heterotypic synonyms: Section *Neemda* subsection *Axilliflorae* Benth., l.c. p. 445. Lectotype species: *B. axillaris* Willd. ex Roem. et Schult.

Adenoplea Radlk., Abh. Nat. Ver. Bremen 8: 406. 1883, as genus. Type species: *A. baccata* Radlk. (= *B. acuminata* Poir.).

Adenoplusia Radlk., l.c. p. 461, as genus. Type species: *A. axillaris* Radlk. (= *B. axillaris* Willd. ex Roem. et Schult.).

Aestivation imbricate; corolla partly hairy inside; tube slightly to conspicuously longer than the calyx, 2–6 × as long as the lobes; stamens included or barely included; filaments very short. Ovary 2- or 4-celled. Fruit a berry.

Species:

<i>B. axillaris</i> Willd. ex Roem. et Schult.	<i>B. fusca</i> Bak.
<i>B. cuspidata</i> Bak.	<i>B. madagascariensis</i> Lam.
<i>B. indica</i> Lam.	<i>B. acuminata</i> Poir.
<i>B. fragifera</i> Leeuwenberg	<i>B. sphaerocalyx</i> Bak.

DISCUSSION OF THE RELATIONSHIP OF THE SECTIONS AND OF THEIR DELIMITATION

BENTHAM (1846) made the most recent survey of the entire genus *Buddleja*, in which he arranged the species known at the time in sections and series, the latter considered as subsections by the present author. He had a slightly narrower concept of the genus, as he maintained the genus *Chilianthus*, considered

as a section here but exclusive of *C. corrugatus* (= *B. loricata*), transferred to section *Neemda*.

Since that time MARQUAND (1930) instated four series for the species from the Old World, but unfortunately he failed to indicate to which section he assigned them. After comparative studies of all Old World and almost all New World species the present author concluded that 3 taxa out of BENTHAM'S sections and subsections could be retained as sections, although with several alterations in their circumscription, and none of MARQUAND'S series.

MARQUAND'S series are not maintained for the following reasons: His *Gynandrae* turned out to be based on an anomaly of *B. paniculata*, described as *B. gynandra*. His *Alternifoliae*, of which only *B. alternifolia* is maintained here as a species (*B. wardii* is a hybrid and the others are synonyms), are characterized only by alternate instead of opposite leaves; in all other respects they perfectly fit in section *Neemda*. His *Curviflorae* mostly have curved corolla tubes, but some specimens of the species placed there do not show a single curved corolla tube, and cannot therefore be excluded from his *Rectiflorae* which quite fit section *Neemda* according to present-day opinion.

Summarizing, the present author distinguishes 4 sections in the genus *Buddleja* one of which was a genus with BENTHAM, two were sections, and one was a subsection:

1. *Buddleja* (formerly section *Lozada* Benth., partly).
2. *Chilianthus* (formerly genus *Chilianthus*, partly).
3. *Neemda* (partly).
4. *Nicodemia* (formerly section *Neemda* subsection *Axilliflorae*).

A complete enumeration of the synonyms with type or lectotype species designated in this paper is given with the section diagnoses, where also comments on the alterations in their delimitation and lists of species are added.

As the survey of the presently known *Buddleja* species neared completion, it became increasingly clear that within the genus a small group of species could always be separated from the others by a single or a few more or less correlated characters. Fortunately the first three of these groups, listed below, comprise different species. The characters by which they can be set apart from the remaining *Buddleja* species relate to different parts of the plants or to non-comparable aspects of the same parts of the plants, and therefore they could be considered as being of uneven weight, e.g. characters of the fruit might be thought to be more important than those of the corolla or those of the stamens. In this case a system of subgenera, sections, and subsections could be built up, as the following situation prevails in this genus:

1. In three species (section *Buddleja*) the corolla is valvate, whereas in all others it is imbricate in aestivation.

2. Three other species (section *Chilianthus*) have long filaments 2.5–6 × as long as the anthers by which the stamens are well-exserted. The remaining have short filaments which usually do not equal the anthers in length. Depending on the level of insertion, the stamens, therefore, are included or barely exserted.

3. Eight species (section *Nicodemia*) have berries, while dehiscent capsules

(indehiscent only known in *B. sessiliflora*) are the rule in the genus.

4. Finally, four out of the eight bacciferous species have a 4-celled ovary, all other *Buddleja* species having a 2-celled one.

If *Buddleja* were divided into subgenera on the basis of e.g. fruit characters, sections would then be established on the basis of filament length, and subsections for different types of aestivation, the scheme of subdivision would entirely lose its surveyability. The hierarchy of the characters also seems rather arbitrary. Therefore the present author is of the opinion that these characters should be used for distinguishing sections only. With this in mind, the number of ovary cells can be left out of consideration, as within the section *Nicodemia* the species resemble each other in so many respects that they cannot be safely hold apart without checking the number of ovary cells. This cannot therefore be regarded as a character of much weight.

After comparative studies of the species placed in section *Neemda* it proved impossible to subdivide this group further. Attempts were made to use characters of the inflorescence, the calyx, the corolla, the stamens, the fruits, and the seeds. As it was suggested earlier, especially by BENTHAM (1846), that the length of the calyx and that of the corolla tube have a more or less fixed relation, special attention was paid to this aspect. Nevertheless, the series starting with *B. cordata*, the corolla tube of which is very short, and ending with *B. speciosissima*, the corolla tube of which is very long, is without discontinuities.

In all Old World species the flowers are bisexual, whereas most of the New World species are dioecious. In these the non-functional organs are reduced. In the pistillate flowers the anthers fail to dehisce and in the staminate ones the ovules remain very small. More detailed information on the American species will be provided in Mrs. E. MEYER-NORMAN's forthcoming revision of the South American species.

KEY TO THE SPECIES REPRESENTED IN AFRICA, INDIGENOUS AND ALIEN

1. Leaves opposite 2
 Leaves alternate. Cultivated, introduced from China
 21. **B. alternifolia**
2. Leaves connate-perfoliate 3
 Leaves petiolate or sessile, but not connate-perfoliate 5
3. Inflorescences axillary, almost racemose, 4–10 cm long; calyx tube ventri-
 cose. Madagascar 19. **B. sphaerocalyx**
 Inflorescences terminal, almost spicate or composed of globose heads;
 calyx tube not ventricose 4
4. Inflorescences a false raceme of globose heads of yellow flowers
 10. **B. globosa**
 Inflorescences almost spicate; corolla yellow or orange
 3. **B. australis**

5. Inflorescences a globose head or a false raceme of globose heads . . . 6
 Inflorescences thyrsoïd or otherwise, not composed of globose heads . 7
6. Inflorescences a globose head; leaves broadly ovate to elliptic and obtuse
 or rounded at the apex. Madagascar 8. **B. fragifera**
 Inflorescences a false raceme of 2–16 globose heads; leaves narrowly oblong
 and long-acuminate at the apex. Cultivated, introduced from S.
 America 10. **B. globosa**
7. Inflorescences axillary 8
 Inflorescences terminal, often also in the axils of the upper leaves . . 10
8. Branchlets quadrangular, often obscurely winged; flowers all pedicellate;
 corolla white or less often yellow; leaf blades decurrent into the petiole
 or the wings of the branchlets 4. **B. axillaris**
 Branchlets subangular or terete; flowers sessile; corolla yellow or orange,
 exceptionally white 9
9. Branchlets obscurely quadrangular; stipules leafy; leaves often sessile;
 blade decurrent into the petiole or the leaf base; inflorescence spicate
 6. **B. cuspidata**
 Branchlets terete or nearly so; stipules none; leaves always petiolate; blade
 rounded or cuneate at the base, sometimes decurrent into the petiole;
 inflorescence thyrsoïd, very variable, often interrupted . 12. **B. indica**
10. Corolla tube short, up to 1.3 × as long as the lobes; stamens exerted
 (staminodes in female flowers of *B. cordata* just included); inflorescence
 paniculate 11
 Corolla tube at least twice (in *B. asiatica* 1.7 ×) as long as the lobes;
 stamens included (or only in *B. australis* sometimes just exerted);
 inflorescence paniculate or not. 15
11. Leaf blades ovate or elliptic, up to twice as long as wide (up to 4 × in
B. cordata) 12
 Leaf blades narrowly ovate or elliptic, at least 3.5 × as long as wide . 14
12. Stamens well-exserted; leaves ovate or nearly so, 1.5–2 × as long as wide,
 1.5–10 × 0.7–7.5 cm, often lobed 13
 Stamens slightly exerted, leaves ovate, narrowly ovate, or narrowly
 elliptic, 2–4 × as long as wide, 4–23 × 3–14 cm, entire or serrulate.
 Cultivated and naturalized in Ethiopia, introduced from Mexico
 5. **B. cordata**
13. Leaves ovate or elliptic, sinuate-lobed with the lobes again crenate,
 undulate, petiolate, rugose and bullate above; flowers sessile, in glo-
 merules of 10–20 11. **B. glomerata**
 Leaves almost triangular to ovate, irregularly dentate to crenate, sessile,
 not bullate; flowers shortly pedicellate or occasionally sessile
 7. **B. dysophylla**
14. Leaf blades bullate and crenate-serrate; inflorescence congested; stamens
 slightly exerted 13. **B. loricata**
 Leaf blades not bullate, entire or obscurely sinuate; inflorescence lax or
 rather lax; stamens well-exserted 17. **B. saligna**

15. Inflorescence paniculate (see also *B. madagascariensis* and *B. nivea*) . . . 16
 Inflorescence thyrsoid or spicate 19
16. Leaf blades bullate, deeply cordate to auriculate at the base, and crenate;
 corolla tube 4–7 mm long 18. **B. salviifolia**
 Leaf blades – if slightly bullate – cuneate or rounded at the base, and
 serrate or entire; corolla tube 5.5–9 mm long 17
17. Calyx lobes mostly narrowly triangular; corolla tube 1.5–2.5 × as long as
 the calyx which is 3–6 mm long 18
 Calyx lobes often broadly triangular; corolla tube 3.3–4.5 × as long as
 the calyx which is 1.5–2.2 mm long; leaf blades elliptic or ovate or
 narrowly so 2. **B. auriculata**
18. Corolla tube 5.5–9 mm long; pistil stellate-tomentulose; anthers inserted
 well above the middle of the corolla tube, with apex 0–1 mm below the
 mouth; fruit a capsule 16. **B. pulchella**
 Corolla tube 7.5–11 mm long; pistil glabrous; anthers inserted near the
 middle of the corolla tube; fruit a berry 1. **B. acuminata**
19. Corolla white, its tube 2.5–5 mm long; leaves very narrowly elliptic; ovary
 glabrous or lepidote (see also *B. nivea* which has a stellate-tomentose
 ovary. Cultivated in southern Africa, introduced from China,
 and is not again keyed out here) 22. **B. asiatica**
 Corolla orange, or else the tube over 5 mm long; leaves narrowly elliptic
 or not; ovary mostly stellate-tomentose 20
20. Corolla white to violet or purple; anthers inserted at or below the middle
 of the corolla tube 21
 Corolla yellow, orange or salmon, occasionally white in *B. indica*; anthers
 inserted in the upper quarter of the corolla tube, mostly barely included
 22
21. Corolla tube mostly curved, purple, tube 3.5–8 × as long as the calyx and
 12–17 mm long, rather wide; leaf blade entire to coarsely sinuate-
 dentate 34. **B. lindleyana**
 Corolla tube straight, white to violet or less often purple; tube 2–4 × as
 long as the calyx, rather narrow, 6–11.5 mm long; leaf blade serrate
 to subentire (see also *B. acuminata*). 29. **B. davidii**
22. Inflorescence spicate; fruit a capsule 23
 Inflorescence thyrsoid; fruit a berry 24
23. Style long, often exserted shortly after anthesis; ovary abruptly narrowed
 into the style; branchlets rather stout. St. Helena, Réunion, intro-
 duced from southern Brazil 3. **B. australis**
 Style short, included; ovary gradually narrowed into the style; branchlets
 rather slender. Southern Arabia to Tanzania 15. **B. polystachya**
24. Calyx lobes mostly narrowly triangular to subulate; inflorescence mostly
 small and often few-flowered; leaves very variable, often orbicular;
 ovary 2-celled 12. **B. indica**
 Calyx lobes broadly triangular or nearly so, acute or obtuse; inflorescence
 small or large; leaves not very variable; ovary 4-celled 25

25. Inflorescence rather congested, terminal and also axillary, 1.5–6 × 1.5–2 cm; leaf blade 1–4.5 × 0.5–2.2 cm, often bullate. 9. **B. fusca**
 Inflorescence rather lax, exclusively terminal, 5–25 × 2–15 cm; leaf blade 4–14 × 1.5–7 cm, not bullate (see also hybrids of *B. indica* and *B. madagascariensis*) 14. **B. madagascariensis**

KEY TO THE SPECIES INDIGENOUS IN ASIA

1. Leaves opposite (the upper ones exceptionally alternate in *B. asiatica*). 2
 Leaves alternate; inflorescences exclusively on short lateral branchlets with very small leaves different from those on the vegetative terminal branchlets 21. **B. alternifolia**
2. Leaves connate-perfoliate, narrowly oblong, 5–7 × as long as wide. Bhutan 23. **B. bhutanica**
 Leaves petiolate or sessile, wide or narrow; if connate-perfoliate, much wider, up to 1.2–3 × as long as wide (*B. crispa*) 3
3. Corolla large, mostly purple or wine red, broadly cylindrical or nearly so, tube (12–)17–21 mm long and at the throat (4–)6–9 mm wide; inflorescence lax, several-flowered; capsule large, 10–16 × 6–8 × 5–7 mm; seeds unwinged 26. **B. colvillei**
 Corolla shorter or longer, mostly up to 2.5 mm wide; if wider (up to 3.5 mm in *B. forrestii* and *B. macrostachya*) capsule up to 10 mm long; seeds mostly winged (unknown in *B. brachystachya*; unwinged in *B. crispa*); inflorescence lax or congested, mostly many-flowered 4
4. Inflorescence a dense spike, 2–6 × 1.5–2 cm, with many long-acuminate bracts several of which are longer than the flowers; leaves coarsely dentate to subentire 40. **B. yunnanensis**
 Inflorescence not a dense spike or, if densely spicate, only some pairs of bracts among the flowers exceeding them (see *B. asiatica* and *B. crispa*) 5
5. Corolla tube (8–)10–20 mm long, outside everywhere with a short indumentum, mostly curved; anthers inserted in or below the middle of the corolla tube (*B. brachystachya*); inflorescence spicate 6
 Corolla tube mostly less than 11 mm, up to 13.5 mm long, outside partly hairy, glabrous, or entirely stellate-tomentose, straight; anthers inserted in or above the middle of the corolla tube or higher, if below, then corolla tube outside glabrous or only partly hairy (*B. forrestii*); if inflorescence spicate, corolla tube less than 5 mm long (*B. asiatica*), broadly cylindrical and 8–11 × 2–3.2 mm (*B. macrostachya*) or leaves more or less lobed (*B. crispa*) (see also *B. brachystachya*) 9
6. Leaves 10–35 × 5–17 mm, acute or obtuse at the apex; inflorescence 1.5–3 × 1.5–2.5 cm; ovary stellate-tomentose except for the glabrous base 24. **B. brachystachya**

- Leaves 30–200 × 15–70 mm (some occasionally smaller), acuminate or less often acute at the apex; inflorescence 4–20 × 2–4 cm, spicate or nearly so; ovary glabrous 7
7. Branchlets 4-winged, stout, 2–4 mm in diam. when dry, glabrous or nearly so; calyx lobes acuminate, mostly longer than wide; corolla and calyx shortly stellate-tomentose and often with some glandular hairs outside. Southern Japan 33. **B. japonica**
- Branchlets terete or – if quadrangular – mostly pubescent, mostly less than 2 mm in diam. when dry, not or obscurely winged; calyx lobes mostly much wider than long 8
8. Branchlets terete or occasionally obscurely angular, rather stout, (1–)2–3 mm in diam. when dry; leaves densely tomentose to glabrous above, ovate or narrowly ovate, subentire, often subtruncate at the base; calyx and corolla shortly stellate-tomentose or stellate-pubescent and with some glandular hairs outside. Southern Japan and Taiwan 28. **B. curviflora**
- Branchlets (sub)quadrangular, slender, 1(–2) mm in diam. when dry; leaves sparsely pubescent to glabrous above, elliptic to narrowly elliptic, entire to coarsely sinuate-dentate; calyx and corolla outside pubescent with glandular hairs which may be accompanied by some stellate hairs. China, southern Japan 34. **B. lindleyana**
9. Leaves ovate, triangular, or narrowly so, 1.2–3 × as long as wide; blade mostly rounded to cordate at the base and abruptly narrowed into the petiole or the leaf base, mostly distinctly crenate or serrate, or even shallowly lobed (exceptionally subentire) (see also *B. nivea* and *B. officinalis*) 27. **B. crispa**
- Leaves ovate to narrowly elliptic, mostly cuneate or decurrent, but never abruptly narrowed nor cordate at the base, crenate, serrate or subentire, never lobed 10
10. Corolla tube outside partly hairy or glabrous (attention: the portion of the tube included in the calyx tube is always glabrous, see genus description) 11
- Corolla tube outside entirely stellate-tomentose 14
11. Inflorescence paniculate, rather lax 30. **B. delavayi**
- Inflorescence thyrsoid or spiciform 12
12. Corolla tube broadly cylindrical, 7–11 × (1.2–)2–3.5 mm; inflorescence spiciform or thyrsoid 32. **B. Forrestii**
- Corolla tube obconical and up to 6.5 mm long, or narrowly cylindrical, 6–11.5 mm long, and about 1 mm wide 13
13. Corolla tube obconical, 4–6.5 mm long; stamens inserted just below the corolla mouth; corolla lilac 20. **B. albiflora**
- Corolla tube narrowly cylindrical or nearly so, 6–11.5 mm long; stamens inserted about halfway the corolla tube and mostly visible through it; corolla white to dark purple 29. **B. davidii**

14. Corolla tube 2.5–6 mm long, if more than 5 mm long, then mostly over 2 mm wide; inflorescence thyrsoïd or spicate (paniculate sometimes in *B. nivea*) 15
 Corolla tube (6–)7–13.5 mm long; if less than 8 mm long, then mostly less than 2 mm wide; inflorescence paniculate, thyrsoïd or spicate (see also *B. davidii*) 19
15. Ovary glabrous or lepidote 16
 Ovary stellate-tomentose 17
16. Inflorescence spiciform; corolla mostly white; lower branches of inflorescence not longer than the others; leaves mostly remotely serrate-dentate; corolla tube 2.5–4.8 mm long; capsule 3–5 × 1.5–3 × 1.5–3 mm 22. **B. asiatica**
 Inflorescence almost cylindrical, with lateral branches not obsolete, the lower ones exceeding the others; corolla mostly purple; leaves mostly serrate; corolla tube 4–5.8 mm long; capsule narrower, 4–6 × 1.5–2 × 1.5–2 mm 36. **B. myriantha**
17. Calyx and corolla outside densely stellate-tomentose; calyx lobes often obscured by their indumentum; corolla tube mostly 1.8 mm wide or wider 18
 Calyx and corolla tube outside shortly tomentose; calyx lobes not obscured by their indumentum; corolla tube 1–1.3 mm in diam. 36. **B. myriantha**
18. Leaves bullate above; anthers often inserted halfway the corolla tube 25. **B. candida**
 Leaves with impressed venation above; anthers inserted 1–1.5 mm below the corolla mouth 37. **B. nivea**
19. Inflorescence spiciform or thyrsoïd; calyx lobes acuminate. 20
 Inflorescence mostly paniculate, if thyrsoïd, then calyx lobes acute or obtuse 21
20. Inflorescence spiciform, continuous and dense, or less often interrupted and rather lax; calyx lobes long-acuminate from a broad base; corolla tube mostly broadly cylindrical and at least 2 mm wide; branchlets quadrangular and often 4-winged 35. **B. macrostachya**
 Inflorescence thyrsoïd, sometimes interrupted; calyx lobes acuminate; corolla tube cylindrical, 1–1.5 mm wide; branchlets terete 31. **B. fallowiana**
21. Inflorescence rather laxly paniculate; corolla tube 10–13.5 mm long, often glabrous just above the calyx; calyx lobes acuminate; anthers inserted 3.5–5 mm below the corolla mouth 30. **B. delavayi**
 Inflorescence paniculate or thyrsoïd, lax or congested; corolla tube 6–10 mm long, outside entirely stellate-tomentose; calyx lobes acute or obtuse; anthers inserted 1.5–4 mm below the corolla mouth 22
22. Corolla tube 1.2–1.6(–2) mm in diam., inside pilose up to the insertion of the stamens or up to just below the mouth; leaves acuminate, rarely acute, entire or less often serrate 39. **B. paniculata**

Corolla tube (1.6-)2-2.2 mm in diam., inside densely pilose up to the mouth or less often just below; leaves mostly acute or obtuse, entire, sinuate, or repand-dentate 38. **B. officinalis**

1. **Buddleja acuminata** Poir., Encyc. Suppl. 1(2): 745. 1810, not R. Br. in Salt (1814), nor H.B.K. (1818); Bentham in De Candolle Prod. 18: 444. 1846.

Fig. 1, p. 18; Map 1, p. 19

Type: Madagascar (not India): sin. loc., herb. Poivre s.n. (P-JU 6048, holotype).

Homotypic synonym: *B. poiretii* Spreng., Syst. 1: 430. 1824.

Heterotypic synonyms: *B. sinuata* Willd. ex Roem. et Schult., Mant. 3:97. 1827, **syn. nov.** Type: Madagascar: sin. loc., Anonymus 1279 herb. Willdenow (B-WILLD 2919, 2nd sheet, holotype). Homotypic synonym: *Adenoplea sinuata* (Willd.) Radlk., Ber. Deutsch. Bot. Ges. 2: 261. 1884; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 48. 1892.

A. baccata Radlk., Abh. Nat. Ver. Bremen 8: 407. 1883; Ber. Deutsch. Bot. Ges., l.c.; Solereder, l.c., **syn. nov.** Type: Madagascar: near Vohemar, Rutenberg Oct. 1877, fl., fr. (holotype not seen, destroyed in B?, not in BREM).

Nicodemia baroniana Oliv. in Hooker, Icon. 23: t. 2238. 1892. Type: N. Madagascar: sin. loc., Baron 6277 (K, lectotype; isotype P). Homotypic synonym: *Adenoplea baroniana* (Oliv.) Petit in Evrard, Bull. Jard. Bot. Brux. 37: 458. 1967.

Buddleja candelabrum Kränzl. in Engler, Bot. Jahrb. 50, Beibl. 111: 43. 1913. Type: Madagascar: sin. loc., Humblot 8 (K, holotype; isotypes: P, W).

A sarmentose shrub, 1.50-3 m high, often lianescent. Trunk 8 cm in diam. (teste Germain 434). Branchlets stellate-tomentose, mostly rusty when dry (like the petioles, the leaves beneath, the peduncles, pedicels, and the calyx and corolla outside). *Leaves* opposite, petiolate; petiole 0.7-2 cm long, stellate-tomentose; blade variable in shape, triangular, narrowly triangular, or narrowly ovate, 1.5-6(-10) × as long as wide, 5-11 × (0.6-)1.5-6.5 cm, mostly long-acuminate at the apex, cuneate to subcordate at the base, coarsely dentate to crenate, often only near the base, to entire, above dark green, stellate-tomentose on the costa, otherwise with scattered stellate hairs to glabrous, beneath stellate-tomentose to -tomentulose and with some glandular hairs, main veins slightly impressed above; venation rather conspicuous. *Inflorescence* paniculate, very small, about 2 cm in diameter, and congested, at onset of anthesis, later much enlarged and lax, especially when fruiting and then up to 15 × 6 cm. Lower bracts leafy; the others linear. Peduncle, branches, and pedicels stellate-tomentose. *Flowers* pedicellate. *Calyx* campanulate, 3-6 × 1.5-2.4 mm, outside stellate-tomentose, inside glabrous; tube 1-3 × as long as the lobes; lobes subequal, narrowly triangular, 1.2-2.2 × 0.8-1.2 mm, acute or acuminate, entire. *Corolla* white, with erect lobes 2-3 × as long as the calyx, 9-13 mm long, outside stellate-tomentose, inside glabrous or with a 2 mm wide pilose

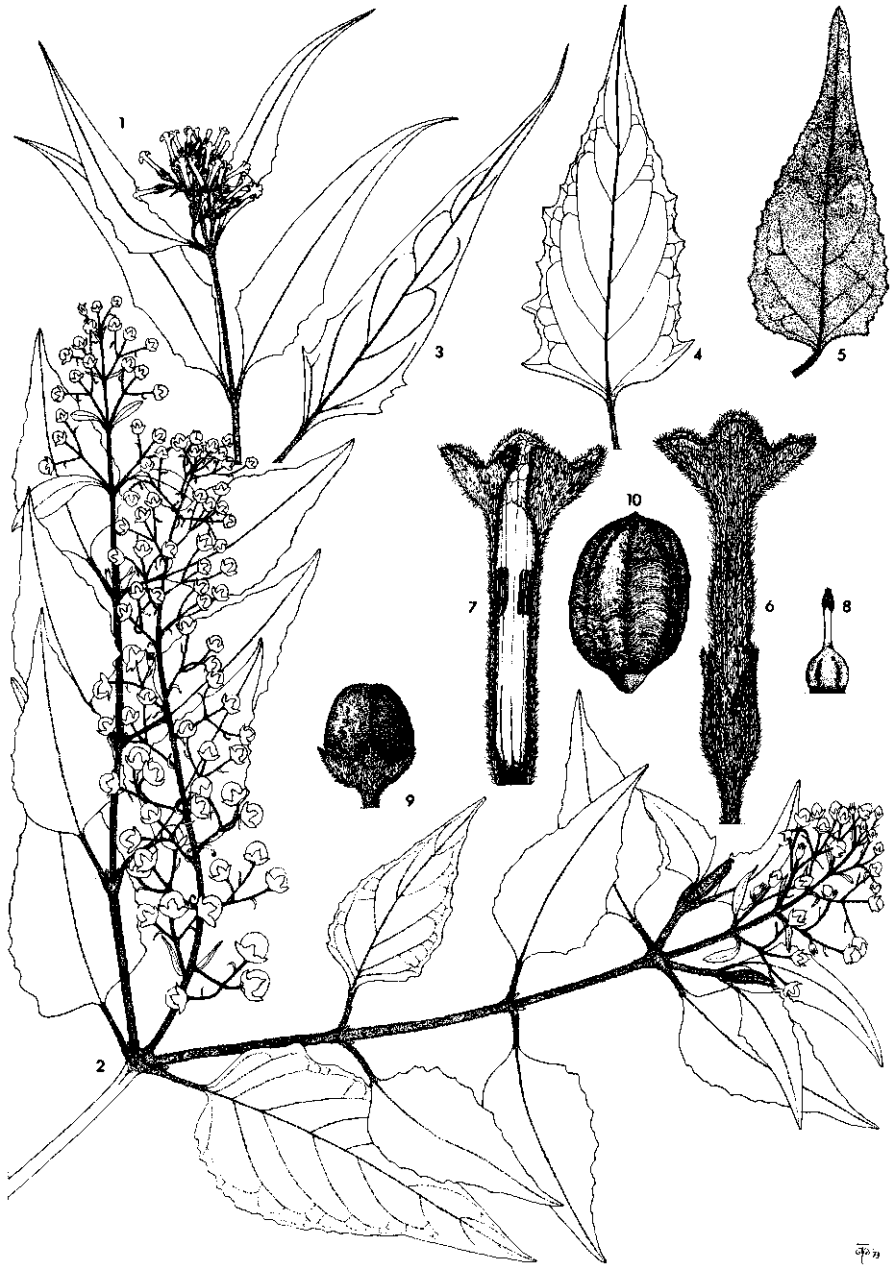
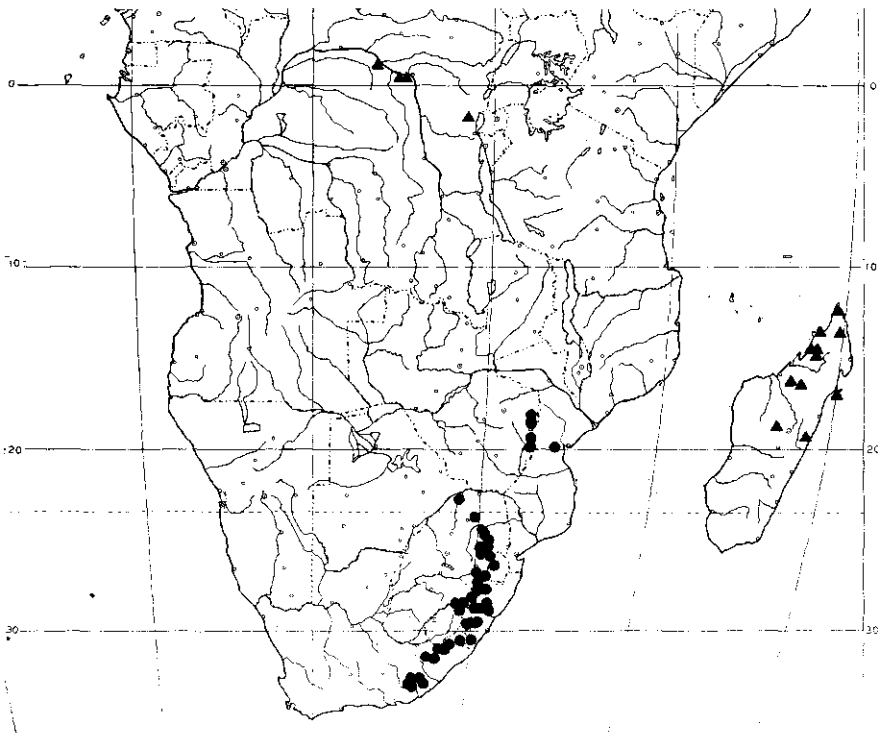


FIG. 1. *Buddleja acuminata*: 1. flowering branch. $\frac{1}{2} \times$; 2. fruiting branch. $\frac{1}{2} \times$; 3-5. leaves. $\frac{1}{2} \times$; 6. flower. $4\frac{1}{2} \times$; 7. opened corolla. $4\frac{1}{2} \times$; 8. pistil. $4\frac{1}{2} \times$; 9. fruit. $1\frac{1}{2} \times$; 10. seed. $45 \times$ (1, 3, 6-8. Perrier de la Bâthie 18823; 2, 9-10. herb. Du Petit-Thouars s.n.; 4. Capuron SF 27365; 5. Perrier de la Bâthie 11983).

ring 2 mm above the base; tube cylindrical, 1.5–2.5 × as long as the calyx, 2.5–5 × as long as the lobes, 7.5–11 mm long, 1–1.6 mm wide, much widened at the throat; lobes suborbicular, 1.5–4 × 1.2–4 mm, rounded, entire, spreading. *Stamens* included; filaments very short, 0.1–0.3 × as long as the anthers, glabrous, inserted at 4–5 mm from the corolla base (above the hairy ring if present); anthers oblong, 1.2–1.5 × 0.4–0.8 mm, deeply cordate at the base, rounded or emarginate at the apex, glabrous; cells parallel. *Pistil* glabrous, 3–4 mm long; ovary subglobose, laterally compressed or sometimes not, 1.5–1.8 × 1.2–1.5 × 0.8–1.5 mm, abruptly narrowed into the rather short style, 4-celled; stigma large, capitate, 0.4–0.6 × 0.3–0.4 mm. In each cell one axile peltate narrowly oblong placenta with about 100 ovules all over. *Berry* blue or black, globose or slightly longer than wide, 5–8 × 4–8 mm, rounded at the apex, often with 4 grooves when dry, glabrous, 4-celled, many-seeded. *Seed* pale brown, subglobose, 0.3–0.5 × 0.2–0.4 × 0.2–0.4 mm, apiculate at one end, with verrucose ridges (resembling an infructescence of *Zea mays*). *Embryo* straight, white, 0.2 × 0.1 mm; cotyledons as wide as the rootlet and half as long; much mealy endosperm.

Distribution: Only known from Zaïre (Orientale) and Madagascar.

Ecology: Forest edges and open places in forests. Alt. 50–800 m.



MAP 1. ▲ *Buddleja acuminata*; ● *B. auriculata*

Specimens examined:

Zaire: Orientale: Basoko, Demeuse 381 (BR, NY); Yalokombe, about 40 km NE of Yangambi (fr. Sept.) Germain 434 (BR, K, WAG); Kisangani (fl., fr. Mar.) Bequaert 7036 (BR, K, WAG). Kivu: Kirambo, Masisi Territory (fl., fr. Jan.) A. Léonard 2580 (BM, G, P).

Madagascar: Makys R., near Camp d'Ambre (fl. Nov.) Perrier de la Bâthie 18823 (P), 18824 (P); Ankarana Mts. (fl. Dec.) Capuron SF 27365 (P, WAG); Nosy Bé, Boivin 2101 bis (P); *ibid.*, Pervillé 1853 (P); Tsaratanana Mts. (fl. Nov.) Perrier de la Bâthie 8613 (P); Mangindrano (fl. Apr.) Levanga RS 5070 (P), (fl. May) 5223 (P); Ankaizina (fl. May) Bosser 2876 (P); *ibid.* (fl. Apr.) Decary 1898 (P, WAG); Mampikony, Boina (fl. July) Perrier de la Bâthie 11983 (L, P); Upper Bemarivo R., Boina (fl. Feb.) Perrier de la Bâthie 8629 (P); St. Marie, Boivin 3 (P); Ampasimadinika (fl.) Lantz 2 July 1881 (P); Ambila, S. of Tamatave (fl., fr. May) Decary 6479 (P, WAG); *sin. loc.*, Baron 6277 (K, P, lectotype of *Nicodemia baroniana*), 6507 (K, P, paratype of *N. baroniana*); herb. Du Petit-Thouars s.n. (P); Goudot annis 1837–1838 (G); Humblot 8 (K, P, W, type of *B. candelabrum*); herb. Poivre s.n. (P-JU 6048, type).

Cult.: Zaire: Orientale: Yangambi, originating from Ibia Forest, Yalokombe (fl., fr. Apr.) Germain 8847 (BR, WAG).

Notes. POIRET erroneously supposed the type specimen to have been collected in India. Its origin should be Madagascar, as the species is not known from India and the inland area of Zaire was still unexplored at that time.

All specimens cited doubtlessly belong to this species, which is easily recognized by its peculiar leaves, short inflorescences with rather large flowers, glabrous pistil, large lax infructescence, and subglobose 4-celled berries.

2. ***Buddleja auriculata*** Benth. in Hooker, *Comp. Bot. Mag.* 2: 60. 1836; in De Candolle, *Prod.* 10: 445. 1846; Solereder in Engler & Prantl, *Nat. Pflanzenf.* 4(2): 48. 1892; Prain & Cummins in *Fl. Cap.* 4(1): 1047. 1909; Marquand, *Kew Bull.* 1930: 201. 1930; Verdoorn in *Fl. S. Afr.* 26: 162, f. 22.2. 1963; Palmer & Pitman, *Trees S. Afr.* 3: 1882. 1973 (with photographs).

Fig. 2, p. 21; Phot. 1, p. 22; Map 1, p. 19

Type: S. Africa: Cape Province: Winterberg and Chumiesberg, Ecklon 1836, composite sheet (K, holotype; isotype: GOET, Chumiesberg).

Heterotypic synonym: *B. auriculata* var. *euryfolia* Prain & Cummins, l.c. p. 1048 (Prain, *Kew Bull.* 1908: 162. 1908, nomen); Phillips in *Fl. Pl. S. Afr.* 8: pl. 314. 1928; Marquand, l.c. Type: S. Africa: Transvaal: near Lydenburg, Wilms 1030 (K, lectotype; isotypes: BM, E, G, GOET, L, P, WU, Z).

A shrub 0.50–3.50 m high, semiscandent, sometimes a small tree. Branchlets stellate-tomentose with short whitish hairs, subangular or terete. *Leaves* opposite, petiolate; petiole 3–11 mm long, stellate-tomentose; stipules leafy, 0.5–5 mm long, often recurved, sometimes reduced to a line; blade elliptic or ovate or narrowly so, 2–5 × as long as wide, 2–13 × 0.5–5 cm, acuminate at the apex, cuneate or rounded at the base, serrate or sometimes entire and revolute at the margin, dark green, shiny, glabrous, and almost bullate above, whitish-tomentose with short stellate hairs (often drying rusty) beneath; venation conspicuous, reticulate, much impressed above, prominent beneath. *Inflorescences* terminal and axillary, large, paniculate, many-flowered, 3–25 ×



FIG. 2. *Buddleja auriculata*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $5 \times$; 3. opened corolla, $5 \times$; 4. pistil, $5 \times$; 5. fruit, $5 \times$; 6. seed, $15 \times$; 7-8. leaves, $\frac{1}{2} \times$ (1-4. Bayliss 6411; 5-6. Devenish 1263; 7. Compton 27871; 8. Rogers 20167).



PHOT. 1. *Buddleja unriculata* (A. Meyer 1 Sept. 1976, phot. A. Meyer, cult. Pretoria).

2–20 cm, rather lax. Peduncle, branches, and pedicels stellate-tomentose. Lower bracts leafy, the others small, linear. *Flowers* sweet-scented, shortly pedicellate or subsessile. *Calyx* subtended by two minute narrowly triangular bracteoles or not, green, campanulate, 1.5–2.2 mm long, outside whitish-tomentose with short stellate hairs, inside glabrous; tube 1.2–4 × as long as the lobes; lobes subequal, often broadly triangular, 0.5–1 × 0.8–1 mm, acute or subacute, entire. *Corolla* creamy, white with orange throat, orange-yellow, lilac, or salmon, with erect lobes 4–5 × as long as the calyx, 7–11 mm long, outside whitish-tomentose with short stellate hairs, sometimes partially glabrescent, inside pilose with simple hairs from near the apex of the ovary to just below the insertion of the stamens; tube nearly cylindrical, 3.3–4.5 × as long as the calyx, 3.5–6 × as long as the lobes, 5.5–9 × 1.2–2 mm, elongate at anthesis, often slightly widened just above the insertion of the stamens; lobes oblong or suborbicular, mostly slightly longer than wide, 1.5–2 × 1.2–1.8 mm, rounded, entire, spreading. *Stamens* included, inserted at 2–2.5(–3.5) mm from the corolla mouth; filaments short, 0.3–1 mm long, glabrous; anthers oblong or nearly so, 0.9–1.2 × 0.3–0.4 mm, rounded or obtuse at the apex, deeply cordate at the base, glabrous; cells parallel. *Pistil* much shorter than the corolla tube, 2.2–4.3 mm long; ovary subglobose or ovoid, laterally compressed, 0.9–1.5 × 0.7–1 × 0.6–0.9 mm, shortly stellate-tomentose, rather abruptly narrowed into the style, 2-celled; style included, stellate-tomentose at the base, 0.5–1.7 mm long; stigma large, clavate or sometimes capitate, 0.3–1.2 × 0.3–0.5 mm. In each cell one axile placenta with 10–15 ovules. *Capsule* ellipsoid, 2–4 × 1.5–2 × 1.2–1.5 mm, laterally compressed, half exerted from the calyx, with an impressed line along the line of dehiscence, acute, hairy like the ovary but less dense; valves torn at the apex for about one-third of their length, acute. *Seed* medium brown, obliquely polyhedral, 1.2–1.5 × 0.6–0.7 × 0.3–0.4 mm, reticulate, narrowly winged.

Distribution: Rhodesia, Moçambique, Swaziland, Transkei, South Africa (Transvaal, Natal, Cape Province).

Ecology: Montane forests or thickets, often in gullies. Alt. 600–2000 m.

A selection of the specimens examined:

Moçambique: Manica e Sofala: Tsetserra (fl. June) Biegel 3962 (K, SRGH).

Rhodesia: Inyanga District (fl. Aug.) Henkel in coll. Eyles 2613 (PRE, SRGH); *ibid.* Circular Drive (fl. June) T. Müller 1259 (K, PRE, SRGH); Inyanga (fl. Oct.) McGregor 09/38 (BM, FHO); Pungwe R. source (fl. Apr.) Chase 4930 (BM, COI, LISC, MO, PRE, SRGH); km 15 Cashel-Melsetter (fl. June) Biegel 3576 (K, SRGH); Melsetter (fl. July) Crook M 7 (K, LISC, NY, PRE, S, SRGH).

Swaziland: Mbabane District (fl. July) Compton 32119 (K, NBG, PRE); *ibid.*, Darkton Valley (fl. June) Compton 27871 (K, M, NBG, PRE, SRGH).

Transkei: Kendall, Naudes Nek-Mt. Fletcher Road, Story 510 (PRE); Mt. Fletcher (fl. July) Sim 2536 (BOL, NH, PRE); near Kokstad (fl. May) Tyson 1263 (GRA, NH, PRE), 1287 (BM, BOL, G. GH, K. P. SAM, UPS, W); Cala, Pegler 1741 (BM, K, LD, PRE); Potriviers Berg, Galpin 2887 (PRE), 6771 (K, PRE).

S. Africa: Transvaal: De Hoek, L. E. Taylor 647 (NY); The Downs, Pietersburg (fl. July) Rogers 20167 (BM, J. K. S. WAG); Odendaalruskamp, A. E. van Wyk 810 (PRE); Lydenburg

(fl. June) Wilms 1030 (BM, E, G, GOET, K, L, P, WU, Z, lectotype of *B. auriculata* var. *euryfolia*); Steenkampsberg (fl. Aug.) Codd 1714 (PRE); Mt. Anderson (fl. June) Smuts 58 (K, PRE); Sabie (fl. Aug.) Rogers 23075 (G, K); Schoemanskloof (fl. June) Smuts 273 (PRE), 315 (K, PRE), 345 (PRE); Waterval Boven (fl. June) Rogers 2742 (BOL, J, K); Barberton (fl. July) Burt Davy 2786 (PRE); Godwane R. (fl. July) Rogers 20272 (A, K, WAG); Rimers Creek (fl. July) Galpin 970 (BOL, GRA, K, PRE, SAM, US); 21 km NE. of Wakkerstroom (fl. July) Acocks 11529 (PRE); Mooihoek, Piet Retief District (last fls. Aug.) Devenish 1263 (K, NH, PRE). Orange Free State: Oliviershoek (fl.) A. v. d. Zeyde 29 May 1969 (STE). Natal: Paulpietersburg (first fls. Apr.) Gerstner 3274 (MO, NH); Utrecht District (fl. June) Devenish PRE 49571 (PRE); Eastcourt, Rehmann 7332 (Z); Qudeni (fl. June) D. Edwards 1489 (K, PRE); *ibid.* (fl. June) Sim 2943 (NH, PRE, SAM); Sevenfontein (fl. Apr.) J. M. Wood 9876 (BOL, E, G, L, P); Umgeni Poort (fl. May) Moll 859 (BR, K, M, NH, PRE, S, SRGH, WAG); Craighead, Pietermaritzburg (fl. July) Strey 11006 (E, EA, K, PRE, WAG); Alfred District, Ingeli (fl. July) Killick 2225 (FHO, K, PRE); Springfontein (fl. June) Thode 5302 (STE). Cape Province: Perie Forest, King Williamstown (fr. July) Doidge PRE 49550 (PRE); Gxulu Mts. (fl. June) Story 3510 (PRE); Chumiesberg (fl. June) Ecklon & Zeyher 49.6 (C, LE, M, S, SAM, W), (fl. Sept.) 49.9 (BREM, FI, HAL, L, LD, P, PRE, UPS, US, W, WU, Z), anno 1836 (GOET, K, type); Winterberg, Ecklon anno 1836 (K, other part of the composite type sheet); Kat R. (fl. June) Ecklon & Zeyher 33.6 (C, G, L, OXF, P, S, W); Hogsback (fl. May) Bayliss 6411 (B, FHI, K, M, WAG); *ibid.* (fl. Apr.) Jacot-Guillarmod 5619 (K, PRE, STE); Katberg (fl. May) Bolus 1995 (BOL, W); Brambledean (fr. Sept.) M. J. Wells 3854 (GRA, K, PRE); Somerset E. (fr. July) Ecklon & Zeyher 115.7 (FI, HAL, S, W); *ibid.*, Bosberg (fl. May) Burchell 3157 (GH, K, L, M, P, W), (fl. June) 3179 (BOL, E, FI, GOET, K, NY, P, PRE, S).

Cult.: Great Britain: Kew Gardens (fl.), figured in Bot. Mag. t. 9409, A. D. Cotton 26 Oct. 1932 (K); Edinburgh (fl. Oct.) C 305 (BM, K). Spain: Barcelona, Montjuich (fl. Dec.) F. Secondeire 4357 (BM, G, K, W), 6918 (FI, G, W). S. Africa: Pretoria (fl. July) Schlieben & Mendelsohn 12841 (PRE); Brummeria Bot. Gard. (fl.) A. Meyer 1 Sept. 1976 (WAG); Kirstenbosch (fl. June) G. Edwards 99/36 (BOL, NBG).

3. ***Buddleja australis*** Vell., Fl. Flum. 1: 41. 1825, t. 104. 1835. Fig. 3, p. 25
Type not seen.

Heterotypic synonyms: *B. brasiliensis* Jacq. f. ex Spreng., Syst. 1: 430. 1824, partly (excl. syn. *B. perfoliata* H.B.K.); Jacquin, Eclog. 2: 10, t. 158. 1844; Bentham in De Candolle, Prod. 10: 442. 1846; Schmidt in Martius, Fl. Bras. 8(1): 281. 1862, illegitimate name. Basionym: *B. neemda* Link, Enum. 1: 125. 1821, not of Buch.-Ham. ex Roxb. (1820). Type: Cult. Hortus Vindobonensis, sin. coll. (W, holotype).

B. stachyoides Cham. et Schlecht., Linnaea 2: 597. 1827; Bentham, l.c.; Schmidt, l.c. p. 283, **syn. nov.** Type: Brazil: sin. loc., Sellow s.n. (holotype not seen, destroyed in B; fotogr. of it seen in G; isotypes seen: BM, G, K, P, W).

B. otophylla Hassk., Versl. Med. Kon. Ak. Wet. Afd. Nat. 5: 97. 1857. Type: Cult. Botanic Garden Bogor (L, probable type).

A shrub 1–3.5 m high. Branchlets quadrangular, stellate-tomentose. *Leaves* opposite, those of a pair equal, sessile, connate-perfoliate, or sometimes petiolate; petiole (if any) up to 15 mm long; blade narrowly ovate to more or less spatulate, 2.5–3 × as long as wide, 5–20 × 2–8 cm, acuminate at the apex, decurrent into the auriculate or perfoliate base or into the petiole,

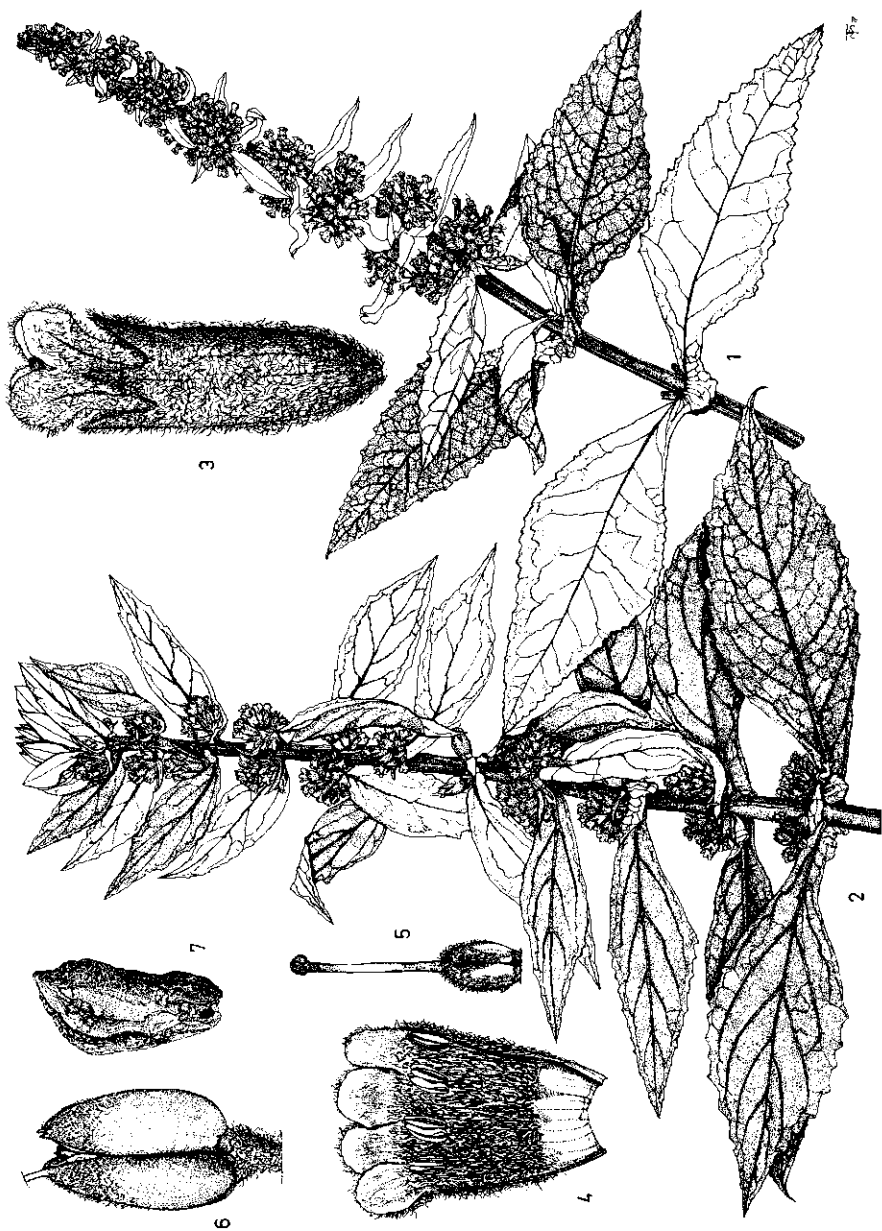


FIG. 3. *Buddleja australis*: 1-2. flowering branches, $\frac{1}{2} \times$; 3. flower, $5 \times$; 4. opened corolla, $5 \times$; 5. pistil, $5 \times$; 6. fruit, $5 \times$; 7. seed, $50 \times$ (1, 6-7). Cadet 4347; 2-5. Irwin c.s. 26235, S.E. of Paracatu, Minas Gerais, Brazil (WAG, dupl. of NY).

crenate-serrate, dark green and finally glabrous above, grey-tomentose with stellate hairs beneath; venation rather conspicuous. *Inflorescence* terminal, 8–30 × 2–3 cm, appearing as a continuous or interrupted spike of glomerulate cymes of sessile flowers subtended by leafy bracts which are 1–10 × as long as the flowers. *Calyx* campanulate, 4.5–7 mm long, outside densely stellate-tomentose to woolly, inside glabrous; tube about twice as long as the lobes; lobes subequal, triangular, 1.5–2.5 × 1.2–1.5 mm, acute, entire. *Corolla* with erect lobes about 1.5 × as long as the calyx, 7–10 mm long, yellow or orange, outside stellate-tomentose, inside pilose from near the level of the apex of the ovary to the base of the lobes; tube nearly cylindrical, 1–1.2 × as long as the calyx, about 3 × as long as the lobes, 5–7.5 mm long, slightly widened towards the throat; lobes suborbicular, 1.8–2.5 × 1.5–2.2 mm, rounded, sinuate, erect. *Stamens* included or barely exerted and then covered by the lobes; anthers sessile, inserted at 0.5–1 mm from the corolla mouth, oblong, 1–1.2 × 0.3–0.7 mm, deeply cordate at the base, apiculate to rounded at the apex, glabrous; cells parallel. *Pistil* 6–9 mm long; ovary ellipsoid, laterally compressed, 2–3 × 1.5–2.5 × 1–1.2 mm, hirt-pilose with stellate hairs at the apex, glabrous at the base or only at the very base, abruptly narrowed into the style, 2-celled; style at first included, later, especially after anthesis, exerted and longer, glabrous or with some minute hairs at the base, 4–5.5 mm long; stigma capitate, 0.3–0.4 mm in diam. In each cell one large oblong axile placenta with about 150–300 ovules. *Capsule* ellipsoid, 5–7 × 3–4 × 2–3 mm, obtuse or rounded, glabrous or nearly so; valves acute and torn at the apex. *Seed* medium brown, obliquely ellipsoid or polyhedral, 0.5–0.6 × 0.2–0.4 × 0.2–0.3 mm, reticulate, not winged.

Distribution: Southern Brazil, Bolivia, Paraguay, Argentina. Naturalized in St. Helena, Réunion, and Australia.

Ecology: Forest edges, gallery forests. Alt. 0–2000 m.

More than 100 specimens collected in America in the wild and several collected from cultivated plants examined and the following:

St. Helena: Mellis 159 (K); Diana's Peak (fl. Aug.) T. M. Salter 384/25 (BM).

Réunion: J. B. Potier s.n. (P); La Prévallée, Hauts de Brulé (fl., fr.) Rivals Oct. 1944 (P, TL); St. Denis (fl., fr. Dec.) Bosser 20945 (P); Brulé de St. Denis, Cadet 4347 (REUN, WAG); Cilaos, de l'Isle 569 (P).

Australia: Queensland: Ashgrove, Brisbane (fl.) S. L. Everist & C. T. White 6 Aug. 1934 (K).

Cult.: Netherlands: Wageningen (fl. Aug.) Belder 26 (WAG). S. Africa: Pretoria (fl., fr. Apr.) Repton 5252 (PRE).

Notes. The leaves may be petiolate, sessile (e.g. in the type of *B. stachyoides*) or connate-perfoliate (e.g. in the type of *B. brasiliensis*). Several intermediates between these forms have been observed among the collections from South America. Rival's collection has connate-perfoliate and sessile leaves on a single branchlet. Therefore *B. stachyoides* is reduced to a synonym here. More detailed information on this species will appear in NORMAN's forthcoming revision of the South American species.

4. *Buddleja axillaris* Willd. ex Roem. & Schult., Mant. 3: 97. 1827; Bentham in De Candolle, Prod. 10. 445. 1846; Baker, Journ. Linn. Soc. 20: 206. 1884.

Fig. 4, p. 28; Map 2, p. 29

Type: Madagascar: sin. loc., Anonym. 1278 in Herb. Willdenow (B-WILLD 2919, first sheet). Homotypic synonym: *Adenoplusia willdenowii* Radlk., Ber. Deutsch. Bot. Ges. 2: 259. 1884. Solereder in E.P. 4(2): 48. 1892.

Heterotypic synonyms: *A. axillaris* Radlk., Bremen Abh. 8: 462. 1883; Solereder, l.c. Type: Madagascar: E. Imerina, Andrangolôaka, Hildebrandt 3671 (M, holotype; isotypes: BM, BREM, C, COI, G, HBG, K, P, US, W, WAG, WU, Z).

B. comorensis Bak., l.c. Type: Comoro Islands: Anjouan (Johanna), Hildebrandt 1666 (K, holotype; isotypes: BM, L).

Adenoplusia ulugurensis Melch., Notizbl. Bot. Gart. Berlin 12: 203. 1934; Bruce & Lewis, Loganiaceae in Fl. Trop. E. Afr. 41. 1960. Type: Tanzania: Morogoro District, NW. Uluguru Mts., Schlieben 2756 (holotype not seen, destroyed in B; lectotype: M; isotypes: BR, G, LISC, P, S, WAG, Z).

A sarmentose shrub, 2–3 m high. Branchlets quadrangular, often obscurely winged, white-pubescent with stellate or simple hairs. Stipules leafy, united, entire or nearly so, 5–12 × 7–15 mm or smaller. Leaves opposite, petiolate or sessile; petiole – if present – mostly winged and up to 2 cm long; blade thinly coriaceous or almost membranaceous, ovate to narrowly elliptic, 2–5 × as long as wide, 6–30 × 2–10 cm, acuminate or sometimes apiculate at the apex, sometimes abruptly narrowed towards the base, decurrent into the petiole or more often into the wings of the branchlets; mostly shallowly crenate-dentate to subentire, sparsely and minutely pilose with stellate hairs above, white-tomentose to subglabrous beneath; secondary veins about 6–8 on each side. Inflorescence axillary, solitary, thyrsoïd, seemingly racemose, slender, 3–14 × 1–4 cm; larger in fruit; peduncle mostly short. Branches sometimes once branched. Bracts very small, linear. Flowers all at least shortly pedicellate, more or less clustered. Calyx campanulate, 2–4.2(–4.8) mm long, outside white-pubescent with often stellate and/or glandular hairs, inside appressed-pubescent with glandular and sometimes also ordinary hairs all over or only on the lobes; tube 1.5–4 × as long as the lobes; lobes subequal or unequal, often narrowly triangular, 1–2.5 × as long as wide, 0.5–1.7 × 0.4–1.5 mm, acute, entire. Corolla white or less often yellow, with erect lobes 1.5–3.5 × as long as the calyx, (5–)7–9(–17.5) mm long, outside pubescent with glandular and often also stellate or simple hairs, inside with a zone of pilosity about midway in the tube; tube nearly cylindrical, 1.2–3 × as long as the calyx, 3.2–6 × as long as the lobes, (3.8–)5–7(–15) mm long, at the throat 0.8–1.2(–2.2) mm wide; lobes more or less oblong, 1–1.6 × as long as wide, 1–2.5 × (0.8–)1–2.5 mm, rounded, entire or more or less obscurely sinuate or undulate, spreading. Stamens included; anthers sessile, inserted 0.5–1.5(–2) mm below the corolla mouth, oblong, 3–4 × as long as wide, (0.9–)1–1.2(–2) × (0.25–)0.3–0.4(–0.8) mm, very deeply cordate at the base, retuse at the apex, glabrous; cells

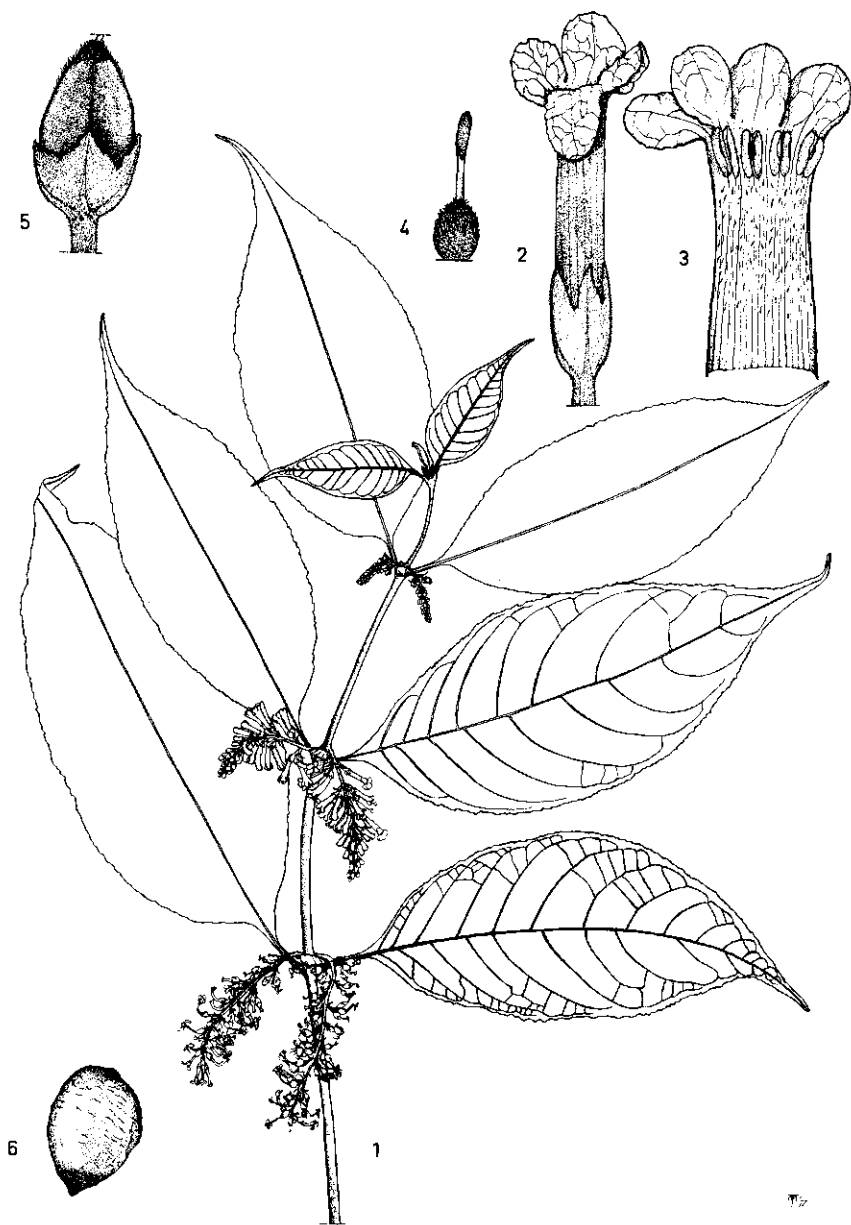


FIG. 4. *Buddleja axillaris*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $5 \times$; 3. opened corolla, $5 \times$; 4. pistil, $5 \times$; 5. fruit, $5 \times$; 6. seed, $15 \times$ (1-4. Capuron SF 20303; 5-6. Decary 18463).

parallel. *Pistil* 3.2–5 mm long, ovary ovoid or nearly so, laterally compressed, 1.2–2.2 × 0.8–1.5 × 0.6–1.1 mm, papillose and mostly with some hairs at the apex or pubescent all over, abruptly narrowed into the style, 2-celled; style with stigma 1.8–2.8 mm long, glabrous or only at the base papillose; stigma large, clavate, about as long as the style. In each cell one axile, approximately elliptic placenta with about 30–50 ovules outside. *Berry* 5–6 × 2.2–4 × 1.8–3 mm, papillose or pubescent with an impressed line along the line of dehiscence, simulating a capsule, apiculate. *Seeds* creamy, obliquely ellipsoid or ovoid, 0.3–0.4 × 0.2–0.25 mm, obscurely angular, obscurely pustulate.

Distribution: Tanzania, Comoro Islands, Madagascar.

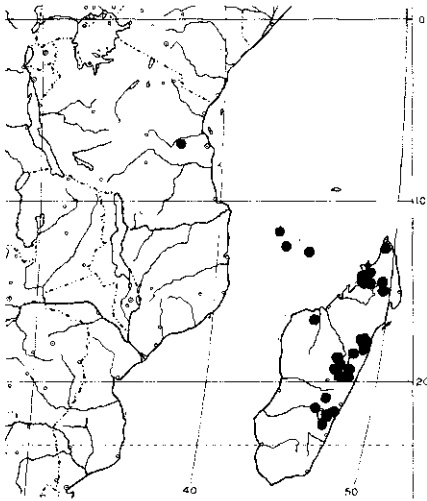
Ecology: Forests, often in the mountains. Alt. 300–1400 m.

Most of the specimens examined:

Tanzania: T6: Uluguru Mts. (fl. Sept.) Schlieben 2756 (BR, G, LISC, M, P, S, WAG, Z, type of *Adenopplusia ulugurensis*); *ibid.*, between Morningside and Bondwa (fl. Sept.) Mwasumbi DSM 2703 (EA).

Comoro Islands: Humblot 131 (BM, K, P). Grande Comore: Humblot 1604 (BM, P, W). Anjouan: Hildebrandt 1666 (BM, K, L, type of *B. comorensis*); Lavanchie s.n. (P). Mayotte: Boivin 15 (P), 3252 (P, WAG).

Madagascar: Mt. d'Ambre (fl., fr. July) Bosser 5631 (P); *ibid.* (fl. May) Debray H 1311 D (P); *ibid.* (fl. Dec.) Morat 1177 (P), 1203 (P); *ibid.* (fl. May) Capuron SF 29184 (P); Tsaratanana Mts. (fl. Apr.) Perrier de la Bâthie 16432 (P); *ibid.* (fl. Nov.) Capuron SF 24977 (P, WAG), 27071 (P); *ibid.* (fl. Nov.) Morat 2384 (P); N. of Mangindrano, Humbert & Capuron 25065 (P, WAG); Maravato, Ambanja District (fl. June) Sajy RS 4164 (P), 4378 (P); Manangarivo Mts. (fl. June) Perrier de la Bâthie 8623 (P); Bealanana District, Dufournet s.n. (P); Ankaizina (fl. Apr.) Decary 2051 (P); Anjanaribe (fl. Dec.) Cours 3695 (P); Andapa, Lokoho R. basin (fl. Nov.-Dec.) Humbert & Capuron 21960 (P); Andapa-Doany Road (fl., fr. Oct.) Jacquemin H 563 J (P); Upper Bemarivo R. (fl. Aug.) Perrier de la Bâthie 8631 (P, WAG); Maningory R. basin (fl. Sept.) Perrier



MAP 2. *Buddleja axillaris*

de la Bâthie 8618 (P); Onibe, Ambatondrazaka District (fl. Nov.) Cours 1005 (P, S); Andrangovallo Mts. (fl. Oct.) Humbert & Cours 17915 (K, P, US, WAG); Antsianaka, E. of Lake Alaotra (fl. Nov.) Humblot 461 (K, P, W); Samalahaza, Dequaire 27888 (P, WAG); Sahatavy (fl. Aug.) Laibosaka RS 11328 (P), (fl. Sept.) 10509 (P); Didy (fl. Aug.) Catat 1817 (P); Mandraka Forest (fl. July) Decary 13485 (P); Mandraka R. valley (fl. Aug., fr. Oct.) Capuron SF 20303 (P, WAG); *ibid.* (fl. Aug.) Humbert 2286 (BM, G, K, P); Andrangoloaka, E. Imerina (fl. Nov.) Hildebrandt 3671 (BM, BREM, C. COI, G, HBG, K, M, P, US, W, WAG, WU, Z, type of *Adenopplusia axillaris*); between Junok and Rogez (fl. Oct.) Viguier & Humbert 709 (B, P); Anjiro (fl.) Decary 11 Mar. 1917 (P); Manisana (fl. June) d'Alleizette 887m (P); Toby, Moramanga (fl. July) Serv. For. 26769 (P, WAG); between Sandrangato and Anosibe (fl. Nov.) Léandri & Capuron 1531 (P); Anosibe (fl. Sept.) Decary 18463 (P, WAG); East Betsileo, Baron 286 (K); Fianarantsoa (fl. Aug.) Serv. For. 2041 (P); Pte. de Farafangana (fl. Oct.) Decary 5578 (P, PRE, W); Namorana R. valley, Decary 13757 (P); Rienana R. valley (fl. Nov.) Humbert 3609 (B, G, P); *sin. loc.*, Baron 1481 (K), 1980 (BM, K, P), 4055 (K), 6299 (K), 6673 (BM, K, P).

Note. *Buddleja axillaris* is closely allied to *B. cuspidata* and *B. sphaerocalyx*. They differ as follows:

- | | |
|--|------------------------|
| 1. Leaves connate-perfoliate; calyx inflated | B. sphaerocalyx |
| Leaves petiolate or sessile; calyx not inflated | 2 |
| 2. Stems and leaves beneath brown-tomentose when dry; flowers sessile. | |
| | B. cuspidata |
| Stems white-pubescent to subglabrous, also when dry; flowers always pedicellate. | B. axillaris |

5. ***Buddleja cordata*** H.B.K., Nov. Gen. 2: ed. qu. 348, ed. fol. 280, t. 185. 1818; Bentham in De Candolle, Prod. 10: 438. 1846; Norman, The genus *Buddleia* in North America, Gentes Herbarum 10: 67. 1967, partly (only the subsp. *cordata*). **Fig. 5, p. 31; Phot. 2, p. 32; Phot. 3, p. 33; Phot. 4, p. 34**

Type: Mexico: Guanajuato R. valley, Humboldt & Bonpland s.n. (P-BO, holotype).

Dioecious shrubs or trees, usually 2–12 m high, sometimes up to 20 m. Trunk at the base 10–45 cm in diam., with brownish or blackish furrowed bark. Branchlets subquadrangular, stellate-tomentose, glabrescent. *Leaves* opposite, those of a pair equal, petiolate; petiole 1–4 cm long; stipules sometimes present, leafy; blade ovate, narrowly ovate, or narrowly elliptic, about 2–4 × as long as wide, 4–23 × 3–14 cm, acute or acuminate at the apex, subcordate to cuneate at the base, sometimes decurrent into the petiole, entire or serrulate, medium green, glabrous or sparingly stellate-vestite and glandular above, beneath whitish or yellowish, mostly with two types of stellate tomentum – one of strongly appressed hairs, the other of loose, floccose candelabra hairs – the latter may be wanting. *Inflorescence* terminal, paniculate, 6–30 cm long, with at least two orders of branches; the lowermost pair of branches subtended by leaves, the upper ones by small bracts. *Flowers* grouped into shortly pedunculate cymes, fragrant. *Calyx* amply tubular, about 2–3 mm long, stellate-tomentose outside, glabrous inside; tube 1–1.8 mm long; lobes broadly triangular, equal or subequal, 0.5–1.5 × 1.2–1.5 mm, obtuse or subacute, entire. *Corolla* white,

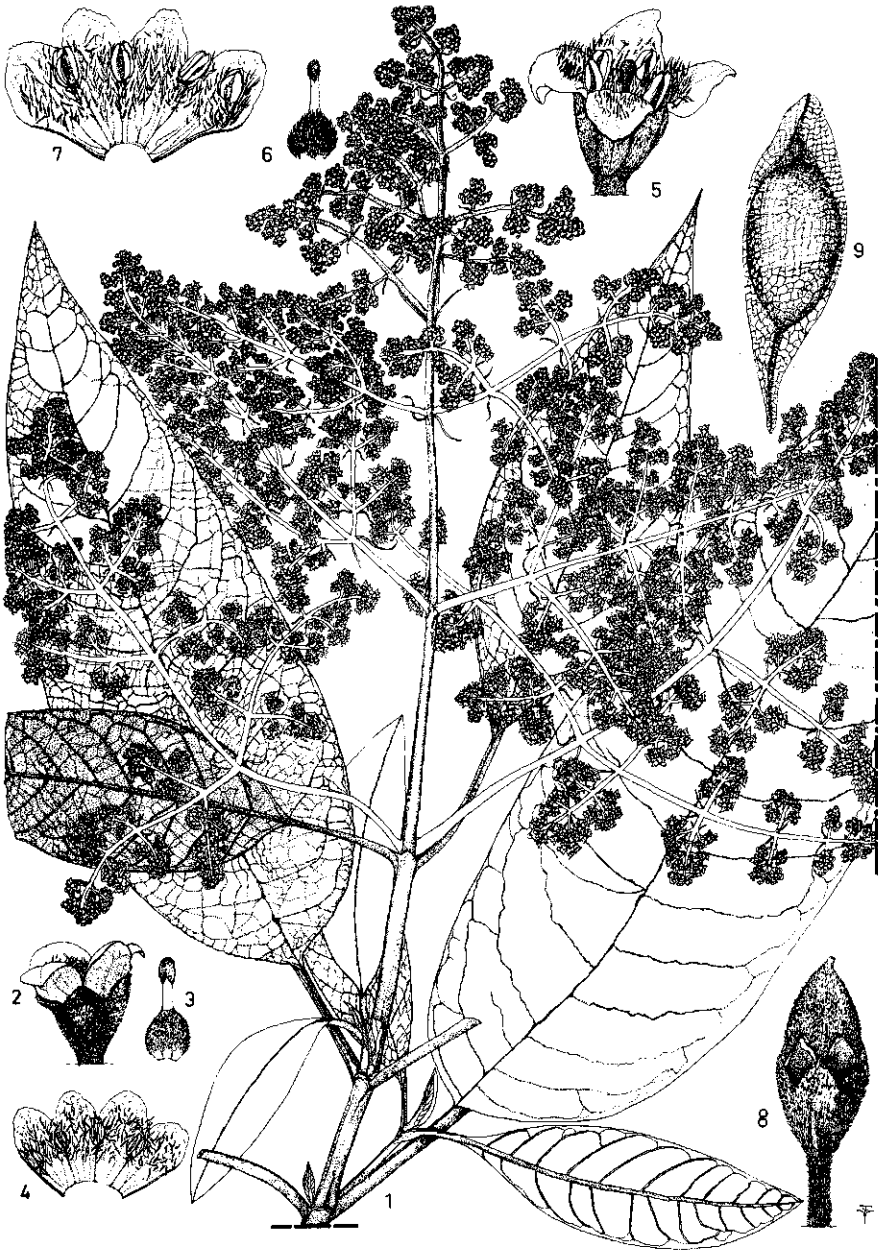
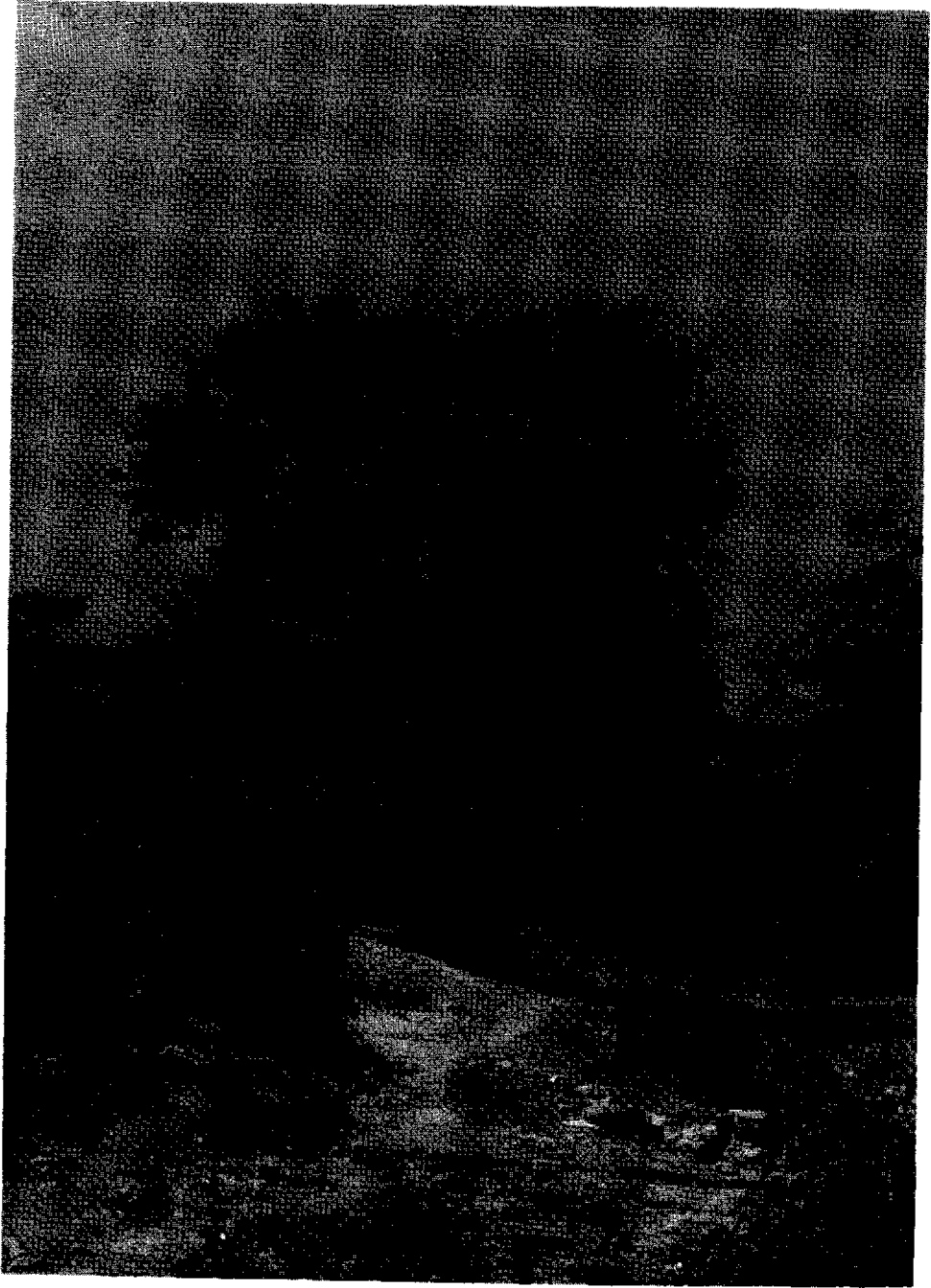


FIG. 5. *Buddleja cordata*: 1. flowering branch, $\frac{1}{2} \times$; 2. female flower, $5 \times$; 3. pistil, $5 \times$; 4. opened corolla with staminodes, $5 \times$; 5. male flower, $5 \times$; 6. pistillode, $5 \times$; 7. opened corolla with stamens, $5 \times$; 8. fruit, $5 \times$; 9. seed, $50 \times$ (1-4. J. de Wilde 5480; 5-7. P. Jansen 7278; 8-9. P. Jansen 7279).



PHOT. 2. *Buddleja cordata* (P. Jansen 7278, phot. H. C. D. de Wit, Ethiopia).



FIG. 3. *Buddleja cordata* ♀ (P. Jansen 7278, phot. H. C. D. de Wit, Ethiopia).



PHOT. 4. *Buddleja cordata* ♂ (P. Jansen 7279, phot. H. C. D. de Wit, Ethiopia).

creamy, or yellow, with a flush of orange at the throat, campanulate, with erect lobes about $1.5 \times$ as long as the calyx, stellate-tomentulose outside on upper two-thirds, inside hirto-pilose in upper half of the tube and lower half of lobes; tube shorter to slightly longer than the calyx, 1.5–2.5 mm long; lobes ovate or nearly so, 1.2–2.2 mm long, rounded, entire or nearly so, spreading. *Stamens* slightly exserted, inserted just below the corolla mouth; filaments short or very short, about $0.3-1 \times$ as long as the anthers, pilose; anthers in male flowers $0.6-1 \times 0.3-0.7$ mm, glabrous, rounded at the apex or approximately so, deeply cordate at the base, in female flowers smaller, about 0.4–0.5 mm long. *Pistil* longer than the staminodes; pistillode about as long as the stamens; ovary stellate-tomentose and often also with glandular hairs, glabrous at the very base or not, ovoid or nearly so, often laterally compressed, in male flowers about $0.8-1.2 \times 0.8-1 \times 0.5-0.8$ mm, in female larger and up to 1.8 mm long,

abruptly narrowed into the style, 2-celled; style glabrous, 0.5–1.4 mm long; stigma clavellate or nearly so, 0.2–1 × 0.2–0.5 mm, obscurely 2-lipped. In each cell one axile placenta with about 50 ovules. *Capsule* oblong, 3.5–5 × 1.5–2 mm, acute at the apex, with glandular and stellate hairs, opening septically for more than half of its length, loculicidally only at the apex. *Seeds* numerous, oblong, 1.2–2 mm long; testa reticulate, extending into prominent wings.

Distribution: Mexico. Cultivated in Ethiopia.

Ecology: Montane forests. Alt. 1500–3000 m.

African specimens examined:

Ethiopia: cult. in garden, Harrar (♂ fl.) Baldrato Dec. 1937 (FI); Mt. Hakim (♀ fl., fr. Aug.) W. Burger 3111 (K, WAG); *ibid.* (♀ fl., fr. July) J. de Wilde 5480 (WAG); *ibid.* (♀ fl. Mar.) P. Jansen 5243 (WAG), (♀ fl., Dec.) 7278 (WAG), (♂ fl., fr. Dec.) 7279 (WAG).

Notes. The description is mainly copied from NORMAN (1967) who gives an elaborate synonymy in her revision. Some of the specimens cited there and some additional ones collected in the wild have been examined. Unfortunately Mrs. M.-NORMAN failed to indicate the difference between the male and female flowers as tried here.

6. ***Buddleja cuspidata*** Baker, Kew Bull. 1895: 113. 1895.

Fig. 6, p. 36, Map 3, p. 40

Type: N. Madagascar: sin. loc., Baron 6489 (K, holotype; isotype: P).

Shrub 3–4 m high. Branchlets brown-tomentose, obscurely quadrangular. Stipules leafy, enrolled, about 2 mm long. *Leaves* opposite, shortly petiolate or sessile; petiole brown-tomentose, up to 1 cm long; blade thinly coriaceous, ovate or elliptic, 2.5–3 × as long as wide, 9–20 × 4–9 cm, acuminate at the apex, decurrent into the petiole or the base, serrate-dentate or crenate-dentate, sparsely pubescent above, brown-tomentose beneath. *Inflorescence* axillary, spicate, 3–15 × 1–1.5 cm. Bracts linear, lower ones about as long as the flowers, the others shorter than the calyx. *Flowers* sessile. *Calyx* campanulate, 2.2–2.5 mm long, outside brown-tomentose with ordinary and glandular hairs, inside minutely pubescent with glandular hairs; tube 3.6–4 × as long as the lobes; lobes (sub)equal, triangular, 0.6 × 0.6 mm, acute, entire. *Corolla* yellow (teste Perrier), with erect lobes 3.5 × as long as the calyx, 7.5–8.5 mm long, outside pubescent with glandular and ordinary hairs, inside about midway with a zone of pilosity; tube nearly cylindrical, 2.8 × as long as the calyx, 4–5 × as long as the lobes, 6–7 mm long; lobes more or less oblong, 1.4 × 1–1.5 × 1.2 mm, rounded, obscurely sinuate or undulate, spreading. *Stamens* included; anthers sessile, inserted about 1 mm below the corolla mouth, oblong to triangular, 0.8 × 0.3–0.4 mm, deeply cordate at the base, retuse at the apex, glabrous; cells parallel. *Pistil* 3.6–4.2 mm long; ovary ovoid, laterally compressed, 1.4–1.5 × 1.2 × 0.6–0.8 mm, papillose except for the glabrous extreme base,

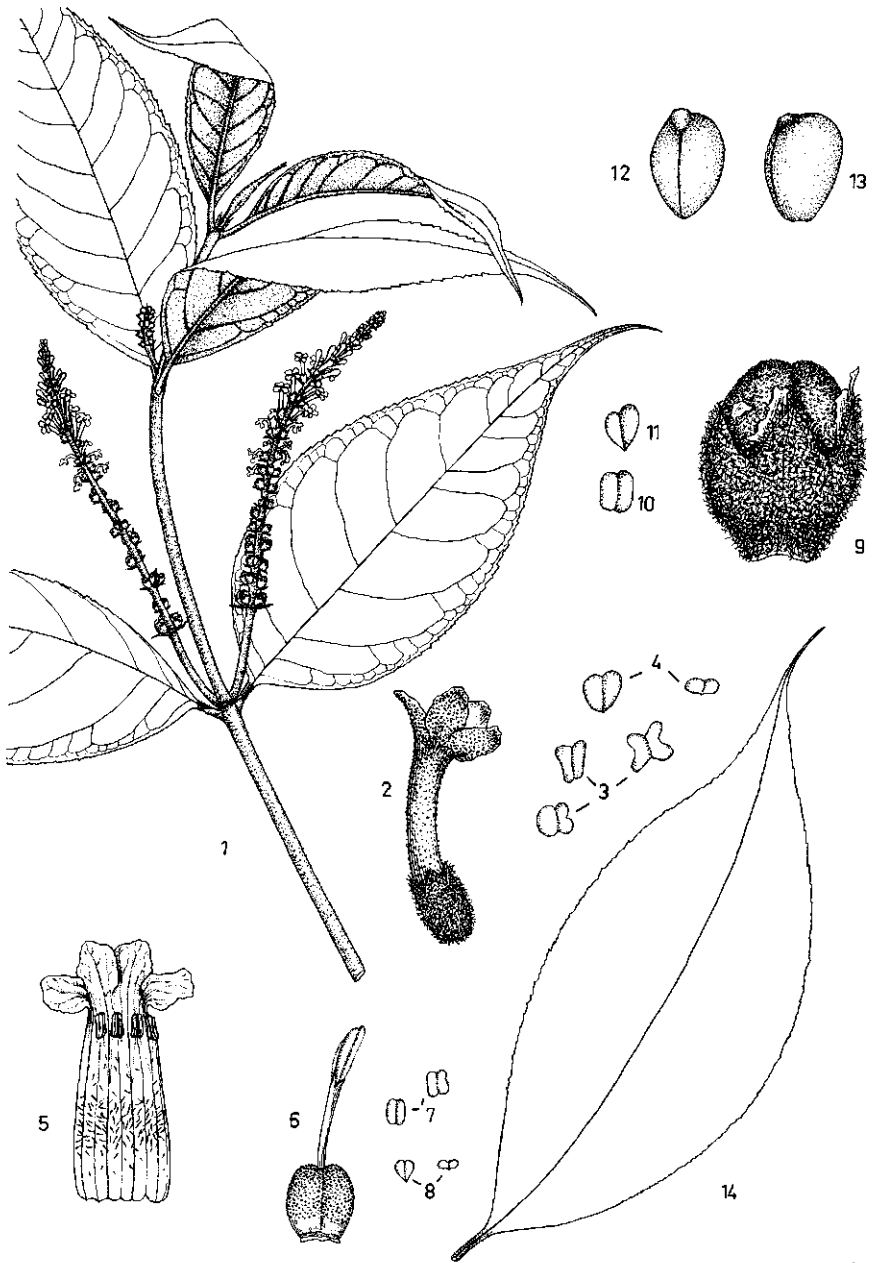


FIG. 6. *Buddleja cuspidata*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $5 \times$; 3. glands of corolla tube above, $90 \times$ and 4. laterally, $90 \times$; 5. opened corolla, $5 \times$; 6. pistil, $10 \times$; 7. glands of ovary, above, $90 \times$ and 8. laterally, $90 \times$; 9. immature fruit, $7 \times$; 10. glands of fruit above, $90 \times$ and 11. laterally, $90 \times$; 12-13. immature seeds, $42 \times$; 14. leaf, $\frac{1}{2} \times$ (1. Perrier de la Bâthie 8609; 2-14. Baron 6489).

abruptly narrowed into the style, 2-celled; style with stigma 2.2–2.7 mm long, papillose at the base, further glabrous; stigma large, clavate, about as long as the style. In each cell one axile suborbicular placenta with about 50 ovules outside. Fruit supposed to be a berry.

Distribution: Madagascar.

Ecology: River banks, forests (?).

Specimens examined:

Madagascar: between Vohemar and Ambilobe (fl. July) Decary 14681 (P, WAG); Bemarivo R. banks (fl. Nov.) Perrier de la Bâthie 8609 (L, P); sin. loc. Baron 6489 (BM, K, P, type).

Note. *B. cuspidata* is closely allied to *B. axillaris* (q.v.) and *B. sphaerocalyx*.

7. ***Buddleja dysophylla*** (Benth.) Radlk., Abh. Nat. Ver. Bremen 8: 410. 1883; Phillips, Journ. S. Afr. Bot. 12: 114. 1946, superfluous combination; Bruce & Lewis, Loganiaceae in Fl. Trop. E. Afr. 40. 1960; Verdoorn in Fl. S. Afr. 26: 167, f. 23.4. 1963; Palmer & Pitman, Trees S. Afr. 3: 1888. 1973; Brummitt, Kew Bull. 31: 173. 1976. **Fig. 7, p. 38; Map 3, p. 40**

Basionym: *Nuxia dysophylla* Benth. in Hooker, Comp. Bot. Mag. 2: 60. 1836.

Type: S. Africa: Cape Province: Uitenhage and Albany Districts and Neutral Territory, Ecklon 1836 (K, composite sheet, herb. Bentham).

Homotypic synonym: *Chilianthus dysophyllus* (Benth.) A. D.C. in De Candolle, Prod. 10: 436. 1846; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 46. 1892; Sim, For. Fl. Cape Col. 276. 1907; Prain & Cummins in Fl. Cap. 4(1): 1045. 1909.

Heterotypic synonym: *C. dysophyllus* var. *rufescens* Sond., Linnaea 23: 85. 1850. **Type:** S. Africa: Natal: Durban, Gueinzus 586 (holotype not seen, destroyed in B; lectotype: W; other isotype seen: S).

Shrub, straggling or scandent (erect if isolated), 1–10 m high, divaricately branched. Bark pale brown. Branchlets terete to quadrangular, striate, tawny- or rusty-pubescent to densely tomentose (also when living), hairs rather long and often stellate. Interpetiolar ridge distinct, often prominent. *Leaves* opposite, petiolate; petiole hairy as branchlets, 0.3–3 cm long; blade almost triangular to ovate, 1.5–2(–3) × as long as wide, 1–10 × 0.7–7.5 cm, with base truncate, subcordate, or wedge-shaped, often decurrent into the petiole, acuminate to rounded at the apex, irregularly dentate to crenate, sparsely to densely stellate-tomentose and glabrescent above, beneath persistently sparsely to densely stellate-pubescent or -tomentose; veins impressed above, prominent beneath, more or less distinctly reticulate. *Inflorescence* terminal, paniculate, large, lax or less often more or less congested in ultimate branchings, many-flowered, 4 × 4 – 20 × 20 cm. Peduncle, branches, and pedicels hairy as branchlets. Lower bracts leafy, the others smaller, upper ones almost sepal-like, but narrower. *Flowers* all at least shortly pedicellate, occasionally sessile, sweet-

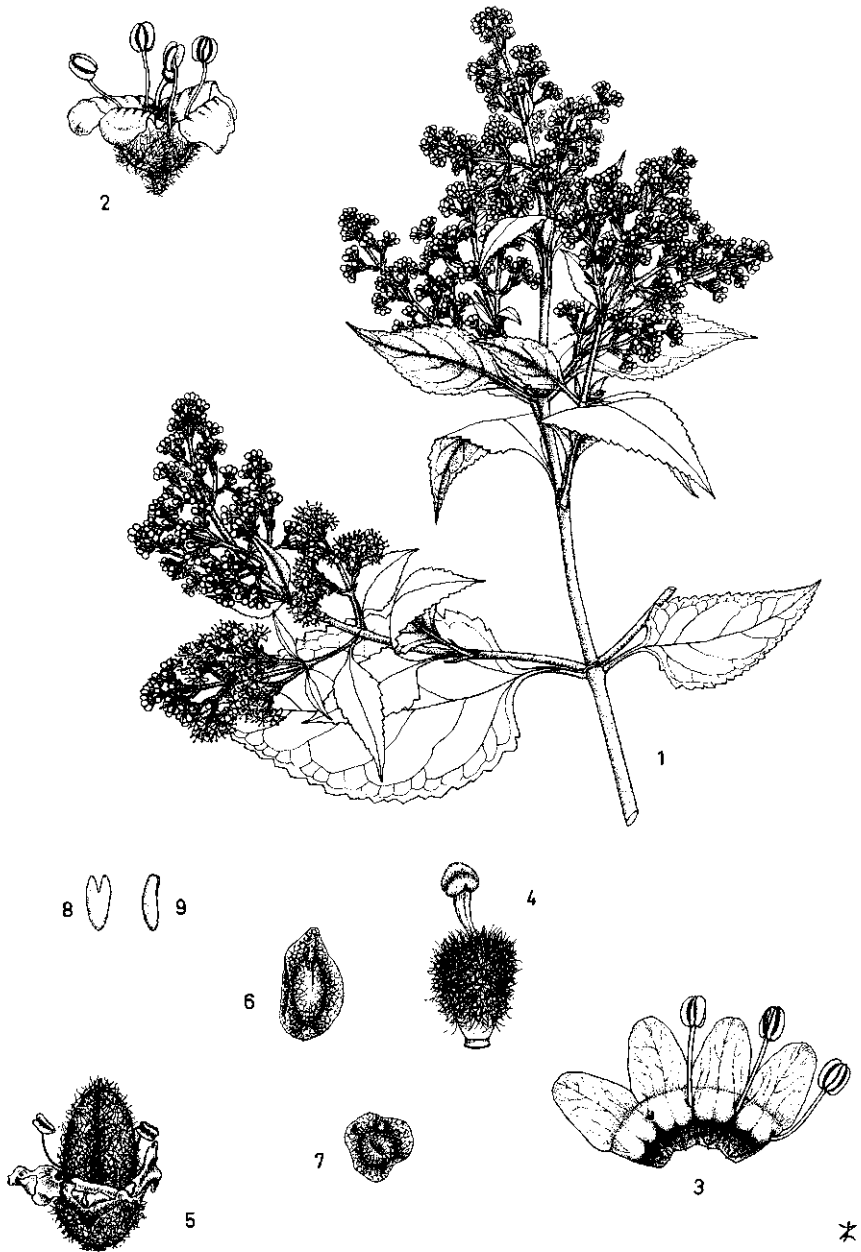


FIG. 7. *Buddleja dysophylla*: 1. flowering branch, $\frac{1}{2}\times$; 2. flower, $5\times$; 3. opened corolla, $5\times$; 4. pistil, $10\times$; 5. fruit, $5\times$; 6-7. seeds, $15\times$; 8-9. embryos, $45\times$ (1-4. Salubeni 1476; 5-9. Pegler 1154).

scented. *Sepals* up to one-third connate, sometimes two halfway united, equal or subequal, ovate or approximately so, $1.5-3 \times$ as long as wide, $0.8-2 \times 0.5-1$ mm, obtuse to acuminate, entire, tawny- or rusty-tomentose outside, (with a few minute glandular hairs or less often) glabrous inside. *Corolla* white, greenish, creamy, or yellowish (or pale mauve, ex PALMER & PITMAN) with maroon coloured throat (teste Archibald 5501) with erect lobes $2-3 \times$ as long as the calyx and $2.5-5$ mm long, outside mostly at least on lobes papillose-pubescent and sometimes also pilose on tube on which both types of hairs may occur among each other, inside papillose-pubescent on lobes, glabrous in tube; tube cup-shaped, often slightly contracted at mouth, slightly longer than the calyx, about as long as the lobes, $1.2-2.5 \times 1.5-2.5$ mm; lobes suborbicular, $1-1.2 \times$ as long as wide, $1.2-2.5 \times 1.2-2.2$ mm, rounded, entire, suberect at first, later recurved. *Stamens* mostly well-exserted; filaments long, often curved, $1-3$ mm long, elongate at anthesis, glabrous or with a few glandular hairs, inserted $0.1-0.5$ mm below the corolla mouth; anthers suborbicular, $0.3-0.8$ mm long, glabrous, cordate at the base; cells slightly divergent at the base. *Pistil* $2-4$ mm long; ovary obovoid or ellipsoid, laterally compressed, $1.2-2 \times 0.9-1.3 \times 0.5-1$ mm, tomentose except for the glabrous disk-like base, abruptly narrowed into the curved, glabrous style, 2-celled; style broadened at apex, with large stigma $0.8-2$ mm long; stigma up to half as long as the style, more or less peltate or clavate. *Capsule* ovoid or ellipsoid, $2.2-3.4 \times 2-2.3 \times 1.2-1.5$ mm, tomentose, about $3 \times$ as long as the calyx, apiculate, indented along the line of dehiscence. *Seed* pale brown, flattened, winged, often obscurely angular, orbicular, obliquely elliptic, or ovate, often angular, $0.6-0.7 \times 0.4-0.5 \times 0.2$ mm, pale brown, minutely reticulate; grain ellipsoid, $0.5 \times 0.3 \times 0.2$ mm; wing slightly diaphanous. Embryo 0.3×0.1 mm; cotyledons not wider than rootlet.

Distribution: Southern Africa from Zaire (Shaba) and Tanzania to Malawi and from Transvaal to eastern Cape Province.

Ecology: Forest edges or scrub. Alt. $0-2600$ m ($0-1100$ m in Swaziland, Transkei, and S. Africa; $2000-2600$ m in Zaire, Tanzania and Malawi).

A selection of the about 140 specimens examined:

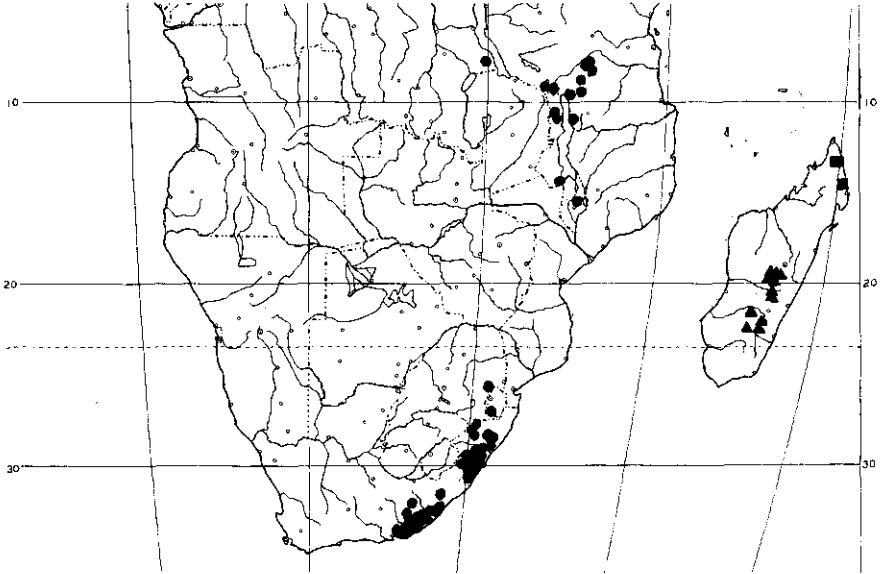
Zaire: Shaba: Kipiri, Marunga, Kankombwa R. gorge (fl. Nov.) Quarré 7275 (BR).

Tanzania: T7: km 31 Iringa-Mbeya Road, Leeuwenberg 10849 (EA, WAG); Upper Ruhudje (fl. Aug.) Schlieben 1112 A (B, BM, BR, G, K, M, P, S, Z); km 3 Njombe-Mbeya Road (fl. Sept.) Semsei 2460 (EA, K, SRGH); Mufindi (fl. Oct.) Balbo 428 (FI, TOM). T 8: Matengo-Songea (fl. Aug.) F. Zimmer 45 (BM).

Malawi: N. end of Nyika Plateau, Brummitt c.s. WC 248 (K); *ibid.*, near Muzengapakweru (fl. Aug.) Synge WC 346 (K); Dedza Mt. (bud June) Brummitt & Salubeni 11691 (WAG); *ibid.* (fl. Aug.) Salubeni 1388 (K, PRE, SRGH), (fl. July) 1476 (K, PRE, SRGH); Zomba Plateau (fl. Aug.) Brummitt 12400 (K, PRE, WAG).

Swaziland: Hlatikulu Forest (fl. August) Compton 27945 (NBG, PRE).

Transkei: Baziya (fl. June) R. Baur 645 (SAM); Willowvale District, 5 km N. of Cats Pass (fl. July) Strey 6707 (BR, K, M, NH, PRE, S); Kentani District (fl. July) Pegler 1154 (BOL, BR, NBG, P, PRE, SAM, US, W, Z).



MAP 3. ■ *Buddleja cuspidata*; ◆ *B. dysophylla*; ▲ *B. fusca*

S. Africa: Transvaal: Barberton (fl. July) Galpin 971 (BOL, K, NH, PRE, SAM, Z). Natal: between Vryheid and Nongoma (fl. Aug.) Pole Evans 3572 (GH, K, PRE), 3580 (K, NH, P, PRE); Ngome Forest (fl. July) Gerstner 4875 (PRE); between Estcourt and Weenen (fl. Aug.) Acocks 10512 (NH, PRE); Bray Hill, Mooi R. (fl. July) H. H. Johnston 978 (E), (fl. Sept.) 992 (E); Upper Umkomaas Valley, Impendle District (fl. June) D. Edwards 3149 (K, NY, PRE); Alberts Falls, near Greytown (fl. July) Verdoorn 1710 (K, P, PRE); Pietermaritzburg (fl. July) Moss 4674 (BM, J, Z); Umbumbulu (fl. Aug.) J. M. Wood 6494 (G, LD, WAG); Inanda (fl. July) Strey 8756 (E, EA, K, PRE, SRGH); *ibid.*, J. M. Wood 608 (BM, BOL, GRA, K, Z); near Avoca (fl. Aug.) Schlechter 3013 (BM, BOL, COI, FR, G, HBG, K, LE, MO, MPU, PRE, W, WU, Z); near Durban (fl. July) J. M. Wood 8318 (E, G, Z), 8663 (MO, P, S); Umkomaas Valley, Richmond Road (fl. July) Sidey 3374 (K, PRE, S, SRGH, US); Dumisa, Alexandra District (fl. July) Rudatis 1078 (BM, E, G, GRO, HBG, K, L, LY, M, P, PRE, S, W, WRSL, Z), 1079 (BM, E, K); Horseshoe farm, Port Shepstone District, Strey 5869 (K, NH, PRE). Cape Province: near King Williamstown (fl. July) Tyson 1024 (BM, BOL, PRE, SAM, STE); near Komgha (fl. Aug.) Flanagan 247 (PRE, SAM); Keiskamahock (fl. July) Kotsokoana 172 (J, PRE); Olifantshoek, near Boesmans R., Ecklon anno 1836 (GOET); near Grahamstown (fl. Feb.) Schönland 1638 (G, GH, UPS, Z); *ibid.*, same date, Glass 1638 (K, P, SAM, W); *ibid.* (fl. Sept.) MacOwan 292 (BM, BOL, GH, GRA, K, NH, WU, Z); Belmont Valley (fr. Sept.) Jacot-Guillarmod 4971 (WAG); Howison Poort, Zeyher 3525 (FR, S, SAM, W); Kaba Valley, Alexandria District (fl. July) Archibald 5501 (K, PRE, STE, UPS); Blaauw Krantz (fr. Sept.) Burchell 3647 (GH, K, LE, NY, P); Albany, Karrega R. (fr. Sept.) Ecklon & Zeyher 10.9 (C, FI, G, HAL, L, LE, MO, P, S, SAM, W, WAG); Port Alfred (fl. July) F. S. Salisbury 146 (CGE, PRE); Ceded Territory, between Konapi and Kat R. (fl., fr. June) Ecklon & Zeyher 43.6 (BREM, C, E, FI, FR, GH, GOET, HAL, HBG, L, LE, MO, NY, P, S, SAM, UPS, US, W, WU, Z); Kafferdrift, Peddie District (fl. July) W. Marais 417 (GRA, K, LD, MO, PRE).

Cult.: Australia: Longueville, Sidney (fl. Aug.) S. Helms 1329 (C); Brisbane Bot. Gard. (fl. Aug.) C. T. White 3305 (A).

8. *Buddleja fragifera* Leeuwenberg, Acta Bot. Neerl. 24: 83. 1975.

Fig. 8, p. 42; Map 5, p. 59

Type: Madagascar: Andrahomana, SW. of Fort Dauphin (fl. Feb.) Humbert & Capuron 29124 (P, holotype; isotype: WAG).

Shrub 2–3 m high. Branchlets stellate-pubescent, rusty when dry. *Leaves* opposite, those of a pair equal, rather long-petiolate; petiole 0.3–0.5 × as long as the blade, stellate-tomentose, 4–10 mm long; blade broadly ovate, ovate or elliptic, 1.2–1.5(–2.5) × as long as wide, 8–30 × 5–24 mm, obtuse or rounded at the apex, subcordate to cuneate at the base, sinuate or entire, with a thick felt-like indumentum of stellate hairs underlain by glandular trichomes, somewhat glabrescent above; 3–4 pairs of secondary veins, only above more or less conspicuous; tertiary venation inconspicuous on both sides. *Inflorescence* a globose head, terminal, 8–15 mm in diam., sometimes subtended by 2 leafy bracts which are much narrower than the leaves. *Flowers* sessile. *Calyx* often subtended by 1–2 much shorter sepal-like bracteoles, campanulate or nearly so, 2–2.5 mm long, outside stellate-tomentose, inside glabrous; tube slightly longer than the lobes; lobes subequal, often broadly triangular, 0.8–1.2 × 1–1.2 mm, obtuse or rounded at the apex, entire. *Corolla* dark yellow to orange-red, with erect lobes 2.4–3 × as long as the calyx, 6–7.5 mm long, outside stellate-tomentose in upper half, glabrous at the base (also above the calyx), inside pilose from near the level of the apex of the ovary to the insertion of the stamens; tube nearly cylindrical, 2–2.3 × as long as the calyx, 3–3.5 × as long as the lobes, 4.8–5.8 mm long, slightly widened towards the throat or not, at the throat 1 mm wide; lobes broadly oblong, 1.2–1.7 × 1–1.3 mm, rounded, obscurely crenate or entire, spreading. *Stamens* just included; anthers sessile with apices in corolla mouth, oblong, 1–1.2 × 0.3–0.4 mm, retuse at the apex, deeply cordate at the base, glabrous; cells parallel. *Pistil* 4 mm long; ovary subglobose, laterally compressed, 1 × 0.9 × 0.5 mm, hirtio-pubescent with stellate hairs, abruptly narrowed into the style, 2-celled; style 2.2 mm long, hirtio-pubescent with stellate hairs at the base, glabrous at the apex; stigma narrowly obovoid, 0.8 mm long, obscurely bilobed. In each cell one axile placenta with 7 ovules attached to the septum. *Infructescence* subglobose, about 15 mm in diam. *Berry* obovoid, about 5–7 × 3–5 × 3 mm, mucronate at the apex, pubescent with glandular and ordinary hairs, 6–14-seeded. *Seed* dark brown, obliquely ellipsoid to obliquely tetrahedral, 1.2–1.6 × 0.9–1 × 0.8–0.9 mm, often partially narrowly winged, minutely reticulate, shiny. Embryo straight, white, 0.8–1 mm long; cotyledons suborbicular, 0.4–0.5 mm long, rootlet obtuse, 0.2–0.3 mm thick.

Distribution: Only known from some localities in the extreme South of Madagascar.

Ecology: Bush, near the coast.

Paratypes:

Madagascar: South, Faux Cap (fl. Oct.) Bosser 10299 (P, WAG); between Ambovombe and Faux Cap (fl. Mar.) Bosser 14379 (P); Ambovombe (fl., fr. May) Decary 2725 (P, WAG), 2758 (P, WAG).

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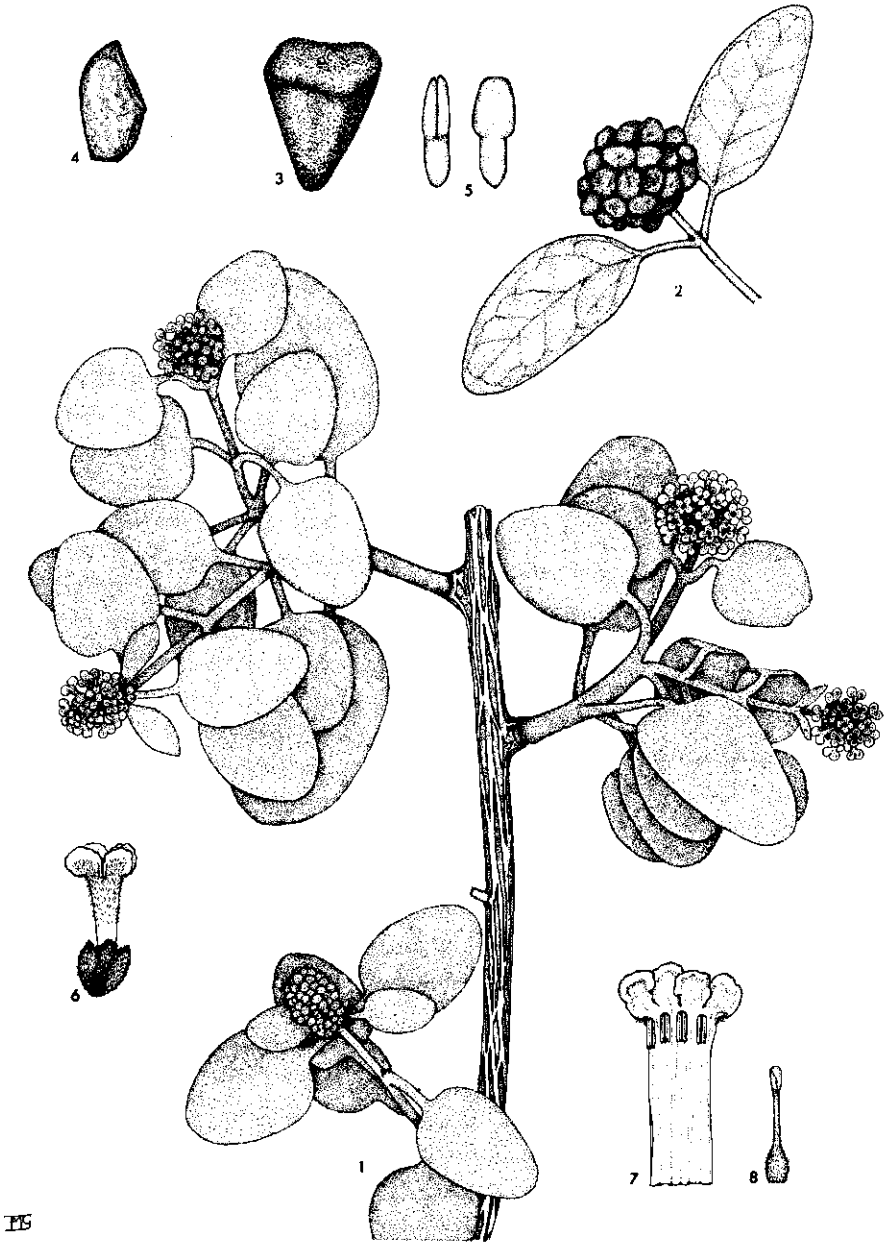


FIG. 8. *Buddleja fragifera*: 1. flowering branch, 1 × ; 2. infructescence, 1 × ; 3. fruit, 4 × ; 4. seed, 10 × ; 5. embryo, 15 × ; 6. flower, 3 × ; 7. opened corolla, 4 × ; 8. pistil, 4 × (1. Humbert & Capuron 29124; 2-5. Decary 2758; 6-8. Bosser 10299).

9. *Buddleja fusca* Bak., Journ. Linn. Soc. 20: 205. 1884.

Fig. 9, p. 44; Map 3, p. 40

Type: Central Madagascar: sin. loc., Baron 1830 (K, holotype; isotypes: K, P).

Shrub 1–3 m. Branchlets nearly terete, stellate-tomentose with rusty hairs when dry. *Leaves* opposite, variable in shape and size, petiolate; petiole 1–5 mm long, stellate-tomentose; blade elliptic or ovate, $1.5\text{--}3 \times$ as long as wide, $1\text{--}4.5 \times 0.5\text{--}2.2$ cm, rounded to acuminate at the apex, cuneate to truncate at the base, repand-dentate to entire, dark green, stellate-tomentulose to glabrous, with impressed reticulate venation, and often bullate above, stellate-tomentose and with prominent reticulate venation beneath. *Inflorescence* thyrsoid, rather congested, terminal and also axillary, $1.5\text{--}6 \times 1.5\text{--}2$ cm. Some bracts, especially the lower ones, leafy; the others very small, linear or nearly so. Peduncle, branches, and pedicels stellate-tomentosé. *Flowers* sessile or shortly pedicellate, fragrant (teste Schlieben 8186). *Calyx* not subtended, campanulate, $2.5\text{--}3.5 \times 2\text{--}2.5$ mm, outside stellate-tomentose, inside glabrous or with some minute glandular hairs; tube $2.5\text{--}4 \times$ as long as the lobes; lobes subequal, often broadly triangular, $0.6\text{--}1.5 \times 0.8\text{--}1.5$ mm, acute or obtuse, entire. *Corolla* yellow or orange, with erect lobes $2.5\text{--}4 \times$ as long as the calyx, 8–11 mm long, outside stellate-tomentose, inside densely pilose in the tube from near the level of the apex of the ovary to that of the insertion of the stamens; tube nearly cylindrical, $2\text{--}3 \times$ as long as the calyx, $2.3\text{--}3.7 \times$ as long as the lobes, 6.5–8.5 mm long, slightly widened towards the throat and there 1.5–2 mm wide; lobes mostly slightly longer than wide, $1.5\text{--}3 \times 1.5\text{--}3$ mm, rounded, entire, spreading. *Stamens* barely included; anthers sessile, with the apex at the level of the corolla mouth, oblong, $1\text{--}1.2 \times 0.3\text{--}0.6$ mm, obtuse to emarginate at the apex, deeply cordate at the base, glabrous; cells parallel. *Pistil* slightly shorter than the corolla tube, 5.5–7.5 mm long; ovary subglobose, laterally compressed, $1\text{--}2 \times 1\text{--}1.5 \times 0.9\text{--}1.4$ mm, stellate-tomentose and often also, especially near the base, with glandular hairs or stellate-pilose at the apex and further pubescent with glandular hairs, abruptly narrowed into the style, 4-celled; style 3.5–4.5 mm long, mostly stellate-tomentose at the base and glabrous at the apex, less often almost completely stellate-tomentose or with some glandular hairs; stigma approximately clavate, 0.7–1.2 mm long. In each cell one oblong bilobed axile placenta with about 12–15 ovules. *Berry* subglobose or ovoid, laterally compressed, $5\text{--}10 \times 4.5\text{--}7 \times 4\text{--}6$ mm, densely pubescent with glandular hairs. *Seed* dark brown, obliquely ellipsoid, $0.8\text{--}1 \times 0.5\text{--}0.7 \times 0.4\text{--}0.5$ mm, acute or rounded at both ends, not winged, smooth, shiny. Embryo white, 0.4–0.5 mm long; cotyledons suborbicular, $0.2\text{--}0.25 \times 0.2$ mm, rounded; rootlet blunt, 0.1–0.15 mm in diam.

Distribution: Madagascar.

Ecology: Forest edges or thickets in the mountains. Alt. 1500–2500 m.

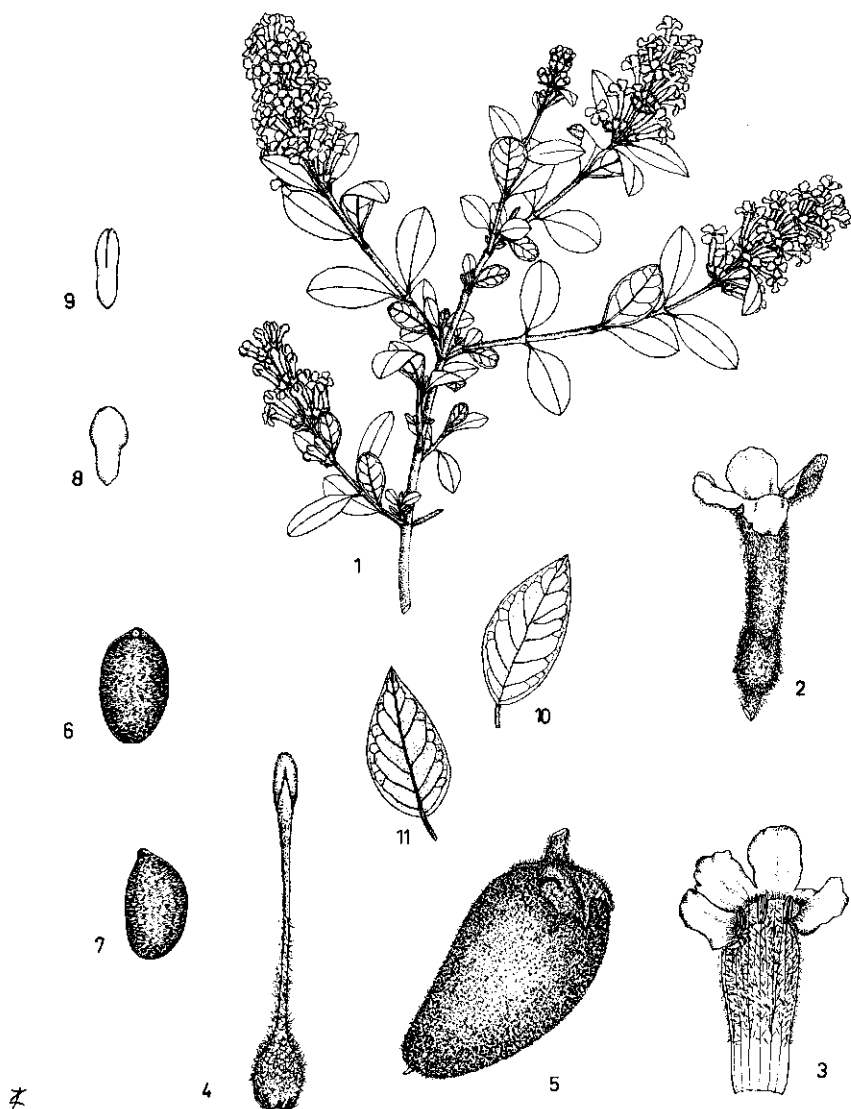


FIG. 9. *Buddleja fusca*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $3 \times$; 3. opened corolla, $3 \times$; 4. pistil, $6 \times$; 5. fruit, $3 \times$; 6-7. seeds, $12 \times$; 8-9. embryos, $12 \times$; 10-11. leaves, $\frac{1}{2} \times$ (1-4. Schlieben 8186; 5-9. Perrier de la Bâthie 9; 10-11. Rakotovao RN 7645).

Specimens examined:

Madagascar: Vavavata, Betafo (fl., fr. Nov.) Decary 13812 (C, G, P, WAG); *ibid.* (fl. Nov.) Viguier & Humbert 1602 (B, P); Ankaratra (fl. Oct.) Perrier de la Bâthie 12893 (P, WAG); Faratsiho, Ankaratra (fl., fr. Jan.) Bosser 7574 (P, WAG); Tsiafajavona (fl. July) Humbert c.s. 4502 (K, P); *ibid.*, Perrier de la Bâthie 8607 (K, P); Manjakatombo, Ankaratra (fl. Dec.) Benoist 480 (P, WAG), (fl. Oct.) 1299 (P); *ibid.* (fl. fr. Oct.) Capuron SF 8 (P); Tsinjoarivo (fl. Dec.) Perrier de la Bâthie 8616 (P); Eritriva, Antsirabe District (fl. Nov.) Viguier & Humbert 1301 (B, P); Ambositra (fl. Nov.) Decary 13519 (P, PRE, S), 13583 (BM, P); Ambalamanakana (fl. Dec.) Schlieben 8186 (BM, BR, G, HBG, K, M, PRE, WAG, Z); Zanjina, Perrier de la Bâthie 9 (P); Ambalavao (fl. Oct.) Rakotovoao RS 7645 (P); Sendrisoa (fl. Mar.) Razafindrakoto RS 3997 (P); *ibid.* (fl., fr. Dec.) Rakotovoao RS 8498 (P); Andringitra Mts. (fl., fr. Dec.) Humbert 3811 (G, K, P, US, WAG); Ambatofitorahana (fl. Nov.) Humbert 19292 (P, WAG); *sin. loc.*, Baron 1830 (K, P, type).

10. ***Buddleja globosa*** Hope, Verh. Holl. Mij Wetensch. Haarlem 20(2): 417, t. 11. 1782; Lamarck, Illustr. 1: 291, t. 69, f. 2. 1792; Ruiz & Pavón, Fl. Per. et Chil. 1: 52, f. 83. a. 1798; Bentham in De Candolle, Prod. 10: 440. 1846; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 48, f. 27. B-E. 1892.

Fig. 10, p. 46; Phot. 5, p. 47; Phot. 6, p. 48

Type: Cult. Bot. Garden Edinburgh (E, neotype; holotype apparently not preserved).

Shrub 2–6 m high. Branchlets subquadrangular, stellate-tomentose, glabrescent. *Leaves* opposite, sessile and often, especially in upper portion of branchlets (\pm 5–8 pairs), connate-perfoliate or with an up to 5 mm long petiole; blade narrowly oblong, 3–6 \times as long as wide, 4–24 \times 1–6 cm (or sometimes smaller), long-acuminate at the apex, decurrent into the petiole or into the base of the opposed leaf, subentire to crenate-serrate, more or less bullate, and practically glabrous above, stellate-tomentose and with prominent reticulate venation beneath. *Inflorescence* terminal, 3–17 \times 3–10 cm, a false raceme of 2–16 long-pedunculate globose heads which are 12–20 mm in diam. and many-flowered. Lower bracts leafy, the others reduced and linear. *Flowers* sessile, fragrant. *Calyx* campanulate, 2.5–3.2 mm long, outside stellate-tomentose, especially in the upper half, inside glabrous; tube 3–4 \times as long as the lobes; lobes equal or subequal, broadly triangular, 0.6–1 \times 1.2–1.5 mm, acute or obtuse, entire. *Corolla* golden yellow, with erect lobes 2–2.4 \times as long as the calyx, 6–7 mm long, outside minutely stellate-tomentulose in upper half to practically glabrous, inside with a pilose zone from 0.5–1 mm above to about 1 mm below the anthers; tube nearly cylindrical, 1.3–1.6 \times as long as the calyx, 2–2.5 \times as long as the lobes, 4–5 mm long, slightly widened towards the throat, at the throat 2–2.5 mm wide; lobes broadly ovate to suborbicular, wider than long, 1.8–2 \times 2.2–3 mm, rounded, entire, spreading. *Stamens* included; anthers sessile, inserted at 1–2 mm below the corolla mouth, oblong, 1–1.4 \times 0.4–0.7 mm, deeply cordate at the base, rounded at the apex, glabrous; cells parallel. *Pistil* slightly longer than the stamens, 4.5–5.2 mm long; ovary obovoid, laterally compressed, 1.2–2 \times 1.2–1.5 \times 1–1.2 mm, hirtio-pubescent with stellate hairs on upper half, glabrous on lower, abruptly narrowed into

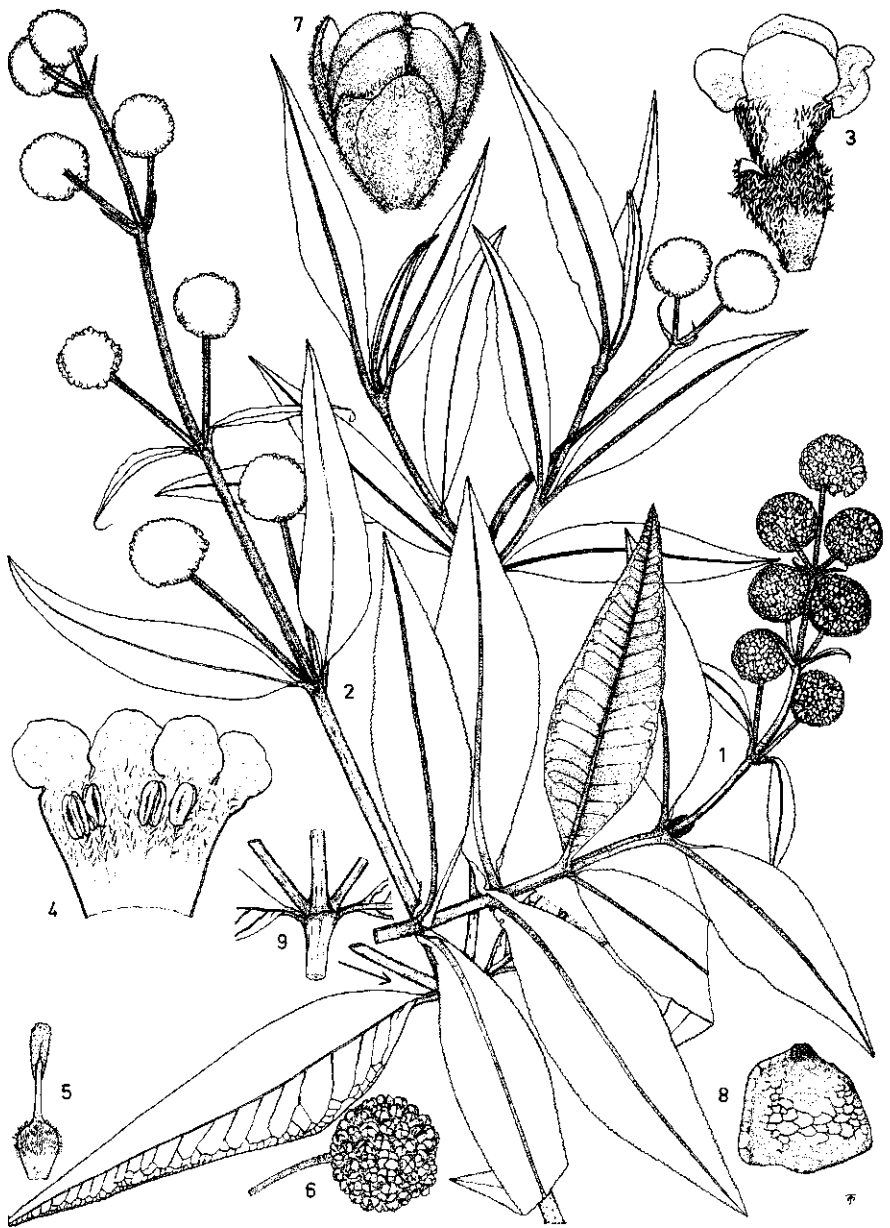
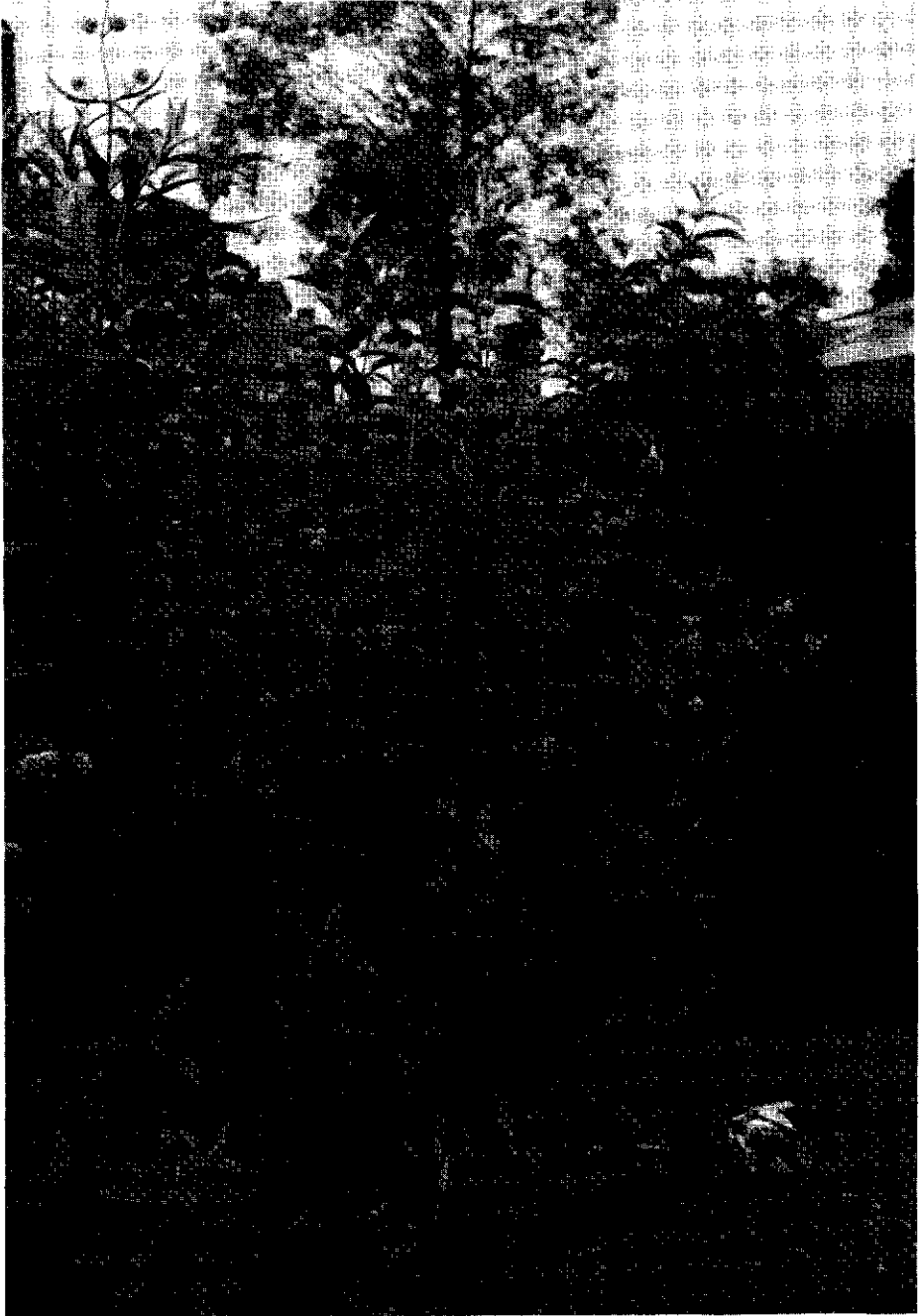


FIG. 10. *Buddleja globosa*: 1-2. flowering branches, $\frac{1}{2} \times$; 3. flower, $5 \times$; 4. opened corolla, $5 \times$; 5. pistil, $5 \times$; 6. infructescence, $\frac{1}{2} \times$; 7. fruit, $5 \times$; 8. seed, $20 \times$; 9. node, $\frac{1}{2} \times$ (1, 3-5. Schajovskoy 77, Argentina, Neuquen, Pucara (M); 2, 9. R. Brown, s.n., Chile, Chiloe Island (E, GH); 6-8. Comber 571, Llolli, Chile (E)).



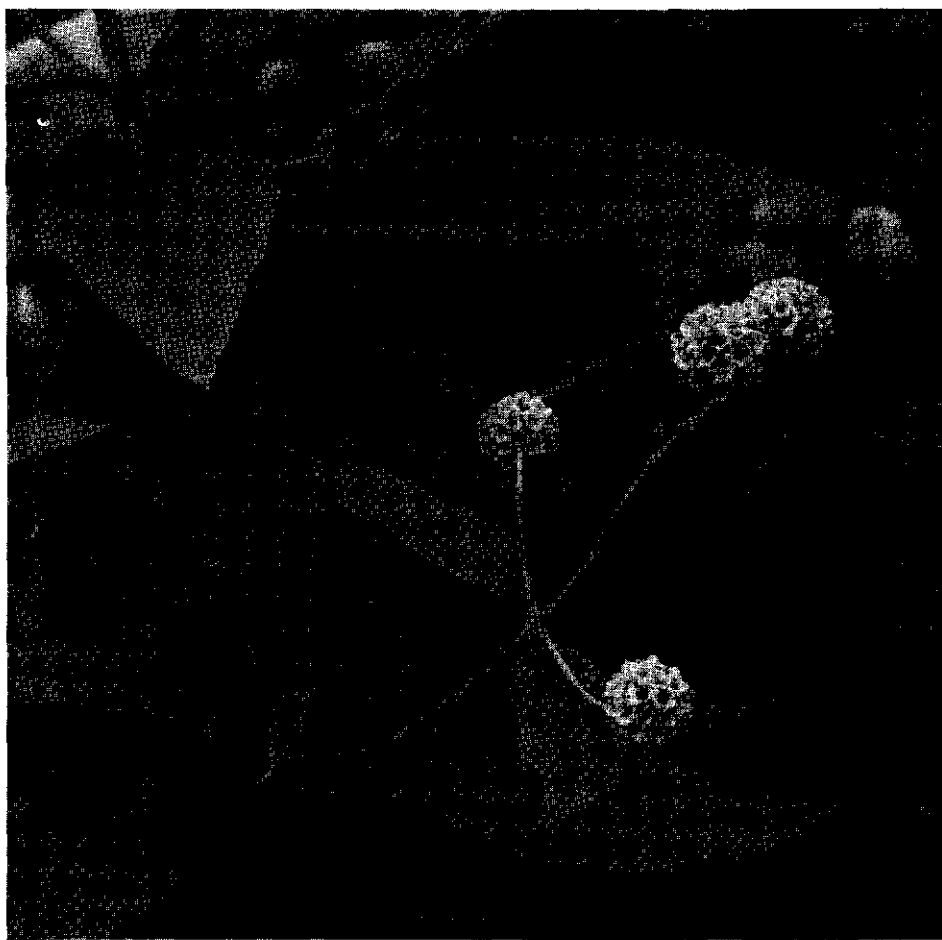
PHOT. 5. *Buddleja globosa* (Leeuwenberg 11038, phot. J. W. Mugge, cult. Wageningen).

Meded. Landbouwhogeschool Wageningen 79-6 (1979)

the style, 2-celled; style just exerted, glabrous, 1–2.5 mm long; stigma large, clavate, 1.2–1.5 × 0.3–0.5 mm. In each cell one axile hemispherical placenta with about 60–100 ovules. *Capsule* ellipsoid or obcordoid, 3–7 × 3.5–4 × 2.5–4 mm, with a rounded or obscurely 4-lobed apex, mucronate by the style base, stellate-tomentulose, glabrescent. *Seed* dark brown, obliquely ellipsoid or nearly so, 0.6–0.8 × 0.4 × 0.2–0.3 mm, slightly winged, reticulate.

Distribution: Peru, Chile, Argentina, mainly in the Andes. Cultivated in Moçambique.

Ecology: Forest or forest edge, mostly in the mountains. Alt. 150–2000 m.



PHOT. 6. *Buddleja globosa* (Leeuwenberg 11038, phot. J. W. Mugge, cult. Wageningen).

Specimens cultivated in Africa and some of them cultivated in Europe:
Great Britain: Edinburgh Bot. Gard. (fl. June) C 10 (BM, CGG, K, WAG); Kew Gardens (fl. Aug.) Leeuwenberg 3391 (WAG), (fl. May) 3467 (WAG), 3468 (WAG).
Madeira: near Curral Velho, G. Mandon s.n. (P, W).
Moçambique: Satuhal (?), Anonymus 202 (COI).

Note. Description based on material collected in the wild.

11. **Buddleja glomerata** Wendl. f. in Bartling & Wendland, Beitr. zur Botanik 2: 4. 1825; Bentham in De Candolle, Prod. 10: 447. 1846; Verdoorn in Fl. S. Afr. 26: 167, f. 23. 3. 1963; Palmer & Pitman, Trees S. Afr. 3: 1887. 1973 (with photographs). **Fig. 11, p. 50; Map 4, p. 55**

Type: S. Africa: Cape, Hesse s.n. (GOET, holotype).

Heterotypic synonym: *Nuxia lobulata* Benth. in Hooker, Comp. Bot. Mag. 2: 60. 1836. Type: S. Africa: Cape Province: Queenstown Division, Klipplaat River, Drège 664b (K, lectotype; isotype: P). Homotypic synonyms: *Chilianthus lobulatus* (Benth.) A. D.C. in De Candolle, Prod. 10: 436. 1846; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 46. 1892; Sim, For. Fl. Cape Col. 276. 1907; Prain & Cummins in Fl. Cap. 4(1): 1044. 1909; Marloth, Fl. S. Afr. 3(1): 48. 1932. *Buddleja lobulata* (Benth.) Phillips, Journ. S. Afr. Bot. 12: 114. 1946.

Shrub, bushy, gnarled, and often straggling, sometimes small tree, 1–3.5 m high. Branchlets white-tomentose (drying rusty) terete to subcompressed, angled, or fluted; the scaly stellate tomentum rubbed off easily; leaf- and stipule-scars on cushions. Leaves opposite, petiolate; petioles tomentose, 3–15 mm long, those of a pair often joined by leafy entire narrow stipules; blade sinuate-lobed with the lobes again crenate, undulate, variable in shape and size, ovate or elliptic, 1.5–2 × as long as wide, 1.5–8.5 × 0.7–4 cm, rounded at the apex, broadly cuneate, or cordate at the base; tomentulose, rugose, and bullate above, beneath rusty-scaly-tomentose and reticulate. Inflorescence a terminal panicle of cymes, 2 × 2–9 × 6 cm, 3–5 × branched; cymes congested, the ultimate forming subglobose heads of about 10–20 flowers, which are about the size of a pea. Lower bracts leafy; the others small, sepal-like. Flowers sessile. Calyx campanulate or nearly so, 1.4–1.6 mm long, outside stellate-tomentose, inside glabrous; lobes equal, about as long as the tube, rarely longer, triangular or narrowly triangular, 0.7–1 × 0.4–0.6 mm, acute, entire. Corolla yellow, cup-shaped, 1.2–1.5 × as long as the calyx, 1.8–2.5 mm long, outside stellate-tomentose or less often pubescent where exposed between the calyx-lobes, but glabrescent towards the lobes outside, glabrous inside; tube short, wide; lobes elliptic, 1.2–1.5 × as long as wide, 1–1.5 × 0.8–1.2 mm, rounded, entire, spreading, concave at the apex. Stamens exserted, mostly somewhat longer than the corolla; filaments long, slender, 1.2–1.8 mm long, glabrous, inserted slightly above the middle of the corolla tube; anthers suborbicular, 0.3–0.4 mm long, glabrous, cordate at the base; cells divergent at the base. Pistil 1.8–2.2 mm

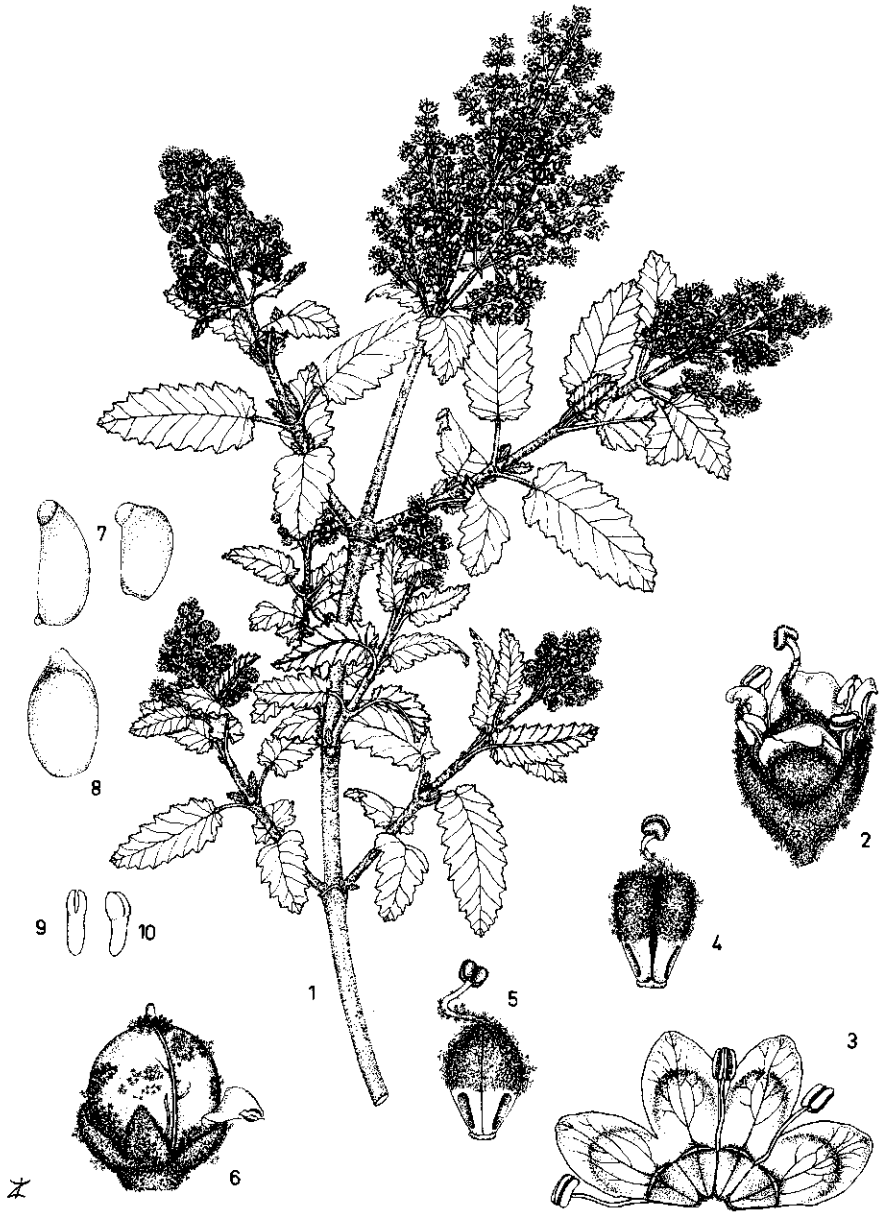


FIG. 11. *Buddleja glomerata*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $10 \times$; 3. opened corolla, $10 \times$; 4-5. pistil, two sides, $10 \times$; 6. fruit, $10 \times$; 7-8. seeds, $25 \times$; 9-10. embryos, $50 \times$ (1-5. Maguire 693; 6-10. Drège Leiden 909.82-416 (L)).

long; ovary stellate-tomentose or less often pubescent, obovoid, laterally compressed, $1 \times 0.8 \times 0.5-0.6$ mm, 2-celled; style curved, 0.8–1.2 mm long, stellate-tomentose or less often pubescent at the base, glabrous at the apex; stigma large, capitate. *Capsule* obovoid, laterally compressed, hairy like ovary, tomentum easily rubbed off in parts, about $1.5 \times$ as long as the calyx, $2.5 \times 1.6-1.8 \times 1.2$ mm, indented along the line of dehiscence, retuse at the apex. *Seed* pale brown, obliquely ellipsoid, about 0.4×0.2 mm, smooth, with one acute end.

Distribution: South Africa.

Ecology: Among the rocks on the hills and mountains of the sandy karroid areas.

Specimens examined:

S. Africa: Orange Free State: between Fauresmith and Luckhoff (fl. Mar.) Pole Evans & C. A. Smith 1867 (PRE); *ibid.* (fl. Mar.) C. A. Smith 532 (PRE), (fl. Jan.) 5299 (PRE). Cape Province: Buis Vlei (fl. Nov.) Acocks 2557 (PRE); *ibid.* (fl. Sept.) E. Wall 22 (LD, S); Asbestos Mts. (fl. Feb.) Marloth 4968 (PRE); Victoria West District, Rehm PRE 49611 (PRE); near Murraysburg (fl. Jan.) Tyson 8 (SAM); between Wolve Kop and Rhenoster Kop, Burchell 2791 (K); Voor Sneeu Berg, Graaff Reinet Division, Burchell 2847 (K); Grootfontein, Theron 305 (PRE); *ibid.* (fl. Jan.) Verdoorn 1534 (BOL, K, PRE); W. Middleburg Road Railway Station (fl. Nov.) Flanagan 1397 (BOL, PRE, SAM, Z); Craddock Road, Horn SKF 2224 (PRE); Tafelberg, near Middelburg (fl. Mar.) Hutchinsonson 3108 (BOL, K, PRE); Koffiebus Mt., Schoombie (fl. Mar.) Schweickerdt 1266 (PRE); Naudesnek (fl. Nov.) J. Phillips J 37627 (J); Bowkerskop (fl. Jan.) Galpin 2558 (GRA, K, PRE); between Shiloh and Los-Tafelberg, Drège anno 1837 (G, HAL, L, LD, LE, S, SAM, W); Klipplaats R., Queenstown Division (fl. Dec.) Drège 664b (K, P, lectotype of *Nuxia lobulata*); Vlekpoort, Maraisburg District, Archibald 2679 (GRA); near Craddock, Cooper 502 (BM, BOL, K, W, Z); Nat. Bergsebra-Wildtuin (fl. Nov.) Brynard 136 (K, PRE); near Mortimer (fl.) L. Kensit (?) Jan. 1901 (BOL); Chalmers, 34 km W. of Craddock (fl. Dec.) Maguire 693 (NBG); Craddock, Tarka R. (fl. July) Zeyher 116.7 (BREM, C, FI, FR, GH, GOET, HAL, K, L, LE, MO, P, PRE, S, UPS, US, W, WAG, WU, Z); Buffelshoek Pass (fl. Oct.) Acocks 11975 (PRE); Pearson (fl.) Jenkins July 1963 (PRE); Brintjeshoogte, near Somerset East, MacOwan 772 (BM, GH, K, NH, NY, PRE, Z); Grootfontein, P. T. v. d. Walt 166 (PRE); Little Fish R., Burchell 3265 (K); Graaff Reinet (fl.) Smuts 23 Sept. 1928 (STE); *ibid.*, Sister Tarcisia 51 (PRE); *ibid.* (fl. Sept.-Oct.) Thode A 612 (PRE); *ibid.*, Oudeberg, Bolus 89 (BOL, K); *ibid.*, Levyns 9609 (BOL); Inenberg and Sondag R., Bowie s.n. (BM); Nieuwveldsberg, Beaufort West (fl. Apr.) Burke 524 (BM, K, PRE, SAM); *ibid.* (fl. Oct.) Drège 2 (K, P), 664a (K, paratype of *Nuxia lobulata*); *ibid.* (fl. July) Levyns 5530 (BOL); *ibid.*, Marloth 8282 (PRE); Sunnyside, Beaufort West, Esterhuysen 2736 (BOL); Rhenosterkop, Zeyher 1329 (BM, BOL, CGE, OXF, P, S, SAM, W); Naudesberg, A. E. van Wyk 162 (PRE, PUC); Cango, Oudtshoorn (fl. Dec.) Bolus 12157 (BOL); Uniondale, Paterson 3024 (PRE); Perdepoort, Willowmore (fl. Sept.) Pole Evans 2555 (K); Doringkloof, Willowmore, M. C. Olivier 1648 (WAG); Swanepoelspoortberg (fl. Sept.) Marloth 4129 (PRE); Alicedale (fl. Sept.) Cruden 12 (GRA, K); *ibid.* (fl. Nov.) Rogers 3732 (Z); Swartrivier, near Riebeeck East (fl. Nov.) Bayliss 7995 (WAG).

Cult.: S. Africa: Kirstenbosch (fl.) P. Bond 1 Sept. 1939 (BOL).

12. **Buddleja indica** Lam., *Encycl.* 1: 513. 1785; *Illustr.* 1: 292. 1792; Leenhouts in *Fl. Males.* 1. 6: 340. 1963.

Fig. 12, p. 53; Map 4, p. 55

Type: Madagascar (not Java): *sin. loc.*, Sonnerat s.n. (P-LA).

Homotypic synonyms: *B. diversifolia* Vahl, Symb. 3: 15. 1794; G. Don, Gen. Syst. 4: 597. 1838; Bentham in De Candolle, Prod. 10: 445. 1846. *Nicodemia diversifolia* (Vahl) Tenore, Cat. Ort. Napoli 88. 1845; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 49. 1895.

Heterotypic synonyms: *B. nepalensis* Colla, Mem. Torin. 35: 182. 1831, **syn. nov.** Type: Cult. Hort. Ripulensis anno 1830 (TO, holotype not seen; photo: WAG!).

B. rondeletiaeflora Benth. in De Candolle, Prod. 10: 445. 1846; Solereder, l.c. p. 49, **syn. nov.** Type: Anjouan: Bojer s.n. (G-DC, holotype; isotype: K). Homotypic synonym: *Nicodemia rondeletiaeflora* (Benth.) Benth., Journ. Linn. Soc. 1: 108. 1857.

N. grandifolia Scott Elliot, Journ. Linn. Soc. 29: 34. 1891, **syn. nov.** Type: Madagascar: Fort Dauphin, Scott Elliot 2743 (K, holotype; isotype: P).

N. diversifolia var. *lucida* Scott Elliot, l.c. p. 35, **syn. nov.** Type: Madagascar: near Fort Dauphin, Scott Elliot 2833 (K, lectotype).

N. rufescens Solered. in Engler, Bot. Jahrb. 17: 558. 1893; l.c. p. 49, **syn. nov.** Type: Madagascar: E. Imerina, Andrangoloaka, Hildebrandt 3663 (M, holotype; isotypes: BM, BREM, G, K, M, P, US, W, WAG, Z).

N. isleana Cordemoy, Fl. Réunion 468. 1895, **syn. nov.** Type: Réunion: Grand Bassin, Hermann 17 July (MARS, lectotype, with immature fruits).

? *N. hermanniana* Cordemoy, l.c. p. 469, **syn. nov.** Type: Réunion: Piton Bleu, Plaine des Cafres (MARS, holotype, veg.).

Clerodendrum loniceroides Moldenke, Lloydia 13: 208. 1950, **syn. nov.** Type: Madagascar: Firingalava, Perrier de la Bâthie 737 (P, holotype, photograph in NY; isotype: P). Homotypic synonym: *Buddleia loniceroides* (Moldenke) Moldenke, Phytologia 4: 285. 1953.

Shrub 0.5–4 m high, sarmentose or sometimes lianescent. Branchlets terete or nearly so, stellate-tomentose and glabrescent or sometimes entirely glabrous. Leaves opposite, petiolate; petiole stellate-tomentose or sometimes glabrous, 3–10 mm long; blade very variable in shape and size, orbicular to narrowly elliptic, 1–4(–5) × as long as wide, (0.3–)1–14(–20) × (0.3–)1–5(–6.5) cm, rounded to long-acuminate at the apex, rounded to cuneate at the base, sometimes even decurrent into the petiole, entire to crenate-serrate or even lobed, glabrous or with some stellate hairs, especially on the costa and the secondary veins above, stellate-tomentose to glabrous beneath; secondary veins conspicuous. Inflorescence terminal or axillary, very variable in shape and size, thyrsoid and few- to many-flowered, continuous or interrupted and composed of more or less glomerulate cymes, or reduced to a single few-flowered cyme, 1–10 × 1–4 cm. Peduncle and branches hairy as the calyx. Bracts small, sepal-like. Flowers sessile. Calyx not subtended, campanulate or narrowly so, (2–)2.5–5 mm long, outside stellate-tomentose with apices of lobes sometimes glabrous, inside glabrous; tube 0.2–3 × as long as the lobes; lobes subequal, mostly narrowly triangular to subulate, 0.8–3 × 0.5–1 mm, acuminate to subulate, entire. Corolla pale yellow or greenish-yellow, less often white, with

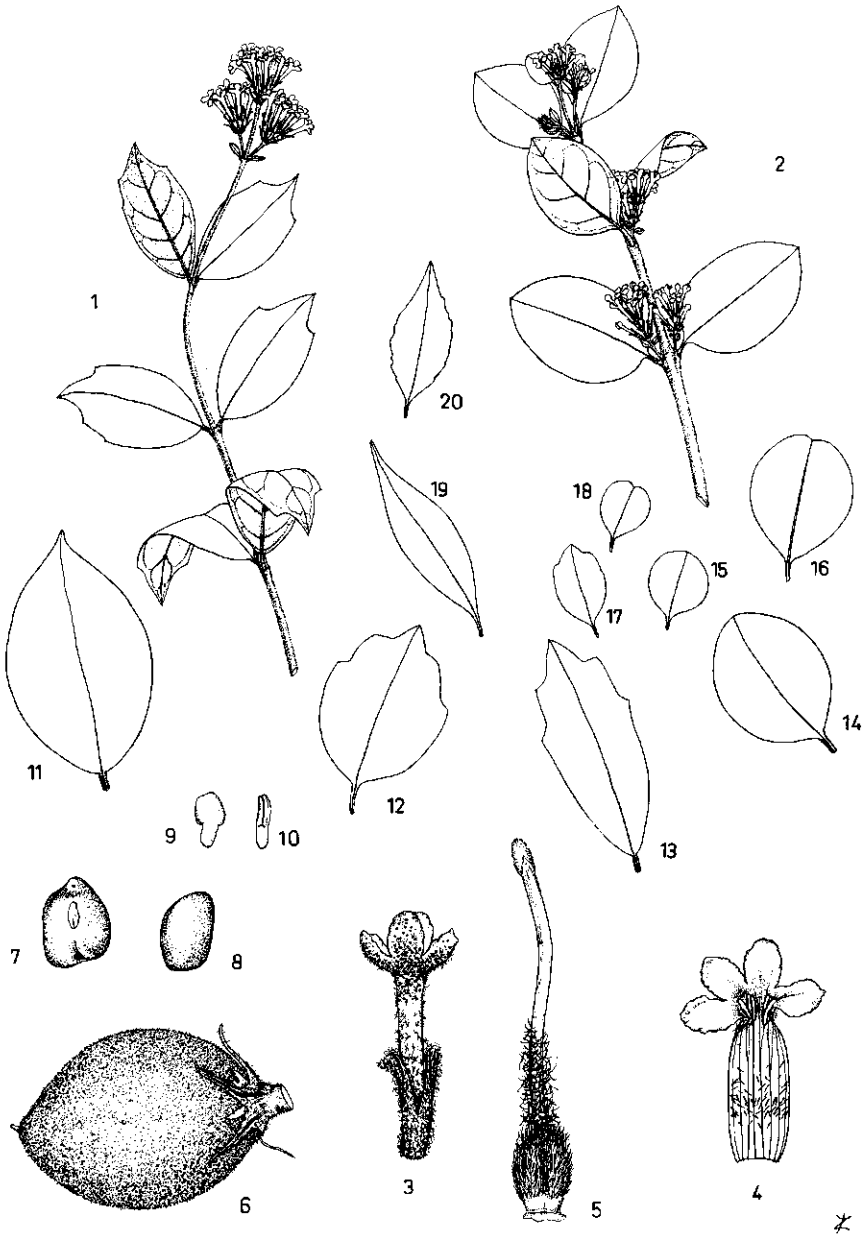


FIG. 12. *Buddleja indica*: 1-2. flowering branches, $\frac{1}{2} \times$; 3. flower, $3 \times$; 4. opened corolla, $3 \times$; 5. pistil, $9 \times$; 6. fruit, $4 \times$; 7-8. seeds, $4 \times$; 9-10. embryos, $4 \times$; 11-20. leaves, $\frac{1}{2} \times$ (1, 3-5. Hildebrandt 3663; 2, 16. Loher, Mar. 1911; 6-10. Aymonin-Keraudren & Aymonin 25566; 11. Capuron SF 28389; 12. Sieber 279; 13. Capuron SF 18387; 14-15, 17-18. Sieber II 66; 19. Perrier de la Bâthie 8603; 20. Perrier de la Bâthie 15908).

erect lobes 2–4(–5.5) × as long as the calyx, 7–17 mm long, outside pubescent with glandular hairs in the upper half, with stellate hairs on the tube down to the calyx mouth, sometimes glabrous above the calyx, inside with a zone of pilose hairs from near the level of the apex of the ovary to 1–2 mm below the anthers; tube nearly cylindrical, 2–4(–5) × as long as the calyx, 3–5.7 × as long as the lobes, 5.5–13.5 mm long, slightly widened towards the throat or not, at the throat 0.8–1.8 mm wide; lobes elliptic or nearly so, 1.5–3.5 × 1–2.2 mm, rounded, minutely crenate to subentire, spreading. *Stamens* included; anthers sessile, inserted at 0.7–2 mm below the corolla mouth, oblong, 2–4 × as long as wide, 1–1.8 × 0.3–0.8 mm, rounded to emarginate at the apex, deeply cordate at the base, glabrous; cells parallel. *Pistil* 4–9.2 mm long; ovary ovoid or ellipsoid, laterally compressed or sometimes not, 1–1.5 × 0.7–1.2 × 0.6–0.8 mm, hirtopubescent with stellate hairs, mostly glabrous at the very base, sometimes up to halfway glabrous or entirely hairy, gradually narrowed into the style, 2-celled; style included, never reaching the anthers, 2.7–7 mm long, hairy like the ovary at the base, glabrous at the apex; stigma small to rather large, capitate or nearly so, 1–2 × as long as wide, 0.2–1 × 0.2–0.5 mm. In each cell one axile placenta with 6–30 ovules attached to the septum. *Berry* white or yellowish, oblong, 1.5–3 × as long as wide, more or less laterally compressed, 12–18 × 4–7 × 3–5 mm, acute or acuminate at the apex, rounded at the base or nearly so, wrinkled when dry, minutely pubescent with many glandular and few stellate hairs. *Seed* dark brown, mat, obliquely ellipsoid, 2–3 × 1.3–2.2 × 1.2–1.8 mm, sometimes some smaller, unwinged, minutely reticulate. Embryo white, 1–2.4 mm long; cotyledons large, suborbicular or nearly so, 0.6–1.7 × 0.5–1.2 mm; rootlet blunt, thick, 0.4–0.7 × 0.3–0.4 mm.

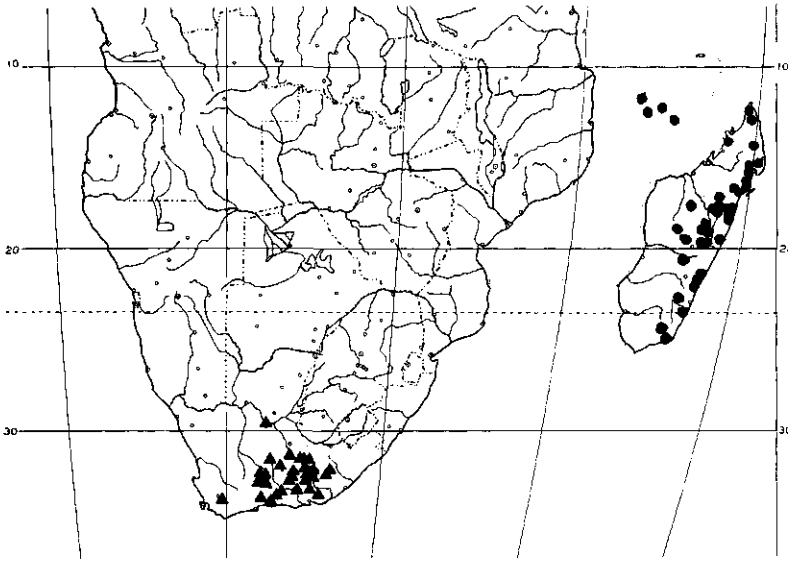
Distribution: Indigenous in Madagascar, the Comoro, and the Mascarene Islands; cultivated all over the world, often represented in hothouses in the temperate zone as *Nicodemia diversifolia*.

Ecology: Widespread in bush or in open places from the coast to the mountains. Alt. 0–2000 m.

Most of the specimens examined:

Comoro Islands: Grand Comore: (fl. Nov.) Humblot 1460 (P, W, WAG); Forêt de Combani (fl. Sept.) Humblot 232 (K, P, W, WAG), Anjouan: Boivin (fl.) Sept. 1847 (P); Bojer anno 1837 (G-DC, K, type of *B. rondeletiaeflora*); Hildebrandt 1695 (BREM, K, LE, P, W); (fl.) Kirk June 1866 (K); Lavanchie 15 (P). Mayotte: Boivin 3253 (P).

Madagascar: Diégo-Suarez (fl., fr. Nov.) Aymonin-Keraudren c.s. 25566 (P, WAG); Forêt d'Ambre (fl. Oct.) Homolle 39 (P, WAG); Toky Bay, Boivin 2506 (G, P, WAG); S. of Sambava, Capuron SF 27712 (P); Manongarivo Mts. (fl. Oct.) Perrier de la Bâthie 3770 (P); Boina, Perrier de la Bâthie 9369 (P); Ivoloïna, Dequaire 27631 (P, WAG); Maroa, Mocquerys 219 (G); Nosy Mangabé, Antongil Bay, Mocquerys 438 (G, Z); Ambohitralanana, Antabaka District (fl. Jan.) Naivo RS 8737 (P); Ile St. Marie (fl. Mar.) Boivin 1817 (G, P, W); Mananara (fl. Oct.) Perrier de la Bâthie 2100 (P); Soanierana (fl. Nov.) Lam & Meeuse 5543 (L, P); Tintingue, Bernier 93 (P); Firingalava (fl. Sept.) Perrier de la Bâthie 737 (P, type of *Clerodendrum loniceroides*); Andilamena (fl. Dec.) Morat 270 (P); Imerimandroso, Rakotovao RS 11403 (P); Varama, Ambatondrazaka



MAP 4. ▲ *Buddleja glomerata*; ● *B. indica*

District (fl. Nov.) Saboureux RS 1602 (P); Andrangovalu Mts. (fl. Oct.) Humbert & Cours 17919 (P); Foulpointe (fl. Mar.) Decary 16998 (P, WAG), 17009 (P, WAG); *ibid.*, Peltier 4205 (P, WAG); Tamatave (fl., fr.) Loher Mar. 1911 (M, WAG); *ibid.* (fl., fr. Sept.) Viguier & Humbert 254 (P, WAG), 318 (P, WAG); Rahobevava, Cours 4361 (P); Mt. Ambohibihy, Bosser 20304 (P, WAG); Mahatsinjo (fl. Jan.) Perrier de la Bâthie 15908 (P, WAG); Betsitra, d'Alleizette 17 (P); Ambatolaona (fl. Sept.) Decary 5900 (P, PRE); Angavokely Mts. (fl. Nov.) Capuron SF 18387 (P, WAG), 20301 (P, WAG); Mandraka (fl. Aug.) d'Alleizette 965 (P); Ampitambe, NE. of Moramanga (fl. Oct.) Capuron SF 28389 (P, WAG); km 64 Tananarive-Périnet (fl. Oct.) Aymonin-Keraudren & Aymonin 25313 (P); km 29 Moramanga-Anosibe Road (fl. Sept.) Bosser & Millot 6687 (P); Périnet, Benoist 1177 (P, WAG); E. Imerina (fl. Nov.) Hildebrandt 3663 (BM, BREM, G, K, M, P, US, W, WAG, Z, type of *N. rufescens*); S. of Tamatave, Ambile (fl., fr. Mar.) Benoist 846 (P), (fl. May) 6301 (P); *ibid.* (fr. Apr.) Decary 6371 (P), 6478 (P, WAG); Betafo, Perrier de la Bâthie 8603 (P, WAG), 17221 (P, WAG), 17229 (P); Ambohimanshoso (fl. Dec.) Bosser 8827 (P); Tsinjoarivo (fl. Nov.) Viguier & Humbert 1786 (P); Lohavanana, Perrier de la Bâthie 17001 (P); Vohitromby, W. of Ambatomarina (fl. Feb.) Capuron SF 29035 (P, WAG); Mananjary Province, F. Geay 7085 (L, P), 7086 (P), 7087 (P), 7424 (P), 7472 (P), 7473 (P), 7602 (P), 7647 (P), 7872 (P), 7928 (P); Mamorana R. mouth (fl. Oct.) Perrier de la Bâthie 3989 (P); Sihanaka, herb. Jard. Bot. Tananarive 2912 (P); Tsiatzombazaha-Ambila Manakara (fl. Nov.) Serv. For. 6559 (P, WAG); Ambatolahy, Farafangana District (fr. June) Rakotavao RS 9263 (P); Vangaindrano, Scott Elliot 2176 (K, P); Itrafanaomby Mt. (fl. Dec.) Humbert 13435 (P, WAG); Fort Dauphin, Scott Elliot 2729 (K), 2743 (K, P, type of *Nicodemia grandifolia*), 2833 (K, lectotype of *Nicodemia diversifolia* var. *lucida*); Cap Ranavalona (fl. Sept.) Decary 10627 (L, P); *sin. loc.*, Baron 1189 (K, P), 1297 (K), 1747 (BM, K), 1792 (K, P), 2835 (K), 3200 (K, P), 1297 (K), 3857 (K), 5015 (K); W. T. Gerrard 30 (K), 141 (P), Sonnerat s.n. (P-LA, type).

Réunion: de l'Isle in herb. de Cordemoy s.n. (MARS, paratype of *Nicodemia isleana*); Grand Bassin, Hermann 17 July (MARS, lectotype of *N. isleana*); Piton Bleu, Hermann s.n. (MARS).

Mauritius: Moka R., Boivin Oct. 1869 (P); *ibid.* Bouton s.n. (CGE, K); herb. Pamplemousses MAU 1103, 1104, 1105 (MAU); *sin. loc.*, Commerson May-June 1769 (BM, G, MPU, P, P-JU 6045, WAG); Sieber II 66 (BM, GOET, K, L, LE, MO, P, W, WAG), II 279 (BR, G, GOET, HAL, K, L, P, US, W); Sonnerat s.n. (P-LA).

Cult.: Netherlands: Bot. Gard. Wageningen (fl. Aug.) J. de Bruijn 2071 (WAG); (fl. Nov.) Leeuwenberg 3511 (WAG). France: Bot. Gard. Paris anno 1831 (L); *ibid.*, Neumann anno 1834 (M). W. Germany: Bot. Gard. München (fl.) Oct. 1906 (M). Austria: Bot. Gard. Wien, Neumayer 18 Mar. 1942 (WU). Italy: Bot. Gard. Firenze (fl.) 21 Aug. 1901 (FI); Bot. Gard. Napoli, Pasquale s.n. (M); Tenore anno 1847 (K), s.n. in herb. Richard (P). India: Bot. Gard. Calcutta, Anderson 28 (P), (fl. Apr.) Gaudichaud 211 (G, P); L. Pierre 3149 (P); Wallich 1243 (BM), 1831 (K), 1832 (K), 6406 (BR, CGE, K-WALL). Singapore: Bot. Gard. (fl.) 20 Nov. 1934 (SING). Indonesia: Bot. Gard. Bogor (fl. Aug.) IV. A. 125 (BO); (fl. May) Hallier f. C. 105 (G, M); (fl.) E. Nyman Aug. 1898 (UPS); (fl.) Poulsen 15 Jan. 1895 (C, WAG); (fl.) C. S. Sargent 16 Oct. 1903 (MO, WAG).

Notes. *B. indica* is a very variable species, especially as to the shape of the leaves and inflorescences. The indumentum and the size of the flowers vary as well, but far less. The fruits and seeds are more or less constant. None of the variable characters could be correlated with others. Moreover, intermediates could be found in all cases. Therefore the present author came to the unexpected conclusion that all specimens cited belong to a single species. This conclusion required comparison of many specimens. *B. rondeletiaeflora*, *Nicodemia rufescens*, *N. hermanniana*, *N. isleana*, and *B. nepalensis* are new synonyms.

13. ***Buddleja loricata*** Leeuwenberg, Acta Bot. Neerl. 24: 83. 1975.

Fig. 13, p. 57; Map 5, p. 59

Basionym: *Nuxia corrugata* Benth. in Hooker, Comp. Bot. Mag. 2: 60. 1836.

Type: S. Africa: Cape Province: Aliwal, North of Herschel, Witbergen, Drèpe 3618 (K, holotype: isotypes: P, PRE).

Homotypic synonyms: *Chilianthus corrugatus* (Benth.) A. D.C. in De Candolle, Prod. 10: 436. 1846; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 46. 1892; Sim, For. Fl. Cap. Col. 276. 1907; Prain & Cummins in Fl. Cap. 4(1): 1044. 1909. *Buddleja corrugata* (Benth.) Phillips, Journ. S. Afr. Bot. 12: 114. 1946; Verdoorn in Fl. S. Afr. 26: 166, f. 23, 2. 1963; Palmer & Pitman, Trees S. Afr. 3: 1887. 1973 (not Jones, Contrib. West. Bot. 18: 56. 1933).

Shrub 1–3.5 m high. Branchlets terete to subquadrangular, stellate-tomentose. Leaves opposite, petiolate; petiole stellate-tomentose, 2–10 mm long; blade very narrowly elliptic, 3.5–10 × as long as wide, 1.2–12.5 × 0.2–2 cm, acuminate to obtuse at the apex, cuneate at the base, crenate-serrate, with often revolute margin when dry, above glabrous or slightly scabrid, and bullate, beneath stellate-tomentose with white hairs; venation inconspicuous. Inflorescence terminal, paniculate, 2–12 × 2–10 cm, congested. Lower bracts leafy, upper ones smaller and sepal-like. Peduncle, branches and pedicels tomentose. Flowers shortly pedicellate or sessile, sweet-scented. Calyx often subtended by some bracteoles which have the size, the shape, and the indumentum of the sepals, obconical or nearly so, 2.2–3 mm long, outside stellate-tomentose, inside glabrous or with some minute glandular hairs in the middle; tube 0.6–1 × as long as the lobes; lobes subequal, rather narrowly triangular, 1.2–2 × 0.8–1.3 mm, acute or subacute, entire. Corolla white, creamy, or



FIG. 13. *Buddleja loricata*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $5 \times$; 3. opened corolla, $5 \times$; 4. pistil, $10 \times$; 5. fruit, $10 \times$; 6. seed, $10 \times$; 7-8. embryos, $10 \times$; 9-10. leaves, $\frac{1}{2} \times$; 11. portion of leaf above, $2 \times$ (1-4, 11. Dieterlein 618; 5-8. Stead & Ward 11; 9. Drège 15-1-1833 (P); 10. Devenish 1139).

pale yellow, often (?) with an orange throat, with erect lobes $1.5-2 \times$ as long as the calyx, 3.5–5.5 mm long, outside stellate-tomentose in the upper half and mostly glandular hairs around the middle, inside glabrous or with a few simple hairs bordering the decurrent filaments; tube cup-shaped, $1-1.3 \times$ as long as the lobes, 1.8–3 mm long; lobes broadly ovate, about as long as wide, $1.5-2.5 \times 1.5-2.2$ mm, obtuse or rounded, shallowly notched, further entire, spreading. *Stamens* barely exerted; filaments very short, $0.1-0.5 \times$ as long as the anthers, inserted just below the corolla mouth; anthers oblong or nearly so, $0.8-1.2 \times 0.3-0.7$ mm, deeply cordate at the base, apiculate to rounded at the apex, dorsally pubescent at the connective, further glabrous; cells parallel. *Pistil* 2.3–3 mm long; ovary broadly ovoid, laterally compressed, $1-1.2 \times 0.9-1.2 \times 0.6-1$ mm, hirtio-pubescent with stellate hairs, rather abruptly narrowed into the style, 2-celled; style 1–1.4 mm long, hirtio-pubescent especially at the base; stigma rather large, capitate, 0.3–0.4 mm in diam. In each cell one axile placenta with 5–6 ovules. *Capsule* ellipsoid, laterally compressed, $3-4 \times 1.5-2 \times 1.2-1.5$ mm, $1.5-2 \times$ as long as the calyx, apiculate, hairy like the ovary, but less densely so; valves torn for about one-third of their length, acute; placentae dry, oblong, each with about 3 seeds in the valves. *Seed* medium brown, obliquely and narrowly tetrahedral, $2-2.6 \times 0.5-0.7 \times 0.3$ mm, with an acute wing at both ends, reticulate. Embryo white, 1.2 mm long; cotyledons oblong, 0.4×0.3 mm, rounded at the apex; rootlet obtuse, 0.2 mm in diam.

Distribution: Lesotho, Transkei, S. Africa (Orange Free State, Natal).

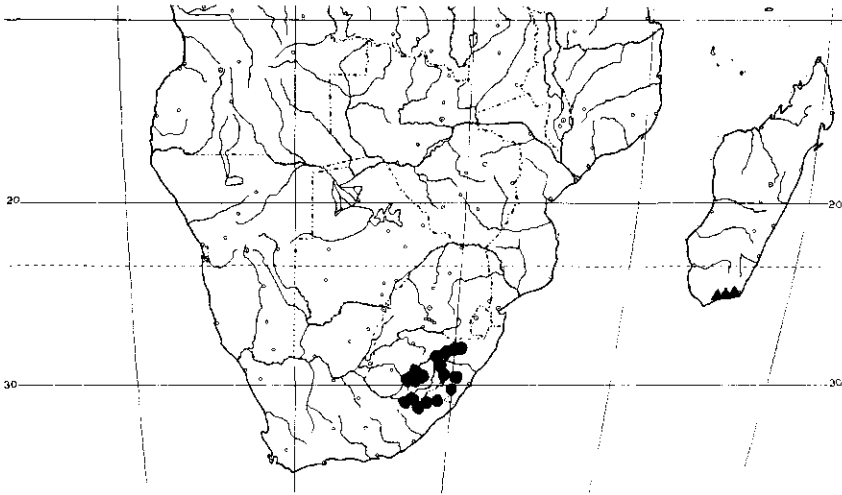
Ecology: Slopes of high mountains, among boulders along water courses, or in damp sheltered gullies. Alt. 1600–2700 m.

Specimens examined:

Lesotho: Lëribé, Ellenberger 85 (P); *ibid.*, Makokwane Mt., Dieterlein 618 (BM, BOL, K, MPU, NH, P, PRE, SAM, WAG, Z); between Thelyanes and Mapoteng (fr. Mar.) M. Schmitz 568 (PRE); Roma (fl.) Jacottet Nov. 1914 (Z); *ibid.*, Mapoteng gorge, M. Schmitz 6682 (ROML); Mamalapi (fl. Dec.) Compton 21322 (NBG); *ibid.* (fl. Dec.) Guillardmod 737 (PRE); 2 km N. of Ramas Gate (fl. Nov.) Bayliss 7859 (WAG); Blue Mt. Pass (fl. Nov.) C. Williamson 864 (K); Khalong-la-Mashulu (fl. Dec.) Jacot-Guillardmod 5905 (PRE); *ibid.*, P. Martin 6378 (ROML); Little Bokong Valley (fl., fr. Jan.) Jacot-Guillardmod 332 (PRE, ROML).

Transkei: Mt. Insiswa (fr. Feb.) Hilliard & B. L. Burtt 6558 (E, K, PRE); Joubert's Pass, near Lady Grey (fl. Nov.) Werger 1798 (K, PRE); Herschel District, Hepburn 113 (GRA); Witbergen, Drège 15 Jan. 1833 (P), (fl., fr.) Jan. 1837 (G, HAL, LE, MO, S, SAM, W), (fl., fr. Jan.) 3618 (K, P, PRE, type); 13 km N. of Moshesh's Fort (fl. Nov.) D. Edwards 4192 (K, PRE); Naudesnek Pass (fl. Nov.) Acocks 12186 (K, PRE); between Maclear and Naudesnek (fl. Nov.) Werdermann & Oberdieck 1122 (B, BR, PRE, US, WAG).

S. Africa: Orange Free State: Golden Gate Nat. Park (fl. Oct.) L. C. C. Liebenberg 7294 (BR, K, M, PRE, STE); *ibid.* (fr. Jan.) B. R. Roberts 3242 (PRE); Harrismith (fl. Nov.) Sankey 243 (K); *ibid.*, Mt. Pelaaan (fl. Nov.) Ferreira 70 (K, PRE). Natal: Pondowana, Utrecht District (fl., fr. Jan.) Stead & Ward 11 (K, NH, PRE); Naauwhoek (fl. Aug.) Devenish 1139 (BR, K, M, NH, PRE); between Kafirdrift and Tweekloof (fl. Dec.) Thode A 288 (K, NH, PRE); Monts aux Sources, Humbert 15085 bis (P); Van Reenen (fl., fr. Nov.) J. M. Wood 5491 (BOL, NH, P, PRE, SAM, Z); Cathedral Peak Forest Station (fl. Dec.) Killick 2278 (PRE), 2279 (PRE), 2286 (K, PRE); Estcourt (fl. Oct.) Wylie in coll. J. M. Wood 10563 (L, NH, PRE); Giant's Castle Game Res. (fl., fr. Jan.) Killick & Vahrmeijer 4026 (PRE, SRGH); *ibid.* (fr. Jan.) Trauseld 355 (PRE);



MAP 5. ● *Buddleja loricata*; ▲ *B. fragifera*

ibid., Ward 6956 (PRE); Cathkin Peak, W. C. West 4576a (SAM); Altemooi (fl. Dec.) Thode NH 16478 (NH), 3297 (STE); Umzimkulu R. headwaters (fl. Nov.) Hilliard & B. L. Burtt 7054 (K); Lions R., Moll 1283 (PRE); Greenwich Farm, Riet Vlei, Frey in coll. Galpin 2734 (K, PRE); Mt. Ingele (fr. Jan.) Nicholson 949 (PRE); Ivanhoe, Louis R. District, Moll 2596 (K, PRE).

Note. *B. loricata* is related to the dioecious *B. incana* Ruiz et Pav. from Colombia and Peru by the narrow, bullate leaves and the small flowers with the short corollas. They differ as follows:

- | | |
|---|---------------------------|
| 1. Leaves crenate-serrate, up to 2 cm wide; inflorescence 2–8 × 2–6 cm, congested; flowers not in heads; corolla tube cup-shaped; 5–6 ovules per cell | <i>B. loricata</i> |
| Leaves entire or minutely crenate, often larger and wider, up to 4 cm wide; inflorescence mostly much larger, 7–20 × 5–20 cm, ultimate branchings congested; flowers in small heads; corolla tube campanulate; about 50 ovules per cell | <i>B. incana</i> |

14. ***Buddleja madagascariensis*** Lam., Enc. 1: 513. 1785; Illustr. 1: 291, t. 69. f. 3. 1792; Vahl, Symb. 3: 14. 1794; Hooker, Bot. Mag. 55: t. 2824. 1828; G. Don, Gen. Syst. 4: 601. 1838; Benth in De Candolle, Prod. 10: 447. 1846; Miquel, Fl. Ind. Bat. 2: 364. 1857 (excl. syn. *B. sinuata* Willd.); Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 48. 1892; Cordemoy, Fl. Réunion 467. 1895; King, Journ. As. Soc. Beng. 74(2): 601. 1908; Leenhouts in Fl. Males. 1: 6: 340. 1963. **Fig. 14, p. 61; Map 6, p. 62**

Type: Madagascar: sin. loc., Sonnerat s.n. (P-LA, holotype).

Homotypic synonyms: *Nicodemia madagascariensis* (Lam.) R. N. Parker, For. Fl. Punjab. 2nd ed. 357. 1924; Bruce & Lewis, Loganiaceae in Fl. Trop.

E. Afr. 36, f. 7.3. 1960; White, For. Fl. N. Rhod. 339. 1962. *Adenoplea madagascariensis* (Lam.) Eastw., Leaflet. West. Bot. 1: 197. 1936.

Heterotypic synonym: *B. heterophylla* Lindl., Bot. Reg. 15: t. 1259. 1839. Type: Cult. Hort., Lee anno 1829 (CGE, holotype).

Sarmentose shrub 2–4 m high or climber 8–10 m long. Branchlets terete, white-tomentose with stellate hairs, drying rusty. *Leaves* opposite or sometimes subopposite, petiolate; petiole 5–20 mm long, stellate-tomentose; blade narrowly ovate or elliptic, 2–3(–4) × as long as wide, 4–14 × 1.5–7 cm, acuminate at the apex, rounded, cuneate, or rarely subcordate at the base, entire, dark green, with impressed reticulate venation, and glabrous or nearly so above (only tomentose when young), white-tomentose with stellate hairs (drying rusty) beneath. *Inflorescence* thyrsoid or paniculate, 5–25 × 2–15 cm. Peduncle, branches, and pedicels hairy as the branchlets. Lower bracts leafy; the others small, linear. *Flowers* sessile or shortly pedicellate. *Calyx* campanulate or urceolate, 2–3.5 × 1.5–2.5 mm, outside white-tomentose with stellate hairs (drying rusty), inside glabrous, tube 3–7 × as long as the lobes; lobes subequal, broadly triangular, 0.4–1 × 0.5–1 mm, acute or obtuse, entire. *Corolla* dark yellow, orange, or salmon, with erect lobes 3–6 × as long as the calyx, 9.5–13 mm long, outside stellate-tomentulose, inside with a 3–5 mm wide pilose ring about 2 mm above the base; tube nearly cylindrical, 2.5–4.5 × as long as the calyx, 2.1–3.4 × as long as the lobes, 7.3–10 mm long, slightly widened towards the throat or not, in the middle 1.5–2 mm wide; lobes suborbicular, up to 1.5 × as long as wide, 2.2–4 × 2–3 mm, rounded, entire, spreading. *Stamens* barely included; filaments very short, 0.1–0.5 × as long as the anthers, glabrous, inserted just below the corolla mouth; anthers oblong, 1–1.4 × 0.3–0.8 mm, deeply cordate at the base, rounded or retuse at the apex, glabrous; cells parallel. *Pistil* 5–8 mm long; ovary subglobose, mostly laterally compressed, 1–1.4 × 0.9–1.2 × 0.7–1 mm, stellate-tomentose at the apex or occasionally entirely glabrous, abruptly narrowed into the style, 4-celled; style with stigma 4–6.8 mm long, stellate-tomentulose at least at the base; stigma large, clavate, 1.2–1.7 mm long. In each cell one axile oblong bilobed placenta with about 30–40 ovules. *Berry* blue-violet (testibus Lam & Meeuse 5378, Grandidier, Rusillon 70) or orange (teste Humbert 2967), immature white (testibus Lam & Meeuse), globose or nearly so, 2.5–5 mm in diameter, rounded at the apex, glandular-pubescent or glabrous, often stellate-tomentose at the apex, topped by the base of the style, many-seeded. *Seed* medium brown, obliquely ovoid or ellipsoid, 0.6–0.9 × 0.4–0.6 × 0.4–0.6 mm, not winged, acute at one end or not, minutely reticulate. Embryo 0.4 × 0.2 mm, widest at the apex; cotyledons gradually narrowed into the slightly longer rootlet.

Distribution: Indigenous in Madagascar, but cultivated and often naturalized all over the world in tropical and subtropical regions.

Ecology: Bush in the mountains. Alt. 600–2000 m.

Madagascan name: Seva or Sevafotsy (Sevalahy, teste S.F. 6567).

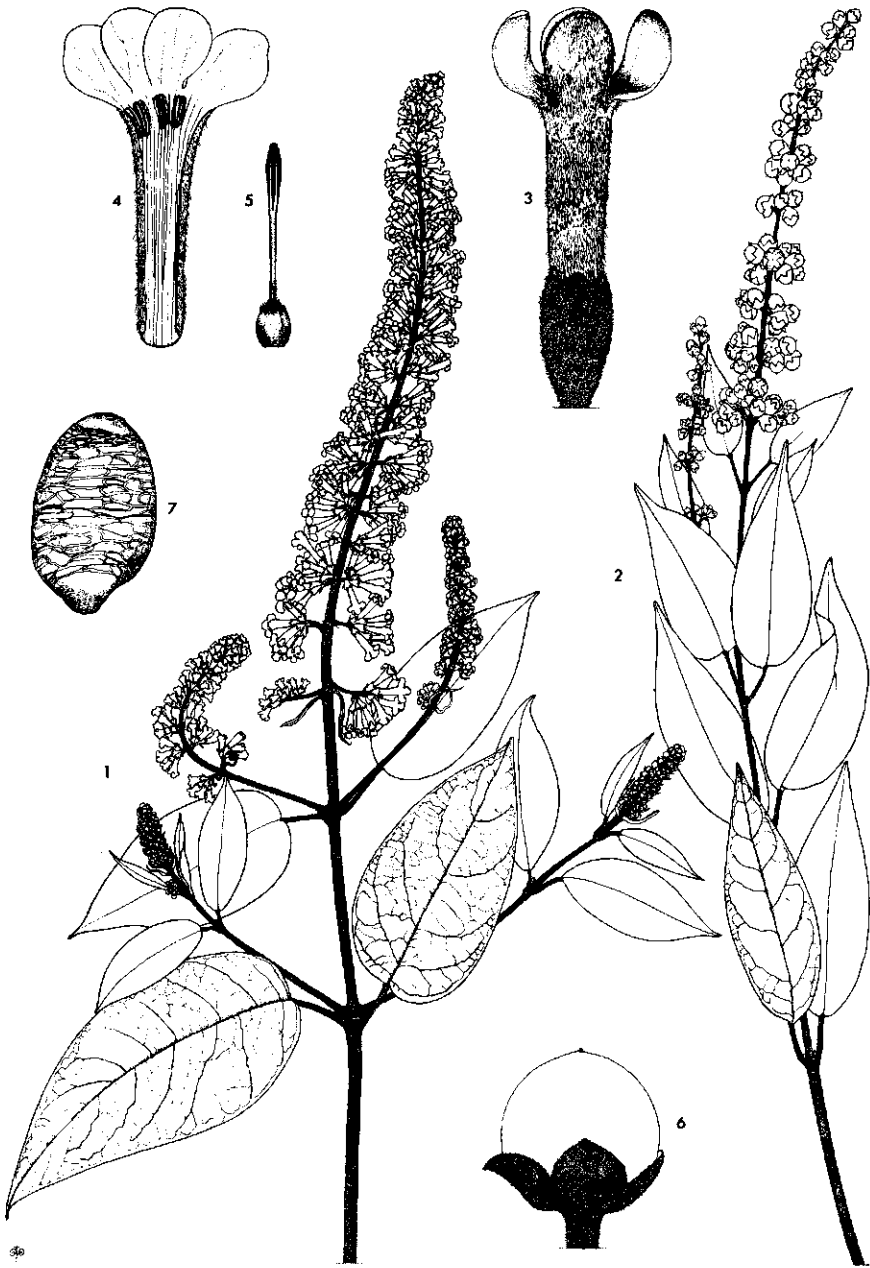
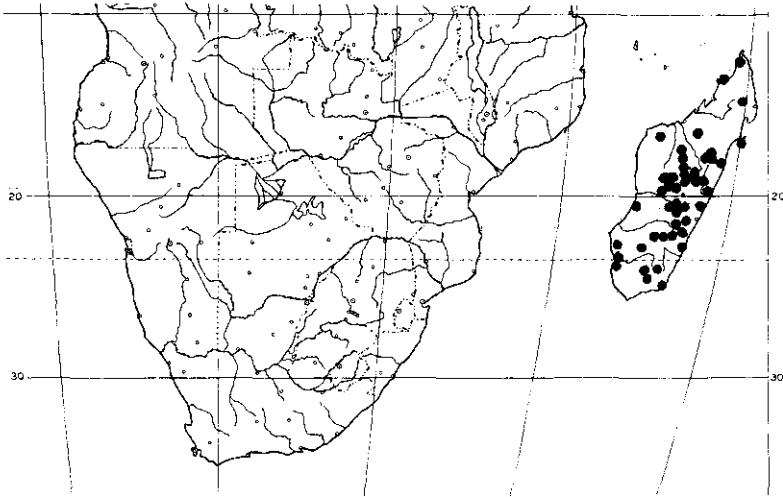


FIG. 14. *Buddleja madagascariensis*: 1. flowering and 2. fruiting branch, $\frac{1}{2} \times$; 3. flower, $4\frac{1}{2} \times$; 4. opened corolla, $4\frac{1}{2} \times$; 5. pistil, $4\frac{1}{2} \times$; 6. fruit, $5 \times$; 7. seed, $35 \times$ (1. Goudot s.n.; 2. Boiteau 346; 3-5. Campenon anno 1887; 6-7. Humbert 2967).



MAP 6. *Buddleja madagascariensis*

A selection of the more than 300 specimens examined, about 110 of which have been collected in Madagascar, about 25 in the Mascarene Islands, and the other from cultivated plants:

Madagascar: Diégo-Suarez (fr. May) Serv. For. 15919 (P); Ile Nosy Bé, Pervillé 902 (P); Maroambihy (fl. Sept.) Silasy RS 9763 (K, P, WAG); Andranomavo (fl. Aug.) Rakotovao RS 4230 (P), (fl. July) 5600 (P, WAG); between Ambonjo and Boina Rs. (fl. Aug.) Perrier de la Bâthie 8630 (P); Ile St. Marie, Richard 324 (P); Andragovalo Mts. (fl. Oct.) Humbert & Cours 17683 (P), 17916 (BR, P), 17966 ter (P); Lac Alaotra (fl. May) Bosser 1047 (P); Ambatondrazaka (fl. Sept.) Cours 736 (P); Firingalava (fl. July) Perrier de la Bâthie 672 (MO, P, WAG); Tsiroanomandidy (fl. July) Decary 7970 (G, P, PRE); Ankazobe Mts. (fl. July) Decary 14364 (P); Tananarive (fl. Aug.) Decary 6683 (BM, K, P, PRE); *ibid.*, Goudot s.n. (G); *ibid.* (fl.) Waterlot Apr. 1917 (BO, P, US); Ankozonandany (fl. Sept.) Boiteau 81 (P), 81 B (P, WAG); between Antsahalanbe and Tananarive, Grandidier s.n. (P); Mandraka R. gorge (fl. Aug.) Humbert & Perrier de la Bâthie 2287 (G, P); Moramanga (fl. July) Decary 17969 (P, WAG); Périnet (fl. July) Serv. For. 3701 (P); Beparasy (fl. June) Catat 1330 (BO, G, P); 15 km S. de Monogaga (fl., fr. Nov.) Lam & Meeuse 5378 (L, P); Betafo (fr. Nov.) Viguier & Humbert 1351 (P); Tsimbazaza (fl. Aug.) Benoist 25 (P), 83 (P); *ibid.* (fl.) Decary 14 Apr. 1917 (P); Ramartina (fl. Sept.) Decary 15484 (HBG, K, P, WAG); Morondava, Grevé 179 (K, P, WAG); Ambohipo (fl. Aug.) Decary 6762 (P, S, US); Imerina, Campenon anno 1887 (MPU, P); *ibid.*, Rusillon 70 (G); Fort Carnot (fl. Sept.) Serv. For. 14422 (P, WAG); Fianarantsoa (fl. July) Serv. For. 14471 (P, WAG); Pte. de Farafangana (fl. Aug.) Decary 4926 (P, PRE); Sandrisoa (fl. Aug.) Serv. For. 6567 (P, WAG); between Ankaramena and Zazafotsy (fr. Oct.) Boiteau 346 (P, WAG); Ihosy R. Valley (fr. Oct.) Humbert 2967 (G, P); Beravi (fl. July) Hildebrandt 3087 (BM, BREM, G, GOET, K, L, LE, M, P, WU); Tulear (fl. Aug.) Poisson 302 (P); Ivakoany Mts., Humbert 7028 bis (P); Amboasary (fl. Oct.) Decary 9248 (P, WAG); Fort Dauphin (fl. June) Decary 4198 (C, P); Mt. de Fort Dauphin-Vissambé (fl. July) Decary 10061 (L, P); *sin. loc.*, Baron 716 (K), 1689 (K), 5029 (K); Sonnerat s.n. (P-LA, type).

Réunion: cultivated and naturalized, St. Denis (fl. Sept.) de l'Isle 571 (P, WAG); Hauts de Brulé (fl.) herb. de Cordemoy Sept. 1893 (MARS); Hauts de St. Francois, Rivals Oct. 1944 (P, TL); *sin. loc.*, Commerson s.n. (G, K, P, P-JU 6041 first sheet); Perrotet 64 (G).

Mauritius: cultivated and naturalized, Pouce Mt., Dumont d'Urville s.n. (P); Port Louis, Cunningham 379 (BM, MO, NY); *sin. loc.*, Bouton MAU 1075 (MAU); Commerson s.n. (B-WILLD 2909, BM, G, L, MPU, P, P-JU 6041 2nd sheet, W); Michaux 44 (G); Sieber 88 (HAL, M, MO), If 307 (BR, G, GOET, HAL, L, LE, P, W); Thouin s.n. (SBT).

Cult. and/or naturalized: Canada: Ottawa (fl. June) R. J. Moore 26 June 1958 (K, parent of Moore's hybrids × B 27 and × B 28). U.S.A.: California: Adelante (fl. Feb.) Bracelin 1936 (GB); New York: N.Y. Bot. Gard. (fl. Sept.) T. H. Everett 307/41 (NY); Texas: Weslaco, Hidalgo County (fl. Feb.) Cory 28205 (A); Florida: Tampa, Hillsborough County (fl.) Tagliarina 16 Feb. 1967 (GH); Altamonte Springs (fl. Feb.) Schallert 19611 (B, BM, GB, M, S); Jensen Beach, Martin County (fl. Mar.) Brumbach 6668 (PRE). Bermuda: Tucker's Town (fl. Feb.) Stewardson Brown 475 (US). Puerto Rico: Villalba (fl. Oct.) F. H. Sargent 3175 (US). Brazil: Rio de Janeiro (fl. Sept.) Glaziou 1537 (BR, P, WAG). Uruguay: Montevideo (fl. Aug.) Herter 470 (B, G, HBG, M, S, WAG, Z). Argentina: Paguahó, Empedrado Department (fl. Oct.) Pedersen 1868 (BR, G, GH, NY, P, US); Benitez, Gob. Chaco (fl. Sept.) A. G. Schulz 7370 (L). Great Britain: Kew Gardens (fl. Nov.) G. Nicholson 177 (K); Wisley (fl.) A. B. Jackson 20 Feb. 1945 (BM); *ibid.* (fl. Sept.) F. G. Meyer 3404 (MO). France: Bot. Gard. Paris, Weinkauff anno 1834 (M); Bot. Gard. Montpellier (fl.) 8 Jan. 1837 (BR); Cap d'Antibes (fl.) Thellung 11 Apr. 1911 (Z). W. Germany: Bot. Gard. München, Kummer anno 1849 (M); Bot. Gard. Berlin, Warth anno 1833 (GOET). Austria: Bot. Gard. Wien (fl.) 17 Feb. 1934 (WU). Madeira: (fl.) Zettuow Apr. 1911 (HBG). Portugal: Bot. Gard. Lisboa (fl.) Frateiro 2 Feb. 1947 (K). Spain: El Atabal, 8 km N. of Malaga (fl. Apr.) v. Prehn Wiese 393 (WAG). Italy: Hanbury Gardens, La Mortola (fl.) H. V. Rosendahl 2 June 1903 (S); Sicilia, Taormina (fl. May) Bornmüller 434 (B, Z). Malta: (fl.) W. Wight Mar. 1970 (BM). Greece: Creta, Heraklion (fr. May) S. Hooper May 1967 (K); *ibid.* (fl. Apr.) Leeuwenberg 10765 (WAG). Algeria: Alger, R. Bauer anno 1862 (GENT). Tunisia: Tunis (fl.) Bisseling Mar. 1951 (L); Hammamet (fl. Jan.) Leeuwenberg 10736 (WAG). Libya: Djanet Oasis, Tibetsi (fl.) J. Juge 8 Apr. 1952 (G). Egypt: Alexandria, Blandenier in coll. Burdet 386 (G); Cairo (fl.) A. Keller Feb. 1904 (Z). Sênégál: Dakar (fl. Apr.) Chevalier 25706 (P); *ibid.* (fl. Mar.) J. G. Adam 941 (P). Nigeria: Naraguta (fl. Sept.) J. K. Jackson 5428 (FHI). St. Helena: Cuming 2456 (BM, K, OXF, W); (fl. May) Maximowicz 13 May 1864 (BM, LE); Mortensen 417 (C); (fl. Sept.) Welwitsch 4762 (BM, LISU). Ascension: Duffey 119 (K), 120 (K); Wawra 375 (LE, W). Ethiopia: Alamaya (fl. Mar.) J. J. Bos 7534 (WAG). Zaïre: Shaba: Lubumbashi, school of fathers Salésiens 172 (BR). Burundi: Ijenda (fl. Jan.) Lewalle 361 (BR). Uganda: Kajansi Fish Farm, between Kampala and Entebbe (fl. Sept.) Kendall & Richardson 12 (EA, K). Kenya: Nairobi (fl. June) Grahame Bell 8 (EA, K); *ibid.* (fl. Feb.) G. R. Williams 116 (PRE), 344 (EA, FHO, K). Tanzania: T 3: Amani, Flock 476 (EA); *ibid.* (fl. Apr.) Greenway 2230 (EA, FHO, K); *ibid.* (fl. Oct.) Ngoundai 430 (EA, K). Zambia: Kitwe (fl.) Fanshawe PPP 12 Aug. 1967 (SRGH); 16 km S. of Lusaka (fl. Sept.) Coxé 58 (K); Fort Jameson (fl. Apr.) F. White 2459 (FHO, K). Rhodesia: Salisbury (fl. June) Biegel 5137 (K, PRE); East Penkridge, Melsetter District (fl. July) Chase 5639 (BM, K, LISC, PRE, SRGH). Moçambique: Maputo (fl. Sept.) Balsinhas 1932 (K, PRE). Botswana: Gaborones (fl. Sept.) O. B. Miller B 918 (PRE). S. Africa: Kruger Nat. Park, Skukuza (fl. July) van der Schijff 639 (K, SRGH); Pretoria (fl. May) Repton 3037 (PRE); *ibid.* (fl. June) Schlieben & Mendelsohn 12792 (PRE); Bot. Gard. Johannesburg, le Sueur J 21057 (J); Grahamstown (fl. June) Bayliss 7516 (M); Knysna (fl. July) Knapp 51 (A, PRE); near Cape Town (fl. July) F. Wilms 3454 (BM); Kirstenbosch, Moss 4678 (J). Cyprus: Nicosia (fl. Apr.) Meikle 4082 (K). Libanon: Beirut (fl. Mar.) Dinsmore 20154 (K). Persia: Abadan (fl. Apr.) H. F. Macmillan 198 (K), 336 (K). India: Bot. Gard. Calcutta, Wallich 6402 (BR, CGE, G, K, K-WALL, L, OXF, P, W); Delhi (fl. Feb.) H. H. Rich 967 (K); Dehra Dun (fl.) Darshan Mani May 1950 (MO, SING); Pulney Hills (fl. Feb.) Angdale 562 (G). Sri Lanka: Peradenia, Macrae 419 (CGE). Hong-Kong: (fl. Feb.) Bodinier 498 (P, WAG). Japan: Koishikawa Bot. Gard. (fl.) May 1908 (TI). Vietnam: Saigon, L. Pierre anno 1873 (P). Malaya Peninsula: Penang (fl. Nov.) Kunstler 5201 (L). Philippines: Cuming 2459 (CGE, G). Australia: Queensland, Springbrook (fl. Sept.) Hubbard 4256 (BM, K); Sidney, J. E. Bickens s.n. (K). New Caledonia: Ngoye (fl. Nov.) Schlechter 15281 (BM, BR, G, HBG, K, L, M, P, S, W, Z); Cold'Amieu (fl. July) I. Franc 2344 (K, P).

Notes. The only fruiting specimens seen have been collected in Madagascar, Mauritius, and Creta. The above description is based on material collected in the wild.

15. **Buddleja polystachya** Fresen., Flora 21: 605. 1838; **Bentham** in De Candolle, Prod. 10: 446. 1846; Engler, Hochgebirgsfl. Trop. Afr. in Abh. Preuss. Akad. Wiss. 1891: 335. 1892; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 48. 1892; Baker in Fl. Trop. Afr. 4(1): 515. 1903; Di Capua in Pirota, Fl. Eritr. in Ann. Inst. Bot. Roma 8: 211. 1903; Fiori, Agric. Col. 5. Suppl. 79. 1911; Blatter, Fl. Arab. in Rec. Bot. Survey India 8(3): 305. 1921; Marquand, Kew Bull. 1930: 193. 1930; Bruce & Lewis, Loganiaceae in Fl. Trop. E. Afr. 36, f. 6. 1-5. 1960. **Fig. 15, p. 65; Map 7, p. 66**

Type: Ethiopia: sin. loc., Rüppell 14 (FR, holotype).

Homotypic synonym: *B. saltiana* Steud., Nom. 2nd ed. 1: 235. 1841.

Heterotypic synonyms: *B. rufa* Fresen., l.c. p. 606. Type: Ethiopia: sin. loc., Rüppell 15 (FR, holotype).

B. powellii Kränzl. in Engler, Bot. Jahrb. 50. Beibl. 111: 34. 1913. Type: Kenya: sin. loc., Powell 73 (holotype not seen, destroyed in B; lectotype: K, isotype: K).

B. polystachya var. *parvifolia* Marquand, Kew Bull. 1930: 193. 1930. Type: Ethiopia: Eritrea, Isaba, near Keren, Beccari 69 (K, holotype; isotypes: FI, WAG).

Shrub or tree, 1-12 m high, with spreading and arching branches. D.b.h. 15-35 cm. Branchlets quadrangular or nearly so, grey- or white-tomentulose with stellate hairs like the leaves beneath, the peduncles, the bracts beneath, and the calyx outside; indumentum usually drying rusty. *Leaves* opposite, petiolate; petiole 1-10 mm long; blade variable in shape and size, ovate, narrowly ovate, elliptic, or narrowly elliptic, (1.5-)2-6 × as long as wide, 1-17 × 0.4-6 cm (up to 20 × 8 cm in vigorous shoots), acuminate, acute or, when very small, obtuse at the apex, gradually to abruptly narrowed at the base and also mostly decurrent into the petiole, entire, serrate, or crenate-serrate, stellate-pubescent, and with impressed venation above, much paler and stellate-tomentulose beneath. Especially on vegetative branches leafy stipules often present. *Inflorescence* terminal, spicate, mostly interrupted, 3-25 × 1-2.5 cm; lower cymes often pedunculate, upper ones sessile. Lower bracts leafy; the others small, linear. *Flowers* sessile, mostly in dense clusters, sweet-scented. *Calyx* often subtended by some linear bracteoles, campanulate, 2.2-3.5 mm long, inside glabrous; tube 3-5 × as long as the lobes; lobes subequal, triangular or broadly triangular, 0.5-1 × 0.5-1 mm, acute, entire. *Corolla* orange with often yellow tube, with erect lobes 2-3.3 × as long as the calyx, 5-10 mm long, outside stellate-pubescent, inside pubescent to almost glabrous in the tube from about 2 mm above the base; tube nearly cylindrical, 1.5-2.7 × as long as the calyx, 2.3-4 × as long as the lobes, 3.5-8 mm long, slightly widened towards the throat or not and there 1-2 mm wide; lobes suborbicular, oblong or nearly so, 1.5-3 × 1.2-2.3 mm, rounded, entire, spreading. *Stamens* barely included; filaments very short, about 0.3 × as long as the anthers, glabrous, inserted just below the corolla mouth; anthers oblong, 1.2-2 × 0.4-0.8 mm, rounded or retuse at the apex, deeply cordate at the base,

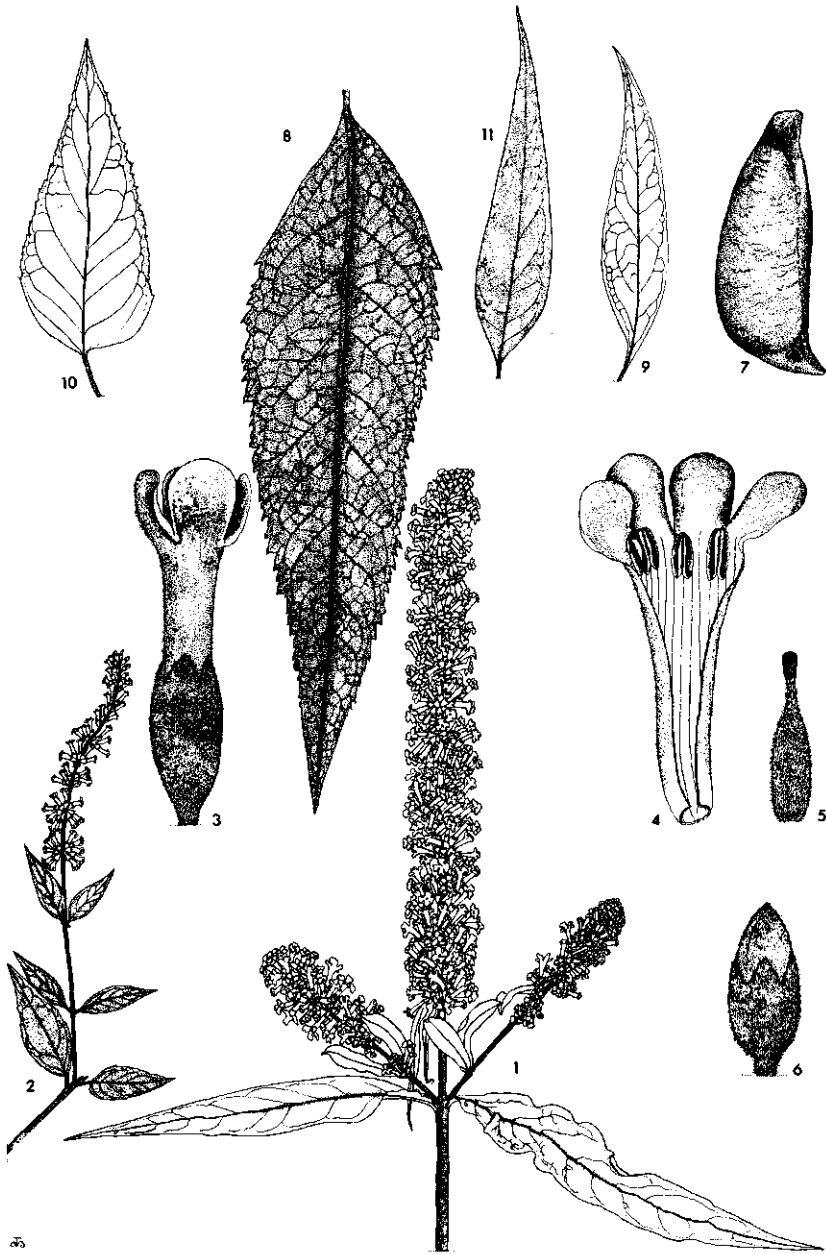
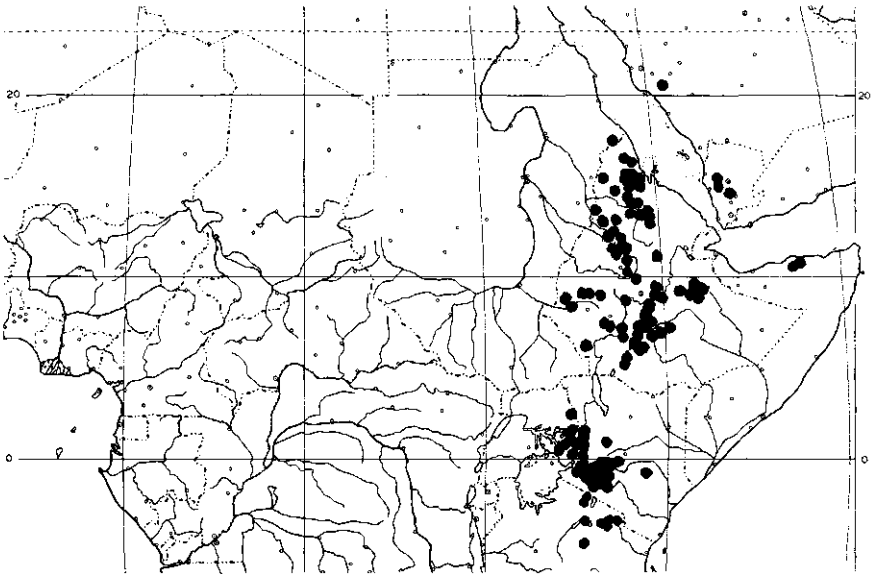


FIG. 15. *Buddleja polystachya*: 1-2. flowering branches, $\frac{1}{2} \times$; 3. flower, $4\frac{1}{2} \times$; 4. opened corolla, $4\frac{1}{2} \times$; 5. pistil, $4\frac{1}{2} \times$; 6. fruit, $4\frac{1}{2} \times$; 7. seed, $45 \times$; 8-11. leaves, $\frac{1}{2} \times$ (1, 3-5. W. de Wilde 9230; 2. Schimper 459; 6-7. Pichi Sermolli 1281; 8. Vatova 1171; 9. Schweinfurth & Riva 779; 10. Pappi 1495; 11. Mooney 5305).

glabrous; cells parallel. *Pistil* 2.2–4.5 mm long; ovary narrowly ovoid, laterally compressed, 1.4–3 × 0.9–1.5 × 0.5–1 mm, hirtopubescent with stellate hairs, gradually narrowed into the short style, 2-celled; style hairy as the ovary; stigma large, subcapitate, 0.3–1.1 × as long as the style. In each cell one axile oblong placenta with about 30 ovules outside. *Capsule* ellipsoid, 3–5 × 2 × 1.5 mm, slightly exserted, acute, hairy as the ovary; valves not torn. *Seed* pale brown, obliquely ellipsoid, often angular, 0.8–1 × 0.2–0.3 × 0.1–0.2 mm, acuminate at both ends, minutely reticulate.

Distribution: Saudi Arabia, Yemen, and East Africa.

Ecology: Scrub, open woodland, light evergreen montane forest, often along water courses. Altitude (700–)1000–3000 m.



MAP 7. *Buddleja polystachya*

A selection of the more than 300 specimens examined:

Saudi Arabia: Bani Malik (fl.) Thesiger 21 June 1946 (BM).

Yemen: Tawila (fl. Oct.) Rathjens 767 (HBG), 798 (HBG); Kohlaan (fl. Mar.) J. R. Ironside Wood 73/16 (BM, WAG); Mahwit (fl. Mar.) J. R. Ironside Wood 72/44 (BM); Kahil Mts., Manakha (fl. Feb.) Schweinfurth 1467 (BM, BR, C, G, GH, K, LE, P, WU, Z); between Saiyani and Ibb (fl. Dec.) H. Scott & E. B. Britton 371 (BM).

Sudan: Dabalut, Red Sea Hills (fl. Apr.) J. K. Jackson 3966 (K).

Ethiopia: Eritrea: Nacfa Plateau (fl. May) Pappi 897 (1848) (FI); Beni-Amer (fl. Feb.) Pappi 7876 (FI); Mt. Mahbar (fl. Jan.) Pappi 2196 (FI); Adinalai-Maldi (fl. Feb.) Pappi 1495 (FI); Ad Teklesan (fl. Mar.) Bally 6649 (EA, K); Keren (fl. May) Beccari 69 (FI, K, WAG, type of *B. polystachya* var. *parvifolia*); Embatacalla (fl. Apr.) De Benedictis 371 (FI), 433 (FI); Bet-Girghis (fl. Feb.) Pappi 127 (3659) (BM, EA, FI, G, HBG, K, LE, MO, US, W, Z); Acrur (fl. Mar.) Schweinfurth & Riva 779 (BO, BR, FI, G, K, LE, MPU, P, S, US, Z); Enda, near Adi Ugri

(fl. Mar.) Fiori 376 (FI). Tigre: Adua, Petit 120 (P); *ibid.*, Schimper 1905 (BM, BR, FI, G, GH, GOET, HAL, K, L, LE, M, MO, P, W, WAG); *ibid.*, Memsach (fl. June) Schimper 266 (BM, BR, CGE, FI, G, GH, GOET, GRO, HAL, HBG, K, L, LE, M, OXF, P, S, U, UPS, US, W, WAG, WU, Z); 51 km S. of Quiha (fl. Jan.) J. de Wilde 4442 (WAG); Shelikot (fl.) H. Salt 29 Mar. 1810 (BM, G, MO); Aman-Eski, Schimper 459 (E, FI, G, P, W). Begemeder: Siemien Mts. (fr. Apr.) Pichi-Sermolli 1281 (FI, K); near Lago Tana (fl. Feb.) Pichi Sermolli 1285 (BR, FI, MO, P, W). Gojjam: Yitemen (fl. Dec.) Seegeler 2984 (WAG). Wollo: Kombolcha, near Dessie, O. West 5843 (EA, K, PRE). Wellega: Lekemti (fl. Jan.) F. G. Meyer 8113 (K, MO); Gimbie (fl. Jan.) Amau Getahun 383 (K). Shoa: Guder, J. J. Bos & P. Jansen 10163 (WAG); near Blue Nile Gorge (fl. Oct.) J. de Wilde 5814 (WAG); Mt. Wochacha (fl. Jan.) W. de Wilde 9609 (WAG); Awash Nat. Park (fl. Feb.) J. de Wilde 6344 (WAG). Harrarghe: Gara Muletta (fl. Mar.) J. B. Gillett 5283 (FI, K); *ibid.* (fl. Oct.) P. Jansen 4269 (WAG); km 36 Bedeno-Curfacelli (fl. Oct.) Westphal 2477 (WAG); Alemaya (fl. May) J. J. Bos 7758 (WAG). Kafa: Jimma (fl. Dec.) Friis c.s. 1694 (K, WAG); Maji (fl. Jan.) J. de Wilde 6203 (WAG). Arusi: 5 km N. of Asella (fl. Oct.) Mats Thulin 1562 (BR, EA, K); km 9 Asella-Bekoji (fl. Jan.) Westphal 3078 (WAG); 8 km S. of Asella (fl. Dec.) W. de Wilde 9230 (P, PRE, WAG); Coré (fl. Dec.) Mooney 5305 (FI, K). Sidamo: Soddo (fl. Dec.) Vátova 1171 (FI); Mt. Delo (fl. Jan.) J. B. Gillett 14892 (B, BR, EA, FI, K, PRE, S, W). Bale: 27 km W. of Gurie (= Dinshu) along road to Adaba (fl., fr. Jan.) J. de Wilde 7349 (WAG); Tiniso (fl. Jan.) Mooney 8520 (FI, K, S).

Somalia: Medishe Valley (fl. Apr.) Glover & Gilliland 926 (BM, EA, FHO, K), (fl. July) 953 (BM, EA, FHO, K); Hered (fl. Nov.) Peck Y 108 (EA, K).

Uganda: U 1: Mt. Moroto (fr. Feb.) Eggeling 2859 (K). U 3: Mt. Elgon (fl. Jan.) Eggeling 2441 (BR, ENT, K); Bugishu (fl. Sept.) A. S. Thomas 462 (EA, FHO, K); Bulucheke (fl. Dec.) Dale U 86 (BR, ENT, FHO).

Kenya: K 1: Lorogi Hills (fl. Oct.) Leakey 945 (EA, FHO). K 2: Sekerr Mts. (fl. Aug.) Agnew c.s. 10350 (EA); Cherangani Hills (fl. Dec.) Maberley 495 (EA, K). K 3: Mt. Elgon (fl. Dec.) Kokwaro 2441 (EA, K); *ibid.* (fl. Dec.) Mwangangi 401 (BR, EA, K), 431 (BR, EA, K, PRE); 8 km NE. of Londiani (fl. Feb.) Spjut & Ensor 3185 (EA, K); Nakuru (fl. Dec.) Scott Elliot 6850 (BM, K); Kinangop Forest (fl. Nov.) Kerfoot 1444 (EA, K). K 4: Kijabe (fl. Feb.) Dowson 24 (EA, K), 705 (EA); Kikuyu Escarpment Forest (fl. Dec.) Perdue & Kibuwe 8248 (EA, K, UPS); Mt. Kenya, Holyoak 715 (A, BM, EA, FHO, MO). K 5: Kakamega (fl. Nov.) Dale 3388 (BR, EA, K); 16 km NEE. of Kisii (fl. Nov.) Vuyk & Breteler 167 (WAG). K 6: Olorurto (fl., fr. May) Glover c.s. 960 (BR, EA, K, PRE); Siabei Gorge (fl. Mar.) Bally 1375 (EA, G, K); Ngong Hills (fl. July) Bally 99 (EA, G, K).

Tanzania: T 2: Loliondo (fl. Sept.) Greenway 10207 (BR, EA, K, PRE); Ngorongoro Crater (fl. Nov.) B. D. Burtt 4190 (BR, EA, FI, K); *ibid.* (fl. Sept.) J. Raynal 19055 (P); Ngurdoto Crater (fl. Oct.) Carmichael 587 (EA, K); Tululusie Hill (fl. Nov.) Greenway & Kanuri 12326 (BR, EA, K, PRE, WAG); Nakuru Narok (fl. Jan.) Van Heerdt 1285 (U); Meru Mt. (fl. Dec.) Richards 21799 (MO), (fl. Nov.) 24629 (K, M, NY).

16. **Buddleja pulchella** N. E. Brown, Kew Bull. 1894: 389. 1894; Wood & Evans, Natal Pl. 1: 49, t. 60. 1899; Prain & Cummins in Fl. Cap. 4(1): 1048. 1909; Marquand, Kew Bull. 1930: 190. 1930; Bruce & Lewis, Loganiaceae in Fl. Trop. E. Afr. 38, f. 6.7. 1960; Verdoorn in Fl. S. Afr. 26: 163, f. 22.3. 1963; Palmer & Pitman, Trees S. Afr. 3: 1883. 1973. **Fig. 16, p. 69; Map 8, p. 70**

Type: Cult. Kew, from Natal Botanic Garden, Durban, 6 Oct. 1894 (K, holotype).

Heterotypic synonyms: *B. usambarensis* Gilg in Engler, Glied. Veg. Usambara, Abh. Preuss. Wiss. 1894: 40, 63. 1894; in Engler, Pflanzenw. Ost-Afr. C: 313. 1895; Baker in Fl. Trop. Afr. 4(1): 516. 1903. Lectotype: Tanzania:

Usambara Mts., Mshusa, Holst 8967 (Z, lectotype; isotypes: BM, COI, G, HBG, K, LE, M, P, S, US, W).

B. woodii Gilg in Engler, Bot. Jahrb. 23: 201. 1896. Type: S. Africa: Natal: New Hannover: near York, Wood 4869 (holotype not seen, destroyed in B; lectotype: Z; other isotypes seen: BOL, K, MO, PRE, SAM, US).

? *B. oreophila* Gilg in Engler, Bot. Jahrb. 23: 202. 1896; Baker in Fl. Trop. Afr. 4(1): 516. 1903. Type: Tanzania: Uluguru Mts., Lukwangule (Usagara), Stuhlmann 9101 (holotype not seen, destroyed in B; no isotype seen).

Shrub, often climbing, 1–10 m high and up to at least 20 m long (tree 4.5 m high, teste Muze 2). Trunk 4 cm in diam. Branchlets terete, white- or pale grey-tomentose with stellate hairs; indumentum drying rusty. *Leaves* opposite or subopposite, petiolate; petiole 5–20 mm long; blade variable in shape and size, ovate, triangular, oblong, or narrowly so, or narrowly obovate, 1.2–3 × as long as wide, 1.8–10(–15) × 1–5(–7) cm, acuminate to obtuse at the apex, gradually or abruptly narrowed at the base and at the same time mostly decurrent into the petiole, sometimes with 1–2 large lobes near the base, furthermore entire, pale grey-stellate-tomentose, glabrescent, and with costa and often main veins impressed above, stellate-tomentose to -pilose beneath; venation inconspicuous. Stipules none. *Inflorescence* paniculate, very variable in size, lax or rather so; 3–25 × 2–25 cm, several times branched. Peduncle, branches, and pedicels hairy like the branchlets. Lower bracts leafy, the others small, linear. *Flowers* in rather loose clusters, shortly pedicellate or sessile, sweet-scented or with an unpleasant odour. *Calyx* often subtended by some small linear bracteoles, cylindrical or nearly so, 3–5 × 1.2–3 mm, white-stellate-tomentose outside (indumentum usually drying rusty), inside glabrous; tube 4–8 × as long as the lobes; lobes subequal, broadly to rather narrowly triangular, 0.5–1 × 0.5–1 mm, acute or obtuse, entire. *Corolla* white, pale orange, or yellow to whitish with orange or yellow throat, with erect lobes 7–12 mm long, outside stellate-tomentulose, inside hirto-pilose in a 2–3 mm wide ring which has its lower edge at 1–2 mm above the base; tube nearly cylindrical, 1.5–2.5 × as long as the calyx, 3.7–6.5 × as long as the lobes, 5.5–9 mm long, slightly widened towards the throat or not and there 1–1.8 mm wide; lobes suborbicular to oblong, 1–3 × 1–2.5 mm, broadly rounded, entire, spreading to reflexed. *Stamens* included; anthers sessile with the apex 0–1 mm below the corolla mouth, oblong, 2–5 × as long as wide, 0.8–1.2 × 0.2–0.5 mm, deeply cordate at the base, rounded to retuse at the apex, glabrous; cells parallel. *Pistil* 2.5–5.2 mm long, stellate-tomentulose, often glabrous at the apex of the style; ovary ovoid or narrowly ovoid, often laterally compressed, 1–2 × 0.4–1.2 × 0.4–1 mm, gradually narrowed into the rather short style; stigma clavate to subcapitate, decurrent into the style, 0.8–1.2 mm long. In each cell one axile oblong placenta with 1–15 ovules outside. *Capsule* narrowly ellipsoid, 4.5–6 × 1.2–1.8 × 1.2–1.5 mm, 1.4–2 × as long as the calyx, acute at the apex, hairy like the ovary but less densely so; valves often split at the apex. *Seed* pale brown, oblong, flat, 2.5–2.8 × 0.5–0.8 × 0.2–0.3 mm, nar-

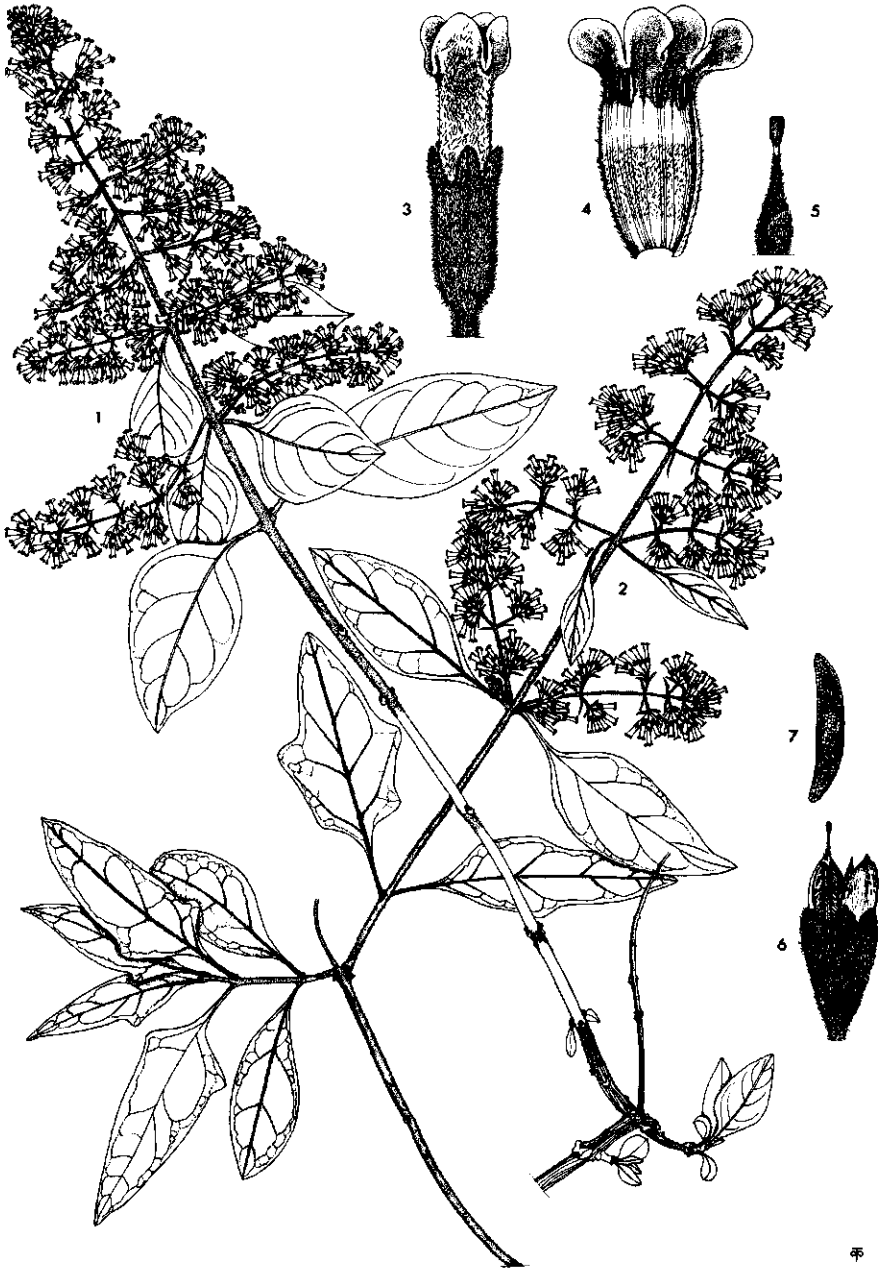
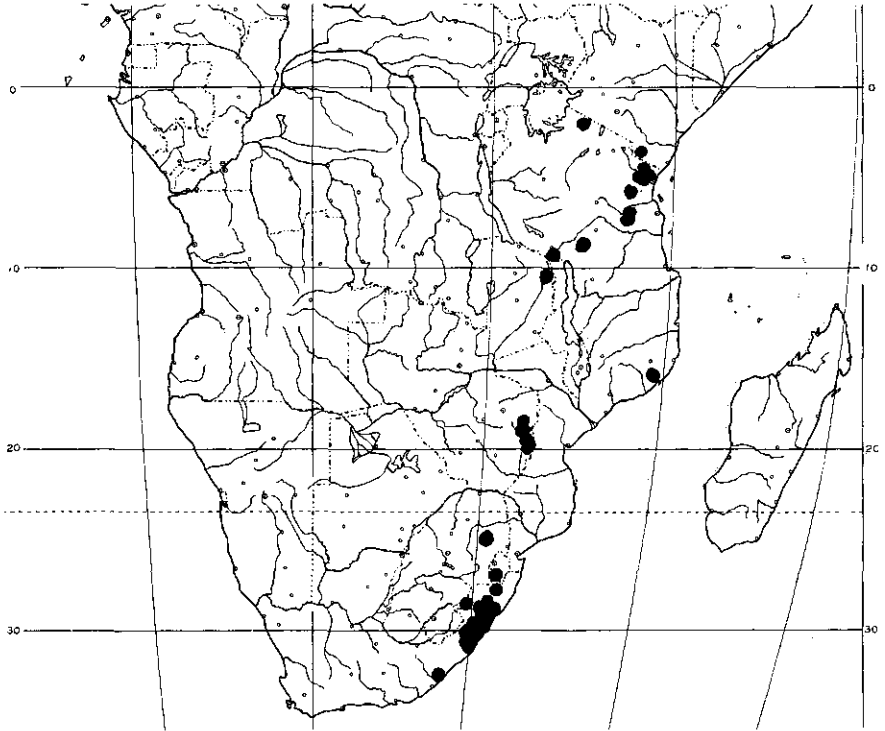


FIG. 16. *Buddleja pulchella*: 1-2. flowering branches, $\frac{1}{2} \times$; 3. flower, $4\frac{1}{2} \times$; 4. opened corolla, $4\frac{1}{2} \times$; 5. pistil, $4\frac{1}{2} \times$; 6. fruit, $4\frac{1}{2} \times$; 7. seed, $6 \times$ (1. Rudatis 1054; 2. Wood 574; 3-5. Drummond & Hemsley 4327; 6-7. Rehmann 7563).

rowly winged at the edges or sometimes not, with acuminate wings at both ends, minutely reticulate all over.

Distribution: Eastern and southern Africa.

Ecology: In tropical Africa in woodland or light forest in the mountains; alt. 1200–2000 m; in southern Africa in forest, mostly at edges, or in open places; alt. 300–1100 m.



MAP 8. *Buddleja pulchella*

Specimens examined:

Kenya: K 7: Teita Hills, Ngangao (fl. Sept.) H. M. Gardner 2940 (EA, FI, K); *ibid.* (fl. Sept.) Drummond & Hemsley 4327 (BR, EA, FI, K, P, PRE, S).

Tanzania: T 1: 16 km W. of Klein's Camp, Loliondo District (fl. Nov.) Tanner 1815 (K, NY). T 3: Shagayu For. Res., Lushoto District (fl. Oct.) Mgaza 644 (BR, COI, EA, K); *ibid.* (fl. May) Procter 230 (EA, K, PRE); *ibid.*, near Sunge (fl. May) Drummond & Hemsley 2568 (B, BR, EA, K, LISC, SRGH); km 3 Shume-Lushoto Road (few fls. Nov.) Leeuwenberg 10817 (EA, WAG); km 20 Lushoto-Lukosi Road (fr. Nov.) Leeuwenberg 10813 (EA, WAG); km 15 of same road, Leeuwenberg 10812 (EA, WAG); Magamba (bud July) Mgaza 40 (EA, FHO, K); *ibid.* (fl. Aug.) Muze 2 (EA, K); Lushoto (fl. Sept.) Semsei 2908 (EA, K, S), (fl. May) 3938 (EA, K); Kitivo For. Res. (fl. Aug.) Semsei 2234 (EA, K); Kwai Road (fl. July) Williams 62 (EA, FHO, K); Mlumbi (fl. Aug.) Geilinger 1438 (Z); Mkusi (fl. Aug.) Greenway 7847 (BR, EA, K, PRE); Gare, near Nguwe R., Lushoto District (bud July) Mshana 69 (EA, K); Kinguri farm (fl. Aug.) Mbailwa

137 (EA, K); Jaegerstal (fl. Aug.) Mshana 222 (EA, K); Kwa Mshusa (fl. Aug.) Holst 8967 (BM, COI, G, HBG, K, LE, M, P, S, US, W, Z, lectotype of *B. usambarensis*); Mzinga-Baya (fl. Aug.) Braun 2773 (EA); Masumbai-Mzinga (fl. Aug.) Braun 2759 (EA). T 6: NW. side of Uluguru Mts. (fl. June) Schlieben 4041 (B, BM, BR, G, HBG, LISC, M, P, S, Z); NW. slopes of Bondwa (fl. Aug.) Gibbon & Pócs 6050/C (EA); Morningside (fl. July) Carmichael 667 (EA, K); *ibid.* (fl. July) Kabuye 233 (EA, K); Uluguru North For. Res., Morogoro Valley (fl. July) Mabblerley 1219 (K). T 7: Kyimbila, Stolz 2195 (B, C, GRO, HBG, L, LD, M, S, U, UPS, W, WAG, Z); Mufindi (fl. Sept.) Paget-Wilkes 167 (EA).

Zambia: Nyika (fr. Dec.) Fanshawe 7296 (FHO, K).

Moçambique: Quelimane, Sim 20530 (PRE).

Rhodesia: Diana's Vow farm, Makoni District, Chase 8563 (FHO, K, PRE, SRGH); Umtali Commonage (fl. June) Chase 770 (BM, K, LISC, S, SRGH); Cross Hill, Umtali (fl. Aug.) Chase 866 (BM, K, SRGH), 868 (BM, K, LISC, SRGH); Vumba (fl. June) Chase 765 (BM, K, LISC); *ibid.* (fl. June) B. S. Fisher 1578 (K, PRE, SRGH).

Swaziland: Hlatikulu Forest (fl. June) Compton 28956 (NBG, PRE).

Transkei: S. bank Msikaba R., near Lambasi store (fr. Aug.) Strey 8960 (E, K, PRE, SRGH); Kentani (fl. fr. July) Pegler 764 (BM, BOL, GRA, PRE, SAM, STE, Z).

S. Africa: Transvaal: Kranskloof (fl. July) Haygarth 23183 (PRE, STE). Natal: Ngyassa, Kwa Zulu (fl.) Yylie Oct. 1908 (G), 8 Oct. 1911 (G); Eshowe (fl. July) Lawn 854 (NH), (fr. Sept.) 2094 (NH); between Eshowe and Nkandhla (fl. Aug.) Pole Evans 3628 (K, PRE); Nkandhla (fl. Sept.) Gerstner 3680 (NH, PRE); *ibid.* (imm. fr. Sept.) Meebold 13127 (COI, M); Nkandhla Forest (fl.) H. C. D. de Wit 381. 12 July 1938 (BO); *ibid.* (fl. June) Edwards 1433 (PRE); *ibid.* (fl. June) Codd 1377 (PRE); Qudeni (fr. Sept.) Gerstner 2508 (NH); Qudeni Forest (fl. July) Compton 19747 (NBG); *ibid.* (bud June) Edwards 1404 (PRE); Entembeni Hill, near Kranskop (imm. fr. Aug.) Acocks 11626 (NH); Van Reenen (fl.) J. M. Wood 16 Aug. 1912 (L); Little Noodsberg Nat. Res. (bud June) Strey 7523 (BR, K, NH, PRE, S); Ketelfontein, Cooper 1159 (BM, E, K, W, Z); Pietermaritzburg, Rehmann 7563 (Z); Table Mt., Amatulu Forest, Pietermaritzburg District (fl. Sept.) Killick 196 (PRE), (fl. July) 596 (PRE); *ibid.* (fl. June) Rump NH 20593 (NH); Hill Crest (fl. Aug.) Thode 3220 (STE); Botha's Hill (fr. Sept.) Hutchinson c.s. 17 (NH); *ibid.* (fl. Sept.) Hutchinson 4665 (K); Inanda, J. M. Wood s.n. (Z); near Durban (fl. Aug.) J. M. Wood 9071 (L, US); Berea, Durban (fl. July) Forbes 245 (C, NH); *ibid.* (fl. July) J. M. Wood 574 (BM, BOL, G, K, MO, NH, PRE, US), 12323 (MO, NH, PRE); Victoria County (fl. June) J. M. Wood 4639 (E); Everton, Eskotene, Pinetown District (fl. June) Hilliard 3982 (E, NH); 7 km W. of Richmond (fl. May) Sidey 790 (S); Dumisa, Alexandra District (fl. July) Rudatis 1035 (BM, K, STE), 1054 (BM, E, G, GRO, K, L, S, STE, W, WRSL, Z), 1945 (BR, G, GRO, HBG, L, LD, P, S, STE, W, WAG, Z), 1947 (HBG); Hlokozi, Rudatis 2366 (STE); Holgate's Forest, Port Shepstone District (fl. Aug.) Nicholson 298 (NH); *ibid.* (fl. Aug.) Strey 5882 (NH); Umgai (fl. June) Strey 10972 (EA, K, PRE).

Cult: Great Britain: from Natal Bot. Gard. (fl.) Kew Gard. 6 Oct. 1894 (K, type); *ibid.*, 15 July 1898 (K); *ibid.*, Leeuwenberg 3401 (WAG). Rhodesia: Salisbury (fl. Aug.) Barbosa 10302 (SRGH); Durban Bot. Gard. (fl. June) J. M. Wood 4869 (BOL, K, MO, PRE, SAM, US, Z, type of *B. woodii*), (fl. July) 7173 (BOL, E, M), 12676 (BM, G, J, Z).

Note. *B. pulchella* can be distinguished from the allied *B. polystachya* as follows:

1. Inflorescence a mostly interrupted spike; flowers sessile; leaves 2–6 × as long as wide, often serrate; 30 ovules per cell ***B. polystachya***
 Inflorescence paniculate; some flowers pedicellate; leaves up to 3 × as long as wide, entire or sometimes with one or two lobes at each side; 1–15 ovules per cell ***B. pulchella***

17. *Buddleja saligna* Willd., Enum. Hort. Berol. 1: 159. 1809; G. Don, Gen. Syst. 4: 601. 1838; Verdoorn in Fl. S. Afr. 26: 163, f. 23.1. 1963; Palmer & Pitman, Trees S. Afr. 3: 1883. 1973 (with photographs).

Fig. 17, p. 73; Phot. 7, p. 74; Map 9, p. 75

Basionym: *B. salicifolia* Jacq., Hort. Schoenbr. 1: 12, t. 29. 1797, non Vahl (1794); Phillips, Journ. S. Afr. Bot. 12: 114. 1946.

Type: Cult. Hort. Schoenbrun, Wien, Austria, herb. Jacquin (W, holotype; isotype: BM).

Homotypic synonym: *Nuxia saligna* (Willd.) Benth. in Hooker, Comp. Bot. Mag. 2: 59. 1836.

Heterotypic synonyms: *Scoparia arborea* L. f., Suppl. 125. 1781, not *Buddleja arborea* Meyen (1834–1835). Type: S. Africa: Cape, Thunberg s.n. (LINN 145.3, holotype; possible isotypes: LD, S, SBT, UPS-herb. Thunberg 3569, 3570, 3571). Homotypic synonyms: *Chilianthus oleaceus* Burchell, Trav. 1: 94. 1822; Sim, For. Fl. Cape Col. 276, pl. 113, f. 2. 1907. *C. arboreus* (L.f.) A. D.C. in De Candolle, Prod. 10: 435. 1846; Pappé, Silva Cap. 1st ed. 26. 1854 and 2nd ed. 30. 1862; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 46, f. 26. A-B. 1892; Prain & Cummins in Fl. Cap. 4(1): 1043. 1909; Marloth, Fl. S. Afr. 3(1): 48, f. 16.9–10. 14 A. 1932.

Callicarpa paniculata Lam., Enc. 1: 563. 1785; Illustr. 1: 293. 1792, not *Buddleja paniculata* Wall. (1820). Type: Africa: sin. loc., Sonnerat s.n. (P-LA, holotype; isotype: P). Homotypic synonym: *Semnos paniculata* (Lam.) Rafinesque, Sylva Tellur. 161. 1838.

Chilianthus arboreus var. *rosmarinaceus* O. Kuntze, Rev. 3(2): 201. 1898. Type: S. Africa: Cape Prov.: Kuruman R. sources, Burchell 2494 (holotype not seen, destroyed in B; lectotype: K; other isotypes seen: GH, GOET, L, LE, M, P, W).

Shrub or small tree, 0.5–12 m high, much branched, resembling *Salix* and *Olea*. Branchlets terete or quadrangular and with 4 ridges or narrow wings, lepidote especially at the apex. Leaves decussate, those of a pair equal, often shortly petiolate; petiole lepidote, glabrescent, 1–20 mm long; blade subcoriaceous, narrowly elliptic to linear, variable in shape and size, 4–12 × as long as wide, 1.2–15 × 0.2–2(–3) cm, acute, acuminate, or less often rounded at the apex, cuneate at the base or decurrent into the petiole, entire or obscurely sinuate at the enrolled margin, often undulate when dry, above lepidote-scaly when young, soon glabrous, much paler and densely grey- or tawny-pubescent with stellate hairs beneath; venation reticulate, impressed above, prominent beneath, forming a line more or less parallel to the margin. Inflorescence terminal and often also in the axils of the upper leaves, paniculate, large, very many-flowered, lax or rather so, 3 × 3–18 × 16 cm, 3–9 × branched. Lower bracts leafy; the others small, linear, lepidote like the peduncle, branches, and pedicels. Flowers subsessile in 3-flowered cymes, sweet-scented. Calyx often subtended by two small linear bracts, cup-shaped or nearly so, 0.8–1.4 mm long, outside densely lepidote-scaly, inside glabrous; tube 0.7–4 × as long as

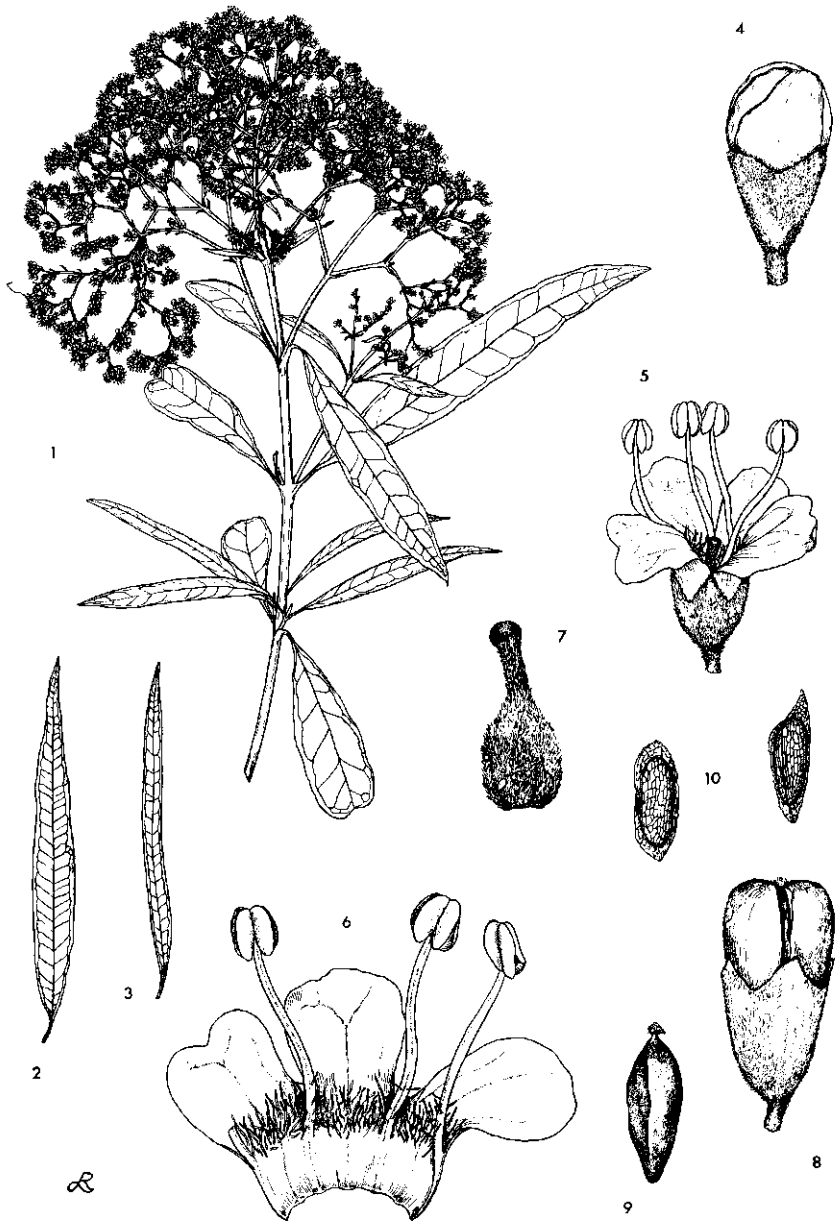


FIG. 17. *Buddleja saligna*: 1. flowering branch, $\frac{1}{2} \times$; 2-3. leaves, $\frac{1}{2} \times$; 4. flower bud, $15 \times$; 5. flower, $10 \times$; 6. opened corolla, $15 \times$; 7. pistil, $20 \times$; 8. fruit, $15 \times$; 9. placenta, $15 \times$; 10. seeds, $15 \times$ (1, 4-7. Schlechter 1939; 2. Wood 4647; 3, 8-10. Ecklon & Zeyher 94.12).

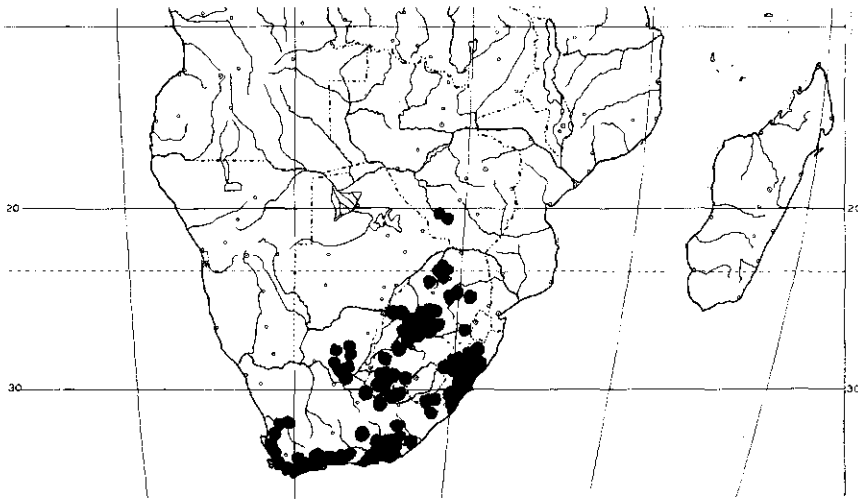


PHOT. 7. *Buddleja saligna* (Beider 129, phot. J. W. Mugge, cult. Wageningen).

the lobes; lobes equal or subequal, mostly broadly triangular, $0.5-1 \times$ as long as wide, $0.2-0.6 \times 0.4-0.6$ mm, acute or obtuse, entire. *Corolla* white or creamy, with erect lobes $1.8-2.2 \times$ as long as the calyx, $1.8-3$ mm long, outside glabrous, pubescent or lepidote, especially on the middle of the lobes, inside pilose with rather stiff hairs in the throat; tube cup-shaped or nearly so, mostly slightly shorter than the calyx, $0.5-1.2 \times 0.7-1.2$ mm; lobes $1.2-2.5 \times$ as long as the tube, suborbicular or elliptic, $1-1.5 \times$ as long as wide, $1-1.8 \times 0.8-1.2$ mm, rounded, entire, recurved. *Stamens* well-exserted; filaments $1-2.5$ mm long, elongate at anthesis, glabrous, inserted at or just above the middle of the corolla tube; anthers suborbicular, narrower after the pollen is shed, $0.3-0.4$ mm long, often cordate at the base, glabrous; cells parallel or slightly divergent at the base. *Pistil* densely lepidote-scaly all over, $1-2$ mm long; ovary ovoid or nearly so, sometimes laterally compressed, $0.5-1.2 \times 0.4-0.8 \times 0.3-0.8$ mm, rather abruptly narrowed into the style, 2-celled; style with stigma about as long as the ovary, $0.5-0.8$ mm long, at the apex broadened towards the large capitate stigma. In each cell one suborbicular peltate placenta with 4-6 ovules outside. *Capsule* oblong, often laterally compressed, $1.5-2.5 \times 0.8-1.2 \times 0.8-1$ mm, sparsely lepidote-scaly, about twice as long as the calyx, 2-, later 4-valved. *Seeds* medium brown, obliquely tetrahedral or nearly fusiform, $0.9-1.3 \times 0.4-0.6 \times 0.2-0.4$ mm, obscurely or not winged, minutely reticulate. Embryo white, 0.3×0.1 mm; cotyledons not wider than the rootlet.

Distribution: Southern Africa south from Rhodesia.

Ecology: Dry hillsides, mixed scrub bushveld, mountain slopes, wooded valleys, forest edges, along rivers and in coastal bush at river mouths. Alt. 0-2000 m.



MAP 9. *Buddleja saligna*

A selection of the about 390 specimens examined:

Rhodesia: Bulawayo District (fl. Dec.) Eyles 1138 (PRE, SRGH); *ibid.*, near Old Kraal (fr. Apr.) Orpen 841/50 (SRGH); Umzingwane, Fern Kloof, Queen Victoria Mem. Mus. 7119 (SRGH); Essexvale, Borle 102 (A, BR, PRE), (fl. Jan.) 104 (K, P, PRE, SRGH, W).

Transkei: near Clydesdale (fl. Mar.) Tyson 1288 (BM, BOL, G, GH, K, P, PRE, SAM, UPS, W), (fl. Nov.) Tyson 2055 (BOL, K, PRE, SAM, US, Z); Umtata, Tsitsa R. (fr. Feb.) Strey 10695 (PRE).

S. Africa: Transvaal: Blouberg, Pietersburg District, Codd 8731 (PRE); *ibid.* (fr. Apr.) Van der Schijff 5367 (K, PRE); Houtbosch, Rehmann 6009 (BM, BOL, K, Z); Dorset, 28 km NNE. of Vaalwater (fl. Feb.) Meeuse 10563 (FHO, LD, M, PRE, S, SRGH, UPS); N. of Zeerust (fl. Feb.) Hutchinson (BM, BOL, K, PRE); between Rustenburg and Zeerust (fl. Feb.) Hutchinson & Phillips 2940 (BM, BOL, GRA, K, PRE); Groot Marico, Sutton 1160 (PRE); Swarttruggens (fl. Feb.) Sutton 922 (PRE), 923 (PRE); Rustenburg Nat. Res. (imm. fr. Feb.) N. Jacobsen 2367 (PRE); Elandskraal, Hekpoort District (fl. Jan.) A. E. Van Wyk 131 (PRE, PUC); Dunningkamp, Suidfrontskaliëkrans, B. J. Coetzee 836 (PRE), 862 (EA, PRE, WAG); Hornsnek, Pretoria District (fl. Mar.) Codd 895 (PRE); *ibid.* (fl. Jan.) Schlieben 7787 (B, BR, G, HBG, K, M, NY, US, Z); Wonderboompoort, Lotsy & Goddijn 549 (L); Groenkloof (fr. Mar.) Repton 5203 (PRE); Irene (fr. Apr.) J. C. Smuts 1300 (K, PRE), (fl. Dec. 1927 (STE); *ibid.*, Doornkloof (bud Jan.) J. G. Gillett 3299 (K); Baviaanspoort (fr. Oct.) Meebold 12988 (M, NY); island of Vaal R., Potchefstroom District (bud Dec.) W. J. Louw 1643 (PRE); Sterkfontein (fr. Jan.) Mogg 33243 (UPS), 34155 (PRE, SRGH); Johannesburg, Klipriviersberg (fr. Apr.) R. F. Rand 1285 (BM); Leupoort, 60 km SW. of Johannesburg (fl. Jan.) Mogg 18443 (BM, J, K, M, SRGH); Schoongesig, 40 km SE. of Johannesburg (fl. Jan.) Mogg 24088 (J, M, MO, SRGH); Heidelberg (fr. Mar.) Murray 635 (PRE); *ibid.* (fl. Dec.) Leendertz 1046 (K, L, PRE). Orange Free State: Diedericksthal, D. B. Muller 1138 (PRE); between Theunissen and Brandfort (fl. Jan.) A. E. Van Wyk 146 (PRE, PUC); Petrusburg District (fr. Jan.) E. R. Anderson E 24 (PRE); Bloemfontein (fl. Dec.) W. F. Barker 8847 (NBG, STE); *ibid.* (fr.) Kuntze 15 Feb. 1894 (G, GH, K, NY, US, Z); *ibid.*, Naval Hill (fl.) M. C. Gillett & J. C. Smuts 30 Oct. 1925 (STE); *ibid.* (fr. and some fls. Mar.) Leeuwenberg & Van Zinderen Bakker sr. 10935 (STE, WAG); 10 km N. of Bloemfontein (fl. Sept.) De Winter 8971 (PRE); Thaba Nchu Mt. (fr. July) B. R. Roberts 1796 (PRE); Fauresmith (fl. Apr.) Keet US 14814 (STE); *ibid.* (fl. Feb.) J. W. Pont 1350 (U), (fl. Oct.) 1638 (U); Fauresmith Res. (fl. Mar.) Hutchinson 3057 (BOL, K, PRE); Fauresmith District (fl. Feb.) Verdoorn 2364 (PRE); Veld Res., Fauresmith (fl., fr. Oct.) Henrici 1849 (PRE), Olifantsfontein, Rehmann 3507 (K, Z); Bethulie, Tussen die Riviere Wildtuin (fl. Nov.) B. R. Roberts 5366 (PRE). Natal: Mielietuin, S. of Colenso (fl. Jan.) Strey 9496 (E, EA, K, PRE, SRGH); Estcourt (fl. Jan.) D. Green G 48 (PRE); Grand Valley Hills, Hlatikulu District (bud Nov.) Compton 29505 (NBG); Weenen (fl. Dec.) O. West 1451 (NH, PRE); Muiden (fr. Jan.) Sim 19136 (PRE); Tugela Ferry (fr. Mar.) F. White 10510 (FHO, PRE); Nkandhla (fl. Feb.) Gerstner 612 (PRE, SRGH); Qudeni (fr. Sept.) Gerstner 3574 (NH, US); Pietermaritzburg (fl. Dec.) Forest Officer NH 28114 (K, MO, NH); Bisley (fr. Sept.) J. H. Ross 395 (COI, K, LISC, SRGH); Table Mt. (fr. Feb.) Killick 364 (PRE); Nagle Dam (fl. Jan.) Wells 1061 (E, PRE); Durban, Gueinzus 90 (C, CGE, P, PRE, S, W), 582 (PRE, W, WAG); Berea, near Durban (fl. Sept.) J. M. Wood 4647 (E, G, LE, MO, PRE, SAM, US, Z); Palmiet (fl. Jan.) J. M. Wood 9179 (P, PRE, WRSL); Inanda (fl. Oct.) J. M. Wood 1108 (BM, BOL, K, NH); Dumisa (fl. Nov.) Rudatis 1221 (BM, E, G, K, PRE, S, STE, W, WRSL, Z); Umkomaas Valley (fl. Dec.) Sidey 3624 (PRE, US); Horseshoe farm, Port Shepstone (fl. Nov.) Strey 7765 (K, M, NH, PRE, SRGH). Cape Province: Toto Mt., Leistner & Joynt 2738 (K, PRE); Kuruman R. sources (fr. Dec.) Burchell 2494 (GH, GOET, K, L, LE, M, P, W, type of *Chilianthus arboreus* var. *rosmarinaceus*); Bergenaarspad (fl. Mar.) Leistner 1393 (FHO, G, K, M, PRE, SRGH, UPS); Banksfontein, Hay District (fl., fr.) Wilman March 1921 (BOL, K); Rolfontein Nat. Res. (fl. Oct.) Jooste 29 (PRE), 191 (PRE); Mierfontein, 10 km SE. of Norvalspont (fl. Mar.) Weger 285 (EA, K, PRE, SRGH, U); Slaai Kraal Farm, Albany District (fr. Feb.) M. J. Wells 3011 (PRE), 3021 (PRE); Komgha (fl. Dec.) Flangan 1087 (BOL, FHO, PRE, Z); Windvoëlberg, Cooper 315 (BOL, E, G, K, NH, NY, PRE, W, WAG, Z); Perie Forest (fr.) Kuntze 2 Mar. 1894 (GH, K, US), 28 Mar. 1894 (K); Hogsback, Rattray 315 (PRE), 324 (PRE); Adelaide (fl. Feb.) Dyke in coll. Marloth 3486 (A,

PRE, STE); Bedford District (fl., fr. Jan.) G. C. Theron 408 (M, PRE); Boesmans R. mouth (fl. Nov.) Archibald 4868 (B, G, K, PRE, UPS); Grahamstown, Atherstone s.n. (K); Gowiekloof, Grahamstown, Stauffer & Jacot-Guillarmod 5214 (A, G, K, P, STE, WAG, Z); Assegai Bosch (fl. Oct.) Burchell 4170 (BOL, FI, GOET, K, L, W); Howison's Poort Dam (fl. Oct.) E. Brink 146 (EA, K, PRE, WAG); Riebeek East (fl. Nov.) Bayliss BRI. B. 685 (K, PRE, WAG); Alicedale (fl. Nov.) Rogers 12009 (K, PRE, Z), 12819 (PRE); Swartkops R., Zeyher 622 (A, BM, BOL, K, M), 3549 (BOL, FR, S, W); Swartkops and Boesmans Rs. banks, Zeyher 229 (BOL); near Vanstaadens R., Ecklon & Zeyher 97.2 (S); *ibid.* (fl. Jan.) Sidey 3108 (PRE, S); *ibid.*, Drège 7889c (K); Vanstaadens Flower Res. (fl. Jan.) Dahlstrand 2562 (PRE, STE); Klein-Bruintjes Hoogte (fl. Oct.) Drège 7889a (P, S); Koega R. (fr. Feb.) Ecklon & Zeyher 79.2 (FI, HAL, P, S, W); Boschberg, near Somerset East, Burchell 3150 (K), 3230 (G, NY, P); Graaff Reinet (fl. Mar.) Bolus 402 (BM, BOL, K, NY), 9129 (FI); *ibid.*, Valley of Desolation (fl. Mar.) Galpin 10035 (K, PRE); *ibid.*, Lam & Meeuse 4772 (L); Tsitsikama Park (fl. Jan.) L. C. C. Liebenberg 7895 (PRE); Clarkson-Humansdorp (fl. Nov.) Penther 1976 (M, S, W); De Vlucht, Uniondale Division (fl. Sept.) Fourcade 5323 (BOL, STE); Knysna (fr. June) Burchell 5499 (K); Knysna District (fl. Dec.) G. C. Theron 983 (K, PRE); Keurbooms R., J. B. Gillett 1420 (STE); *ibid.*, Heinecken K 71 (PRE); *ibid.* (fl. Nov.) L. E. Taylor 2929 (STE), (fl. Jan.) 6009 (NBG); Knysna R. (fl. Dec.) Schonland 3436 (COI, GRA, NBG, PRE); old road Knysna-George, near Karatara (fl. Dec.) J. J. Bos 915 (M, WAG), 916 (M, PRE, WAG); Wilderness (fl. Dec.) B. Martin 278 (M, NBG); *ibid.* (fl. Jan.) P. G. Jordaan 1189 (STE); Swart R. hill, George District (fl. Dec.) Fourcade 4494 (BOL, K); between Gouritz R. and Lange Kloof, Zeyher s.n. (K); between Cango Caves and Oudtshoorn (fl. Nov.) Werdermann & Oberdieck 839 (A, B, BR, K, PRE, US, WAG); Oudtshoorn (fl. Dec.) L. Britten 3076 (GRA); Gouritz R. (fl. Dec.) Ecklon & Zeyher 94. 12 (BREM, C, E, FI, FR, GH, GOET, HAL, HBG, L, LE, M, MO, NY, OXF, P, PRE, S, UPS, US, W, WAG, WU, Z); Boskloof, Sand R. (fl. Nov.) Leipoldt 583 (SAM); between Gouritz and Great False Rs. (fl. Nov.) Burchell 6525 (E, K); Riversdale (fl. Dec.) Schlechter 1939 (BM, BOL, C, CGE, FI, G, NBG, NY, P, US, WU, Z); Soetemelis R. (fl. Nov.) Burchell 6805 (BM, E, GH, K, M, NY, P, S, W); Grootvaderbosch, Heidelberg District (fl. Dec.) L. Willems 82 (NBG); Montagu Bath (fr. Feb.) Moss 8184 (BM, J); Kogmanskloof (fl.) Ecklon (?) 24 Oct. 1826 (SAM); *ibid.* (fl. Nov.) Hutchinson 1091 (BM, BOL, K, PRE); *ibid.* (fr.) Kuntze 2 Feb. 1894 (G, GH, K, NY, US, Z); Swellendam (fl. Dec.) Hafstrom & Acocks 2215 (S); Bontebokpark, P. J. Barnard 665 (PRE), 690 (PRE); Potteberg, Bredasdorp District (fl.) H. David Dec. 1948 (NBG); Enon (fl. Nov.) Thode A 2711 (K, NH, PRE, US); Caledon, Ecklon Feb. 1828 (P); Boontjes Kraal, near Caledon (fr. Apr.) Burchell 934 (GH, K); Hermanus (fl. Dec.) Marloth 2770 (PRE); False Bay (fl.) Robertson April 1772 (BM); Hopefield (fl. Feb.) Bachmann 932 (A, BM, BREM, G, M, W, WU, Z); Tweeveli, Berg R. (fr. June) P. G. Jordaan 575 (STE); Piquetberg (fl. Oct.) Pillans 7945 (BOL, K); Pakhuis Pass, Clan William District (fl. Oct.) Schlieben & Van Breda 9903 (BR, K, M, PRE, S, SRGH, STE, WAG); between Grasberg and Watervals Rs., Drège 7889b (K); *sin. loc.*, Sonneret s.n. (P-LA, type of *Callicarpa paniculata*); Thunberg s.n. (LINN, type of *Scoparia arborea*); Verreux anno 1831 (G, LE, NY); Zeyher 26 (G, HAL, L, P).

Cult: U.S.A.: California: Saddle Peak, Santa Monica Mts. (fl., fr. Oct.) P. H. Raven & H. J. Thompson 13761 (GH). Netherlands: Bot. Gard. Amsterdam (GRO); Bot. Gard. Wageningen, seedlings of herb. Leeuwenberg 10936 from Bloemfontein, Leeuwenberg 11036 (WAG), (fl. Sept.) Belder 129 (WAG). W. Germany: Bot. Gard. Frankfurt, Engelmann anno 1826 (MO); Bot. Gard. Goettingen anno 1804 (FR); Bot. Gard. Berlin (fl. Aug.) Leeuwenberg 11597 (WAG). Austria: Wien, Hort. Schönbrunn herb. Jacquin s.n. (BM, W, type); Bot. Gard. Wien 22 June 1896 (WU). Italia: Bot. Gard. Napoli (fl.) July 1832 (L); *ibid.*, Tenore anno 1840 (M). S. Africa: Capetown, Kirstenbosch (fl. Nov.) Ferreira 18 (PRE, STE).

18. **Buddleja salviifolia** (L.) Lam., Enc. 1: 513. 1785; Illustr. 1: 291. 1792 (as *Budleia salviifolia*); Jacquin, Hort. Schoenbr. 1: 12, t. 29. 1797 (as *Buddleia salviifolia* and *Budleja salviifolia*); G. Don, Gen. Syst. 4: 601. 1838 (as *Buddleia salviifolia*); Bentham in De Candolle, Prod. 10: 444. 1846; Pappé, Silva Capensis

1st ed. 25. 1854 and 2nd ed. 31. 1862 (as *Buddleia salviaefolia*); Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 48, f. 27 L. 1892; Baker in Fl. Trop. Afr. 4(1): 516. 1903; Sim, For. Fl. Cape Col. 277, pl. 114. 1907; Prain & Cummins in Fl. Cap. 4(1): 1046. 1909; Phillips in Fl. Pl. S. Afr. 8: t. 287. 1928; Marquand, Kew Bull. 1930: 198. 1930; Marloth, Fl. S. Afr. 3(1): 50, f. 16. 11-12, f. 19. 1932; Bruce & Lewis, Loganiaceae in Fl. Trop. E. Afr. 38, f. 6.6. 1960; Verdoorn in Fl. S. Afr. 26: 160, f. 22. 1. 1963; Palmer & Pitman, Trees S. Afr. 3: 1879. 1973 (with photographs).

Fig. 18, p. 79; Phot. 8, p. 80; Map 10, p. 81

Basionym: *Lantana salviifolia* L., Syst. Nat. 10th ed. 2: 1116. 1759 (as *salvifolia*).

Type: S. Africa: Cape, herb. Linnaeus (LINN 783.7, lectotype, designated by BRUCE & LEWIS).

Heterotypic synonym: *B. aurantiaco-maculata* Gilg in Engler, Bot. Jahrb. 30: 377. 1901; Baker, l.c. p. 517. Type: Tanzania: Mbeya District, Poroto Mts., Goetze 1129 (holotype not seen, destroyed in B; lectotype: L; other isotypes seen: BM, BR, G, P, W).

Shrub or sometimes small tree, 1-8 m high. Branchlets white- or, especially when dry, rusty-tomentose with stellate hairs as the leaves beneath, the peduncles, bracts beneath, and calyx and corolla outside. *Leaves* opposite, sessile or shortly petiolate; petiole - if present - up to 7 mm long; blade narrowly ovate to narrowly oblong, (2-)4-6.5 × as long as wide, 4-17 × 0.8-4.5 cm, sometimes some smaller, long-acuminate to an acute apex, deeply cordate to auriculate at the base, crenate, bullate, finely and distinctly rugose and glabrescent above; venation conspicuous, reticulate, prominent beneath. Stipules leafy. *Inflorescence* paniculate, very variable in size, 2-15 × 1-10 cm (30 × 25 cm observed in herb. Schlieben 7117(B)); ultimated branches 3-flowered more or less sessile and clustered. Lower bracts leafy; the upper ones much smaller, narrowly ovate, caudate, joined at the base, usually glabrous above. *Flowers* sessile, sweet-scented. *Calyx* more or less enclosed by 1 or 2 pairs of bracteoles, which are joined at the base and about as long as the calyx, which is campanulate, 2-3 mm long, and inside glabrous; tube 1-3 × as long as the lobes; lobes subequal, broadly to rather narrowly triangular, 0.8-1.5 × as long as wide, 0.5-1.5 × 0.5-1 mm, acute, entire. *Corolla* white or lilac to purple, with a deep orange throat, with erect lobes (2-)2.5-3.5 × as long as the calyx, 6-9 mm long, outside tomentose, inside hirsute on the base of the lobes and in the tube, except for the glabrous base; tube nearly cylindrical, (1.4-)2-2.7 × as long as the calyx, 2.5-3.2 × as long as the lobes, 4.2-6.8 mm long, slightly widened towards the throat and there about 2 mm wide; lobes suborbicular to oblong, 1.8-2.5 × 1.2-1.8 mm, rounded, entire, spreading. *Stamens* included; filaments very short, 0.2-0.5(-1) × as long as the anthers, glabrous, inserted 3-4 mm above the corolla base; anthers oblong, 0.8-1.5 × 0.3-0.5 mm, often deeply cordate at the base, often apiculate at the apex, glabrous; cells parallel. *Pistil* 2.8-5 mm long; ovary subglobose, laterally compressed,

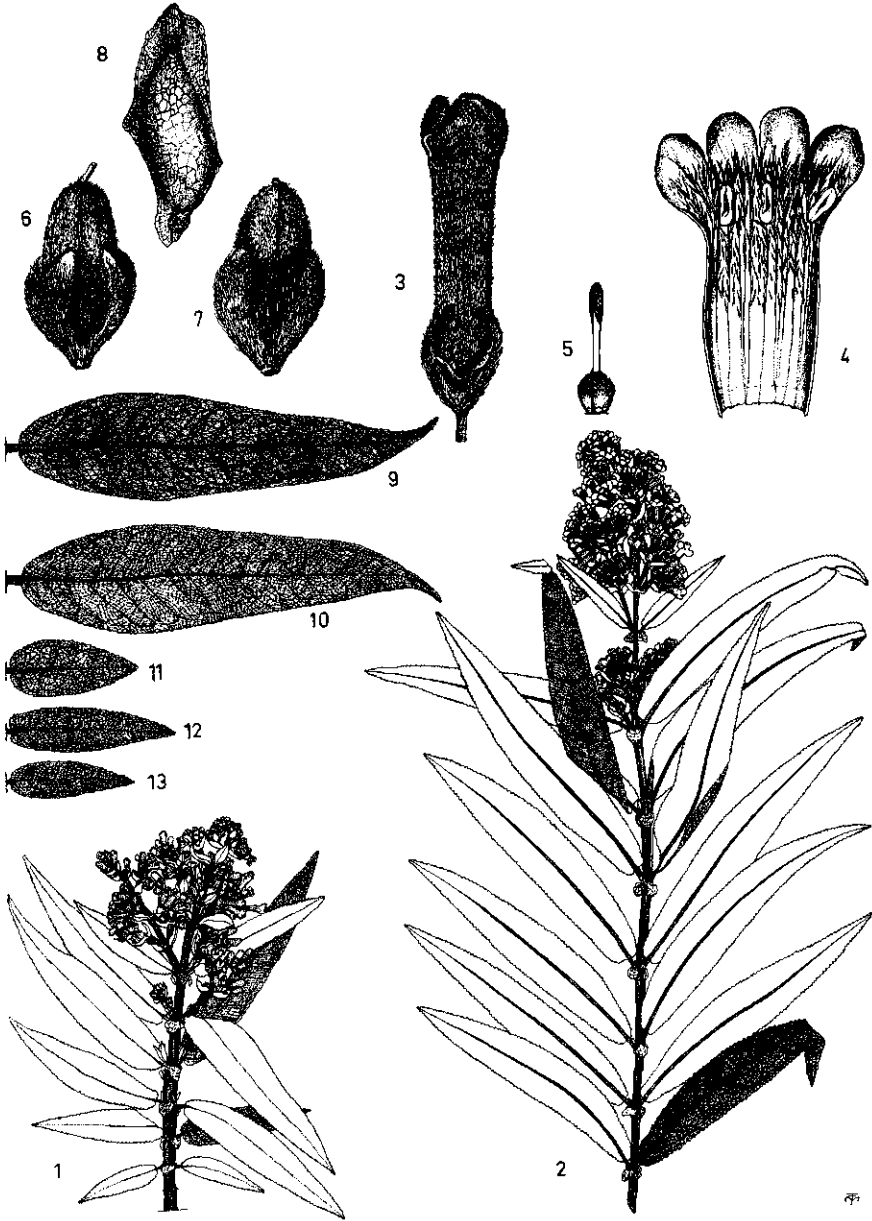


FIG. 18. *Buddleja salviifolia*: 1-2. flowering branches, $\frac{1}{2} \times$; 3. flower, $5 \times$; 4. opened corolla, $5 \times$; 5. pistil, $5 \times$; 6-7. fruits, $5 \times$; 8. seed, $25 \times$; 9-13. leaves, $\frac{1}{2} \times$ (1. Sidey 3025; 2. Schelpe 557; 3-5, 9-10. Schlieben 7117; 6-8. Biegel 288; 11-13. Schlechter 8373).



PHOT. 8. *Buddleja salviifolia* (A. Meyer 1 Sept. 1976, phot. A. Meyer, cult. Pretoria).

1–1.2 × 1 × 0.8–1 mm, hirtio-pubescent with stellate hairs, abruptly narrowed into the style, 2-celled; style with stigma 2–3 mm long, glabrescent; stigma large, clavate, often larger than the style. In each cell one axile orbicular peltate placenta with about 20 ovules outside. *Capsule* 3–4.5 × 2–2.4 × 1.4–2 mm, ellipsoid, exerted by about half from the calyx, apiculate, hairy as the ovary but less dense; valves torn for about one third of their length, subacute. *Seed* medium brown, obliquely tetrahedral, 0.8–1.5 × 0.4–0.6 × 0.3 mm, narrowly winged at the edges; wings minutely reticulate as the testa. *Embryo* 0.3–0.4 mm long; cotyledons suborbicular, 0.15–0.18 × 0.15 mm, rounded.

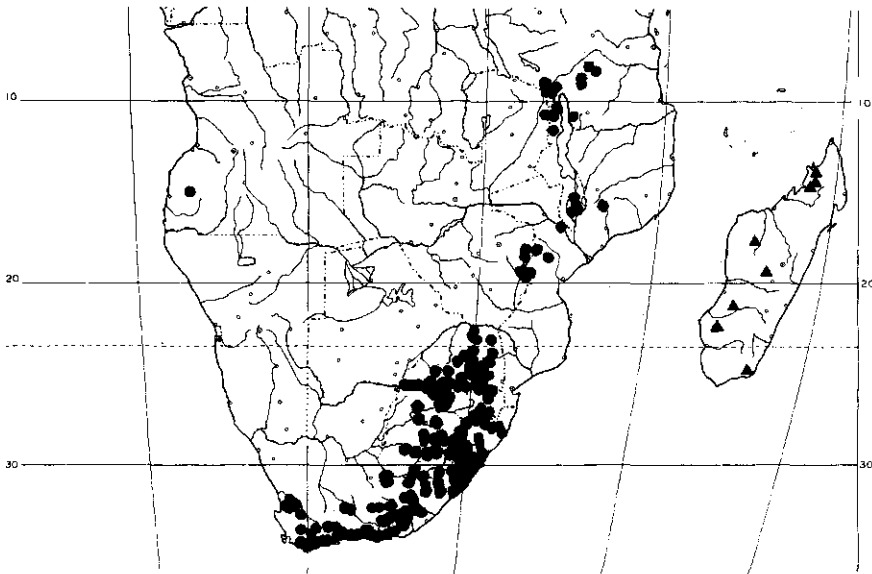
Distribution: Southern and eastern Africa, south from Angola and Kenya.

Ecology: Forest edges, rocky slopes, along water courses, and in montane grassland. **Alt.** in the tropics 1200–2500 m, near the Cape from 150 m.

A selection from the about 580 specimens examined:

Angola: Huila: Serra da Chela (fl., fr. Oct.) Gossweiler 13082 (LISC); Humpata (fl. Aug.) Fritzsche 246 (S); *ibid.* (fl. July) Pritchard 302 (BM, LISC); *ibid.*, Welwitsch 5511 (BM).

Tanzania: T 7: Iringa District, T. Wigg 85 (FHO, K, WAG); Mufindi (fl. Oct.) Balbo 429 (FI, TOM), 711 (TOM); *ibid.* (fl. Aug.) Greenway 3482 (EA, FHO, K); Lake Ngwazi, Mufindi District (fl. Aug.) Perdue & Kibuwa 11010 (EA); Kigogo (fl. Aug.) Carmichael 251 (EA, FHO, K); Mbeya Range, Kerfoot 391 (EA), (fl. Mar.) 1630 (BR, EA, K, PRE), (fr. Dec.) 3199 (EA); Ngusi, Njombe District (fl. May) Eggeling 6544 (EA, FHO, K); Poroto Mts. (fl. Aug.) Goetze 1129 (BM, BR, G, L, P, W, type of *B. aurantiaco-maculata*); Kiwira Fishing Camp (fl. Aug.) Greenway 8396 (EA, FHO, K, PRE); Kiwira R. valley (fl. Aug.) B. D. Burt 6232 (BM, BR, K); Kyimbila (fl. Oct.) Stolz 379 (BM, G, GH, GRO, HBG, K, L, M, S, U, US, W, Z), 2068 (B, C, G, GRO, L, LD, M, S, U, W, WAG, Z). T 8: Matengo-Songea (fl. Aug.) Zimmer 48 (BM).



MAP 10. ● *Buddleja salviifolia*; ▲ *B. sphaerocalyx*

Zambia: Nyika Plateau (fl. Sept.) Coxe 32 (SRGH); *ibid.* (fl. June) Fanshawe 9757 (K), (fr. Dec.) 7242 (FHO, K); *ibid.* (fl. Oct.) Robson & Angus 481 (EA, K).

Malawi: Nyika Plateau (fl. Aug.) Brass 17166 (A, BM, BR, EA, FHO, K, MO, NY, PRE, SRGH, US); *ibid.* (fl. Sept.) Robinson 6258 (B, K, M, NY, SRGH); *ibid.* (fl. Sept.) Tyrer 845 (BM, BR, COI, NY, SRGH, WAG); Lake Kaulime (fl. Sept.) Tyrer 925 (BM, BR, COI, NY); N. Rukuru R. waterfall (fr. Oct.) Robson & Angus 412 (EA, K, PRE); Zomba Plateau (fl. Aug.) Leach 10445 (K, LISC, PRE, SRGH); *ibid.* (fl. Aug.) Salubeni 806 (K, PRE, SRGH); Nyankhava Mt. (fl. Sept.) Humbert 17009 (K, P, WAG); Mlanje Mts. (fr. Jan.) Hilliard & B. L. Burt 6139 (E); Tuchila Hut (fl. Apr.) Brummitt 9628 (K, WAG); *ibid.* (fl. July) Newman & Whitmore 46 (BM, BR, NY, SRGH, WAG); Sombani Hut (fl. June) Brummitt 11243 (K, WAG); *ibid.* (fl. July) Chapman 394 (BM, BR, COI, EA, FHO, K, PRE); Lucheno Plateau (fl. July) Brass 16646 (A, BM, BR, K, MO, NY, PRE, SRGH), 16665 (BR, K, MO, NY, SRGH, US, WAG).

Mozambique: Zambézia: Gurue, Pico Namuli (fl. Sept.) Mendonça 2245 (LISC). Manica e Sofala: Bárue, Serra de Choa (fr. Dec.) Torre & Correia 13628 (LISC); Gogôgo Mt., Serra da Gorongosa (fr. Oct.) Mendonça 2425 (LISC); *ibid.* (fl. July) Schelpe 457 (BM, SRGH); Nhandore Mt., Serra de Gorongosa (fl., fr. Oct.) Torre & Pereira 12429 (LISC); Vumba Mts. (fl. Aug.) Dawe 388 (K); Manica, Tsetserra Plateau (fr. Nov.) Torre & Pereira 12688 (LISC), (fl. Apr.) 15722 (LISC).

Rhodesia: Inyanga Mts., Fries c.s. 3568 (LD); Troutbeck (fr. Nov.) O. B. Miller B/1217 (PRE); Nyamziva Falls (fl. Sept.) Biegel 288 (SRGH); Pungwe View, Methuen 30 (K, PRE); *ibid.* (fl. Sept.) Rutherford Smith 92 (BR, K, LISC, S, SRGH); Mt. Nuza (fl. June) Gilliland 390 (BM, FHO, K, PRE, SRGH), 2055 (BM); Chipungu Falls (fl. July) Schelpe 557 (BM, SRGH); Vumba Mts. (fl. July) Galpin 9256 (K, PRE); *ibid.* (fl., fr. Sept.) Morris 344 (BOL); *ibid.*, Eagle School (fl. Aug.) Chase 7798 (BR, K, LISC, MO, PRE, SRGH); Leopards Rock (fl. July) Bruce 207 (K, PRE); Melsetter District (fl. Sept.) Williams 147 (MO, PRE, SRGH); *ibid.*, Bridal Veil Falls Road (fl. Aug.) Crook M 54 (K, LISC, NY, PRE, SRGH); Chimanimani, O. West 3660 (SRGH); Mt. Pene (fl. Sept.) Swynnerton 675 (BM, K, SRGH), (fr. Oct.) 6090 (BM).

Swaziland: Havelock Mine, Pigg's Peak (fl. Sept.) O. B. Miller 2992 (PRE); *ibid.* (fl. Aug.) Sidey 3285 (S, US); King's Forest, Pigg's Peak District (fl. Aug.) Compton 27969 (FHO, NBG, PRE); Duiker Bush (fl. Aug.) Compton 26966 (K, NBG, PRE); Pongolo R. Nat. Res., Moss 61 (J, UPS).

Lesotho: Lérivé District, Dieterlein 54 (K, MPU, NH, P, PRE, SAM, WAG, Z); Maseru District (fl. Sept.) Jacot-Guillarmod 2146 (K, NH, PRE); Pack Saddle Hill (fl. Aug.) C. Williamson 749 (K, WAG); Mokhotlong, Cooper 695 (BM, BOL, E, G, K, NH, NY, PRE, W, WAG, Z), 697 (BM, BOL, G, K, NH, NY, PRE, W, WAG, Z).

Transkei: Sterkspruit, Herschel District (fl. Oct.) Hepburn 159 (GRA); Belfort (fl. July) Jacottet 381 (Z); Cata town, Alacoque 128 (GRA, Z); Maclear, Bayliss B.R.I.B. 1337 (PRE); Baziya Mt. (Aug.–Sept.) R. Bauer 244 (GRA, HBG, K); Mt. Ayliff (fl. Aug.) Story 4163 (GRA, MO, PRE); between St. Johns R. and Umsikaba (fl. May) Dreye 699e (K, P, SAM); Port St. Johns (fl. Jan.) Wager PRE 49547 (PRE).

S. Africa: Transvaal: Soutpansberg (fl. Sept.) Humbert 10626 (P, WAG); Blouberg, Leemans 74 (PRE); *ibid.*, Smuts & Pole Evans 871 (PRE); 15 km E. of Louis Trichardt (fl. Aug.) Schlieben 7117 (B, BR, G, HBG, K, M, NY, US); Duivelskloof (fl. Oct.) Scheepers 475 (K, M, NY, PRE, SRGH); Haenertsburg (fl. Sept.) Cortlett 129 (PRE); Potgietersrus (fr. Oct.) Leendertz 7401 (PRE); Helpmekaar Arboretum, Pietersburg District (fl. Aug.) Burt Davy 20250 (A, FHO); Lulu Mts. (fl. Sept.) Mogg 16974 (PRE); Mariepskop (fl. July) L. E. Taylor 582 (A, NY), 583 (NY); Bedford (fr. Jan.) Van der Schijff 4982 (K, PRE), 5564 (PRE); Graskop (fl. July) Rogers 23016 (G); Kaffirskraal, Zeerust, H. J. T. Venter 4558 (PRE); Bokkraal, 40 km E. of Zeerust (fl. July) W. J. Louw 330 (PRE); Klerksdorp-Potchefstroom (fr. Sept.) E. Wall 29 (GB, S); Swart-ruggens (fl. June) Sutton 856 (PRE), 986 (K, PRE, US), 987 (PRE); Sterkfontein (fl. Aug.) Mogg 34175 (SRGH); Bulhoek (fl. Aug.) Schlechter 1227 (PRE); Rustenburg Nat. Res. (fl. Aug.) N. Jacobsen 991 (PRE); Breeds Nek (fl. Oct.) Lam & Meeuse 4826 (L); Jacksonstuin, Brits District (fr. Feb.) Van Vuuren 84 (PRE), (fl. Sept.) 556 (K, M, PRE); Witpoortje Kloof, W. W. Rand, Moss 13448 (BM, J); Hartbeestpoortdam (fl. Oct.) Lanjouw 811 (U); Pretoria (fl. Aug.) Collins 26669 (PRE); The Fountains, Verdoorn (fl. Aug.) 440 (PRE); Wolwekloof (fl.) Mogg 26 Aug.

1933 (B, BR, K, MO, PRE, S, SRGH, UPS); Bot. Res. Brummeria (fl. Sept.) De Winter 5941 (PRE); Pienaars R. source, Leeuwenberg 11019 (PRE, WAG); Roodeplaatdam, Leeuwenberg 10920 (PRE, PRU, WAG); Baviaanspoort, A. P. Goosens 47 (PRE); Irene (fl. all) J. C. Smuts Sept. 1924 (STE), Aug. 1927 (STE), Sept. 1927 (STE); Johannesburg (fl. Aug.) Nelson 11717 (PRE); Klipriviersberg (fl. Sept.) R. F. Rand 716 (BM); Loskopdam, Kloppersloop, G. K. Theron 1394 (PRE); Mapochsdrif, Potgieterspoort, C. J. Du Plessis 466 (PRE); Sneueberg (fl. Dec.) Pearson & Pillans 5806 (BOL, K); Lydenburg (fl. Aug.) Wilms 1027 (BM, E, G, GOET, K, L, MO, P, Z); Schoemanskloof (fl. June) J. C. Smuts 266 (PRE); Sabie, Rogers 14685 (BM, J, K); Mt. Anderson (fl. Sept.) Humbert 10908 (K, P, WAG); Kaapsche Hoop (fl. Sept.) Rogers 18822 (PRE), 21596 (A, G, K, Z); Barberton Mts. (fl. June) Burt Davy 335 (PRE); Barberton-Piggs Peak Road (fl. July) Levyns 9986 (BOL); Havelock Mine (fl. June) Bayliss 1534 (G, Z); Mooihoek, Piet Retief District (fl. Aug.) Devenish 1027 (K, M, PRE). Orange Free State: De Kroon (fl. Oct.) Putterill PRE 16166 (PRE); Bloemfontein (fl. Jan.) Tyson 157 (GRA); Thaba Nchu Mt. (fl. July) B. R. Roberts 1811 (PRE), 1819A (PRE), 1821 (PRE); Oakford, Georgetown District, Rehmann 557 (BM, BR, Z); Groot Doornkop, Senekal (fr. Dec.) A. P. Goosens 902 (PRE); Fouriesberg, Lütjeharms 6824 (S); Golden Gate Hoogland Nat. Park (fl. Oct.) L. C. C. Liebenberg 7302 (BR, M, PRE); Rouxville-Zastron Road, J. Stephen 124 (PRE). Natal: Charlestown, Kuntze 22 Mar. 1894 (NY); Donkerhoek (fl. July) Devenish 6 (K, PRE); Ngome (fl. July) Gerstner 4877 (BR, NH, PRE); Cathedral Peak, Drakensbergen (fl. Aug.) Germain 1550 (BR); Van Reenenspass, Rehmann 7261 (Z); Estcourt (fl. Sept.) Acocks 10566 (NH); Qudeni (fl. July) Gerstner NH 23008 (NH); *ibid.* (fl. Sept.) Meebold 13129 (COI, M); Cathkin Peak (fl. Sept.) W. C. West 4576 (SAM); *ibid.* (fl. July) Esterhuysen 7963 (BOL, K); Champagne Castle (fl. Oct.) Meebold 13128 (M); Macamac (fl. June) McLea 36 (BOL), 467 (BOL); Giants Castle (fl. Sept.) Symons 512 (PRE); Boston (fl. Apr.) J. M. Wood 4656 (PRE), 9881 (US); Umgeni Poort, Moll 862 (K, NH, NY, PRE); Cedara (fl. July) J. M. Wood 10467 (E, MO, NH, S); Pietermaritzburg (fl. Jan.) Sidey 3025 (PRE, S); Inanda, J. M. Wood 135 (BM, PRE, Z); Dumisa, Alexandra District (fl. Aug.) Rudatis 1442 (BM, BR, E, G, GRO, HBG, K, L, M, S, US, W, Z), (fl. July) 1948 (HBG, Z); Umtwalumi R., Gerrard 1850 (BM, K, NH, W). Cape Province: Braamspruit, Aliwal North, Burt Davy 10440 (G); Thomas R., Queenstown District, Cooper 193 (BM, E, G, K, NY, PRE, W, WAG, Z); Ruigtefontein (fl. July) Thode A 1862 (K, NH, NY, PRE, US); Hogsback, Victoria East District (fl. Aug.) Jacot-Guillarmod 3602 (GRA); *ibid.* (fl.) H. C. D. de Wit 23 July 1938 (BO); Alice, Kotsokoane 98 (J, PRE); Kat. R. sources, near Philipstown (fl. June) Ecklon & Zeyher 38.6 (A, C, FI, G, GOET, HAL, HBG, L, LD, LE, M, MO, NY, P, S, SAM, UPS, US, W, WAG, Z); Swartkops R., Uitenhage Division, Ecklon & Zeyher 2.5. (S); *ibid.*, Zeyher 461 (FR, K, PRE, STE), 1328 (BM, FI, G, LE, OXF, P, PRE, S, SAM, W); between Galgebosch & Melk R. (fl. Feb.) Burchell 4766 (K, L, M); Craigie, Burn Valley, P. T. van der Walt 92 (PRE); Boschberg, Somerset East, Burchell 3226 (GH, K, L, LE); *ibid.*, Mac Owan 927 (BM, GH, K, MO, NH, NY, Z); Oudeberg, Graaff Reiniet, Levyns 9614 (BOL); *ibid.* (fl. Sept.) Drège s.n. (G, K, L, LE, MO, S, W, WAG); *ibid.* (fl. Sept.) Bolus 467 (BOL, S); Diepkloof R., Graaff Reiniet District (fl. Sept.) Acocks 16159 (PRE); Baviaans For. Res., Willowmore Division (fr. Dec.) J. J. Bos 945 (M, PRE, STE, WAG); Storms R., Humansdorp District (fl. July) Acocks 21181 (K, M, PRE); Karredouw Pass (fl., fr. Mar.) Fourcade 3221 (BOL, L, PRE, STE); Tsitsikama (fl. May) Fourcade 152 (BOL); Keurbooms R. source (fr. Mar.) Burchell 5077 (GH, K); between Keurbooms and Bitou Rs. (fl. Apr.) Burchell 5284 (K); Knysna Forest (fl. Aug.) Humbert 9938 (K, P, WAG); Kaatjes Kraal, near Yzernek (fl. Mar.) Burchell 5202 (K); Wilderness-George (fl. July) Levyns 745 (BOL); George, Ecklon & Zeyher s.n. (LE, OXF, S); *ibid.* (fl. Mar.) Schlechter 2418 (BM, BREM, G, K, W, Z); Langekloof (fr. Dec.) Ecklon & Zeyher 100.12 (C, S); between Gouritz R. and Langekloof (fl. Dec.) Ecklon & Zeyher 99.12 (BREM, C, E, FR, G, GH, GOET, HAL, HBG, K, L, LE, M, MO, P, PRE, S, UPS, US, W, WAG, Z); Nuweveld Mts. (fl. Oct.) Drège 699a (K, OXF, P); Plattekloof, Riversdale Division (fl. June) Muir 348 (PRE); Witteberg, Laingsburg District (fl. Oct.) Compton 7965 (NBG); *ibid.*, Drège 15/133 (P); Donkerkloof, Montagu (fl. Sept.) Levyns 8038 (BOL); Kogmanskloof (fl. Oct.) Levyns & Michell 101 (BOL, PRE); Tradouw Pass (fl. Dec.) Hafström & Acocks 2214 (S); Grootvadersbosch, Heidelberg District (fl.) Ecklon Oct. 1828 (S); Swellendam, Sparrman anno 1772 (S); Zuurbraak, between Swellendam and Heidelberg (fl. Jan.) Schlechter 2138 (BM, Z); Potberg (fr. Oct.) Pillans 9451

(BOL); Caledon, Kleinriviersberg, Ecklon & Zeyher 58.6 (BREM); Swarteberg, near Caledon (fl. Dec.) Zeyher 3526 (F1, K, P, S, SAM, W, WAG, Z); *ibid.* (fl. Jan.) Bolus BOL 9232 (BOL); Bonteberg, Worcester District (fl. Nov.) Compton 9939 (NBG); *ibid.* (fl. Nov.) Esterhuysen 3721 (BOL, PRE); Bull Hoek, Clanwilliam Division (fl. Aug.) Schlechter 8373 (BM, COI, E, G, GRO, HBG, K, L, LE, MO, P, PRE, S, US, W, Z); Wupperthal, Clanwilliam Division, Drège 699 c (K, P); Voëlfontein (fl. Sept.) Compton 4988 (BOL, NBG); *sin. loc.*, Sonnerat s.n. (MPU, P); Thunberg s.n. (LD, S, SBT).

Cult.: Great Britain: Kew (fl.) W. J. Bean 26 July 1907 (K); *ibid.*, Leeuwenberg 3400 (WAG); Bot. Gard. Edinburgh, from seeds of herb. Hilliard & B. L. Burtt 6139 (WAG); *ibid.*, C 3050 (BM). Netherlands: Bot. Gard. Amsterdam s.n. (GRO). France: Bot. Gard. Paris (fl.) herb. J. Gay 17 June 1819 (K); Bot. Gard. Montpellier s.n. (BR, K). W. Germany: Bot. Gard. Goettingen, herb. Schrader s.n. (LE); Bot. Gard. Berlin (fl.) May 1875 (LE, W); *ibid.* (fl.) Rube 16 July 1804 (L); *ibid.*, Warth anno 1833 (GOET). Austria: Wien, Hort. Schoenbrunn, herb. Jacquin s.n. (W); *ibid.* herb. Portenschlaff 220 (W). Italy: Bot. Gard. Napoli (fl.) July 1832 (L, M). S. Africa: Pretoria (fl. Aug.) Schlieben & Mendelsohn 12854 (PRE); *ibid.*, Bot. Gard. Brummeria (fl.) A. Meyer 1 Sept. 1976 (WAG); Cape Town, Kirstenbosch (fl. July) Bolus NBG 1240/14 (BOL). New Zealand: Havelock North (fl.) Meebold Sept. 1948 (M).

19. **Buddleja sphaerocalyx** Bak., Journ. Linn. Soc. 22: 505. 1887.

Fig. 19, p. 85; Map 10, p. 81

Type: Madagascar: *sin. loc.*, Baron 4401 (K, holotype; isotypes: BM, K, P).

Sarmentose shrub, 2–3 m high. Branchlets obscurely quadrangular, pubescent with glandular and ordinary hairs. *Leaves* opposite, connate-perfoliate; united base 0.5–2 cm wide at each side of the stem; blade 2–3 × as long as wide, 10–21 × 3.5–11 cm, narrowly ovate, acuminate at the apex, more or less abruptly narrowed towards the base, crenate-serrate, pubescent with glandular and often also ordinary hairs on both sides, not bullate. *Inflorescence* axillary, solitary, almost racemose, 4–10 × 1.5–6 cm (in fruit up to 11 × 3 cm), distinctly pedunculate; floriferous portion 1–2 × as long as the pubescent peduncle. Branches often once branched. Pedicels 2–5 mm long, pubescent. Bracts leafy, elliptic, linear or nearly so, the lower ones up to 20 × 8 mm; the others much smaller. *Flowers* all at least shortly pedicellate. *Calyx* urceolate, contracted at the mouth, 5.2–10 mm long, outside densely pubescent with obscurely glandular and ordinary hairs, inside less hairy with the same hairs all over; tube ventricose, 2.5–3.5 × as long as the lobes; lobes subequal, triangular, 1.5–3 × 1.2–2.5 mm, acute or acuminate at the apex, entire or obscurely dentate. *Corolla* white, with erect lobes 1.6–2.5 × as long as the calyx, 8.5–20 mm long, outside pubescent with glandular and ordinary hairs, inside with a shortly pilose zone in the middle; tube nearly cylindrical, often slightly contracted towards the apex, 1.2–2 × as long as the calyx, 3–5 × as long as the lobes, 7–16 mm long, at the throat about 1–1.8 mm wide; lobes more or less oblong, 1.5–5 × 1.2–3 mm, rounded, entire, spreading. *Stamens* included; anthers sessile, inserted 2–3 mm below the corolla mouth; oblong or nearly triangular, 1–2 × 0.3–0.7 mm, very deeply cordate at the base, retuse at the apex, glabrous; cells parallel. *Pistil* 4–6 mm long; ovary subglobose, laterally compressed, 1.5–2 × 1.5 × 1–1.2 mm, papillose, abruptly

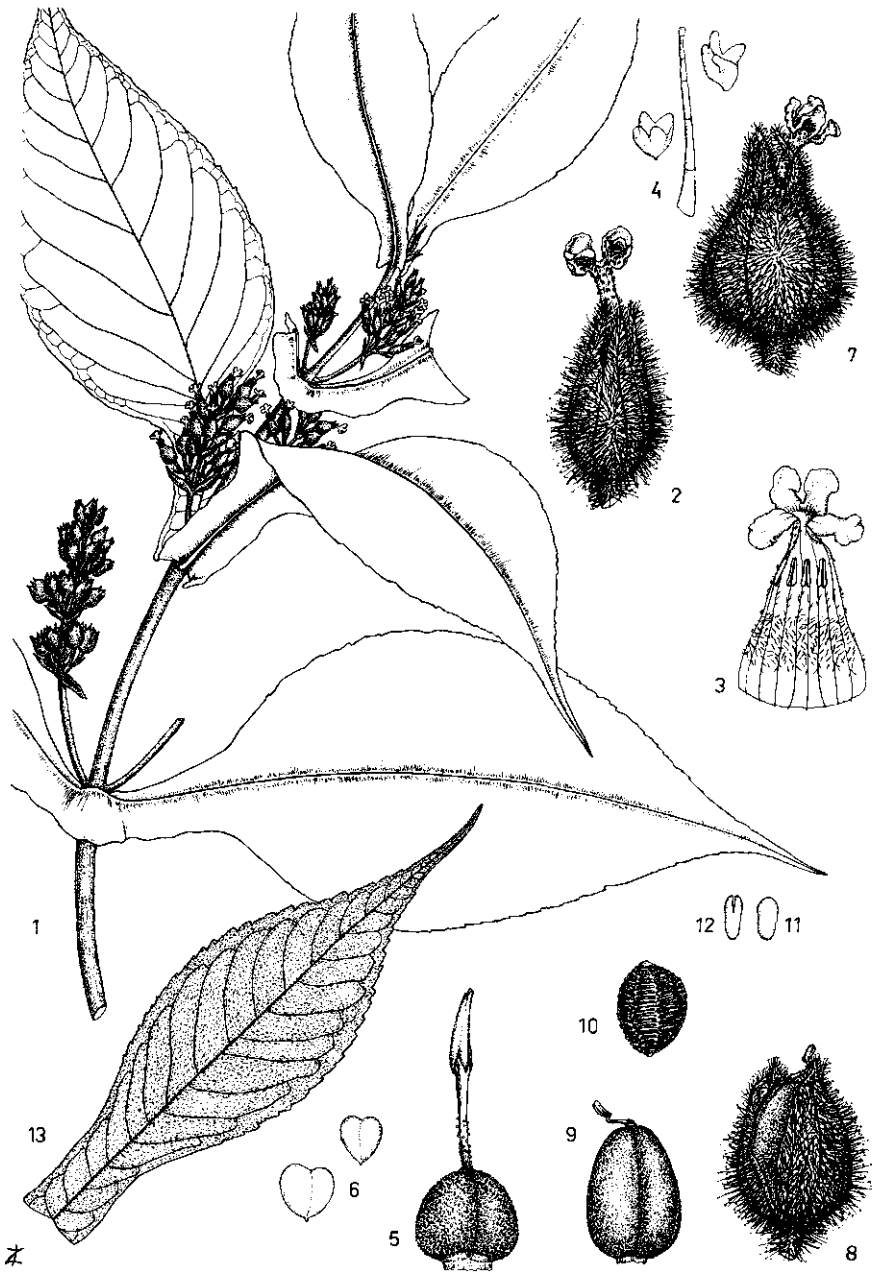


FIG. 19. *Buddleja sphaerocalyx*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $4 \times$; 3. opened corolla, $4 \times$; 4. glands of corolla and glanduliferous hair of calyx, $50 \times$; 5. pistil, $8 \times$; 6. glands of ovary, $50 \times$; 7. dry flower with immature fruit, $4 \times$; 8. fruit in calyx, $2 \times$; 9. fruit, $2 \times$; 10. seed, $20 \times$; 11–12. embryos, $20 \times$; 13. leaf, $\frac{1}{2} \times$ (1, 7. Perrier de la Bâthie 1785; 2–6. Perrier de la Bâthie 8615; 8–12. Baron 4401; 13. Capuron SF 24975).

narrowed into the style, 4-celled; style with stigma 2.5–4 mm long, glabrous; stigma large, clavate, about as long as the style. In each cell one axile peltate placenta with about 80 ovules outside. *Berry* orange (?), subglobose, 7–10 mm long, apiculate, papillose, exerted from the calyx. *Seeds* numerous, obliquely subglobose or ellipsoid, 0.3–0.4 × 0.2–0.3 mm, obscurely angular and obscurely pustulate.

Distribution: Madagascar.

Ecology: Moist forests, on riverbanks, often (?) in mountains. Alt. 300–2200 m.

Specimens examined:

Madagascar: Tsaratanana Mts., Morat 2388 (P); N. of Mangindrano (fr. Jan.–Feb.) Humbert & Capuron 25206 (P); Upper Maevarano R. basin (fl., Nov.) Capuron SF 24975 (P, WAG); Bealanana District, Dufournet s.n. (P); Hezomby R. gorge (fl. Oct.) Perrier de la Bâthie 1785 (P); Ambohipierenana (fl. May) Catat 1131 (P); Gui du Makay (fl. Aug.) Perrier de la Bâthie 8615 (P); Ankazoabe, Morat 2575 (P); Col du Manangotry (fl. Sept.) Decary 10508 (K, P, US); sin. loc., Baron 4401 (BM, K, P, type); herb. Du Petit-Thouars s.n. (P).

Note. *B. sphaerocalyx* is closely allied to *B. axillaris* (q.v.) and *B. cuspidata*.

20. **Buddleja albiflora** Hemsl., Journ. Linn. Soc. 26: 118. 1889.

Fig. 20, p. 87; Phot. 9, p. 88

Types: China: Hupeh: Ichang, Henry 156A (K, lectotype), 1871 (K, P, paratype), 2515 (K, P, W, paratype), 4689 (K, paratype).

Heterotypic synonyms: *B. girdalii* Diels in Engler, Bot. Jahrb. 29: 535. 1900. **Type:** China: Shensi: Ta-see-tsuen, Girdaldi 15 Sept. 1897 (K, lectotype; isotype: P). **Homotypic synonym:** *B. albiflora* var. *girdalii* (Diels) Rehd. et Wilson in Sargent, Pl. Wilson. 1: 569. 1913.

B. hemsleyana Koehne, Gartenfl. 52: 169. 1903. **Type:** Cult., Berlin, Späth Arboretum, Koehne 432 (B, holotype; isotypes: BM, GH, M, OXF). **Homotypic synonym:** *B. albiflora* var. *hemsleyana* (Koehne) Schneider, Illustr. Hand. Laubholz. 2: 845, f. 530 e. 1912.

Shrub 1–3 m high. Branchlets terete or subangular, glabrous or less often minutely stellate-tomentose and glabrescent. *Leaves* opposite or sometimes some of them subopposite, shortly petiolate; petiole glabrous or stellate-tomentose, 3–15 mm long; blade narrowly ovate or elliptic, 3–5 × as long as wide, 8–30 × 2–10 cm, acuminate at the apex, cuneate or rounded at the base, serrate, crenate-serrate, or sometimes subentire; glabrous or with spreading stellate and/or glandular hairs and with impressed reticulate venation above, often minutely white-tomentose with stellate hairs beneath. *Inflorescence* terminal, thyrsoid, mostly narrow and almost cylindrical, often partly interrupted, 7–25 × 2–5 cm. *Calyx* campanulate, 2–3.2 mm long, outside with some minute glandular hairs or stellate-tomentose, inside with minute glandular hairs or glabrous; tube 1–4 × as long as the lobes; lobes triangular,

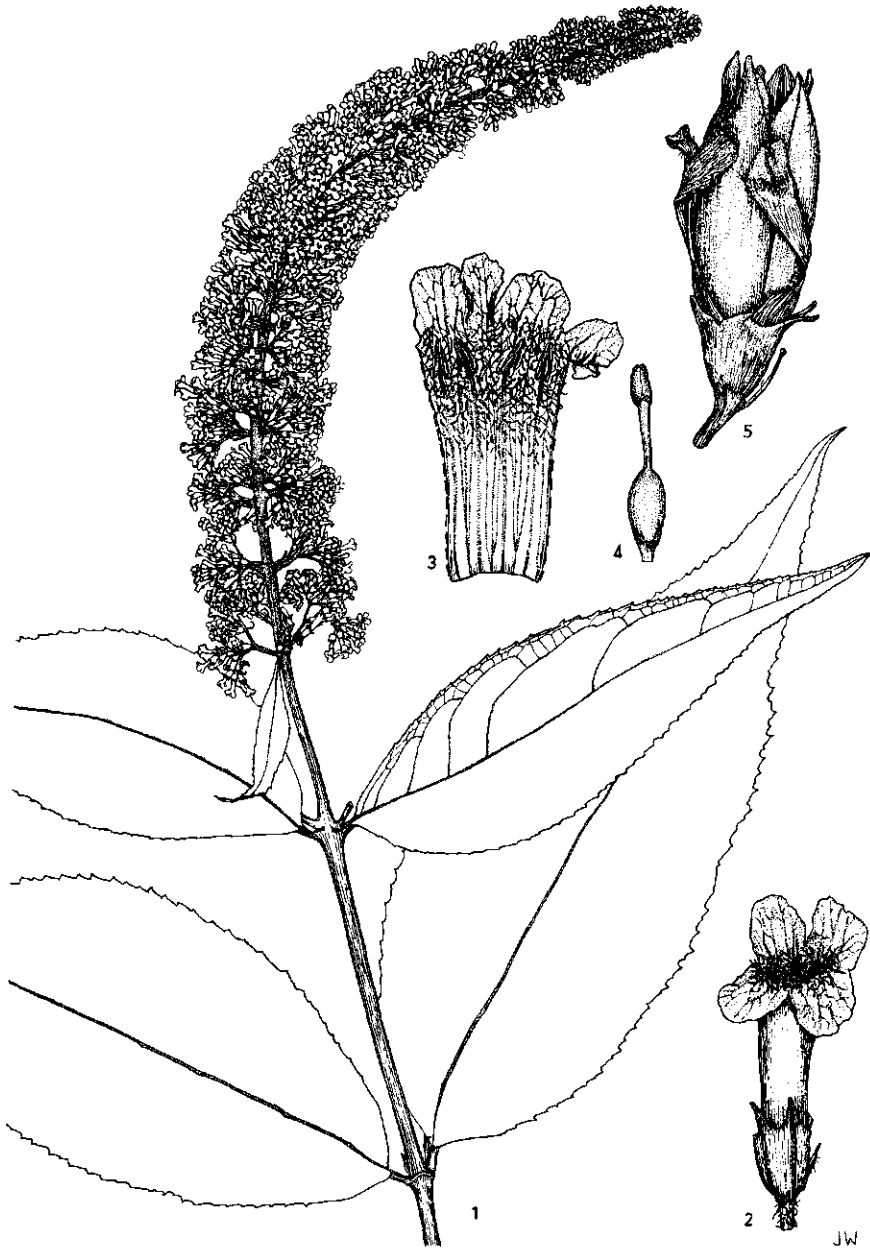
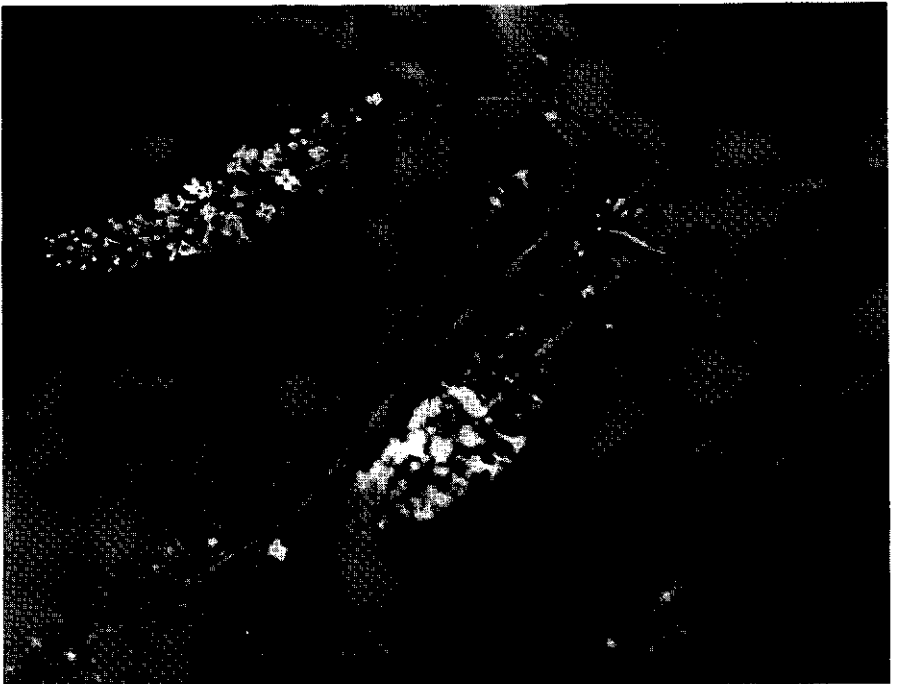


FIG. 20. *Buddleja albiflora*: 1. flowering branch, $\frac{2}{3} \times$; 2. flower, $6 \times$; 3. opened corolla, $6 \times$; 4. pistil, $6 \times$; 5. fruit, $6 \times$ (1-4. Wilson 3361, leaves, especially for their apices Wilson 4117; 5. Rock 15071).

0.5–1.7 × 0.5–1 mm, acute or acuminate, entire. *Corolla* lilac, with erect lobes 2–3 × as long as the calyx, 5.2–8 mm long, outside glabrous or mostly exclusively in the upper half partially stellate-tomentose (indumentum never completely covering the portion of the corolla exerted from the calyx), inside pilose with simple hairs in the throat; tube gradually widened towards the throat, 1.6–2.2 × as long as the calyx, 3–4.3 × as long as the lobes, 4–6.5 mm long, at the base 1–1.2 mm and at the throat 1.5–3 mm wide; lobes suborbicular, 1.2–1.5 × 1.2–1.5 mm, crenate or nearly so, spreading or in dry specimens often suberect. *Stamens* barely included or barely exerted, inserted just below the corolla mouth; anthers sessile, oblong, 0.6–1.3 × 0.3–0.5 mm, rounded or nearly so at the apex, deeply cordate at the base. *Pistil* glabrous, 3.2–3.7 mm long; ovary ovoid, laterally compressed, 1.5–1.7 × 1–1.2 × 0.6–0.8 mm, abruptly narrowed into the included style, 2-celled; stigma clavate, 0.8 mm long. In each cell one axile placenta with about 15–20 ovules. *Capsule* ellipsoid, dark brown, 5–8 × 2–3 × 1.5–2 mm, glabrous; valves torn at the apex. *Seed* brown, spindle-shaped, about 4–5 × 0.5–0.7 × 0.3–0.5 mm, with slender wings at both ends, reticulate, with a small ellipsoid grain in the middle.

Distribution: China (Hupeh, Kansu, Shensi, Szechwan, Yünnan).

Ecology: Open grassy slopes or stream banks; alt. 2000–2850 m.



PHOT. 9. *Buddleja albiflora* (Leeuwenberg 11357, phot. Leeuwenberg, cult. Cambridge, Great Britain).

A selection of the specimens examined:

- Baenitz, C. (cult.) 1778 (L).
- Edinburgh (cult.) C 1 (BM, CGG, LE, WAG).
- Fargas 43 partly (G, P, WAG).
- Giraldi 15 Sept. 1897 (K, P, lectotype of *B. giraldii*).
- Henry, A. 156A (K, lectotype), 1871 (K, P, paratype), 2515 (K, P, W, paratype), 4689 (K, paratype), 6193 (BM, E, G, K, LE).
- Koehne, E. 432 (B, BM, GH, M, OXF, type of *B. hemsleyana*).
- Leeuwenberg, A. J. M. (cult.) 11353 (WAG), 11357 (WAG); Licent, E. 2673 (BM, K, P, W).
- McLaren, H. D. 231 C (BM); Meyer, F. N. 1916 (LE, P).
- Potantin, G. N., 20 June 1885 (LE), 21 June 1885 (LE), 5 July 1885 (LE); Purdom anno 1910 (K, WAG).
- Rock, J. F., 14675 (E), 14819 (P, W), 15012 (E), 15071 (A, K).
- Wilson, E. H. (Arn. Arb. Exp.) 3360 (BM, K, US, W), 3361 (A, BM, E, K, W), 4640 (A), (Veitch Exp.) 2247 (E, K, LE, P, W), 2247a (E, K, NY, P, W), 4117 (BM, K).

Notes. The four closely allied species *Buddleja albiflora*, *B. asiatica*, *B. davidii*, and *B. myriantha*, the first of which might be confused with the third and fourth and the second with the fourth, can be distinguished as follows:

1. Corolla 7.5–14 mm long; tube narrowly cylindrical, outside glabrous or stellate-pubescent and/or with minute glandular hairs; anthers mostly inserted halfway the corolla tube **B. davidii**
 Corolla 5–8 mm long; tube cylindrical or gradually widened towards the throat; anthers mostly inserted just below the corolla mouth, otherwise the corolla outside stellate-tomentose 2
2. Corolla tube outside only in the upper half with glandular hairs or mostly partially stellate-tomentose, gradually widened towards the throat; anthers inserted just below the corolla mouth; inflorescence mostly interrupted near the base; branchlets subterete, glabrous or glabrescent; ovary glabrous **B. albiflora**
 Corolla tube outside stellate-tomentose all over and often at the same time with some glandular hairs, cylindrical or nearly so; anthers inserted at 0.5–1.5 mm from the corolla mouth or in *B. asiatica* often even lower down; inflorescence more regular and not or obscurely interrupted or spiciform; branchlets stellate-tomentose; ovary glabrous, stellate-tomentose in upper half or lepidote
 16 of Key to Asiatic species.

21. *Buddleja alternifolia* Maxim., Bull. Acad. Pétersb. 26: 494. 1880.

Fig. 21, p. 90

Type: China: Kansu Province: S. side of Huangho R., Piasezki 13–25 June 1876 (LE, holotype).

Heterotypic synonyms: *B. legendrei* Gagnep., Not. Syst. 2: 280. 1912, **syn. nov.** Type: China: Szechwan Province: Pong-son-shi, Likin valley, Legendre 1036 (P, holotype).

B. tsetangensis Marquand, Journ. Linn. Soc. 48: 202. 1929, **syn. nov.** Type: China: Tibet: Tsetang, Tsangpo Valley, Kingdon Ward 5616 (K, holotype; isotypes: E, L).

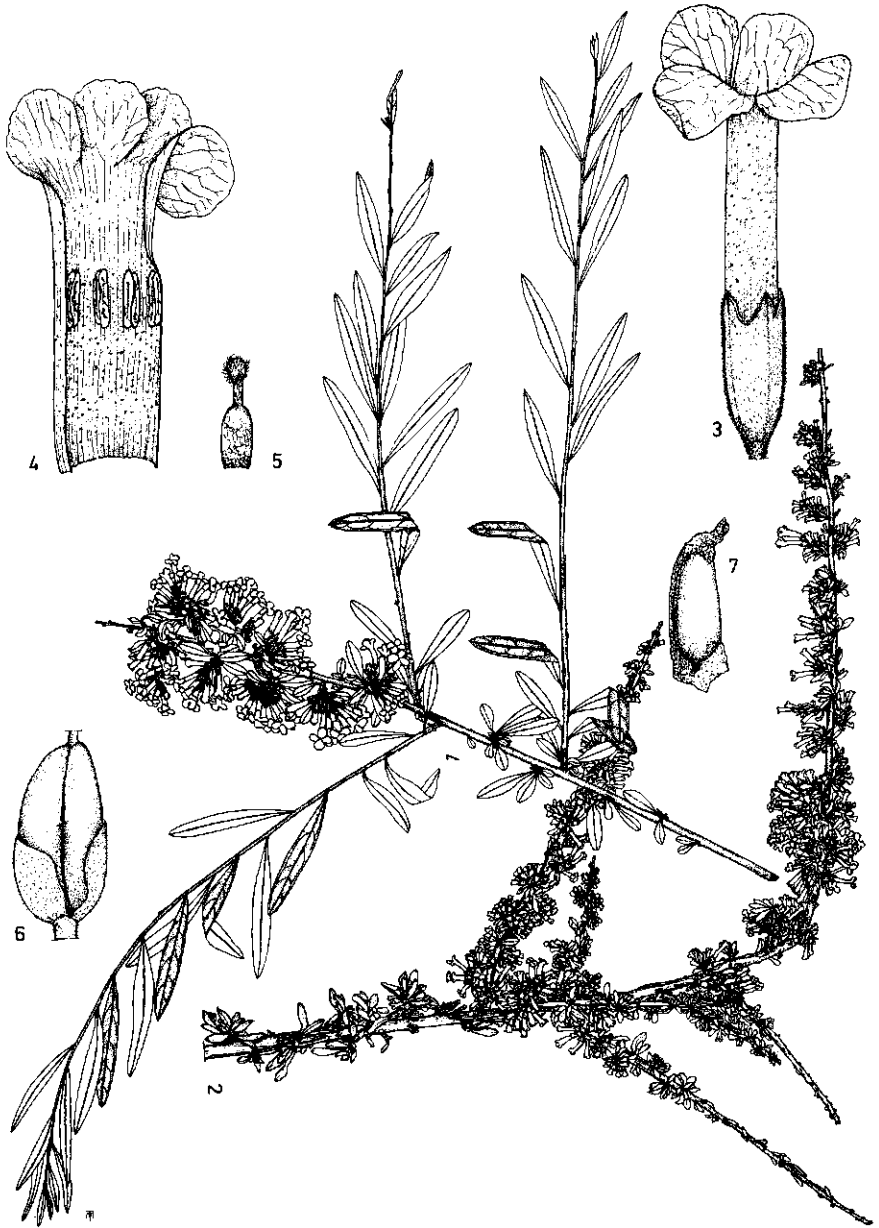


FIG. 21. *Buddleja alternifolia*: 1-2. flowering branches, $\frac{1}{2}\times$; 3. flower, $5\times$; 4. opened corolla, $5\times$; 5. pistil, $5\times$; 6. fruit, $5\times$; 7. seed, $15\times$ (1, 3-5. Rock 12754; 2. Ludlow c.s. 4096; 6-7. Meyer 1787).

Shrub 1–9 m high, bushy. Branchlets stellate-tomentose to almost glabrous, quadrangular to subterete; the terminal and some lateral rapidly growing and with rather large narrowly elliptic leaves; the others very short, with much smaller leaves, and floriferous. *Leaves* on the long vegetative branchlets shortly petiolate; petiole up to 2 mm long; blade 5–7 × as long as wide, 20–70 × 3–13 mm, acuminate, acute, or obtuse at the apex, cuneate or decurrent at the base, entire, shortly stellate-tomentose on both sides or almost glabrous above. Leaves on floriferous branchlets much smaller, shortly petiolate or sessile; blade elliptic or obovate or narrowly so, 5–15 × 2–10 mm, rounded or obtuse at the apex, cuneate or decurrent at the base, stellate-tomentose on both sides and often glabrescent above. *Inflorescence* very short, congested, only on the short lateral branchlets, 1–4.5 × 1–3 cm. *Flowers* fragrant. *Calyx* campanulate, 2.5–4 mm long, outside stellate-tomentose and with some glandular hairs, inside with a few minute glandular hairs in the upper half; tube very variable in length, often torn at one side; lobes much shorter, subequal to unequal, triangular or broadly so, 0.5–1.7 × 0.8–1 mm, mostly acute, less often acuminate or obtuse, entire. *Corolla* creamy, lilac, violet, or purple, with an orange throat (when creamy often also with an orange tube), with erect lobes 2.7–3.3 × as long as the calyx, 8–13 mm long, outside sparsely pubescent with glandular and sometimes also some stellate hairs to almost glabrous, inside with a pilose zone from 0.5–1 mm above the base to 0.5–1 mm below the base of the anthers, and often with some glandular hairs on the lobes; tube nearly cylindrical, 1.8–2.5 × as long as the calyx, 3–6 × as long as the lobes, 6–10 × 1.2–1.8 mm; lobes suborbicular, 1.2–3 × 1.2–3 mm, crenate or subentire, spreading. *Stamens* included, inserted 2–4.5 mm below the corolla mouth; anthers sessile or less often subsessile, oblong or nearly ovate, 1–1.8 × 0.4–0.8 mm, rounded or occasionally apiculate at the apex, deeply cordate at the base. *Pistil* included, glabrous, 2.5–4 mm long; ovary ovoid or nearly so, laterally compressed, 1–2 × 0.7–1.2 × 0.5–0.8 mm, with a disk-like base, 2-celled, rather abruptly narrowed into the short style; stigma large, clavate, 0.7–1 × 0.4–0.5 mm. In each cell one axile placenta with 10–30 ovules outside. *Capsule* ellipsoid, 4–5 × 2 × 2 mm, glabrous; valves torn at the apex. *Seeds* pale brown, narrowly oblong, 1.5–2 × 0.4–0.5 × 0.2–0.3 mm, winged all around, acuminate at both ends, reticulate; grain itself ellipsoid.

Distribution: China (Tibet, Kansu, Yunnan, Szechwan, Shensi, Shansi).

Ecology: Thickets, on river banks or along dry river beds, high up in the mountains. Alt. 1500–4000 m.

Some of the specimens examined:

Africa:

Cult.: S. Africa: Pretoria (fl. Oct., Dec.) Repton 25B (PRE), 2700 (PRE), 6586 (PRE); Johannesburg (fl. Oct.) Elovson J 26098 (J).

Asia and cult. in Europe and Canada:

Ching, R. C., 185 (E, K, P, US).

Edinburgh (cult.) C 428 (BM, CGG, K, WAG).

Farrer 100 (E, K, WAG, cult.); Fenzel 1944 (W), 2049 (W), 2141 (W), 2162 (W).
 Hers, J., 2402 (A, BR, K, P).
 Jettmar May 1938 (W).
 Kennedy, R. S., 17 (K); Kingdon Ward, F., 5616 (E, K, type of *B. tsetangensis*), 11728 (BM); Krause, E., 14 (M).
 Leeuwenberg, A. J. M., 3543 (WAG, cult.); Legendre 1036 (K, P, type of *B. legendrei*); Licent, E., 1993 (BM, P, W), 2011 (BM, K, P, W), 4306 (BM, K, P, W), 5488 (P, W); Ludlow, F., c.s. 4096 (A, BM, E, G), 13513 (BM, E); Ludlow, F. & G. Sherriff 1321 (BM), 8588 (BM), 9469 (E).
 Meyer, F. N., 1787 (K, LE, NY, P); Moore, R. J., 26 June 1958 (K, cult.).
 Petros 5 May 1957 (LE); Piasezki 13–25 June 1876 (LE, type); Potanin, G. N., 19 June 1885 (K, LE); Purdom (cult.) 388 (K).
 Richardson, H. E., 3 (BM); Rock, J. F., 12754 (A, E, K, P, W), 13617 (E, K, P, W).
 Wang, T. P., 2854 (K).

Notes. The type specimen of *B. legendrei* lacks the vegetative branchlets. In all other respects it resembles very much the type of *B. alternifolia* and does not exceed the individual variation of the species. The type of *B. tsetangensis*, collected on the roof of the world, has very compact growth, like all specimens from that area. The vegetative branchlets are relatively short, but the flowers are exactly like those of other specimens examined, except that their corollas are white, not lilac or purple like those collected outside Tibet.

22. **Buddleja asiatica** Lour., Fl. Coch. 72. 1790; Bentham in De Candolle, Prod. 10: 446. 1846; White, For. Fl. N. Rhod. 339. 1962; Leenhouts in Fl. Males. ser. 1. 6: 337, f. 24. 1963; Bakhuizen van de Brink Jr., Fl. Java 2: 212. 1965; Leeuwenberg, Vidal & Galibert, Fl. Camb. Laos Viet. 13: 92, f. 15. 1–8. 1972. **Fig. 22, p. 94**

Type: Vietnam: sin. loc., Loureiro s.n. (BM, holotype).

Heterotypic synonyms: *B. salicina* Lam., Illustr. 1: 291. 1791. Type: India: sin. loc., Herb. de Jussieu 6042 (P-JU, holotype). Homotypic synonym: *B. asiatica* var. *salicina* (Lam.) Koorders & Valetton, Bijdr. 9: 89. 1903.

B. neemda Buch.-Ham. ex Roxb., Fl. Ind. ed. Carey & Wall. 1: 411. 1820. Type: India: Hort. Bot. Calcutta, cult., Buchanan s.n. (K, holotype). Homotypic synonym: *B. nimda* Buch.-Ham. ex Roem. et Schult., Mantissa 3: 88. 1827.

B. serrulata Roth, Nov. Pl. Sp. 82. 1821. Type: not cited by Roth (not seen, destroyed in B).

B. discolor Roth, Nov. Pl. Sp. 83. 1821. Type: not cited by Roth (not seen, destroyed in B).

B. subserrata D. Don, Prod. Fl. Nepal. 92. 1825. Type: Baparia, Buchanan 27 Feb. 1802 (BM, holotype).

B. densiflora Blume, Bijdr. 743. 1826. Type: Java: Mt. Tjerimai, Blume 1593 (L, holotype). Homotypic synonym: *B. asiatica* var. *densiflora* (Blume) Koorders & Valetton, l.c. p. 91.

B. sundaica Blume, l.c. Type: Java: Province Tjanjor, sin. loc., Blume s.n. (L 908. 127–406, holotype). Homotypic synonym: *B. asiatica* var. *sundaica*

(Blume) Koorders & Valetton, l.c. p. 90.

B. acuminatissima Blume, l.c. Types: Java: Tjapung (?), Blume s.n. (L 909. 82-701, syntype); sin. loc., Blume s.n. (L 909.82-700, 900.111-47, and 900. 112-262, syntypes).

B. amentacea Kränzl., Bull. Jard. Bot. Pétersb. 13: 89, 92. 1913. Type: Indonesia: Java: sin. loc., herb. Fischer s.n. (LE, holotype, not seen; photographs seen in E and K; isotype seen: K).

B. asiatica var. *brevicuspe* Koorders, Atlas Baumarten Java f. 326 K-N. 1914. Type: Indonesia: Java: Ngadisari, Koorders 37659 (L, syntype); Passuruan, G. Ardjuno, Koorders 38142 (L, syntype).

B. neemda var. *philippensis* Cham. et Schlecht., Linnaea 2: 598. 1827. Type: Philippines: Luzon: near Tierra-alta, Chamiso s.n. (holotype not seen, destroyed in B; no isotype seen).

Vitex esquirolii Lévl., Fl. Kouy-Tchéou 443. 1914. Type: China: Kweichow: Lofou, Esquiroil 3536 (E, holotype; P, isotype).

B. arfakensis Kan. et Hat., Bot. Mag. Tokyo 56: 157, f. 1. 1942. Type: Indonesia: New Guinea: Angi, Arfak Mts., Kanehira & Hatusima 13795 (A, not seen, but seen by LEENHOUTS).

Missapplied name: *B. virgata* Blanco, Fl. Filip. 57. 1837; 2nd. ed. 38-39. 1845 with reference to L.f. (not of L.f., 1781).

Shrub, undershrub or sometimes small tree, 0.80-7 m high. Branchlets terete or nearly so, densely stellate-pubescent or -woolly with white, grey or fulvous hairs. *Leaves* opposite, those in the inflorescence often more or less alternate, shortly petiolate; petiole 2-15 mm long; blade narrowly to very narrowly elliptic or ovate, 3-8 × as long as wide, 3-30 × 0.5-7 cm, long-acuminate at the apex, cuneate at the base or decurrent into the petiole, remotely serrate-dentate to subentire or sometimes distinctly serrate, glabrous to rather densely stellate-pubescent above, beneath densely stellate-pubescent or -woolly; veins often impressed above. *Inflorescence* terminal and/or axillary, thyrsoid, spiciform, 5-25 × 0.7-2 cm, densely tomentose. Pedicels very short, 0.2-2 mm long; flowers crowded or more or less remote, (sub-)sessile, in 1-3-(rarely more-) flowered cymes; each cyme in the axil of a linear bract. *Flowers* fragrant. *Calyx* campanulate, 1.3-4.5 mm long, outside stellate-pubescent or -tomentose, inside glabrous or occasionally lepidote; lobes 0.4-3 × as long as the tube, subequal, triangular or narrowly triangular, 0.7-2.6 × as long as wide, acute or acuminate, entire. *Corolla* white, sometimes pale violet or greenish, with erect lobes 1.3-3 × as long as the calyx and 3-6 mm long, outside densely or less often sparsely stellate-tomentose except for the glabrous base of the tube (lobes often also glabrous outside), inside woolly or less often pilose in the throat and pilose or woolly in the tube, except for the glabrous base; tube nearly cylindrical, 1.4-2.4 × as long as the calyx, 1.7-4 × as long as the lobes, 2.5-4.8 × 1.2-1.5 mm; lobes orbicular or nearly so, 1-1.7 × 1-1.5 mm, rounded, entire or crenate, spreading. *Stamens* included, inserted 1.7-2.5 mm above the base of the corolla tube; filaments very short,



FIG. 22. *Buddlejã asiatica*: a. flowering branch, $\frac{1}{2} \times$; b. connate petiole bases, $2 \times$; c. flower, $5 \times$; d. opened corolla, $10 \times$; e. immature fruit with style and stigma, $10 \times$; f. fruit, $5 \times$; g. seeds, $10 \times$ (a. Rahmat 11423; b. Holstvoogd 571; c-e. Hoogland & Pullen 5355; f-g. Koorders 4343).

0.3–0.5 × as long as the anthers, glabrous; anthers narrowly triangular or after the pollen is shed oblong, 0.8–1.2 × 0.2–0.4 mm, sagittate at the base or nearly so, glabrous. *Pistil* 2–3 mm long; ovary glabrous or lepidote, ovoid or nearly conical, laterally compressed, 1–1.5 × 0.8–1 × 0.6–0.9 mm, 2-celled, abruptly narrowed into the short glabrous or subglabrous style; stigma large, clavate, 0.7–1 × 0.3–0.4 mm. *Capsule* ellipsoid, 3–5 × 1.5–3 × 1.5–3 mm, often laterally compressed, glabrous or sparsely and minutely lepidote, with an indented line of dehiscence, apiculate; valves often torn at the apex. *Seeds* pale brown, reticulate, winged at both ends, 0.8–1 × 0.3–0.4 × 0.2 mm; grain ellipsoid, apiculate at both ends, 0.3–0.4 × 0.3 × 0.2 mm.

Distribution: Nepal, India, Bangla Desh, Burma, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, New Guinea, Philippines, China (Yünnan, Kwangsi, Szechwan, Fukien, Kwantung, Hainan), Hong-Kong, Taiwan.

Ecology: Open places or light forests. Alt. 200–2000 m.

Specimens examined:

Africa (cult.):

Kenya: Riar Ridge, Kiambu District, Hindorf 810 (K).

Zambia: Lusaka Forest Nursery, F. White 3034 (BR, FHO, K).

S. Africa: Transvaal: Westfalia, near Tzaneen, Letaba District, Schlieben 7203 (B, BR, G, HBG, K, M); Pretoria: E. P. Phillips PRE 15721 (PRE); *ibid.*, Repton 3B (PRE), 1442 (PRE); *ibid.*, Verdoorn 28 Aug. 1933 (PRE); Frankenwald, between Pretoria and Johannesburg, Crook 25870 (J).

Europe (cult.):

Great Britain: Kew Gardens, Leeuwenberg 7828 (WAG); Wisley, A. B. Jackson Feb. 1944 (BM).

Asia (cult.):

Iran: Abadan, H. F. Macmillan 199 (K), 200 (K), 337 (K).

Asia (most of the specimens collected in the wild and seen, except for those collected in SE. tropical Asia (continent and islands)):

Abbay, B. N., 2 (E); Aitchinson, J. E. T., 491 (K), 1094 (K); Alsterlund, I., 89 (E); Anderson, D. J., 5 Jan. 1862 (K), 11 Mar. 1868 (K).

Beauvois, J., 22 (P); Beddome, R. H., 121 (K), 5298 (BM); Bodinier, E., 497 (E, P); Bons d'Anty 166 (K, P); Bourne, A. G., 279 (K), 551 (K); Bourne, F. S. A., 30 (K); Buchanan Hamilton, F., 407 (E), 408 (E); Bullock, A. A., 900 (K); Burt, B. L., 657 (E).

Campbell, A., 8259 (R); Cavalerie, J., 4350 (K, P), 8145 (K), 8146 (K); Cave, G. H., 6 Jan. 1913 (BM), 1 Jan. 1914 (E); Chan, K. Y., 1394 (K); Chen Ping En 2685 (M); Chow, H. C., 8994 (A); Chuang, C. C. & M. T. Kao 2444 (TI); Chung, H. H., 1318 (E, K), 2801 (BM, E, K, W); Clarke, C. B., 6565 (LE), 8335 (BM), 10813 (BM), 14044B (BM), 23710C (LE), 23775 (BM), 27003 (K), 27003A (LE); 37413 (A, BM), 37413C (LE); Collet, C. B., 2 (K); Cooper, R. E. c.s. 4350 (BM); Cowan, J. M., 8 (E), 616 (E), 1957 (E), 2063 (E); Cox & Hutchinson 537 (K); Craib, W. G., 220 (E).

Delavay, J. M., 318 (K, P, WAG), 4143 (K, P, WAG), Apr. 1888 (K, P, WAG); Dickason, F. G., 7343 (A), 7343A (E, LE); Dobremez, J. F., 2551 (BM); Drummond, J. R., 1713 (E, K), 21023 (K), 21972 (K), 25488 (E, P); Ducloux 1484 (E), 4550 (P), 5619 (P), 6472 (P), 6689 (P, WAG); Duthie, J. F., 18555 (K), 23729 (K), 25951 (K).

Edgeworth 40 (K); Esquirol 3536 (E, P, type of *Vitex esquirolii*).

Faber, E., 607 (K), 608 (K, W); Falconer, H., 282 (K); Faurie, J., 332 (BM, P), 465 (BM, P, W); Feng, K. M., 354 (A); Forrest, G., 7494 (K), 9454 (E, K), 9487 (K), 9637 (K), 12229 (BM).

Gamble, J. S., 3255A (K), 12257 (K), 14577 (K), 17892 (BM, K), 22322 (K); Griffith, W., 198 (K), 236 (K, W), 1113 (BM), 1114 (BM), 2448 (BM, K), 2449 (BM).

Haines, H. H., 291 (K), 4871 (K); Hancock, W., 263 (K); Handel-Mazzetti, H., 424 (E, W), 801 (W), 5778 (K, W); Hara, H., c.s. 3794 (TI), 6303887 (BM), 6303890 (K); Hart, G. S., 4 (E); Hayata, B., 1 Dec. 1921 (TI); Helfer, J. W., 9 (BM, LE), 304 (M); Henry, A., 200 (K), 200A (E), 200B (P), 3456 (BM, K, P), 8759 (K, P), 10443A (E), 10443B (E, K), 10443C (E), 10443D (K), 11679 (K); Ho, H. T., 60066 (W); Hohenacker (ed.) 442 (BM, BREM, K, LE, M, P, W), 1422 (HAL, K, LE, M, P, W); How, F. C. & N. K. Chun 70157 (B, E, K, P); Huang, T. C., 2188 (TI); Huk, A., 85 (P), 166 (BM).

Ikeda, G., 2022 (KAG).

Jacob, K. C., 17694 (K); Jacquemont, V., 175 (P), 320 (P); Jamieson, D., 507 (K), 937 (E); Jarrett, F. M., c.s. 914 (K).

Kao, M. T., 7138 (TI); Keenan, J. c.s. 3410 (K), 3719 (K); Kermode, C. W. D., 17195 (K); Khan, B., 115 (M), 331 (M); Khan, M. S., 850 (E); Kingdon Ward, F., 1118 (BM), 6431 (K), 13233 (BM), 17008 (BM), 19139 (BM), 20489 (BM), 21278 (BM), 21789 (BM), 22547 (BM); Kitamura, S., 20 Mar. 1932 (TI); Koelz, W. N., 11273 (E), 24562 (W).

Lace, J. H., 1174 (E), 1899 (E), 2728 (K), 6377 (E); Lau, S. K., 660 (P), 1155 (BM, P), 3431 (P), 4189 (BM), 4833 (BM); Legge, J. M., 48 (K); Lei, C. I., 122 (B, K, P, W), 394 (B, K, P, W); Liang, H. Y., 61733 (B, K, P), 63081 (M), 64907 (M), 70040 (A); Lind, B. K. & H. H. Chung 1547 (K); Linsley Gressitt 298 (BM, K), 1019 (BM).

MacDaniels, L. H., 170 (W); Maries, G. C., anno 1890 (BM); McClure, F. A., 8391 (E, K, P), 20057 (K); Merrill 'Species Blacooanae 15' (W); Mooney, H. F., 2231 (K), 2799 (K); Morse, H. B., 468 (K), 469 (K).

Odashima, K., 17763 (BM, M, W); Oldham, R., 318 (BM, GH, K, P, W).

Prain's coll. 18 (K); Price, W. R., 122 (K).

Ram, C., 460 (E); Ram, K., 8820 (E); Ramamoorthy, T. P. & K. N. Gandhi 2740 (E); Robertson, W. A., 77 (K); Rock, J. F., 556 (W).

Saldanha, C. J., 12852 (E), 15601 (K), 16909 (E); Sampson, T., 424 (BM); Sasaki, I., 855 (TI); Saulière, A., 263 (K); Schilling, A. D., 714 (K, W); Schlagintweit 12400 (BM); Schneider, C., 16 (A), 277 (A, G, K, P); Shaik Mokim 36 (K); Shi Ying Hu 5139 (K), 6914 (K), 7071 (K), 10473 (K), 11289 (K), 12524 (K); Shrestha 3939 (BM); Sinclair, J., 4070 (E); Stainton, J. D. A., 5294 (BM); id. c.s. 637 (BM); Stewart, R. R., 1056 (K); Strachey & Winterbottom 2 (BM, GH, K, LE).

Taam, Y. W., 1976 (B); Tamura, M. & H. Koyama TNS 246379 (TNS); Thakur Rup Chand 4402 (W); Thompson, R., 246 (K), 610 (K); Thorel 2979 (E); Toppin, S., 2565 (E); Treutler 1156 (K, LE); Tsai, H. T., 51484 (A), 56443 (A), 56911 (A), 57821 (A); Tsang, W. T. 20701 (B, K, W), 21847 (BM, P); Tsang, Tang & Fung 17762 (K); Tsang, Wai-Tak 473 (K), 784 (K); Tsiang, Y., 714 (K, P), 12881 (K).

Von Wissmann, H., 614 (W), 1084 (W).

Wallich, N., 6401 a-o (K, K-WALL), some duplicates in other herbaria; Wang, C. W., 66611 (A), 71151 (A), 72116 (A); Warburg, O., 10808 (K), 10809 (K); Watt, G., 76 (E), 422 (E), 1101 (E), 5816 (E, LE, P), 6028 (E, K, P), 6104 (E, P), 8001 (E); Wawra, H., 1524 (W); Wenger, M. L., 437 (K); Wight 597 (E, LE), 764 (E), 1811 (GH, K, LE, M, W), 2213 (BM, K, LE, P); Wilson, E. H. (Arn. Arb. Exp.) 3362 (BM, E, K, W), 9647 (BM, K), (Veitch Exp.) 78 (K, W); Wright, C., 270 (GH).

Yamazaki, T. c.s. 1104 (TI).

Note. The description is based on material collected in the wild, among which the specimens cited by LEEUWENBERG & VIDAL (1972).

23. *Buddleja bhutanica* Yamazaki, Journ. Jap. Bot. 46: 49, fig. 1A. 1971.

Fig. 23, p. 98

Type: Bhutan: Tinlegang, Kanai c.s. 25756 (TI, holotype).

Shrub 1.5–2 m high. Branchlets terete, glabrous. *Leaves* opposite, connate-perfoliate (later often torn by the development of the branchlet), narrowly oblong, 5–7 × as long as wide, 6–16 × 1–3 cm, acuminate at the apex, serrate or subentire, glabrous at both sides or with some minute glandular hairs beneath and when young with some stellate hairs above; venation reticulate, impressed above and prominent beneath. *Inflorescence* terminal, 8–17 × 3–8 cm, a panicle composed of 3–5 often partly interrupted spike-like thyrsi. *Flowers* fragrant. *Calyx* campanulate, 2–2.2 mm long, glabrous on both sides, ciliate; lobes 3–4 × as long as the tube, subequal, triangular, 1.2–1.5 × 1 mm, acuminate, entire. *Corolla* white, with erect lobes 2–2.5 × as long as the calyx, 4.5–5.5 mm long, outside practically glabrous (with some minute glandular and often also some minute ordinary hairs), inside with a pilose zone from 2 mm above the base to the base of the lobes and often with some glandular hairs on the lobes; tube nearly cylindrical, 1.6–2 × as long as the calyx, 2.7 × as long as the lobes, 3.3–4 mm long; lobes broadly elliptic, slightly longer than wide, 1.3–1.5 × 1.2–1.3 mm, subentire, spreading. *Stamens* barely included, inserted 1 mm below the corolla mouth; anthers subsessile, oblong, 1 × 0.5 mm, obtuse or nearly so at the apex, deeply cordate at the base. *Pistil* glabrous, about 3 mm long; ovary ovoid or nearly so, laterally compressed, 2-celled (only immature fruit seen); style very short, included, about 0.5 mm long; stigma large, capitate, 0.5 × 0.5 mm. In each cell one axile placenta with about 100 ovules. *Capsule* ellipsoid to ovoid, laterally compressed, 4–5 × 2.5–3 × 2 mm, with 2 indented lines of dehiscence. *Seeds* winged at both ends, reticulate, about 1 × 0.2 × 0.1 mm (immature ?).

Distribution: Only known from the type locality and Lobeysa.
Ecology: Bush in the mountains. Alt. 1700 m.

Specimens examined:

Bhutan: Tinlegang (fl. Apr., fr. May), Kanai, Murata, Ohashi, Tanaka & Yamazaki 1029 (TI, paratype), 9913 (TI, paratype), 14858 (TI, paratype, not seen), 25756 (TI, holotype); near Lobeysa, Gierson & Long 20 June 1975 (E).

Note. *B. bhutanica* resembles *B. asiatica* strikingly by the inflorescences, flowers and fruits, but it can easily be distinguished by the connate-perfoliate leaves.

24. *Buddleja brachystachya* Diels, Notes Roy. Bot. Gard. Edinb. 5: 249. 1912.

Fig. 24, p. 100

Type: China: Yünnan: between Lu-po Pass and Salween, Mekong-Salween divide, Forrest 1076 (E, holotype; isotype: K).



FIG. 23. *Buddleja bhutanica*: 1. flowering branch, $\frac{1}{3}\times$; 2. flower, $6\times$; 3. opened corolla, $8\times$; 4. pistil, $8\times$; 5. fruit, $6\times$ (1. Hara c.s. 25756, holotype; 2-4. Hara c.s. 9913; 5. Hara c.s. 1029).

Heterotypic synonyms: *B. nana* W. W. Smith, Notes Roy. Bot. Gard. Edinb. 8: 126. 1913, **syn. nov.** Type: China: Yunnan: on the divide between the Shayang and Chu-tong vallies, Forrest 5519 (E, holotype; isotype: K).

B. purdomii W. W. Smith, op. cit. 9: 87. 1916, **syn. nov.** Type: China: Kansu: near Kaii-how, walls of the Hei-Shui-Jang, Farrer & Purdom 14 (E, holotype; isotype: K).

Small shrub 0.30–0.90 m high. Branchlets subquadrangular to subterete, more or less densely stellate-tomentose. *Leaves* opposite, small, sessile or shortly petiolate; petiole up to 7 mm long, stellate-tomentose; blade elliptic or nearly so, 10–35 × 5–17 mm or smaller, acute or obtuse at the apex, cuneate or decurrent at the base, entire or obscurely sinuate, above almost glabrous to stellate-tomentose and furthermore with some glandular hairs, sparsely or densely stellate-tomentose beneath. *Inflorescence* thyrsoid, small, congested, often few-flowered, sometimes almost head-like, 1.5–3 × 1.5–2.5 cm. *Calyx* campanulate, 3–9 mm long, outside more or less densely stellate-tomentose, inside glabrous or with some minute glandular hairs; tube 1.3–2.7 × as long as the lobes; lobes triangular or narrowly so, 1–4 × 1–1.5 mm, acute or acuminate, entire. *Corolla* lavender, with erect lobes 2–4 × as long as the calyx, 11–18 mm long, outside shortly stellate-tomentose and with few or many glandular hairs on the lobes, inside pilose with simple hairs from the level of the apex of the ovary to the throat and with at least some glandular hairs on the lobes; tube nearly cylindrical, often slightly curved, 1.4–2.4 × as long as the calyx, 2–3 × as long as the lobes, 8–13 mm long, above the calyx 1.8–2 mm wide, rather abruptly widened at the throat; limb mostly large, 6–10 mm in diam.; lobes suborbicular, 3–5 × 3–4.6 mm, crenate or nearly so, spreading. *Stamens* included; filaments very short, about 0.2–0.3 × as long as the anthers, inserted 3.5–7 mm below the corolla mouth; anthers oblong or nearly so, 1.2–1.8 × 0.7–0.8 mm, rounded or nearly so at the apex, deeply cordate at the base. *Pistil* short, 3.8–4.2 mm long; ovary ellipsoid, laterally compressed, 1.5–2 × 1.2–1.5 × 0.8–1 mm, at the apex, in the upper half, or almost completely stellate-tomentose (extreme base always glabrous), abruptly narrowed into the glabrous style, 2-celled; stigma clavate, 1.2–1.5 × 0.4–0.8 mm. In each cell one axile placenta with about 35–100 ovules. *Capsule* ellipsoid, 5–6 × 2 × 2 mm, stellate-tomentellous (only seen in Wilson 4320).

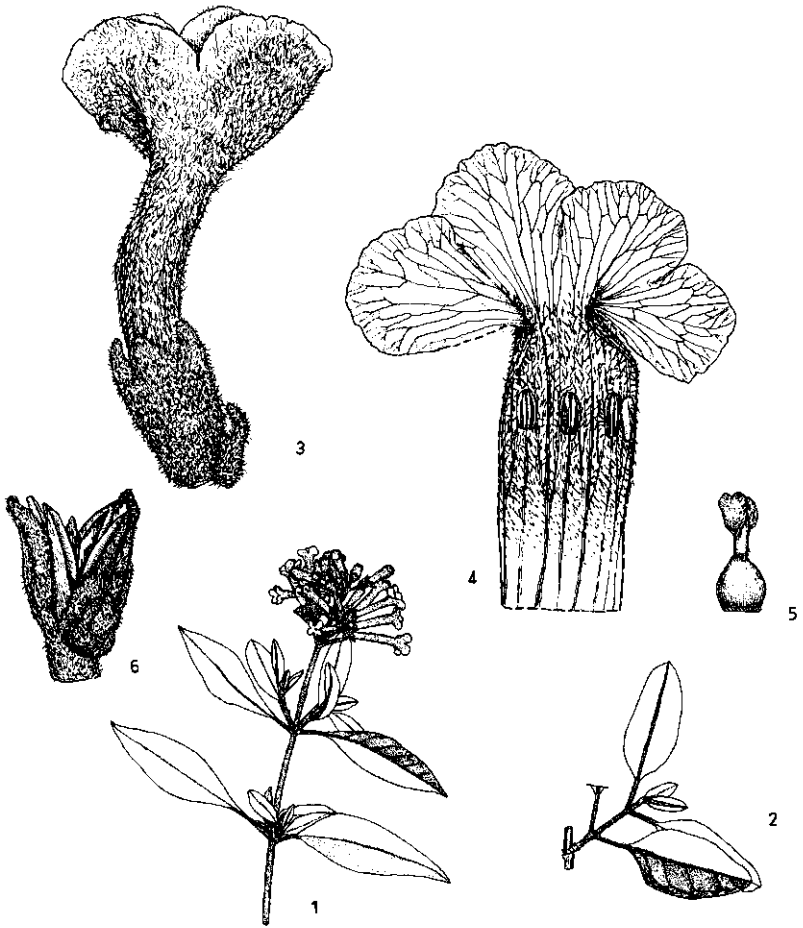
Distribution: China (Yunnan, Szechwan, Kansu).

Ecology: Open often dry and rocky places; alt. 2000–2400 m.

Specimens examined:

Farrer & Purdom 14 (E, K, type of *B. purdomii*); Forrest, G., 1076 (E, K, type); 5519 (E, K, type, of *B. nana*), 12352 (BM, E), 13645 (E, K, P); Rock, J. F., 12017 (A, LE, NY), 12029 (E), 12034 (A, K, LE, P, W); Wilson, E. H. (Veitch exp.) 4320 (A, K).

Note. There is no correlation between the characters employed for separating



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FIG. 24. *Buddleja brachystachya*: 1-2. branches, $\frac{2}{3} \times$; 3. flower, $4 \times$; 4. opened corolla, $4 \times$; 5. pistil, $4 \times$; 6. open fruit, $4 \times$ (1. Forrest 1076, holotype; 2, 6. Wilson 4320; 3-5. Rock 12017).

the three species distinguished by MARQUAND (1930) which are consequently united here.

25. *Buddleja candida* Dunn, Kew Bull. 1920: 134. 1920. **Fig. 25, p. 102**

Type: India: Abor Hills, Sidi R. mouth and opposite Yambung on the north side of the Dihang, Burkill 37631 (K, holotype).

Shrub. Branchlets stellate-tomentose, terete or nearly so. *Leaves* opposite, petiolate; petiole 5–15 mm long, stellate-tomentose; blade narrowly oblong, about 4 × as long as wide, 7–18 × 1.7–5 cm, acuminate at the apex, cuneate at the base or decurrent into the petiole, serrate, stellate-tomentose on both sides when young, above bullate and glabrescent with age; venation minutely reticulate, impressed above. *Inflorescence* terminal, a panicle composed of several interrupted spike-like thyrsi, 8–20 × 3–11 cm. *Calyx* campanulate, 3 mm long, stellate-tomentose and with some glandular hairs outside, glabrous inside; lobes triangular, 1.7 × 1.5 mm, acuminate, entire. *Corolla* violet, with erect lobes twice as long as the calyx, 6 mm long, outside stellate-tomentose and with some glandular hairs, inside with a pilose zone from the level of the apex of the ovary to the throat and with some glandular hairs on the lobes; tube cylindrical or nearly so, 1.6 × as long as the calyx, 4.8 mm long; lobes suborbicular, 1.2 × 1.2 mm, subentire, spreading. *Stamens* included, inserted in the middle of the corolla tube; anthers sessile, oblong to ovate, 1.2 × 0.5 mm, acute at the apex, cordate at the base. *Pistil* 4 mm long; ovary ovoid to conical, laterally compressed, 2.2 × 1.5 × 1.2 mm, stellate-tomentose except for the disk-like glabrous base, gradually narrowed into the short glabrous included style; stigma subcapitate, 1 × 0.6 mm. *Capsule* ellipsoid, 6 × 2 × 2 mm, stellate-tomentose and with glandular hairs, partly glabrescent; valves torn at the apex. *Seeds* spindle-shaped, winged at both ends, about 1.2 × 0.4 × 0.3 mm, reticulate.

Distribution: NE. India and probably also in Tibet in China.

Ecology: Mountains, riverbanks.

Specimens examined:

Burkill 37631 (K, type); Dallimore, W., 507-28 (K, cult., seedling of herb. Kingdon Ward 7863); Edinburgh (cult.) C 515 (BM, E, WAG), C 1173 (E); Kingdon Ward, F., 6372 (K), 7863 (K); Moore, R. J., 56-161-15 (cult.) (K, parent of hybrid XB31).

The following specimens may also belong here:

Griffith, W., 3746 (K, P); Kingdon Ward, F., 8451 (K), 11000 (BM, E), 19194 (BM), 19222 (BM, E), 20009 (BM).

Notes. Field studies are required to determine if *B. candida*, maintained here, is specifically distinct from the very closely allied *B. nivea*. The specimens which could not be identified with certainty resemble also *B. myriantha*, and, to a lesser degree, *B. asiatica* and *B. macrostachya*. They may be hybrids between the two latter species.



FIG. 25. *Buddleja candida*: 1. flowering branch, $\frac{2}{3} \times$; 2. flower, $8 \times$; 3. opened corolla, $8 \times$; 4. pistil, $8 \times$; 5. open fruit, $6 \times$ (1, 5. Burkill 37631, holotype; 2-4. cult. Kew 7863).

26. *Buddleja colvilei* Hook. f. et Thoms. in Hooker, Illustr. Himal. Pl. t. 18. 1855. Fig. 26, p. 104

Types: India: Sikkim, Lachen, Hooker f. 2 Aug. 1849 (K, lectotype), July 1849 (K, paratype); Chola 6 Nov. 1849 (K, paratype); Nepal: Nangki, Hooker f. s.n. (K, paratype). Mixed duplicates of the above cited collections (A, BM, CGE, GH, GOET, L, LE, M, OXF, P, U, W, iso-syntypes).

Shrub or small tree 2–6 m high. Branchlets subquadrangular to subterete, with scattered stellate and glandular hairs. *Leaves* opposite, sessile to 10 mm long-petiolate; petiole with same indumentum as branchlets; blade narrowly elliptic or approximately so, $3-5 \times$ as long as wide, $7-16 \times 2-6$ cm, acuminate at the apex, cuneate or rounded at the base or decurrent into the petiole, serrate, with scattered glandular and stellate hairs on both sides, sometimes almost tomentose beneath; venation reticulate, impressed above, prominent beneath. *Inflorescences* terminal and in the axils of the upper leaves, these all together $7-23 \times 4-6$ cm, terminal one laxly thyrsoid, others laxly cymose. *Calyx* amply campanulate, $(6-)6.5-8 \times (4-)5-8$ mm, outside densely stellate-tomentose, with glandular hairs, or with glandular and more or less scattered stellate hairs, inside with glandular hairs; tube $1.4-3 \times$ as long as the lobes which are triangular or broadly triangular, $1.5-3 \times 1.5-3$ mm, acuminate at the apex, entire, tips often recurved when dry. *Corolla* purple, wine-red, or less often pink, with erect lobes $2.9-3.9 \times$ as long as the calyx (17–)23–30 mm long, outside with some glandular hairs and near the mouth often as well with some stellate hairs, inside with a pilose zone from the level of the apex of the ovary to the mouth and with some glandular hairs in the throat and at the base of the lobes; tube amply cylindrical or nearly so, $2-3 \times$ as long as the calyx, $2-3 \times$ as long as the lobes, (12–)17–21 mm long, at the base (3–)5–8 mm and at the throat (4–)6–9 mm wide; lobes suborbicular, $5-10 \times 5-10$ mm, crenate, spreading. *Stamens* barely included, inserted (2–)4–6 mm below the corolla mouth; filaments very short, $0.25-0.5 \times$ as long as the anthers; anthers oblong or ovate, (1.2–)2.5–5 \times (0.7–)1.3–2 mm, obtuse or apiculate at the apex, cordate at the base. *Pistil* 18–22 mm long; ovary ovoid or nearly so, laterally compressed, $5-8 \times 3-5 \times 2-2.2$ mm, stellate-tomentose, gradually narrowed into the style; style barely exerted, long, thick, glabrous or stellate-tomentose at the base only; stigma large, capitate or nearly so, $1.5-4 \times 1.6-4$ mm. In each cell one axile placenta with about 100–150 ovules attached by its complete length to the middle of the septum. *Capsule* ellipsoid, laterally compressed, $10-16 \times 6-8 \times 5-7$ mm, stellate-tomentose, often partly glabrescent, acute at the apex; valves torn at the apex. *Seeds* obliquely polyhedral, unwinged, reticulate, brown, about $2-3 \times$ as long as wide and about 1–1.5 mm long.

Distribution: Nepal, Bhutan, India (Assam, Sikkim).

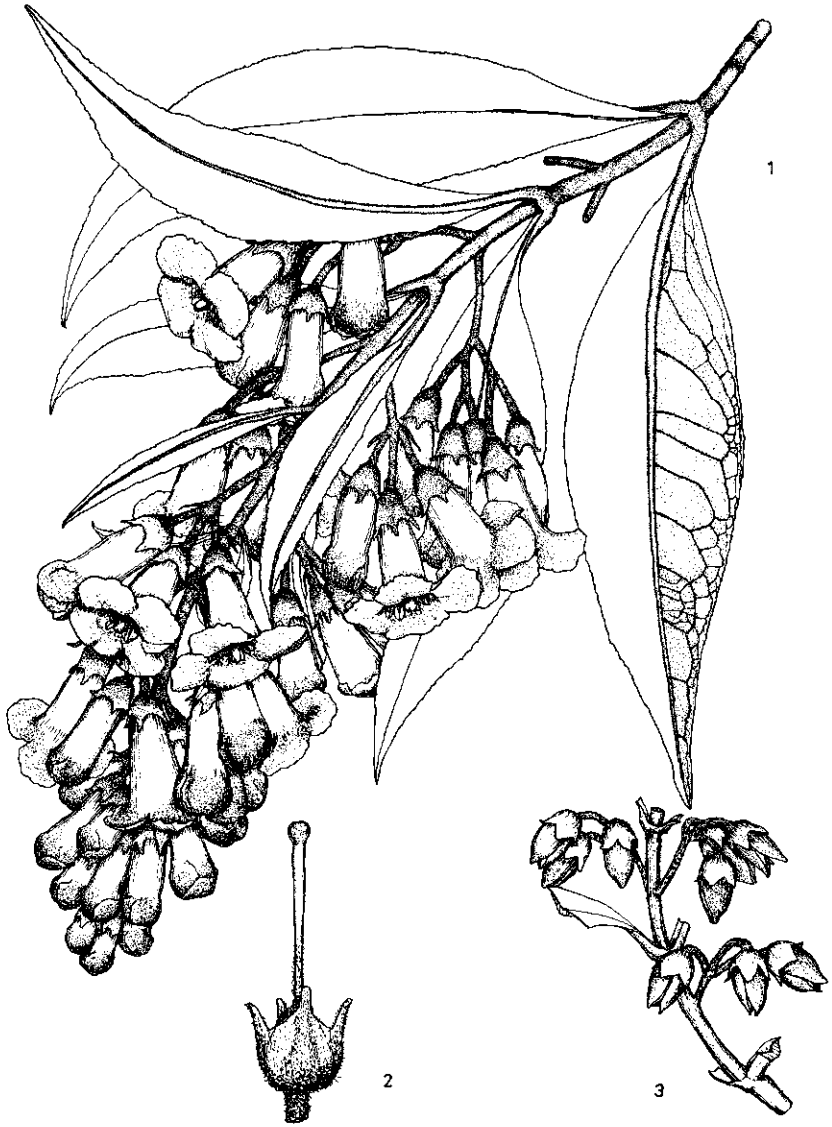


FIG. 26. *Buddleja colvilei*: 1. flowering branch, $\frac{2}{3}\times$; 2. pistil, $2\times$; 3. fruits, $\frac{2}{3}\times$ (1. Illustration Horticole 4: pl. 127. 1857 and Ludlow c.s. 16514 and 19272; 2. Ludlow c.s. 16514; 3. same plate, Clarke 12896 B (LE) and King anno 1878 (LE)).

Ecology: Forest, thickets or open places high up in the mountains. Alt. 2000–4200 m.

Some of the specimens examined:

- Anderson, T., 1010 (M, P).
Beddome, R. H., 5294 (BM).
Clarke, C. B., 12896 (K, LE), 13445 (BM); 25599 (BM), 35736c (BM); Cooper, R. E., 3392 (BM), 4162 (BM); Cooper, R. E. c.s. 2723 (E).
Dobremez, J. F., 1282 (BM).
Edinburgh (cult.) C 2 (BM, CGG, K, WAG), C 473 (BM, CGG, K).
Gamble, J. S., 517 (K), 8466 (K), 9495 (K), 10436 (K); Gould, B. J., 501 (E), 862 (K).
Hara, H., 1605 (TI); Hara, H. c.s. TI 69079 (TI), 69081 (TI).
King's coll. 32 (K), 38 (BM, L, P); Kingdon Ward, F., 11584 (BM), 13769 (BM).
Leeuwenberg, A. J. M., (cult. Kew) 3404 (WAG), 3469 (WAG), 11365 (WAG); Lowndes, D., 731 (E); Ludlow, F., c.s. 16514 (A, BM), 19272 (BM, P), 19507 (BM), 19923 (BM), 20880 (BM), 21281 (BM); Ludlow, F. & G. Sheriff 191 (BM), 572 (BM), 614 (BM), 3347 (BM).
Rohmoo Lepcha 87 (E), 1203 (E), 1205 (E).
Smith, W. W., 3840 (E).
Trentler 493 (K).
Williams, L. H. J., 466 (BM).

Notes. Among the Asiatic species, *B. colvilei* has the largest flowers by which it is easily recognized. Relatively small-flowered specimens of it, however, may be confused with relatively large-flowered specimens of *B. forrestii*, as they are similar in their leaves, calyx, and outer side of the corolla. The two species can be distinguished as follows:

- Corolla tube 7–11 mm long; ovary glabrous or stellate-tomentose at the apex only; capsule with some glandular hairs; seeds winged all around; inflorescence lax or congested ***B. forrestii***
Corolla tube (12–)17–21 mm long; ovary stellate-tomentose all over like the capsule; seeds unwinged; inflorescence lax ***B. colvilei***

27. ***Buddleja crispa*** Benth., Scroph. Ind. 43. 1835. **Fig. 27, p. 107**

Type: India: Kamoon, Wallich 6404a (K, holotype: isotypes: BM, CGE, K-WALL, LE, M, OXF, P, W).

Heterotypic synonyms: *B. crispa* var. *decipiens* Schmidt, Journ. Bot. London 6: 245. 1868. Type: India: W. Himalaya, near Simla, Schlagintweit 5028 (BM, LE, P, isotypes).

B. tibetica W. W. Smith, Rec. Bot. Surv. Ind. 4: 270. 1911, **syn. nov.** Type: Tibet: Ljalung valley, J. C. White 72 (K, holotype). Homotypic synonym: *B. whitei* Kränzl. in Engler, Bot. Jahrb. 50. Beibl. 111: 46. 1913.

B. truncata Gagnep., Not. Syst. 2: 187, 192. 1911, **syn. nov.** Type: China: Yünnan, Pee Cha Ho Gorges, near Mosuyu, Delavay 27 March 1887 (P, holotype; isotype: WAG).

B. agathosma Diels, Notes Roy. Bot. Gard. Edinb. 5: 248. 1912, **syn. nov.**

Type: China: Yünnan: W. of Yünnan fu, Forrest 593 (E, holotype, photograph in K; isotypes: K, P, WAG).

B. caryopteridifolia W. W. Smith, Notes Roy. Bot. Gard. Edinb. 8: 179. 1914, **syn. nov.** Type: Yünnan: Tong Shan, Yangtze bend, Forrest 11016 (E, holotype; isotype: WAG).

B. eremophila W. W. Smith, l.c., **syn. nov.** Type: China: Yünnan: near the Yangtze, Kingdon Ward 304 (E, holotype). Homotypic synonym: *B. caryopteridifolia* var. *eremophila* (W. W. Smith) Marquand, Kew Bull. 1930: 200. 1930.

B. incompta W. W. Smith, l.c. p. 180, non L.f. Type: China: Yünnan: A-tun-tsi Valley, Kingdon Ward 345 (E, holotype). Homotypic synonym: *B. acosma* Marquand, l.c. p. 187.

B. truncatifolia Lévl. in Fedde, Repert. 13: 342. 1914. Type: China: Yünnan: Kiao-tche-keou, Maire Apr. 1903 (E, holotype; isotypes: K, P). Homotypic synonym: *B. tibetica* var. *truncatifolia* (Lévl.) Marquand, l.c. p. 205, **syn. nov.**

B. farreri Balf. f. et W. W. Smith, Notes Roy. Bot. Gard. Edinb. 9: 84. 1916, **syn. nov.** Type: China: Kansu: below Chago, Satance Valley, Farrer & Purdom 44 (E, holotype; photograph: K). Homotypic synonyms: *B. tibetica* var. *farreri* (Balf. f. et W. W. Smith) Marquand, l.c. p. 205; *B. crispa* var. *farreri* (Balf. f. et W. W. Smith) Hand.-Mazz., Symb. Sin. 7: 947. 1936.

B. praecox Lingelsh. in Fedde Repert. Beih. 12: 464. 1922. Type: China: E. Tibet, W. Limpricht 1310 (K, isotype).

B. hastata Prain ex Marquand, l.c. p. 197, **syn. nov.** Type: Tibet: between Gyantse and Phari, H. J. Walton July–Sept. 1904 (K, holotype; isotype: BM).

B. agathosma var. *glandulifera* Marquand, l.c. p. 198. Type: China: Yünnan: Yang-Dza Shan, Mekong-Salween divide, Forrest 20143 (K, holotype; isotype: A).

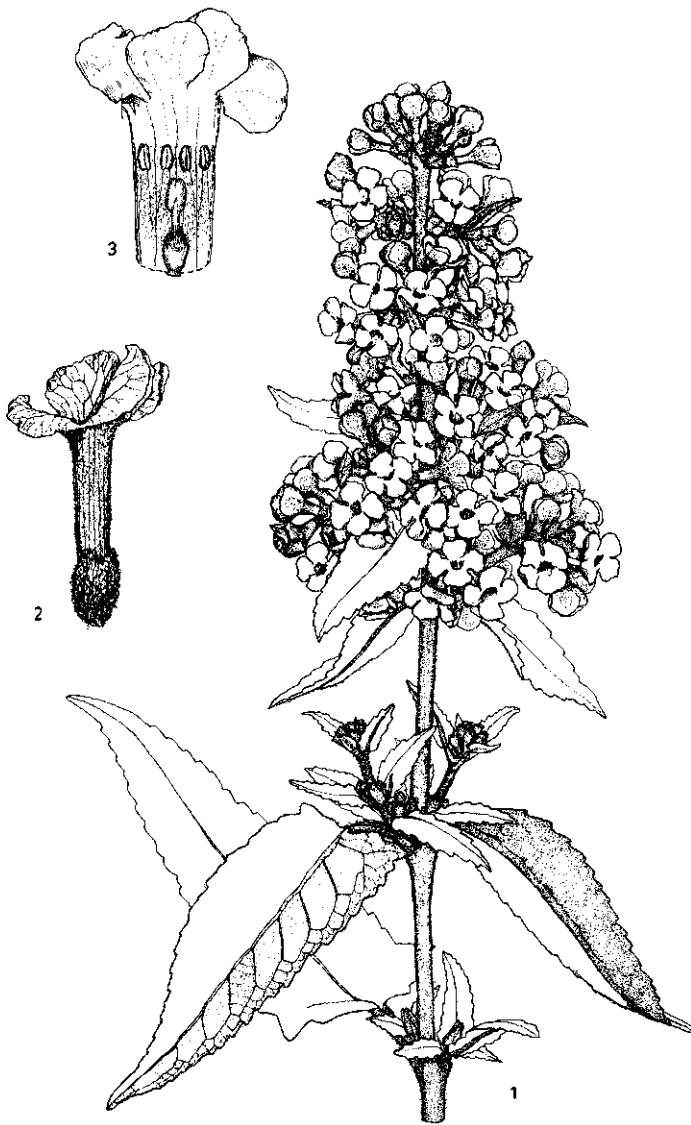
B. caryopteridifolia var. *lanuginosa* Marquand, l.c. p. 201. Type: China: Yünnan: N. of Yungpeh, Forrest 21175 (E, lectotype; isotype: K).

B. tibetica var. *grandiflora* Marquand, Journ. Linn. Soc. Bot. 48: 202. 1929. Type: Tibet: Tsela Dzong, Kingdon Ward 5693 (K, lectotype).

B. tibetica var. *glandulifera* Marquand, Kew Bull. 1930: 206. 1930. Type: China: Yünnan: Chungtien Plateau, Forrest 13871 (K, holotype).

B. sterniana A. D. Cotton, Gard. Chron. Ser. 3. 121: 159, f. 76. 1947, **syn. nov.** Type: Cult. Stern's garden at Highdown Goring-by-Sea, Great Britain, Stern 25 Apr. 1945 (K, lectotype; isotype: WAG).

Shrub, 0.20–3.60 m high. Branchlets subterete to quadrangular, densely stellate-tomentose. Leaves opposite, very variable in shape and size, petiolate, sessile, or on some vigorous shoots connate-perfoliate, densely tomentose on both sides, often glabrescent, especially above; petiole often winged, up to 30 mm long, sometimes with suborbicular stipules 1–1.5 cm in diam.; blade ovate, triangular, or narrowly so, 1.2–3 × as long as wide, 1–1.5 × 0.8–8 cm, acuminate, acute, or obtuse at the apex, cuneate to cordate at the base or even



JW

FIG. 27. *Buddleja crispata*: 1. flowering branch, $\frac{2}{3} \times$; 2. flower, $3 \times$; 3. opened corolla with pistil, $3 \times$ (Flore des Serres 9: pl. 958. 1854, Forrest 16557, and Boom 10681, cult. (L)).

decurrent into the petiole or leaf base, crenate, serrate, dentate, or shallowly lobed and then basal lobes often larger; venation reticulate. *Inflorescence* terminal, often on short lateral branches and then seemingly axillary, paniculate to interrupted-spicate, very variable in shape and size, lax or congested, 1–20 × 1–15 cm. *Flowers* sweet-scented. *Calyx* campanulate, 3–5(–9) mm long, outside densely stellate-tomentose and often also with some glandular hairs, inside glabrous or with some glandular hairs; tube 1.2–3.5 × as long as the lobes; lobes triangular, longer than wide to wider than long, 0.8–1.7 × 0.8–1.5 mm, acute or obtuse, entire (occasionally with some teeth). *Corolla* lilac, violet, or purple, with an orange throat, often greyish-hairy outside, with erect lobes 2.2–4 × as long as the calyx, 7–16 mm long, outside with several or many glandular hairs and often densely or sparsely stellate-tomentose, or entirely glabrous, inside with a pilose zone from the level of the apex of the ovary to that of the insertion of the stamens or less often to the throat (in which cases the stamens may be surrounded by this indumentum), and often with several glandular hairs on the lobes; tube cylindrical or nearly so, 1.4–3.1 × as long as the calyx, 2.8–6.3 × as long as the lobes, 5.8–12 × 1–2 mm; lobes suborbicular, 1.2–4 × 1.2–4 mm, crenate or subentire, spreading. *Stamens* included, inserted (1–)2–5.5 mm below the corolla mouth, or, in other words, mostly slightly above the middle of the tube; anthers sessile, 1–1.7 × 0.3–0.8 mm, rounded or nearly so at the apex, deeply cordate at the base. *Pistil* 3–5 mm long; ovary ovoid, laterally compressed, 1.2–2 × 0.9–1.4 × 0.6–1.1 mm, stellate-tomentose, glabrous at the extreme base, rather abruptly narrowed into the style; style included, short, glabrous, stellate-tomentose at the base, or sometimes with glandular hairs; stigma large, clavate, 1–2 × 0.3–0.8 mm. In each cell one axile placenta bearing about 100 ovules on the outer side. *Capsule* ellipsoid, 5–6 × 2–3 × 2–3 mm, stellate-tomentose; valves torn at the apex. *Seed* obliquely ellipsoid or polyhedral, reticulate, about 0.5–0.7 × 0.2–0.4 × 0.2–0.3 mm, unwinged.

Distribution: Afghanistan, Pakistan, Nepal, northern India, Bhutan and China (Tibet, Yunnan, Sikang, Kansu).

Ecology: Dry slopes with boulders, exposed cliffs, thickets; alt. 1500–4000 m.

Specimens examined (a selection):

- Aitchinson, J. E. T., 189 (BM, K, LE).
Biskam 2286 (E); Brito, B. F., 75 (FHO); Burt, B. L., 776 (E).
Cavalerie, J., 8265 (K, WAG); Cooper, R. E., 3596 (BM), 3825 (BM).
Delavay, J. M., 1543 (K, P, WAG), 27 Mar. 1887 (P, WAG, type of *B. truncata*), 29 Apr. 1884, Moto-Yun (P); Dobremez, J. F., 707 (BM, G), 2109 (BM); Drummond, J. R., 2801 (K), 2802 (BM, K), 21973 (K); Ducloux 1614 (E), 6133 (P), 6675 (P), 6676 (P); Duthie, J. F., 68 (K), 69 (LE), 188 (LE), 1814 (W), 14921 (K), 15686 (K), 18920 (W), 19942 (K), 20591 (K), 21959 (FHO).
Edinburgh (cult.) C 304 (BM, K), C 507 (E), C 508 (BM, WAG), C 1176 (E).
Farrer & Purdom 44 (E, type of *B. farreri*); Feng, K. M., 3195A (A); Forrest, G., 593 (E, K, P, type of *B. agathosma*), 10362 (BM, E), 10520 (BM, E), 11016 (E, type of *B. caryopteridifolia*),

11528 (A, BM, K), 12578 (BM, E), 12788 (BM, E), 12852 (E), 13409 (E), 13871 (E, P, type of *B. tibetica* var. *glandulifera*), 14080 (K, P), 15311 (E, K), 15317 (K, W), 16258 (K, P, W), 16639 (E, P); 16557 (E, K), 17139 (A, K), 17161 (E, K), 18687 (E, K, P), 18720 (E, K, P), 19659 (A, K), 19665 (E, K, P, W), 20143 (A, K, type of *B. agathosma* var. *glandulifera*), 20543 (E, K, P), 20767 (E, K, P), 21175 (E, lectotype of *B. caryopteridifolia* var. *lanuginosa*), 21188 (BM, K), 21273 (A, BM, K), 21280 (E, K, W), 23077 (K), 23238 (E, K, P, W), 27918 (BM, E), 29081 (BM, E).

Gamble, J. S., 4145A (K), 4145C (K), 26525 (K); Griffith, W., 613 (K), 2445 (BM), 2446 (BM), 3744 (GH, GOET, K, LE, M, P, U, W, WAG); Gubanov, I., c.s. 874 (LE).

Hanbury-Tracy 77 (BM), 87 (BM); Handel-Mazzetti, H., 203 (W), 3405 (E, K, W), 4389 (K, W), 5684 (W), 7585 (A, W), 8786 (K, W), 8791 (E, LE, W); Hara, H., c.s. 2708 (TI), 4666 (TI).

Keshava Nand 42 (E, FHO); Kingdon Ward, F., 304 (E, type of *B. eremophila*), 313 (E), 345 (E, type of *B. incompta* W. W. Smith = *B. acosma*), 5635 (K), 5693 (K, lectotype of *B. tibetica* var. *grandiflora*); Kishen-Singh 71 (NY); Kitamura, S., 29 May 1955 (TNS); Koelz, W. N., 8217 (NY).

Lace, J. H., 693 (FHO), 1324 (E); Lamond, J., 715 (E), 1238 (E), 1392 (E), 1754 (E); Leeuwenberg, A. J. M., (cult.), 3386 (WAG), 3388 (WAG), 3470 (WAG), 11355 (WAG); Legendre 531 (P); Ludlow, F., c.s. 1338 (BM), 4095 (A, BM), 4653 (BM), 8587 (BM), 9480 (BM), 12335 (BM), 12401 (BM), 13511 (BM), 16039 (BM, E).

Moore, R. J., 55-161-1 (cult.) (K).

Podlech, D., 16786 (M), 17518 (M), 18618 (M), 20311 (M), 22410 (M); Polunin, O., c.s. 811 (A, BM), 956 (A, BM), 1650 (BM), 2155 (BM), 3899 (BM).

Rechinger, K. H., 27736 (M), 28415 (M), 29369 (M), 29455 (B, K, M), 35473 (B, E, K, M); Rich., H. H., 128 (K); Richardson, H. E., 6 (BM); Rock, J. F., 5050 (A); Rodin, R. J. 5548 (K).

Salim 26 (K); Satapau, H., 6725 (K); Schlagintweit 5028 (BM, LE, P, type of *B. crispa* var. *decipiens*); Schneider, C., 130 (G, K), 1736 (E, K); Sharmā, S. P., 103 (K); Siddiqui, M. A., 27110 (BM); Soulié, J. A., 734 (P); Stainton, J. D. A., 4214 (BM), 6182 (BM), 7502 (BM); id. c.s. 906 (BM), 4785 (BM), 5559 (BM); Stern (cult.) 25 Apr. 1945 (K, WAG, lectotype of *B. sterniana*), 14 Oct. 1944 (K, WAG, paratype of *B. sterniana*); Steward, R. R., 1867 (K), 27432 (BM), 28336 (E); Stocks, J. E., 867 (K); Strachey, R. & J. E. Winterbottom 1 (BM, K, LE).

Thesiger, W., 1695 (BM); Tsiang, Y. & H. Wang 16433 (A).

Vickery, A. R., 417 (BM), 827 (BM); Volk, O. H., 71/339 (M).

Wallich, N., 6404a (BM, CGE, K, K-WALL, LE, M, OXF, P, W, type), 6404b (CGE, K-WALL); Walton, H. J., July-Sept. 1904 (BM, K, type of *B. hastata*); Wang, C. W., 63035 (A), 66202 (A), 70270 (A); Watt, G., 678 (E), 12894 (E); White, J. C., 72 (K, type of *B. tibetica* and *B. whitei*); Wilson, E. H. (Veitch Exp.) 4122 (BM, K), 4122a (K), 4123 (K).

Yü, T. T., 5945 (A), 8174 (A), 13315 (A).

Notes. As to shape and size of the leaves and inflorescences *Buddleja crispa* is one of the most variable species of the genus. The flowers, however, are not more variable than in various other species, e.g., in *B. davidii*. The leaves are mostly more or less triangular and often shallowly lobed, but they may be serrate or dentate. Furthermore they vary very much in size. These characters depend on the place they occupy on the plant and on its habitat. Large leaves are found on flowering branches of plants growing in rather warm or more or less sheltered places, but as well in vigorous shoots of specimens from more or less exposed sites. The inflorescence varies very much in shape and size. It is usually lax and appears after the leaves or is produced by plants which are not deciduous and inhabit more or less sheltered or warmer places. It is more congested when the plants are more exposed and may appear before or with the leaves higher up in the mountains. In the latter habitat the shrubs are deciduous in autumn.

Due to this large variation the species has many synonyms, as can be gleaned from MARQUAND's publication (1930) and the list at the beginning of the paragraph on the species in the present paper. MARQUAND paid attention to the sequence of flowering and leaf bearing of specimens, the arrangement of the inflorescences, the indumentum of the outer side of the corolla and that of the branchlets. On the basis of these characters he distinguished several species and varieties which are reduced to synonyms here. The following remarks may show why the author arrived at this conclusion. The corolla tube is densely glandular and not tomentose in *B. tibetica* var. *glandulifera*, *B. acosma*, and *B. agathosma* var. *glandulifera*. The types of *B. caryopteridifolia*, *B. caryopteridifolia* var. *lanuginosa*, *B. crispa*, *B. eremophila*, *B. sterniana*, and *B. truncatifolia*, however, have densely stellate-tomentose corollas with some glandular hairs. Finally the types of *B. hastata* and *B. tibetica* have only some glandular hairs on the outer side of the corolla. This indicates how great the variation is in number of both glandular and stellate hairs.

The inflorescence is often interrupted, as in, e.g., the types of *B. agathosma*, *B. crispa*, or it may be continuous, e.g., in the type of *B. agathosma* var. *lanuginosa*.

The type of *B. hastata* has dense clusters of flowers, while the inflorescences of that of *B. tibetica* are rather loose. In this respect Dobremez 707, Stainton c.s. 906, and Ludlow c.s. 4095 constitute a series of intermediates. Intermediates also exist between the types of *B. caryopteridifolia* and *B. crispa* as to the shape of the inflorescence, e.g. the type of *B. caryopteridifolia* var. *lanuginosa*.

The branchlets are subquadrangular, e.g. in the types of *B. crispa*, *B. tibetica*, or subterete, e.g., in the types of *B. crispa*, *B. farreri*, and *B. tibetica* var. *glandulifera*.

Although several names are reduced to synonyms here on the above mentioned grounds, the following questions remain:

In the Kew Gardens two specimens are grown side by side, which are greatly different in habit and flowering season. One is a small shrub, attached to the wall which is flowering in July at the apices of leaf bearing branchlets. The other is an about 70 years old tree, a seedling of the type of *B. farreri* which is flowering twice a year, the first time in spring before the leaves appear and the second time in the late summer on leaf-bearing branchlets. The strong difference in flowering seasons of both specimens had been observed for many years by the gardener BRAIN HALLIWELL, who kindly showed the specimens to the present author. The lack of possibilities to distinguish these plants in the herbarium together with the possibility that these two specimens have genetically fixed differences, leaves the question open. Elaborate field studies may solve it. The present author, however, has the impression that the specimens in cultivation belong to a few clones only. It is quite possible, that both specimens have been collected on greatly different altitudes and that in the field forms could be found with intermediate seasonal aspects. The herbarium material gives that impression.

28. *Buddleja curviflora* Hook. et Arn., Bot. Beech. Voy. 267. 1838.

Fig. 28, p. 112

Type: Japan: Luchu Islands, Okinawa, Beechy June 1827 (K, holotype).

Heterotypic synonyms: *B. venenifera* Makino, Bot. Mag. Tokyo 24: 56. 1910, **syn. nov.** Type: Japan: Osumi Province: Yaku-shima Island, T. Makino Sept. 1909 (MAK, holotype; isotype (?): K).

B. formosana Hatusima, Bull. Arts & Sci. Div. Ryukyu Univ. Math. et Nat. Sci. 3: 106. 1959, **syn. nov.** Type: Taiwan (Formosa): Mt. Namako-yama, Taroko, S. Suzuki 2 Nov. 1931 (KAG, holotype).

Shrub 1–1.50 m high. Branchlets terete or occasionally obscurely angular, stellate-tomentose or -pubescent to almost glabrous, rather stout, (1–)2–3 mm thick when dry. *Leaves* opposite, petiolate; petiole 5–20 cm long; blade ovate or less often narrowly ovate, 1.5–3(–4) × as long as wide, 3–16 × 1.5–7 cm, acuminate, acute, or sometimes in some leaves obtuse at the apex, cuneate, rounded or subtruncate at the base, subentire or occasionally some with some obscure teeth, densely stellate-tomentose on both sides, above glabrescent to completely glabrous, beneath less glabrescent to almost glabrous. *Inflorescence* terminal, thyrsoïd, mostly appearing spicate, sometimes interrupted, 5–20 × 2–4 cm, up to 25 cm long when fruiting. *Calyx* campanulate, 2–3.5 mm long, outside densely stellate-tomentose and with some minute glandular hairs, inside with spreading minute glandular hairs; tube 3–4 × as long as the lobes; lobes subequal, triangular, slightly longer than wide to twice as wide as long, 0.5–1 × 0.8–1 mm, acute, entire. *Corolla* purple (testibus Hatusima & Sako 30200), with erect lobes 3.5–11 × as long as the calyx, 11–22 mm long, outside stellate-pubescent and with minute glandular hairs, inside pilose from the level of the apex of the ovary to the mouth or the base of the lobes and often with some glandular hairs on the lobes; tube cylindrical or nearly so, often curved, 3–10 × as long as the calyx, 5–10 × as long as the lobes, abruptly widened from the base of the anthers when dry, (9–)12–20 mm long, below 1.2–1.5 mm and above 1.4–2.2 mm wide and further widened at the throat; lobes suborbicular, equal or 2 slightly smaller than both others, 1.5–2.5 × 1.5–2.5 mm, rounded, crenate or subentire, spreading. *Stamens* included, inserted near the middle of the corolla tube; filaments very short, 0.25–0.5 × as long as the anthers; anthers oblong or nearly so, 1.4–2 × 0.5–0.6 mm, rounded or nearly so at the apex, deeply cordate at the base. *Pistil* 5–7.2 mm long, glabrous; ovary ovoid or nearly so, laterally compressed, 1.8–2.5 × 1.2–1.5 × 0.8–1 mm, 2-celled, rather abruptly narrowed into the rather thick included style; stigma clavate, large, 1.2–2.5 × 0.4–0.8 mm. In each cell one axile placenta with about 80–100 ovules outside. *Capsule* ellipsoid, 5–7 × 3 × 2–3 mm, glabrous or with some minute glandular hairs; valves torn at the apex. *Seeds* obliquely ellipsoid to polyhedral, narrowly winged at 2–4 sides, 1.2–1.5 × 0.4–0.5 × 0.2–0.4 mm, reticulate, acuminate at both ends.

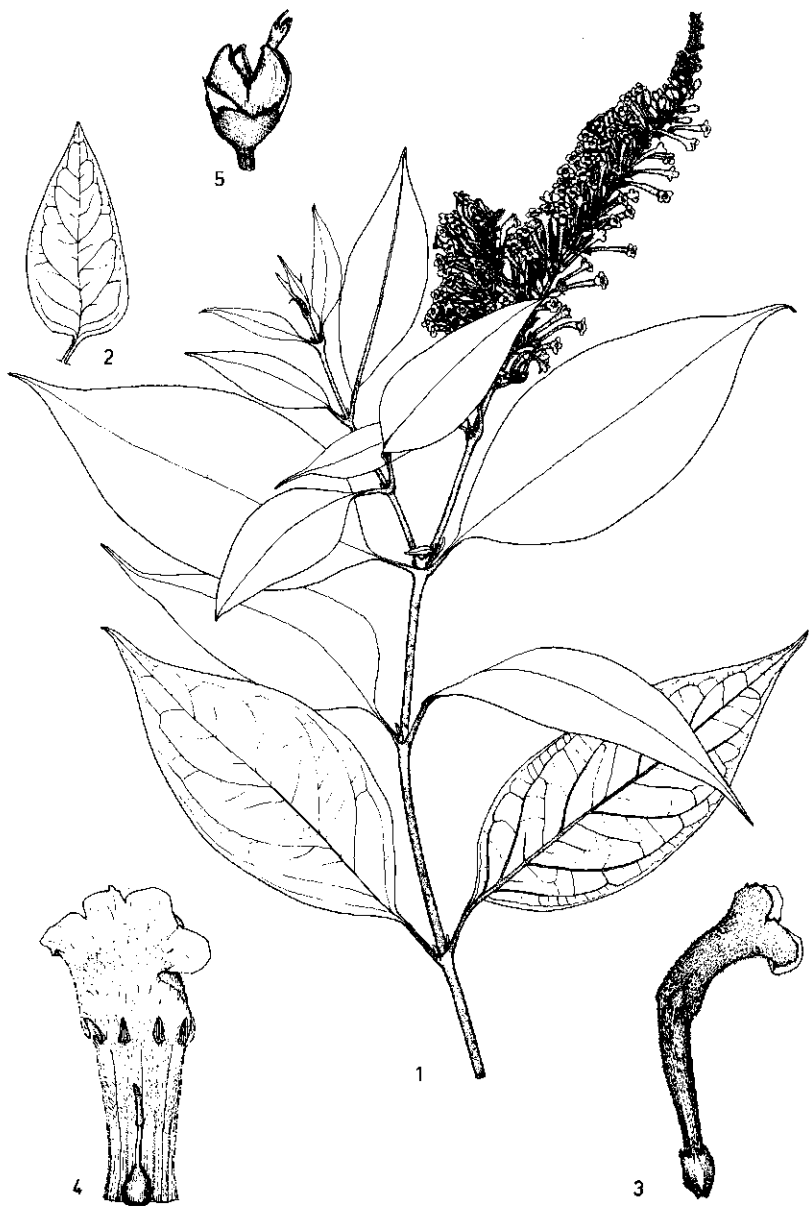


FIG. 28. *Buddleja curviflora*: 1. flowering branch, $\frac{1}{2}\times$; 2. leaf, $\frac{1}{2}\times$; 3. flower, $3\times$; 4. opened corolla, $3\times$; 5. open fruit, $3\times$ (1, 3-4. Walker 8188; 2, 5. Kitamura & Murata 871).

Distribution: Japan, mainly in the south, and Taiwan.
Ecology: Thickets. Alt. 50–300 m.

Some of the specimens examined:

Azuma, M., 3 Apr. 1953 (U), 20 Aug. 1954 (U).

Beechy June 1827 (K, type).

Chuma, C., 4 Mar. 1968 (TI).

Edinburgh (cult.) C 3014 (E).

Faurie, J., 4019 (G, GOET, P, W), 4097 (G, P).

Hashimoto, T., 30 Aug. 1950 (TI); Hatusima, S., c.s. 18119 (KAG, TI), 20911 (KAG), 22187 (MAK); Hatusima, S. & Sako 30200 (TI), 31842 (KAG), 32169 (KAG), 32434 (KAG), Hurusawa, I., 4 Aug. 1946 (TI).

Kanai, H., 19 Oct. 1958 (TI); Kawanabe, K., 4858 (KAG); Kitamura, S. & Murata 871 (K, P, U); Komeda, T., 2597 (A).

Makino 462 (LE); Makino herb. 96455 (MAK, type of *B. venenifera*; the veg. K sheet may be a duplicate of it), 96457 (MAK), 96458 (MAK), 96468 (MAK).

Nagasawa, M., 12 Nov. 1972 (TI); Nakaïke, T., 1040 (K, U); Nakayama, Y., 11–15 Dec. 1971 (KAG); Noguchi, H., Feb. 1959 (KAG).

Okuyama 15986 (TNS).

Sako, S., 1102 (KAG), 6181 (KAG, TI), 7022 (KAG), 7301 (KAG); Suzuki, S., 2 Nov. 1931 (KAG, type of *B. formosana*), 4 Aug. 1961 (TI).

Tagawa, M., 831 (TNS); Tagawa, M. & F. Konta 95 (K, M, MAK, P, U); Tashiro, Z., TNS 65122 (TNS); Togashi, M., 12 Nov. 1962 (LE); Togasi, M., TNS 1453 (B, BM, BR, K, P, TI, W).

Walker, E. H., 8188 (GH); Wilson, E. H., anno 1914 (A); Wright annis 1853–1856 (GH, P). Yano 31 July 1964 (MAK).

Notes. *Buddleja curviflora* was confused with both *B. japonica* and *B. lindleyana*, as the three species are closely related and none of the preceding authors had the opportunity to compare all type specimens of their names and synonyms. The branchlets of *B. lindleyana* are intermediate between those of both other species, but they are more slender, while also its inflorescence is more slender than in both other species and the flowers are outside covered by glandular hairs which are less frequent in both other species. They have there mainly stellate hairs. The most robust species is *B. japonica* with its rather thick clearly winged branchlets and thick congested inflorescences and infructescences. They may be distinguished on the best way as described in no's 7 and 8 of the key.

29. ***Buddleja davidii*** Franch., Pl. David. ex. Sinarum Imp. in Nouv. Arch. Mus. Paris Sér. 2. 10: 103. 1888 (as *Budleia davidi*); White, For. Fl. N. Rhodesia 339. 1962; Leenhouts in Fl. Males. 1. 6: 340. 1963. **Fig. 29, p. 115**

Type: China: E. Tibet, Moupine Province, Rev. Père David Aug. 1869 (P, holotype).

Heterotypic synonyms: *B. variabilis* Hemsl., Journ. Linn. Soc. 26: 120. 1889. Type: China: Hupeh: Ichang, Henry 156 (K, lectotype; isotypes: LE, P).

B. variabilis var. *magnifica* Wilson, Flora and Sylva 3: 340, with fig. on p. 339. 1905. Type: Cult. Great Britain: Coombe Wood, Veitch Nursery, Aug. 1905

(K, holotype). Homotypic synonym: *B. davidii* var. *magnifica* (Wilson) Rehd. et Wilson in Sargent, Pl. Wilson. 1: 567. 1913.

B. variabilis var. *veitchiana* Veitch, Cat. Hardy Trees etc. 38, with fig. 1902; Wilson, Flora and Sylva 3: 340. 1905. Type: Cult. Great Britain: Hort. Veitch, Aug. 1902 (K, holotype).

B. variabilis var. *wilsonii* Wilson, l.c. (Gard. Chron. Ser. 3. 36: 155. 1904, nomen). Type: China: Hupeh: Hsing-shan Hsien, Wilson (Arn. Arb. Exp.) 3348 (A (?), holotype, not seen). Homotypic synonym: *B. davidii* var. *wilsonii* (Wilson) Rehd. et Wilson, l.c. p. 568.

B. variabilis var. *superba* Veitch, Kew Bull. 1909: App. 83. 1909. Type not seen, apparently not preserved. Homotypic synonym: *B. davidii* var. *superba* (Veitch) Rehd. et Wilson, l.c.

B. variabilis var. *prostrata* Schneider, Illustr. Handb. Laubholz. 2: 846. 1912. Type not seen, apparently not preserved.

B. davidii var. *alba* Rehd. et Wilson, l.c. Type: China: Szechwan: Lungan Fu, Wilson (Arn. Arb. Exp.) 4638 (A, holotype; isotype: K).

B. variabilis var. *nanhoensis* Chittenden, Journ. Roy. Hort. Soc. 47: 193. 1922. Type: China: Kansu: Farrer 424 (not seen, not in E, nor in K). Homotypic synonym: *B. davidii* var. *nanhoensis* (Chittenden) Rehd., Man. Cult. Trees & Shrubs 767. 1927.

B. shimidzuana Nakai, Bull. Nat. Sci. Mus. Tokyo 29: 75. 1950, **syn. nov.** Type: Japan: Hondo: Otjigawa R., Otaki-Tjitjibu, Province Musasi, Nakai & Shimidzu TNS 72729 (TNS, holotype).

Shrub 0.50–3 m high, often sarmentose. Branchlets subquadrangular, stellate-tomentose when young, glabrescent. *Leaves* opposite or sometimes subopposite, shortly petiolate; stipules leafy, often only present on main branches, suborbicular or broader than long, 1–6 mm long; petiole stellate-tomentose, 1–5 mm long; blade narrowly ovate or narrowly elliptic, 3–6 × as long as wide, 4–20 × 1–7 cm, sometimes smaller or larger, acuminate at the apex, cuneate at the base, serrate to subentire, above dark green, glabrous or nearly so and with impressed reticulate venation, beneath white-tomentose (mostly drying brownish) with stellate hairs. *Inflorescence* terminal, sometimes also lateral, thyrsoïd, long and rather narrow, 10–30 × 3–5 cm, rarely smaller, composed of mostly short-stalked, lax, many-flowered cymes. Lower bracts leafy; the others small, linear. Peduncle, branches, and pedicels stellate-pubescent. Flowers all shortly pedicellate or some sessile. *Calyx* often subtended by 1 or 2 linear bracteoles, which are 1–2 mm long, slender-campanulate, 2–3.5 × 1–1.5 mm, outside stellate-pubescent to glabrous, inside with minute glandular hairs; tube (1.5–)2–5 × as long as the lobes; lobes subequal, mostly narrowly triangular, 0.5–2 × 0.5–0.8 mm, acute or acuminate, entire. *Corolla* violet or lilac (white not seen in specimens collected in the wild), orange-yellow in the throat, with erect lobes 3–5 × as long as the calyx, 7.5–14 mm



FIG. 29. 1-7. *Buddleja davidii*: 1. flowering branch, $\frac{1}{2} \times$; 2. leaf, $\frac{1}{2} \times$; 3. flower, $4\frac{1}{2} \times$; 4. opened corolla, $4\frac{1}{2} \times$; 5. pistil, $4\frac{1}{2} \times$; 6. fruit, $4\frac{1}{2} \times$; 7. seed, $6 \times$; 8-11. *B. myriantha*: 8. flowering branch, $\frac{1}{2} \times$; 9. flower, $4\frac{1}{2} \times$; 10. opened corolla, $4\frac{1}{2} \times$; 11. pistil, $4\frac{1}{2} \times$ (1, 3-6. Rev. Père David anno 1869, holotype; 2. Henry 7008; 7. Fang 5838; 8. Maire Sept. 1910 (P); 9-11. Ducloux 7381).

long, outside glabrous or stellate-pubescent and/or with minute glandular hairs, inside with a pilose ring from the level of the base of the stigma to 0–2 mm below the mouth or approximately so; tube nearly cylindrical, 2–4 × as long as the calyx, 3–5.5 × as long as the lobes, 6–11.5 mm long, below the throat 0.9–1.5 mm wide and from there rather abruptly widened; lobes orbicular or slightly longer than wide, 1–3 × 1–3 mm, rounded, entire to crenate, spreading. *Stamens* included; filaments very short, 0.1–0.5 × as long as the anthers, mostly inserted in the middle of the corolla tube; anthers oblong or nearly so, 0.8–1.2 × 0.2–0.6 mm, deeply cordate at the base, retuse to apiculate at the apex, glabrous; cells parallel. *Pistil* 3–4.2 mm long; ovary oblong or nearly so, laterally compressed, 1.2–2 × 0.8–1.1 × 0.6–0.9 mm, glabrous, minutely pubescent, or sometimes with glandular hairs, abruptly narrowed into the style, 2-celled; style about as long as the stigma, glabrous; stigma large, clavate, 0.6–1.4 × 0.2–0.4 mm. In each cell one axile oblong placenta with 20–50 ovules attached to the apex of the septum. *Capsule* narrowly ellipsoid or narrowly ovoid, (3–)5–9 × 1.2–2 mm, acute at the apex, narrowed towards the base, mostly 3–4 × as long as the calyx, with an impressed line along the line of dehiscence, sparsely stellate-pubescent to glabrous; valves torn at the apex, subacute. *Seed* medium brown, thread-like, 2–4 × 0.4–0.5 × 0.2–0.4 mm, in centre slightly thickened, minutely reticulate, long-winged at both ends; grain itself 0.5–0.6 × 0.3–0.4 × 0.2–0.4 mm.

Distribution: Indigenous in China (Tibet, Yunnan, Hunan, Szechwan, Kweichow, Kansu, Kiangsu, Kwangsi, Hupeh) and Japan, but cultivated and often naturalized all over the world.

Ecology: In mountains in thickets. Alt. 600–3000 m. In Africa cultivated in gardens in the mountains and sometimes naturalized.

Specimens examined (Africa all; others most; cult. outside Africa mostly not cited):
Africa: All cult.

Morocco: Casablanca, Vanderyst 13480 (BR).

Nigeria: Obudu, Ogoja Province, Adebusuji FHI 58704 (FHI); Naraguta, Plateau Province, J. K. Jackson 5370 (FHI).

Cameroun: Victoria Bot. Garden, Ogu 228 (FHI); Nkambe, Satabié 51 (P, WAG); Nkong-samba, Leeuwenberg 9868 (WAG, YA); 8 km N. of Foubot, Leeuwenberg 10193 (WAG, YA); Nkolbisson, W. of Yaoundé, Dang 287 (P).

Ethiopia: Wellega: Ghimbi, Milchersich 126 (FI).

Angola: Benguela, Bie, Silva Porto, Cardoso s.n. (LISJC).

Rwanda: Butare Territory, naturalized, Reckman 4656 (GENT).

Kenya: Mt. Kenya, Fries 512 (UPS); near Kikuyu, Kiambu District, Kokwaro & Kabuye 354 (EA, K); Nairobi, Starzenski EAH 10256 (EA).

Tanzania: Lushoto, Semsei 4179 (BR, EA, K); *ibid.*, Shabani 521 (EA, K); Kungului, Lushoto District, Mgaza 354 (EA, K); Amani, Braun 933 (EA, PRE).

Zambia: Kawambwa, W. Province, White 3641 (FHO, K); Fort Jameson, E. Province, White 2454 (FHO, K).

Rhodesia: Ruwa, Goromonzi District, Biegel 4422 (PRE).

South Africa: Transvaal: Pretoria, Codd 8950 (PRE), 8951 (PRE); *ibid.*, Copeman 66

(PRE), 67 (PRE); Repton 1501 (PRE); Witpoortje, Moss 4679 (J). Cape Province: East London, Anonym. Jan. 1925 (PRE); Kirstenbosch, Commi de Courcy NBG 1132/34, Henderson 1331 (NBG).

Mauritius: Royal Bot. Garden, Guého MAU 15238 (MAU).

Asia:

Bodnier, E., 1688 (E), July 1899 (E).

Cavalerie, J., 674 (K), 4139 (P), 4355 (K), 4523 (K, P), 7492, p.p. (K); Cheng, W. C., 2923 (BM, P); Chiao, C. Y., 1632 (A), 12917 (K), 12960 (E, K, LE); Chiao, C. Y. & C. S. Fan 252 (A), 392 (A), 725 (A); Chow, H. C. 877 (E), 8163 (A); Chu, K. L., 3118 (BM, E, W), 3643 (BM, K, P), 4098 (BM, W), 4118 (BM, W); Chung, Z. S., 83401 (A), 83585 (A); Cunningham, R., 88 (E), 480 (E).

David, A., Aug. 1869 (P, type); Delavay, J. M., 5052 (G, P, WAG); Ducloux 456 (E), 2056 (A, P), 2971 (BM, P), 4279 (E, P), 4380 (P).

Esquirol 5021 (P).

Faber, E., 604 (K), 606 (K), 4166A (W); Fan, C. S. & Y. Y. Li 623 (BM, LE, P, W); Fang, W. P., 1277 (A), 1960 (E, K, P), 2824 (E, K, P), 3092 (E, P), 3494 (E, K, P), 3701 (P), 4192 (E, K, P), 5838 (K, P), 6095 (K), 6586 (K), 12660 (BM), 12661 (W), 12771 (BM, US, W), 12901 (BM, W); Farges 43, p.p. (P); Feng, K. M., 2078 (A), 2839 (A).

Handel-Mazzetti, H., 12266 (E, W), 12582 (A, W); Hara, H., 23 Sept. 1955 (TI); Henry, A., 156 (K, LE, P, lectotype of *B. variabilis*), 1069 (K, LE, W, paratype of *B. variabilis*), 2060 (K, paratype of *B.v.*), 2351 (K, LE, P, paratype of *B.v.*), 2668 (K, paratype of *B.v.*), 3110A (K, P, paratype of *B.v.*); 3110B (E, K), 3285 (E, GH, K, P), 4166 (LE), 4166A (BM, K, P), 7008 (BM, E, K, P), 7281 (LE); Hisauchi, K. (cult.) TNS 1769 (A, BM, BR, K, LE, MAK, P, W, distributed as *B. shimidzuana*); Hopkingson 519 (P), 549 (P).

Ito, H., 1 Sept. 1951 (TI).

Lee, T. C., 2995 (US); Legendre 439 (P); Licent, E., 5008 (BM, K, P).

McLaren, H. D., 150 (E), C231 (E), U212 (E); Muroi, H., 1294 (A); Mussot 268 (P).

Nakai, T. & D. Shimidzu TNS 72729 (TNS, type of *B. shimidzuana*).

Pei, C., 10092 (K), 10152 (K), 10194 (K); Peng, T. C., 65 (A); Potanin, G. N., 12 July 1885 (LE), 20 July 1885 (LE), 15 Aug. 1885 (LE), 13 July 1893 (K, P), 22 July 1893 (LE), 1 Aug. 1893 (K, LE), 7 Aug. 1893 (K, LE, P), 24 Aug. 1893 (LE), 27 Aug. 1893 (K, P), 2 Sept. 1893 (LE), 25 Sept. 1893 (LE, P).

Rock, J. F., 24271 (BM, E, K).

Schoch, O., 426 (A); Smith, H., 4600 (A); Soulié, J.-A., 778 (K, P, WAG), 919 (E, K, P), 2204 (P); Steward, A. N., c.s. 36 (BM, E, FHO, K, L, LE, P, W); Sun, C. L., 1338 (US); Sun, S. C. & K. Chang 435 (A), 893 (A), 1367 (A).

Tai, L. Y., 156 (A), 1069 (A); Tsang, W. T., 28364 (A).

Wang, F. T., 23248 (LE, P); Weigold, H., 20–25 Aug. 1914 (W); Wen-Kuang Hu 8434 (US), 8739 (US); Wilson, E. H. (Arn. Arb. Exp.) 613 (A, BM, E, K, paratype of *B. davidii* var. *magnifica*), paratype of *B. davidii* var. *superba*), 613A (BM, K, US, W), 3346 (BM, E, K, LE, W), 3347 (K), 3349 (A, K), 3350 (K), 4638 (K, type of *B. davidii* var. *alba*), (Veitch Exp.) 1249 (A, E, K, LE, NY, P, W, WAG), 1347 (E, K, LE, P, W, WAG), 1347a (K, W), 1569 (K, W), 1738 (K, W), 4120 (A, BM, K, P), 5038 (A, BM), 5039 (K).

Yamamoto, T., TNS 39499 (TNS); Yin, K. N., 35 (A, US); Yü, T. T., 14125 (A); Yu-shih Liu 1102 (A), 1314 (A), 1439 (A).

Notes. The description is based on material collected in the wild. *Buddleja davidii* is closely allied to *B. albiflora* (q.v.) and *B. myriantha*. Some cultivars and forms described as varieties are listed below:

‘African Queen’

Netherlands: Wageningen, Leeuwenberg 10750 (WAG).

'Black Knight'
 Netherlands: Dedemsvaart, Boom 37778 (L); Wageningen, Leeuwenberg 10743 (WAG).
 'Cardinal'
 Wageningen, Leeuwenberg 10751 (WAG).
 'Empire Blue'
 Dedemsvaart, Boom 20395 (L), 37777 (L); Wageningen, Leeuwenberg 10745 (WAG), 10756 (WAG).
 'Fascination'
 Dedemsvaart, Boom 20393 (L).
 'Flaming Violet'
 Dedemsvaart, Boom 20395 (L).
 'Fortune'
 Wageningen, Leeuwenberg 10754 (WAG).
 'Ile de France'
 Dedemsvaart, Boom 20396 (L); Wageningen, Leeuwenberg 10746 (WAG).
 'var. *magnifica*'
 Great Britain: Kew, Leeuwenberg 3392 (WAG).
 'var. *nanhoensis*'
 Great Britain: Edinburgh, C 5 (BM, K, LE, WAG); Kew, Leeuwenberg 3409 (WAG); Netherlands: Leersum, Boom 37760 (L), 37762 (L); Wageningen, Boom 2973 (L).
 'Orchid Beauty'
 Netherlands: Utrecht, Mennega 7471 (U, WAG).
 'Peace'
 Edinburgh, C 1658 (WAG).
 'Purple Prince'
 Wageningen, Leeuwenberg 10752 (WAG).
 'Royal Red'
 Edinburgh, C 510 (BM, CGG, WAG); Wageningen, Leeuwenberg 10748 (WAG), 10753 (WAG).
 'var. *superba*'
 Edinburgh, C 6 (BM, K, WAG, raised from seeds of herb. Wilson 613).
 'var. *veitchiana*'
 Edinburgh, C 15 (LE); Wageningen, Boom 5976 (L).
 'White Bouquet'
 Dedemsvaart, Boom 20394 (L).
 'White Cloud'
 Dedemsvaart, Boom 15811 (L).
 'White Profusion'
 Utrecht, Mennega 6072 (U, WAG); Wageningen, Leeuwenberg 10744 (WAG).

30. **Buddleja delavayi** Gagnep., Not. Syst. 2: 190, 193. 1912. Fig. 30, p. 120

Type: China: Yünnan: near Tang fang of Pectsaoto, in the Santchang Kiou Gorge, Delavay 3939 (P, lectotype; isotype: K).

Heterotypic synonyms: *B. heliophila* W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 8: 126. 1913, **syn. nov.** Type: China: Yünnan: E. flank of Tali Range, Forrest 6796 (E, holotype; isotype: K).

B. glabrescens W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 85. 1916. Type: China: Yünnan: N. end of Chien-Chuan Valley, Forrest 12433 (E, lectotype).

B. heliophila var. *angustifolia* Marquand, Kew Bull. 1930: 202. 1930, **syn. nov.** Type: China: Yünnan: Shweli-Salwin divide, Forrest 24069 (K, holotype; isotypes: BM, E).

B. heliophila var. *pubescens* Marquand, l.c., **syn. nov.** Type: China: Yünnan: between Taipingpu and Yangpi, Forrest 21121 (K, lectotype; isotypes: A, E).

B. delavayi var. *tomentosa* Comber, Notes Roy. Bot. Gard. Edinburgh 18: 230. 1934, **syn. nov.** Type: China: Yünnan: Shweli-Salwin divide, Forrest 15664 (E, holotype; isotypes: BM, K).

B. heliophila var. *adenophora* Hand.-Mazz., Symb. Sin. 7: 948. 1936, **syn. nov.** Type: China: Yünnan: Djischan, NE. of Dali (Talifu), Handel-Mazzetti 6386 (W, holotype).

Shrub 1–2 m high. Branchlets subterete, glabrous or stellate-tomentose and soon glabrescent. Leaves opposite, sessile or shortly petiolate, very variable in size; petiole up to 4 mm long; blade elliptic or narrowly so, 2–4 × as long as wide, 4–16 × 1.5–6.5 cm, acuminate at the apex, cuneate or decurrent at the base, repand-dentate to entire, stellate-tomentose to almost glabrous on both sides, often with some glandular hairs above; venation rather conspicuous. *Inflorescence* terminal, paniculate, rather lax, 4–12 × 3–7 cm. *Flowers* fragrant, almost all pedicellate. *Calyx* campanulate, 2.5–5 mm long, outside glabrous or more or less densely stellate-tomentose and often with some glandular hairs, inside with a few scattered minute glandular hairs; tube 2–3 × as long as the lobes, often torn at one side; lobes subequal, triangular, as long as wide or slightly longer, 0.5–1.5 × 0.5–1.2 mm, acute or acuminate, entire. *Corolla* rose-pink or lavender, often (?) turning more bluish at anthesis, often (?) with a rose-orange throat, with erect lobes 3.5–5 × as long as the calyx, 13–16 mm long, outside sparsely to densely stellate-tomentose and often with glandular hairs, often glabrous just above the calyx, inside with a pilose zone from the level of the base of the stigma to the mouth or the base of the lobes and often with some glandular hairs on the lobes; tube cylindrical or nearly so, 2–4 × as long as the calyx, 2.5–4.5 × as long as the lobes, 10–13.5 × 1.5–2 mm; lobes suborbicular, 2.5–4.5 × 2–4 mm, subentire, spreading. *Stamens* included, inserted 3.5–5 mm below the corolla mouth; anthers sessile or subsessile, 1.5–2 × 0.4–0.7 mm, rounded or nearly so at the apex, deeply cordate at the base; cells parallel. *Pistil* 4.5–5 mm long; ovary ovoid or nearly

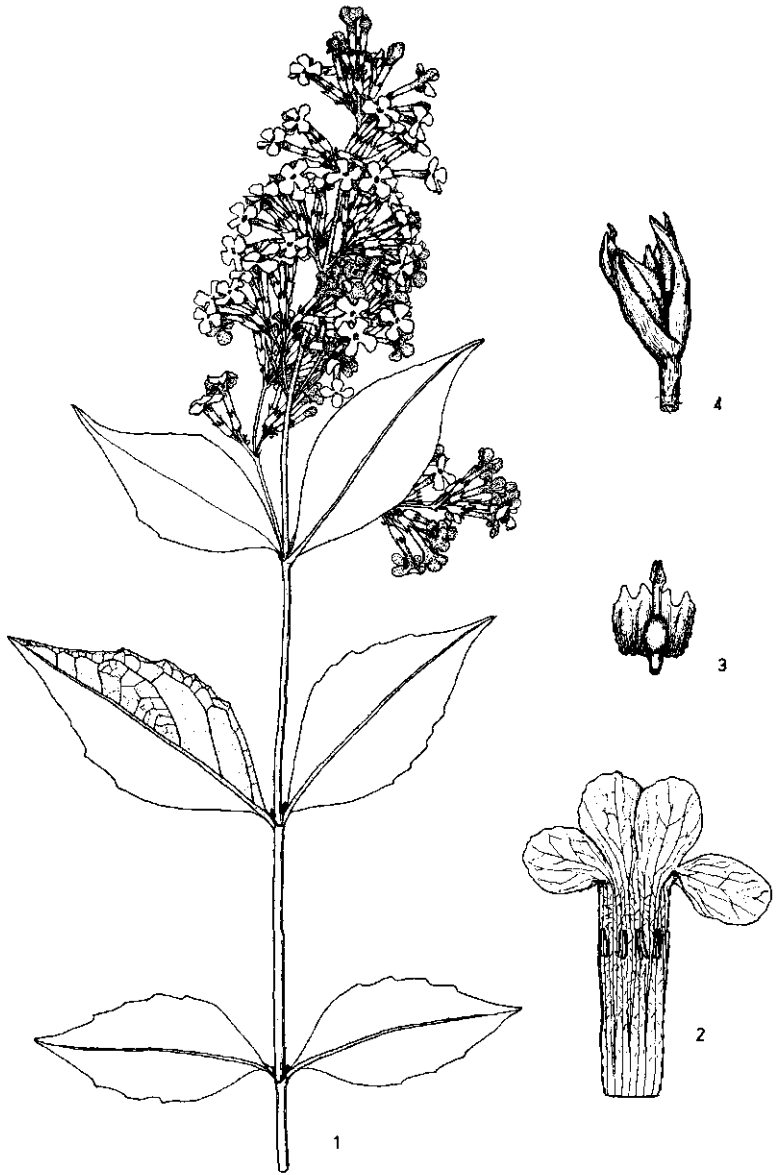


FIG. 30. *Buddleja delavayi*: 1. flowering branch, $\frac{1}{4} \times$; 2. opened corolla, $3 \times$; 3. opened calyx with pistil, $3 \times$; 4. open fruit, $6 \times$ (1. Forrest 12753; 2-4. Forrest 12433).

so, laterally compressed, 1.5–2 × 1.1–1.4 × 0.8–1 mm, glabrous or stellate-tomentose and then only at the extreme base glabrous, 2-celled, abruptly narrowed into the short glabrous included style; stigma large, clavate, 1.5–2 × 0.4–0.9 mm. In each cell one axile placenta with about 20–50 ovules outside. *Capsule* ellipsoid, 4–7 × 2–4 × 2–3 mm, glabrous or partly stellate-tomentose; valves torn at the apex. *Seeds* narrowly elliptic, about 2 × 0.5 × 0.3 mm, acuminate at both ends, winged all around, reticulate; grain itself ellipsoid.

Distribution: China (Yunnan).

Ecology: Thickets in valleys in the mountains. Alt. 2000–3000 m.

Most of the specimens examined:

Delavay, J. M., 790 (P, WAG, t), 3891 (P, WAG, g, paratype), 3939 (K, P, g, lectotype); Edinburgh (cult.) C 1270 (E, g); Forrest, G., 6796 (E, K, t, type of *B. heliophila*), 9984 (BM, K, t), 9988 (BM, K, t), 11241 (E, t), 12433 (E, lectotype of *B. glabrescens*), 12753 (E, paratype of *B. glabrescens*), 15622 (K, P, t), 15664 (BM, E, K, type of *B. delavayi* var. *tomentosa*), 18199 (E, K, t, paratype of *B. delavayi* var. *tomentosa*), 19357 (E, K, P, W, t, paratype of *B. heliophila* var. *pubescens*), 21121 (A, E, K, t, lectotype of *B. heliophila* var. *pubescens*), 24069 (BM, E, K, g, erroneously cited as t by MARQUAND, type of *B. heliophila* var. *angustifolia*); Handel-Mazzetti, H., 6386 (W, t, type of *B. heliophila* var. *adenophora*), 7476 (W, t); Maire, E. E., 542 (A, K, W, t); McLaren, H. D., A64 (BM, E, t), C73 (BM), C83 (A, BM, E, t), C84 (BM, E, K, t), L75A (BM, K), L89A (BM, K); Rock, J. F., 8605 (A, US, g); Tsai, H. T., 57150 (A, g).

Notes. Some specimens have glabrous, others stellate-tomentose ovaries. The first ones may have glabrous or hairy calyces like the latter, while also the leaves and the corollas vary independently. As in most species, the indumentum of the ovary is rather constant or absent. In this special case a letter 'g' indicates specimens with glabrous ovaries, a letter 't' those with tomentose ones. Comparative studies of all specimens cited above showed that they all belong to a single species.

31. *Buddleja fallowiana* Balf. f. et W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 15. 1917. **Fig. 31, p. 122; Phot. 10, p. 123**

Type: China: Yunnan: north end of Lichiang plain, Forrest 6047 (E, lectotype; isotypes: BM, K, P, W).

Heterotypic synonym: *B. fallowiana* var. *alba* Sabourin, Rev. Hort. 97: 418, f. 167. 1929. **Type:** icon. cit., no specimen preserved.

Shrub 1–5 m high. Branchlets terete, densely stellate-tomentose. Stipules present or not. *Leaves* opposite, subsessile or shortly petiolate; petiole up to 6 mm long; blade ovate to narrowly elliptic, 2–4 × as long as wide, 4–13 × 1–6.5 cm, acuminate, acute, or in some leaves obtuse at the apex, cuneate or decurrent at the base, crenate-serrate, densely stellate-tomentose on both sides, glabrescent above; venation not conspicuous. *Inflorescence* terminal, thyrsoid, 5–15 × 2–3 cm, appearing spicate, sometimes interrupted. *Flowers*

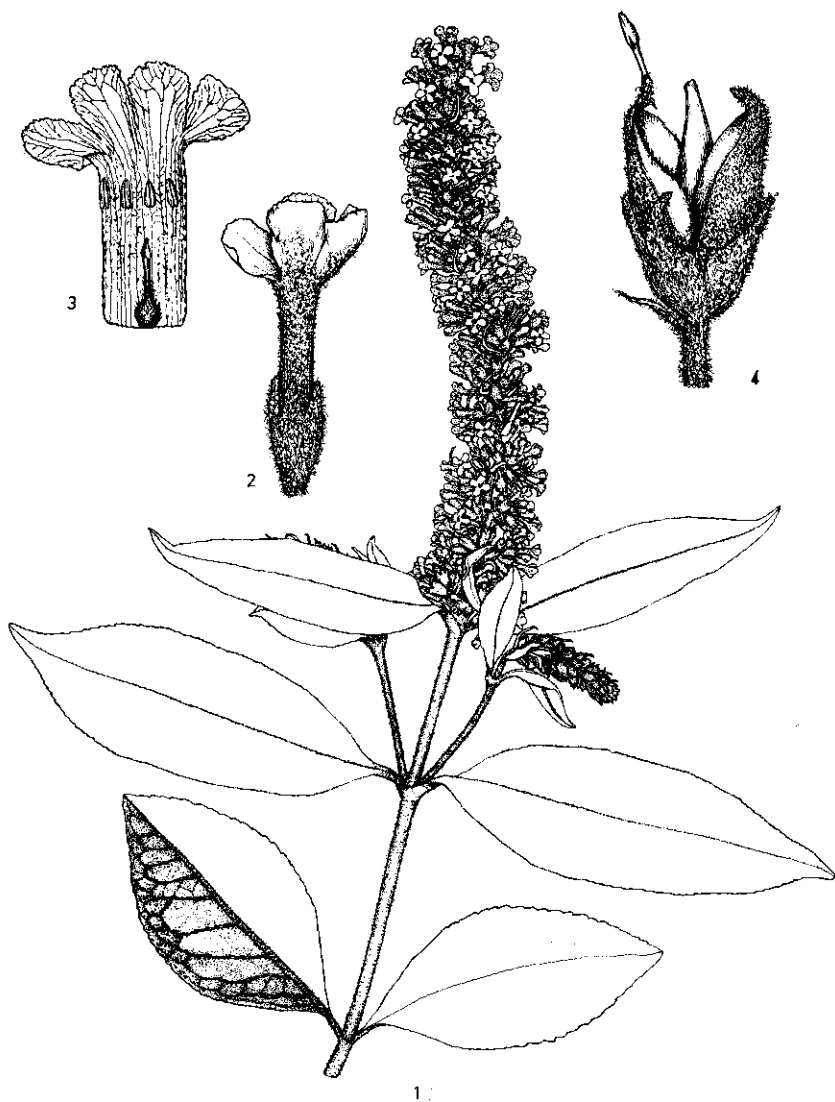


FIG. 31. *Buddleja fallowiana*: 1. flowering branch, $\frac{3}{4} \times$; 2. flower, $4 \times$; 3. opened corolla with pistil, $4 \times$; 4. open fruit, $4 \times$ (1-3. Forrest 6047, isotype (P); 4. Rock 2807).

fragrant. *Calyx* campanulate, 3.5–5 mm long, outside densely stellate-tomentose, inside with some minute glandular hairs; tube 1–1.5 × as long as the lobes; lobes triangular, longer than wide, 1.5–2.5 × 1–1.2 mm, acuminate, entire. *Corolla* white or lavender, with orange throat, with erect lobes 2–3.5 × as long as the calyx, 9–14 mm long, outside densely stellate-tomentose, inside pilose from the level of the apex of the ovary to the mouth and often also with some glandular hairs on the lobes; tube cylindrical or nearly so, 1.5–2.5 × as long as the calyx, 2.5–4 × as long as the lobes, 7–10 × 1–1.5 mm; lobes elliptic or nearly so, 2–4 × 1.5–2.5 mm, crenate-serrate, spreading. *Stamens* included, inserted 2–3.5 mm below the corolla mouth; anthers subsessile, oblong, 1–1.5 × 0.3–0.5 mm, rounded at the apex, deeply cordate at the base; cells parallel. *Pistil* with stigma not reaching the insertion of the stamens, 3–4 mm long, stellate-tomentose, except for the glabrous apex of the style; ovary ovoid, laterally compressed, 1.2–2 × 1–1.4 × 0.9–1.1 mm, 2-celled, gradually narrowed into the short included style; stigma large, clavate, 0.8–1.2 × 0.3–0.6 mm. In each cell one axile placenta with about 25–40 ovules outside. *Capsule* ellipsoid, included in the calyx, about 4–6 × 2–4 × 2–3 mm, stellate-tomentose. *Seeds* elliptic or nearly so, 1.5–2 mm long, winged all around, reticulate, brown; grain itself ellipsoid.



PHOT. 10. *Buddleja fallowiana* (Leeuwenberg 11359, phot. Leeuwenberg, cult. Cambridge, Great Britain).

Distribution: Burma (coll. Alsterlund), China (Yünnan).
Ecology: River or creek banks, thickets. Alt. 1800–3300 m.

Most of the specimens examined:

Alsterlund, I., 177 (E); Edinburgh (cult.) C 512 (BM, CGG, K, WAG), C 513 (BM, CGG, K), C 514 (BM, K, WAG); Forrest, G., 6047 (BM, E, K, P, W, lectotype), 6285 (BM, E, K, P, paratype), 10591 (BM, E, K, paratype), 17790, p.p. (K, rest is *B. macrostachya* and *B. paniculata*), 22398 (E, K), 22595 (E, K), 23179 (K, P, W), 30932 (BM, E); Handel-Mazzetti, H., 3999 (W); Leeuwenberg, A. J. M. (cult.) 11359 (WAG), 11363 (WAG); McLaren, H. D., P 105 (BM, K); Rock, J. F., 2807 (W), 4883 (K, M, P), 5622 (A), 24878 (BM, E, K); Schneider, C., 2054 (A, G, K, W), 3399 (G, K); Williams (cult.) 292–1914 (K, seedling of herb. G. Forrest 10591).

32. *Buddleja forrestii* Diels, Notes Roy. Bot. Gard. Edinburgh 5: 249. 1912.
Fig. 32, p. 125

Type: China: Yünnan: E. flank of Tali Range, Forrest 4666 (E, lectotype; isotype: A).

Heterotypic synonyms: *B. longifolia* Gagnep., Not. Syst. 2: 190, 191. 1912, not of H.B.K. (1818), **syn. nov.** Type: China: Yünnan: Kichan, near Tapintze, Delavay 3991 (P, lectotype; isotypes: K, WAG). Homotypic synonym: *B. pterocaulis* A. B. Jackson, Journ. Bot. 73: 81. 1935.

B. henryi Rehd. et Wilson in Sargent, Pl. Wilson. 1: 571. 1913 (May); Kränzl. in Engler, Bot. Jahrb. 50. Beibl. 111: 44. 1913 (Aug.). Type: China: Yünnan: Mengtze, Henry 9025 (K, holotype).

B. limitanea W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 9: 85. 1916, **syn. nov.** Type: China: Yünnan: W. flank of Shweli-Salween divide, Forrest 8962 (E, lectotype).

B. taliensis W. W. Smith, l.c. p. 87, **syn. nov.** Type: China: Yünnan: W. flank of Tali Range, Forrest 11561 (E, holotype; isotypes: A, K).

B. cooperi W. W. Smith, Notes Roy. Bot. Gard. Edinburgh 10: 14. 1917, **syn. nov.** Type: Bhutan: between Rudong La and Pumthang, Cooper 4154 (E, holotype; isotype: BM).

B. forrestii var. *gracilis* Lingelsh. in Fedde, Repert. Beih. 12: 464. 1922. Type: China: Yünnan: Talifu, Tsang Shan slopes, Limpricht 1007 (holotype not seen, destroyed in B; no isotype seen).

B. henryi var. *glabrescens* Marquand, Kew Bull. 1930: 192. 1930, **syn. nov.** Type: China: Yünnan: S. of Red River from Manner, Henry 9025 A (K, holotype).

B. subherbacea Keenan, Notes Roy. Bot. Gard. Edinburgh 29: 343, figs. 1–2. 1969, **syn. nov.** Type: Cult. Royal Botanic Garden Edinburgh C 11, raised from seeds of herb. Kingdon Ward 8559 (E, holotype; isotypes: BM, CGG, K).

Shrub or undershrub which may look herb-like, 1–6 m high. Branchlets subquadrangular and often narrowly winged, stellate-pubescent or -tomentose

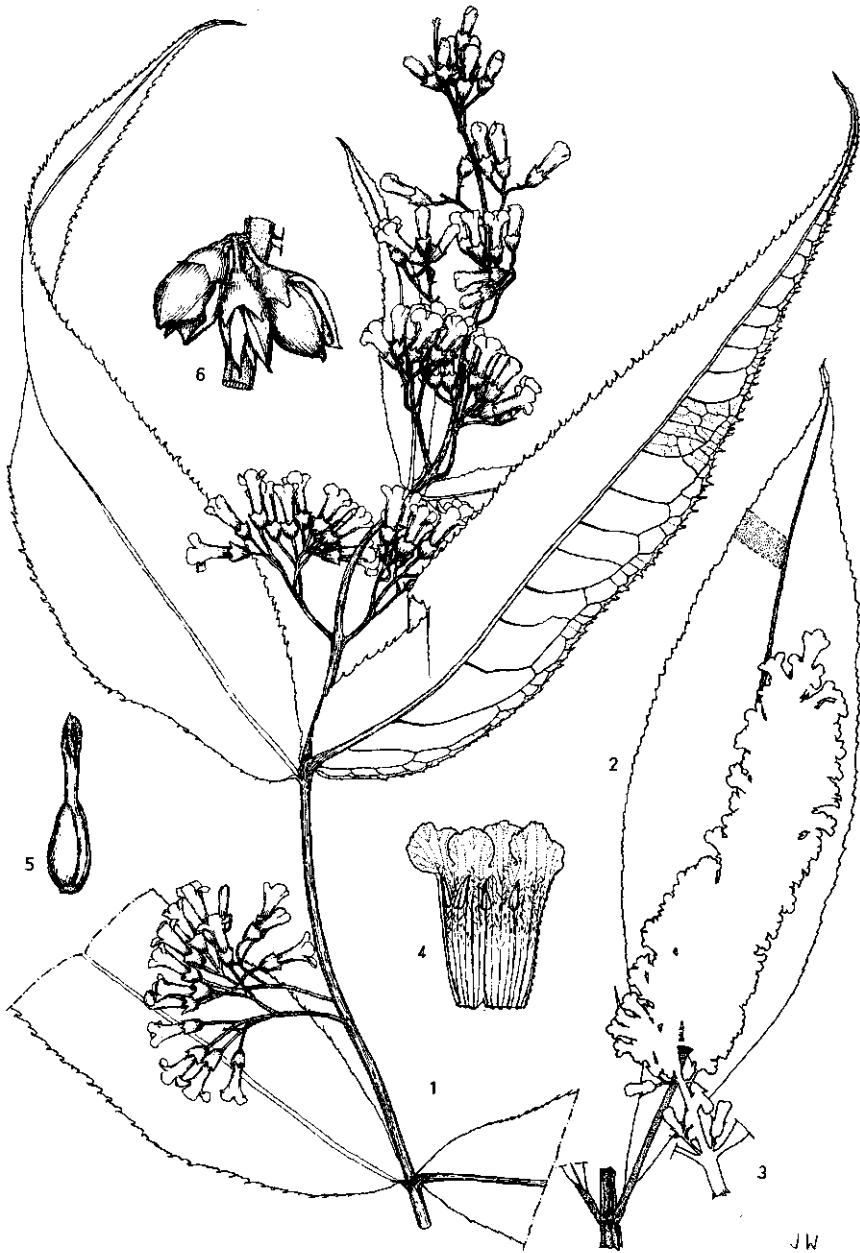


FIG. 32. *Buddleja forrestii*: 1. flowering branch with lax inflorescence, $\frac{2}{3} \times$; 2. leaf, $\frac{2}{3} \times$; 3. outline of congested inflorescence, $\frac{2}{3} \times$; 4. opened corolla, $2 \times$; 5. pistil, $3 \times$; 6. fruits, $2 \times$ (1, 4-5. Kingdon Ward 13980; 2-3. Forrest 979; 6. Tsai 51553).

and soon glabrescent and/or with glandular hairs, or glabrous. *Leaves* opposite, sessile or less often petiolate; petiole up to 15 mm long; blade narrowly elliptic or nearly so, (2-)3-6 × as long as wide, 5-35(-42) × 1-7(-13) cm, acuminate at the apex, decurrent or cuneate at the base, crenate-serrate, serrate, less often dentate, or in some leaves subentire, rather thinly stellate-tomentose or glabrous on both sides; venation reticulate. *Inflorescence* terminal and often also in, or above the axils of the upper leaves, thyrsoïd or less often paniculate, lax to almost spike-like and then interrupted or not, 6-25 × 2-8 cm. Flowers fragrant. *Calyx* campanulate, 3.5-7 mm long, outside glabrous to stellate-tomentose and often also with some minute glandular hairs, inside with some minute glandular hairs; tube 2-5 × as long as the lobes; lobes triangular to very broadly triangular, 1-2 × 1.5-3 mm, acute to almost subulate with blunt tips at the apex, entire or occasionally with some teeth. *Corolla* orange, maroon, wine-red, purple, pinkish, or bluish, with erect lobes 2-4 × as long as the calyx, 9-16.5 mm long, outside glabrous or stellate-tomentose near the mouth and/or with some minute glandular hairs, inside with a pilose zone from the level of the apex of the ovary to the mouth or the base of the lobes and often with some glandular hairs on the lobes; tube broadly cylindrical or nearly so, 1.5-2.6 × as long as the calyx, 1.8-3.5 × as long as the lobes, 7-11 × (1.2-)2-3.5 mm; lobes suborbicular, 2-6 × 2-5.5 mm, crenate-serrate or subentire, spreading. *Stamens* included, inserted 1-6 mm below the corolla mouth or, in other words, from just below the mouth to one-third above the base; anthers sessile or subsessile, 1.4-3 × 0.6-1.2 mm, elliptic or nearly ovate, rounded or mucronate at the apex, deeply cordate at the base; cells parallel. *Pistil* (4-)6.5-13 mm long; glabrous or stellate-tomentose only at the apex of the ovary; ovary ovoid or nearly so, laterally compressed, 2.2-6 × 1.2-2.8 × 1-1.5 mm; style included or barely exerted, occasionally (2 Bhutan specimens) very short; stigma clavate (only in these Bhutan specimens subcapitate and 1 × 1.2 mm) or nearly so, 1.5-2.2(-3.5) × 0.6-1.5 mm. In each cell one axile placenta with about 40-100 ovules outside. *Capsule* ellipsoid, 6-10(-12) × 3-4 × 2-3 mm, with some glandular hairs. *Seeds* very narrowly elliptic, winged all around, 2-4 mm long, reticulate, grain itself ellipsoid, central.

Distribution: Bhutan, India (Assam), northern Burma, China (Yünnan).

Ecology: Forests, forest edges, scrub, mostly near riverbanks in the mountains. Alt. 2000-4000 m.

A selection of the specimens examined:

Cooper, R. E., 4154 (BM, E, type of *B. cooperi*); Cox & Hutchinson 428 (K); Delavay, J. M., 672 (P, WAG, paratype of *B. longifolia* Gagnep.), 3991 (K, P, WAG, lectotype of *B. longifolia* Gagnep.); Ducloux 455 (E); Edinburgh (cult.) C 8 (BM, CGG, K, WAG), C 11 (CGG, E, K), C 11A (E, K), C 478 (BM, K), C 479 (BM, CGG, K), C 511 (BM, K, WAG); Feng, K. M., 1175 (A), 3248 (A); Forrest, G., 979 (E, P, paratype), 4666 (A, E, lectotype), 8962 (E, lectotype of *B. limitanea*), 9044 (E), 11561 (A, E, K, type of *B. taliensis*), 15851 (K, P), 15936 (BM, K), 16017

(A, E, K), 17546 (A, K, P), 18361 (E, K, P), 23215 (K), 25062 (K), 25079 (K), 25761 (BM, K), 28020 (E), 28131 (K), 28183 (E); Griffith, W., 2431 (BM); Henry, A., 9025 (A, K, LE, type of *B. henryi*), 9025A (K, paratype of *B. henryi* Kränzl. and holotype of *B. henryi* var. *glabrescens*); Howell, E. B., 33 (K); Kingdon Ward, F., 1867 (E, paratype of *B. limitanea*), 1873 (E), 3314 (E), 8559 (K), 13197 (BM), 13980 (BM); Leeuwenberg, A. J. M. (cult.) 3394 (WAG); Ludlow, F., c.s. 20959 (BM); McLaren, H. D., C201 (A, BM, E), C219 (BM, E, K), L104 (BM, E, K), L104A (BM, E, K); Rock, J. F., 6237 (A), 6889 (E); Schneider, C., 2487 (A, G, GH, K); Stern, H., 2232 (K); Ten, S., 423 (A, E), 541 (A); Tsai, H. T., 51553 (A), 53845 (A), 56297 (A), 57824 (A), 58095 (A), 58345 (A), 58442 (A), 58578 (A); Yü, T. T., 16920 (A), 20044 (A, E).

Notes. Although this species is variable in many characters, it is not easily confused with others, except with *B. macrostachya* which resembles it strikingly in its leaves, inflorescences and flowers. The two species are distinguished as follows:

Corolla tube outside glabrous or loosely stellate-tomentose only in the upper half; ovary glabrous or loosely stellate-tomentose at the apex; fruit with some scattered glandular hairs	<i>B. forrestii</i>
Corolla outside densely and rather appressedly stellate-tomentose all over, except for the glabrous base which is included in the calyx; ovary rather appressedly stellate-tomentose all over, like the fruit . . .	<i>B. macrostachya</i>

33. *Buddleja japonica* Hemsley, Journ. Linn. Soc. 26: 119. 1889. Fig. 33, p. 128

Type: Japan: Yokohama: Hakone, Maximowicz anno 1862 (K, lectotype; isotype: LE).

Misapplied name: *B. curviflora* hort. ex Carr., Rev. Hort. 37: 339. 1866; Linden & André, Illustr. Hort. 17: 133, pl. 25. 1870, not Hook. et Arn.

Shrub 1 m high. Branchlets shortly tomentose at the apex, soon glabrous or nearly so, quadrangular or nearly so, 4-winged, rather thick, 2–4 mm in diam. when dry. Leaves opposite, shortly petiolate; petiole stellate-pubescent to almost glabrous, 2–5 mm long; blade narrowly ovate or narrowly elliptic, 3–6 × as long as wide, 6–20 × 2–6 cm, acuminate at the apex, cuneate or rounded at the base, repand-dentate to subentire, with some stellate hairs or glabrous above, sparsely stellate-pubescent to almost glabrous beneath; venation reticulate. Inflorescence thyrsoïd, appearing spicate, interrupted or more often not, 6–15 × 2.5–4 cm, when fruiting at the base up to 25 cm long, very variable in length. Calyx campanulate, 4.5–6.5 mm long, outside stellate-tomentose and often with some minute glandular hairs, inside with some minute glandular hairs; tube 1.6–3.3 × as long as the lobes; lobes triangular, mostly longer than wide, 1–2 × 0.8–1.2 mm, acuminate or less often acute, entire. Corolla lavender, with erect lobes 2.7–4 × as long as the calyx, 12–19 mm long, outside stellate-pubescent and often with some minute glandular hairs, inside pilose from the level of the apex of the ovary to the mouth or the base of the lobes; tube cylindrical or nearly so, often curved, 2.6–3.5 × as long as the



FIG. 33. *Buddleja japonica*: 1. flowering branch, $\frac{2}{3} \times$; 2. opened corolla, $2 \times$; 3. opened calyx with pistil, $3 \times$ (Illustration Horticole 17: pl. 25. 1870, Togashi 7466, and Maximowicz 21 Aug.-2 Sept. 1863 (LE)).

calyx, 4–6 × as long as the lobes, 10.5–16 mm long, 1.2–2.5 mm wide and rather abruptly widened at the throat; lobes suborbicular, 1.5–3.5 × 1.2–3 mm, crenate or subentire, spreading. *Stamens* included, inserted 2.8–5.5 mm above the base; filaments short, 0.25–0.5 × as long as the anthers; anthers oblong or nearly so, 1.2–2 × 0.4–1 mm, rounded or nearly so at the apex, deeply cordate at the base; cells parallel. *Pistil* glabrous, 3.5–4.5(–5.5) mm long; ovary ovoid or nearly so, laterally compressed, 2.2–2.5(–3.5) × 1.4–2.2(–2.5) × 1–1.3 mm, 2-celled, rather abruptly narrowed into the short thick included style; stigma large, clavate, 1.2–1.5 × 0.4–0.8 mm. In each cell one axile placenta with about 100–150 ovules outside. *Capsule* ellipsoid, 6–9 × 4 × 3–4 mm, glabrous or with some minute glandular hairs; valves torn at the apex. *Seeds* narrowly polyhedral and winged at 2–4 sides, reticulate, 1.5–2 × 0.4–0.5 × 0.2–0.3 mm, acuminate at both ends; grain itself ellipsoid.

Distribution: Southern Japan.

Ecology: Mountains, along river banks. Ait. 900–1600 m.

A selection of the specimens examined:

- Bisset, J. P., 827 (E), 833 (BM), 3338 (E), 3687 (E), Oct. 1876 (K).
Dickins, F. V., 1305 (K); Dorsett, P. H. & W. J. Morse 624 (LE), 867 (P).
Faurie, J., 544 (G, P), 5539 (BM, W), 5945 (BM, W), 13519 (K, P, WAG); Furuse, M., 31 Aug. 1957 (A).
Hasegawa, K. M., 1 Aug. 1967 (TI); Honda, M., 20 June 1926 (TI).
Kato, I., Oct. 1954 (TI); Kikuchi, M., TNS 177049 (TNS); Kitamura, S., 28 Aug. 1938 (TI);
Kodama, T., TNS 174581 (TNS); Koehne, E., (cult.) 83 (BM); Koyama, H., 1799 (TI).
Leeuwenberg, A. J. M. (cult.) 3405 (WAG), 10768 (WAG).
Makino herb. 96407 (MAK), 96410 (MAK), 96420 (MAK); Maries (Central Mts. Japan) (K); Maximowicz 24 July–3 Aug. 1862 (LE), 5–17 Oct. 1862 (K, LE, lectotype), 21 Aug.–2 Sept. 1863 (LE); Momiyama, J., 747 (TI); Muroi, H., 3792 (A).
Obha, H., 523 (TI); Ohwi, J., 12 Oct. 1954 (K); Ohwi, J. & K. Okamoto NSM 296 (A, B, BM, BR, K, L, LE, NY, P, TI, W); Okamoto, K., TNS 1240 (B, BM, BR, K, P, TI, W); Okuyama, S., 16240 (TNS 277184).
Savatier, L., 896 (K, LE, P), 2180 (P); Sawada, T., 3 July 1927 (GOET, M); Shimidzu, T., 17846 (E); Siebold, Ph. Fr. de, anno 1861 (A, L, LE).
Takeda, H., Aug. 1904 (K); Tanaka, H., 11 Aug. 1959 (K); Togashi, M., 7466 (LE); Togasi, M., 28 Aug. 1950 (TI); Torii, K., TNS 305124 (TNS); Tschonoski, A., 109 (LE), 255 (LE), anno 1864 (LE, M, P, W), anno 1866 (BM, K).
Yasuda, A., 11 Sept. 1906 (BR); Yatabe, R., 19 July 1880 (G); Yoshinaga, T., 10 Aug. 1930 (TI); Yoshino, Z., 2 July 1933 (TI).

Note. *Buddleja japonica* is closely allied to *B. curviflora*, *B. lindleyana*, less so to *B. brachystachya*, by the leaves, inflorescences, flowers, and fruits. The corolla of these four species is often curved, evenly pubescent outside, and rather abruptly widened just below the mouth.

34. *Buddleja lindleyana* Fortune in Lindley, Bot. Reg. 30: misc. 25. 1844; 32: t. 4. 1846; Bentham in De Candolle, Prod. 10: 446. 1846; Hemsley, Journ.

Linn. Soc. 26: 119. 1889; Solereder in Engler & Prantl, Nat. Pflanzenf. 4(2): 48, f. 27, J-K. 1892; Burt-Davy, Kew Bull. 1908: 162. 1908; Prain & Cummins in Fl. Cap. 4(1): 1048. 1909; Rehder & Wilson in Sargent, Pl. Wilson. 1: 564. 1913; Bakhuizen van de Brink Jr., Fl. Java 2: 212. 1965; R. W. Long & O. Lakela, Fl. Trop. Florida 692. 1971.

Fig. 34, p. 131

Types: cult. Cambridge Bot. Gard., Great Britain, raised from seeds sent from Chuzan, China, by Fortune on 13 Nov. 1843 which arrived on 4 March 1844, not preserved; China: Chuzan, anno 1845, Fortune 37 (CGE, neotype; iso-neotypes: BM, G, GOET, K, LE, OXF, P, W).

Homotypic synonym: *Adenoplea lindleyana* (Fortune) Small, Man. S. E. Fl. New York 1047. 1933.

Heterotypic synonym: *B. lindleyana* var. *sinuato-dentata* Hemsl., Journ. Linn. Soc. 26: 120. 1889. Type: China: Hupeh: Ichang, Henry 624 (K, lectotype; isotypes: LE, P).

Shrub or undershrub 1–3 m high. Branchlets quadrangular or approximately so, rusty-pubescent with stellate and/or glandular hairs, less often almost glabrous. Leaves opposite or subopposite, very variable in shape and size, shortly petiolate; petiole stellate-pubescent, 1–7 mm long; blade sparsely pubescent to glabrous above, minutely to densely pubescent with often stellate hairs beneath, membranaceous when dry, ovate, elliptic, or narrowly elliptic, 2–3(–5) × as long as wide, 2–11 × 0.7–5 cm or sometimes smaller, long-acuminate at the apex, cuneate at the base, entire to coarsely sinuate-dentate; secondary veins conspicuous. Stipules none. Inflorescence terminal, almost spicate, more or less interrupted, 4–20 × 2–4 cm. Lower bracts leafy, often linear, 1–10 mm long. Flowers shortly pedicellate. Calyx campanulate or urceolate, often subtended by some small bracteoles, 2–3.5 mm long, outside densely pubescent with glandular and often also some stellate hairs, inside sparsely pubescent; tube 3–10 × as long as the lobes often tooth-like, subequal or unequal, mostly broadly triangular, 0.2–1 × 0.5–1 mm, acute, entire. Corolla purple, mostly curved, with erect lobes 4–10 × as long as the calyx, 13–20 mm long, pubescent with glandular and often also some stellate hairs outside; tube nearly cylindrical, gradually widened from somewhat above the insertion of the stamens, 3.5–8 × as long as the calyx, 5–6 × as long as the lobes, 11–17 mm long, pilose inside from 1 mm below the insertion of the stamens to the mouth, at the base 1–1.5 mm and at the throat 2.5–4 mm wide; lobes suborbicular, about as long as wide or wider, 2–3 mm long, rounded, entire. Stamens included; filaments very short, much shorter than the anthers, glabrous, inserted 3–6 mm above the base of the corolla; anthers oblong or ovate, 1.2–2.2 × 0.4–0.6 mm, cordate at the base, obtuse or rounded at the apex, glabrous; cells parallel. Pistil 3–4.5 mm long, glabrous; ovary ovoid, often laterally compressed, 1.5–2.2 × 1–1.5 × 0.8–1 mm, abruptly narrowed into the style, 2-celled; style included, with stigma 1.2–2.5 mm long; stigma large, clavate, larger than the style. In each cell one axile placenta with about

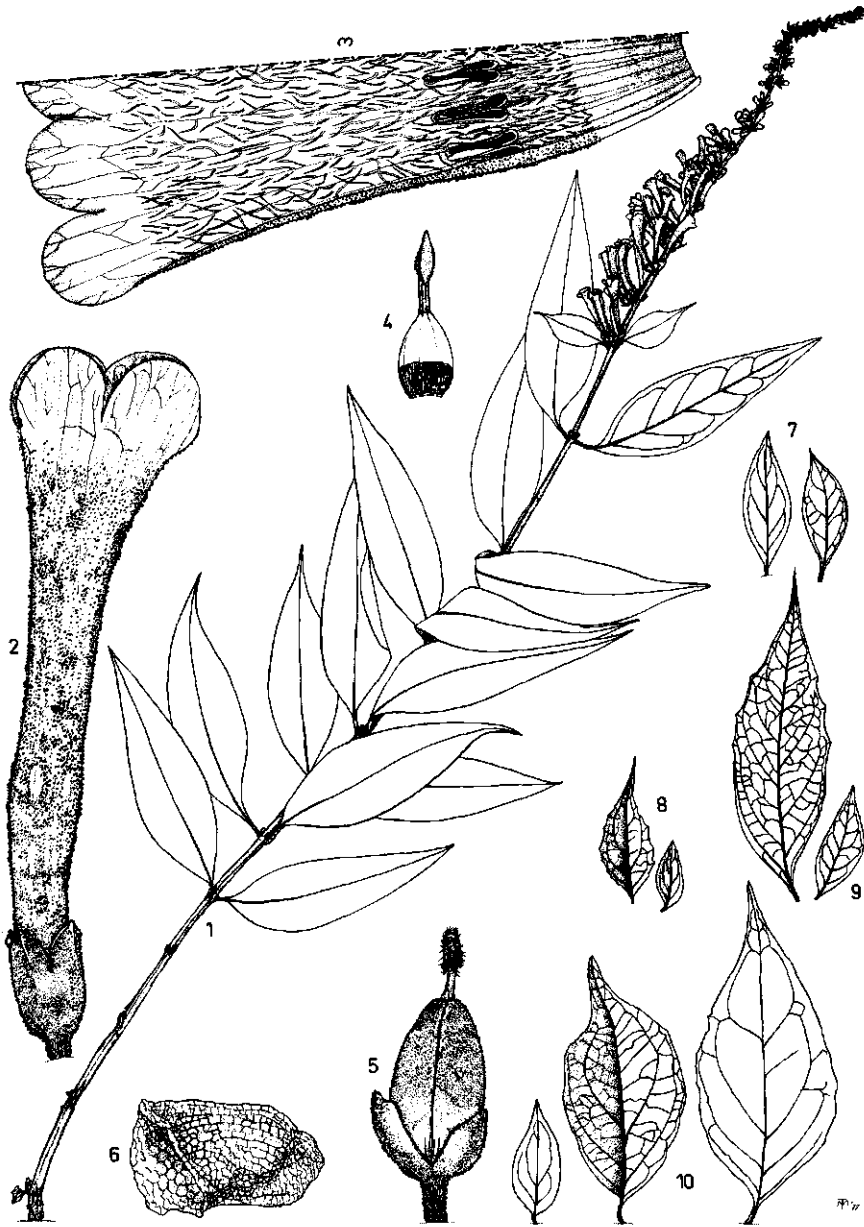


FIG. 34. *Buddleja lindleyana*: 1. flowering branch, $\frac{1}{2} \times$; 2. flower, $5 \times$; 3. opened corolla, $5 \times$; 4. pistil, $5 \times$; 5. fruit, $5 \times$; 6. seed, $30 \times$; 7-10. leaves, $\frac{1}{2} \times$ (1. Handel-Mazzetti 2169; 2-4, 7. Fortune 37, neotype; 5-6. Handel-Mazzetti 242; 8. Sun & Chang 452; 9. Chow 7531; 10. Tai 49).

30 ovules outside. *Capsule* 4–6 × 2–2.5 × 1.5–2 mm, ellipsoid, exerted by about two-thirds from the calyx, with an impressed line along the line of dehiscence, apiculate, glandular-pubescent or less often glabrous; valves up to the middle torn. *Seeds* pale brown, obliquely tetrahedral, 0.7–1 × 0.5–0.7 × 0.4–0.5 mm, narrowly winged at the edges; wings minutely reticulate like the testa.

Distribution: China (Szechwan, Hupeh, Kiangsu, Anhwei, Shanghai, Chekiang, Fukien, Kiangsi, Hunan, Kwangsi, Kwantung, Yünnan), Macao, Hong Kong, Japan.

Ecology: Bush on road sides, mostly in the mountains. Alt. 300–1800 m.

A selection of the specimens examined:

Africa (cult.):

Algeria: Hamma Bot. Garden 26 July 1867 (LE).

Egypt: Talbiya, N. D. Simpson 5140 (K).

St. Helena: Mellis 12 (K); Toms 4 (K).

Zaire: Shaba: Lubumbashi, faters Salésiens 726 (BR).

Rhodesia: Salisbury, P. L. D. Wood SRGH 56278 (K, SRGH); Makoni, Rusapi District, H. Wild 4646 (BR, K, PRE).

S. Africa: Transvaal: Lydenburg, Wilms 1028 (BM, G, K, naturalized (?)); Pretoria, Erens 26 Apr. 1951 (PRE); Johannesburg, Eliouzen s.n. (PRE); Repton 5789 (PRE). Sin. loc., Tyson in herb. Bolus 30640 (BOL).

Réunion: Hell Bourg, Rivals s.n. (P, TL).

Mauritius: Curepipe Road, F. H. Adam MAU 18408 (MAU).

Asia and cult. outside Africa:

Azuma, M., 15 Aug. 1956 (U).

Bakhuizen van den Brink, R. C., Jr., 3588 (U); Burch, D. & M. Newberry (cult. Florida) 4184 (GH).

Calléry 316 (P); Carles, W. R., 146 (E), 575 (K), 622 (E); Cheng, C. H., 1003 (M), 1134 (M), 1254 (M); Cheo, H. C., 164 (E); Cheo & Wilson 12725 (A); Chiao, C. Y., 1768 (A); Chiao, C. Y. & C. S. Fan 86 (A); Chien, S. S. 1093 (W), 5594 (BM, W), 6078 (E); Ching, R. C., 1653 (P, W), 1830 (E), 2759 (E, K); Chow, H. C., 7531 (A); Chow, K. S., 14 (1973) (K); Chung, H. H., 2359 (K), 2843 (BM, E, K, W), 3413 (W), 7367 (A).

Dalziel, J. M., May 1889 (E); David, A., 735 (LE, P, WAG); Delavay, J. M., 5125 (P, WAG), July 1894 (P); Dixon, R. A. (cult. Texas) 480 (GH); Ducloux 2076 (P).

Edinburgh Bot. Gard. (cult.) C 12 (K, LE).

Faber, E., 77 (K), 4190 (W); Fan, C. S. & Y. Y. Li 12 (E), 65 (BM), 143 (W); Fang, W. P., 1952 (E, K, P), 2425 (P), 2470 (K, NY, P), 3101 (K, P), 6585 (K), 7442 (K), 13082 (BM); Forbes, F. B., 124 (BM), 976 (BM); Ford, C., 321 (BM); Fortune (cult.) 29 (K), 32 (K), 34 (GH), 37 (BM, CGE, G, GOET, K, LE, OXF, P, W, neotype).

Gamble (cult. Dehra Dun, India) 23253 (K); Godfrey (cult. Florida) 56536 (GH).

Hancock, W., 26 (K), 87 (K); Handel-Mazzetti, H., 2169 (E, W); Harris, W., (cult. Jamaica) 12099 (BM, K, NY); Harvey, F. L., (cult. Arkansas) 45 (GH); Hatusima, S., 18063 (KAG, TI); Henry, A., 624 (K, LE, P, lectotype of *B. lindleyana* var. *sinuato-dentata*), 3979 (K, P), 4190 (BM, K, LE, P).

Kawagoe, S., 8 Aug. 1913 (KAG).

Lau, S. K., 4400 (BM, US); Law, Y. W., 826 (K); Lee, T. C., 2724 (US), 3063 (US), 3811 (US); Legendre 499 (P); Levine, C. O., 3445 (BM, K); Ling, K., 12393 (K).

McClure, F. A., 19107 (NY); Meyer, F. N., 1497 (K, LE); herb. Micheli, M., Sept. 1877 (G).

Pollard, C. L. & W. R. Maxon (cult. Alabama) 14 (GH); Price, W. R., 1172 (K); Purpus, J. A. in coll. E. Koehne 313 (BM, CGE, GH, M, OXF).

Read, B. E., 1187 (BM).

Sampson, Th., 321 (P, W, WAG); Schallert, P. O. (cult. Georgia) 508 (BM); Schindler, A. K., 363 (BM, K, LE, W); Small, J. K., c.s. (Florida) 6850 (GH, P); Stewart, A. N., 2354 (K); Stewart, A. N. & H. C. Cheo 741 (BM, LE, NY), 747 (P, W); Sun, S. C. & K. Chang 452 (A), 521 (A), 850 (A).

Tang Siu Ging 15307 (A); To & Tsang 12675 (BM, P); Tsang, W. T., 21193 (K, LE, P); Tsui, T. M., 480 (K, P, W), 595 (K, P, W); Tutcher, W. J., 656 (K).

Walker, E. H., 8189 (US); Walker, E. H., c.s. 6433 (K, KAG); Wang, C. H., c.s. 1290 (LE); Wang, F. T., 23274 (LE, P); Wawra (cult. Hawai) 2504 (W); Wilson, E. H. (Arn. Arb. Exp.) 1375 (BM, HBG, K, W), 1375A (BM, HBG, K, LE, W), 1516 (BM), (Veitch Exp.) 1615 (K, W), 1995 (K, W), 4116 (BM, K), 5037 (BM, K).

Yu-shih-Liu 1036 (A).

Note. Description mainly based on specimens collected in the wild.

35. **Buddleja macrostachya** Benth., Scroph. Ind. 42. 1835; Leeuwenberg, Vidal & Galibert in Fl. Camb. Laos Viet. 13: 94, f. 15. 9–12. 1972. **Fig. 35, p. 134**

Type: Bangla Desh: Sillet (Sylhet), Churra Poonji (Cherrapunji), Gomez 13 in herb. Wallich 6407 (K, holotype; isotype: K-WALL).

Heterotypic synonyms: *B. martii* T. A. Schmidt, Journ. Bot. London 6: 245. 1868. Type: India: sin. loc. Schlagintweit 562 (holotype not seen, destroyed in B?; no isotype seen).

B. hosseusiana Kränzl., Ann. Naturh. Hofm. Wien 26: 396. 1912. Type: Thailand: Doi Djieng Dao Highlands, Hosseus 400 (W, holotype; isotypes: BM, E, G, HBG, K, L, M, P).

B. cylindrostachya Kränzl. in Engler, Bot. Jahrb. 50. Beibl. 111: 46. 1913, **syn. nov.** Type: China: Yünnan: Mengtze, Henry 10251 (K, lectotype; isotypes: A, BM, E, NY).

B. hancockii Kränzl., l.c. Type: Yünnan: Mengtze, Hancock 384 (K, holotype). Homotypic synonym: *B. henryi* var. *hancockii* (Kränzl.) Marquand, Kew Bull. 1930: 192. 1930, **syn. nov.**

B. hookeri Marquand, l.c. p. 191, **syn. nov.** Type: Burma-China Frontier: Seinghku Valley, Kingdon Ward 7456 (K, holotype).

Shrub or small tree 1–3.50 m high. Branchlets quadrangular and often 4-winged, stellate-tomentose. Leaves opposite, sessile or subsessile, bases provided with entire leafy stipules; blade mostly narrowly elliptic, (2.5–)4–7 × as long as wide, 4–27 × 1–12 cm, acuminate at the apex, decurrent into the very short petiole or into the leaf-base, crenate-serrate, stellate-tomentose and glabrescent above, densely stellate-tomentose beneath; tertiary venation reticulate, mostly impressed above. Inflorescence terminal, spicate, dense or less often interrupted, 5–20 × 2.5–4 cm, many-flowered. Flowers sweet-scented. Calyx campanulate, 2.8–6 mm long, outside stellate-tomentose and often with a few glandular hairs, inside glabrous or with some minute glandular

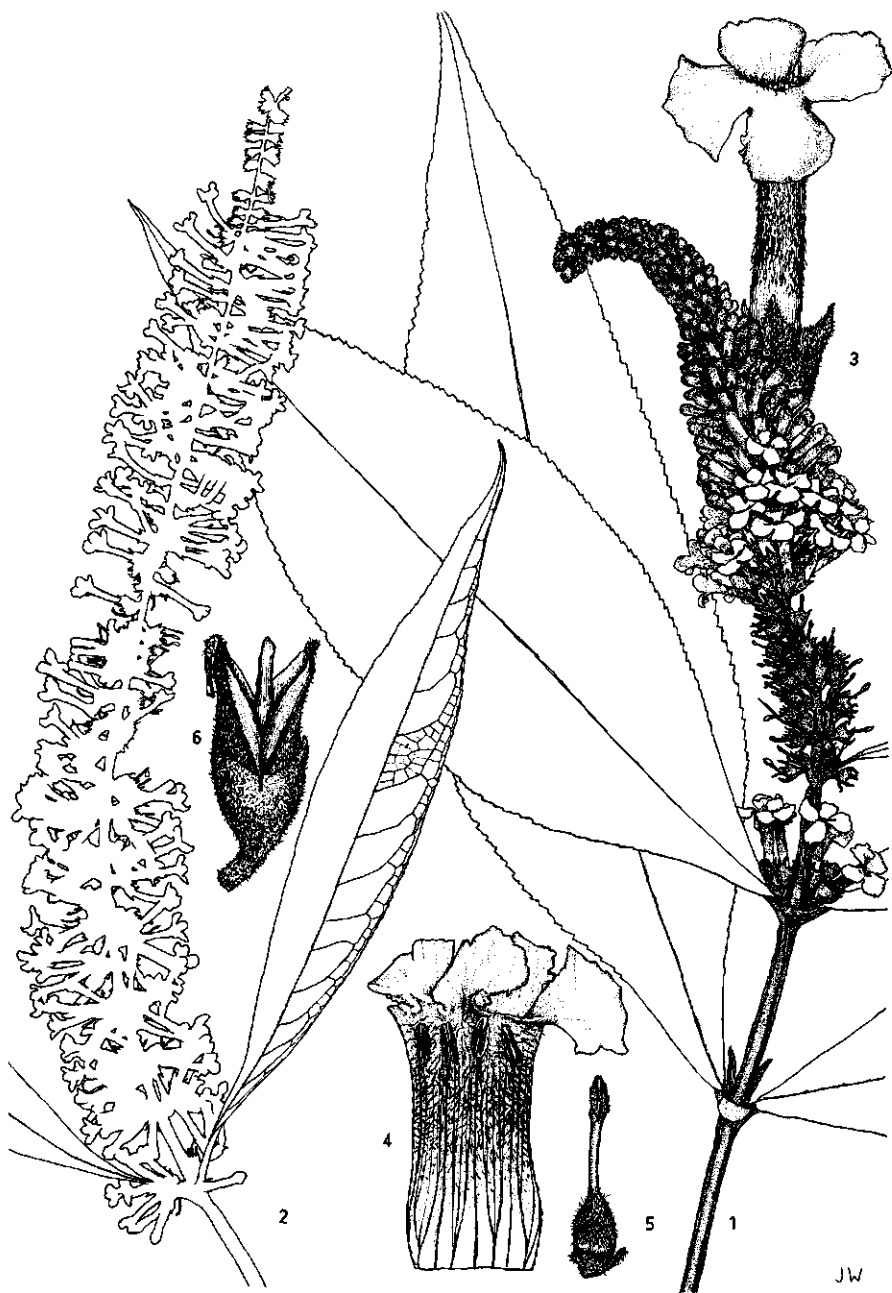


FIG. 35. *Buddleja macrostachya*: 1-2. flowering branches, $\frac{2}{3} \times$; 3. flower, $3 \times$; 4. opened corolla, $3 \times$; 5. pistil, $3 \times$; 6. calyx with open fruit, $3 \times$ (1, 3-5. Forrest 9264; 2. Ludlow c.s. 19659; 6. Griffith 197).

hairs; lobes $0.5-1 \times$ as long as the tube, triangular, $1.2-2.5 \times 1-1.8$ mm, long-acuminate, entire. *Corolla* creamy, pinkish, lilac, purple, or mauve, orange or red in the throat, with erect lobes $1.8-3.5 \times$ as long as the calyx and $9-15$ mm long, outside stellate-tomentose and often with a few glandular hairs, inside with a villose zone from the level of the apex of the ovary to the mouth or just below; tube amply cylindrical or nearly so, $1.5-2.8 \times$ as long as the calyx, $2.6-4 \times$ as long as the lobes, $8-11 \times (1.5-)$ $2-3.2$ mm; lobes suborbicular, $2-4 \times 2-4$ mm, rounded, entire or crenate, spreading. *Stamens* included, inserted $1-2$ mm below the corolla mouth; filaments very short, $0.3-0.5 \times$ as long as the anthers; anthers narrowly triangular or oblong, $1.5-2.3 \times 0.5-1$ mm, deeply cordate at the base; cells parallel. *Pistil* $5.5-8.5$ mm long; ovary ovoid, laterally compressed, $2-4 \times 1.4-2.5 \times 1.2-1.4$ mm, stellate-tomentose and often with some glandular hairs, not abruptly narrowed into the short included style which is hairy like the ovary at the base; stigma large, clavate, $1.2-2 \times 0.4-0.8$ mm. *Capsule* narrowly ovoid or ellipsoid, laterally compressed, $7-10 \times 3-4 \times 2-3$ mm, stellate-tomentose. *Seeds* pale brown, $3-3.5 \times 0.3-0.4 \times 0.2-0.3$ mm, reticulate, with 2 long narrow wings at both ends; grain itself ellipsoid, $0.5-0.6 \times 0.2-0.3 \times 0.2$ mm. Embryo 0.3×0.1 mm; cotyledons slightly wider than the rootlet.

Distribution: India (Assam, Sikkim), Bangla Desh, Burma, Bhutan, China (Yunnan), Thailand, Vietnam.

Ecology: Mountains, near creek- or riverbanks in forest. Alt. 1750-3200 m.

A selection of the specimens examined:

Bor, G. L., 20946 (L).

Clarke, C. B., 6087 (LE), 15551A (BM), 16277 (LE), 16277A (BM), 37350C (LE), 37350E (BM), 41823A (G), 41823B (LE), 41823C (BM), 44891 (LE); Cooper, R. E., 4453 (BM), 4673 (BM); Cooper, R. E., c.s. 2305 (E).

Dickason, F. G., 7242 (A, L); Ducloux 4451 (P).

Edinburgh (cult.) C 3049 (E).

Fielding (Khasia) (K); Forrest, G., 7604 (E), 9264 (BM), 9471 (E), 9661 (E), 17790, p.p. (E, rest is *B. fallowiana* and *B. paniculata*), 23055 (P), 26184 (E), 29369 (BM, E).

Gammie, G. A., 1215 (BM); Griffith, W., 196 (BR, K), 197 (CGE, K, OXF, P, W), 237 (K), 237A (W), 3742 (GH, GOET, K, LE, M, P, U, W).

Hancock, W., 264 (K, paratype of *B. cylindrostachya*), 384 (K, type of *B. hancockii*); Henry, A., 10251 (A, BM, E, K, NY, lectotype of *B. cylindrostachya*), 10251A (K, LE, paratype of *B. cylindrostachya*), 10251B (BM), 10251C (E), 10251D (E); Hosseus, C. C., 400 (BM, E, G, HBG, K, L, M, P, W, type of *B. hosseusiana*).

Kanai, H. c.s. 8265 (TI); Kerr, A. F. G., 6590 (BM, E, K, L, P); Kingdon Ward, F., 7456 (K, type of *B. hookeri*), 7702 (K), 8598 (K, WAG), 12506 (BM), 14085 (BM), 17039 (BM), 18871 (BM), 21893 (BM), 22757 (BM); Koelz, W. H., 23742 (L), 27160 (L, W), 27163 (L).

Ludlow, F., c.s. 19659 (BM).

Maung Po Khant 15253 (K); McLaren, H. D., 3 (BM), 7 (BM), 282B (BM), F234 (E).

Parkinson, C. E., 5321 (K), 5332 (K); Parry, N. E., 124 (K), 466 (K), 553 (K); Poilane, E., 18822 (P, WAG); Prain, D., Oct. 1886 (K), Sept. 1903 (E, K).

Schneider, C., 2951 (G, erroneously cited as *B. forrestii* by MARQUAND); Smitinand, T., 7310 (K).

Tagawa, M., c.s. 4149 (E); Takhtajan, A., 6144 (LE); Thakur Rup Chand 5042 (W), 6633 (L); Tsai, H. T., 54579 (A), 55011 (A), 56347 (A), 56758 (A), 58314 (A), 58425 (A).
Von Wissmann, H., 504 (W), 1207 (W).
Wallich, N., 6407 (K, K-WALL, type); Wang, C. W., 72283 (A); Watt, G., 5011 (K, P), 5125 (K), 5810 (E), 5938 (P), 7379 (M, P); Wenger, M. L., 431 (K), 432 (K), 433 (K).
Yü, T. T., 16240 (A), 18090 (A).

Notes. The inflorescence of *B. macrostachya* may be continuous, e.g., in the types of *B. cylindrostachya* and *B. hosseusiana*, or somewhat interrupted, e.g., in the holotype, Kingdon Ward 14085, and Tsai 56347, or else distinctly interrupted, as in the type of *B. hookeri*, while the flowers of these specimens are notably similar. The above-listed names are reduced to synonyms after careful comparative studies of the specimens examined.

B. macrostachya is closely allied to *B. forrestii*, q.v.

36. **Buddleja myriantha** Diels, Notes Roy. Bot. Gard. Edinb. 5: 250. 1912 (not of Kränzl., 1913). **Fig. 29, p. 115**

Type: China: Yünnan: W. slopes of Tsan-Shan Range, Yang-pi Pass, Forrest 912 (E, lectotype; isotype: K).

Heterotypic synonyms: *B. adenantha* Diels, l.c. p. 248, **syn. nov.** Type: China: Yünnan: E. flank of Tali Range, Forrest 4736 (E, holotype; isotype: P).

B. duclouxii Marquand, Kew Bull. 1930: 189. 1930, **syn. nov.** Type: China: Yünnan: near Ngy-leang, Petrus Py in coll. Ducloux 3790 (K, holot.; isot.: P).

Shrub 1–3 m high. Branchlets subquadrangular, stellate-tomentulose, later glabrescent. *Leaves* opposite or sometimes some of them subopposite, shortly petiolate or sessile; petiole tomentulose, up to 6 mm long, often with two sometimes partly united suborbicular up to 10 mm long stipules; blade narrowly elliptic, 3–6 × as long as wide, 5–20 × 0.9–6 cm, acuminate at the apex, cuneate or decurrent at the base, serrate, crenate-serrate, or subentire, with spreading glandular and mostly also stellate hairs above, stellate-tomentulose beneath; venation reticulate, entirely or partly impressed above. *Inflorescence* slender, thyrsoid, almost cylindrical, but sometimes composed of 3 slender thyrsi, 6–22 × 1.2–3 cm; mostly regular, not or obscurely interrupted; lower branches short. *Flowers* often (?) fragrant, mostly pedicellate. *Calyx* campanulate, 2–4 mm long, outside shortly stellate-tomentulose, inside with minute glandular hairs or glabrous; tube 0.7–1.7 × as long as the lobes; lobes rather narrowly triangular, 1.2–1.7 × 0.8–1.2 mm, acuminate, entire. *Corolla* purple, violet, or white, with erect lobes 1.7–2.5 × as long as the calyx, 5–7 mm long, outside stellate-tomentulose and often also with glandular hairs, inside pilose with simple hairs in upper three-fifths of the tube; tube cylindrical or nearly so, 1.2–2 × as long as the calyx, 2.7–4.8 × as long as the lobes, 4–5.8 × 1–1.3 mm; lobes suborbicular, 1–1.2 × 1–1.2 mm, crenate or nearly so, spreading. *Stamens* included, inserted 0.5–1.5 mm below the corolla mouth; anthers sessile (apex 0–1 mm from the mouth) 0.8–1.2 × 0.4–0.5 mm, rounded or

nearly so at the apex, deeply cordate at the base; cells parallel. *Pistil* 2.8–4 mm long; ovary ovoid or conical, laterally compressed, 1.5–2 × 1–1.5 × 0.6–0.9 mm, glabrous or (less often?) stellate-tomentose in upper half, abruptly narrowed into the glabrous included style, 2-celled; stigma capitate or clavate, 0.2–0.9 × 0.2–0.3 mm. In each cell one axile placenta with about 20–30 ovules. *Capsule* ellipsoid, 4–6 × 1.5–2 × 1.5–2 mm, glabrous or stellate-tomentose. *Seed* fusiform, about 2–2.5 × 0.3–0.5 × 0.2–0.3 mm, with slender wings at both ends, reticulate, with a small ellipsoid grain in the middle.

Distribution: Upper Burma, Tibet, China (Yünnan, Kweichow).

Ecology: Forest edges, thickets, stream banks; alt. 2000–3200 m.

A selection of the specimens examined:

- Bodinier, E., 1688 (P), 1688bis (E, P), 1688ter (P).
Cavalerie, J., 4355 (K, P); Ching, R. C., 21429 (A).
Delavay, J. M., 3627 (K, P, WAG); Ducloux 444 (K, P), 589 (P), 2847 (P), 3542 (P), 3789 (LE, P), 3790 (K, P, type of *B. duclouxii*), 7381 (P).
Edinburgh (cult.) C 10679 (E); Esquirol 581 (K).
Farrer 1239 (E); Feng, K. M., 3380 (A), 3446 (A), 11246 (A), 11437 (A), 11515 (A), 11879 (A), 12672 (A), 13678 (A); Forrest, G., 912 (E, K, lectotype), 4736 (E, P, type of *B. adenantha*), 4760 (E, P), 14549 (A, BM, K), 19235 (K, P), 19804 (K, P, US), 27055 (K, NY, P, US, W), 27536 (A, K, P, W), 28033 (E), 29064 (BM).
Handel-Mazzetti, H., 4933 (E, W), 8404 (W), 9578 (W); Henry, A., 10915 (E, K, LE).
Johnstone, G. H., 23 July 1951 (cult.) (K, seedling of herb. G. Forest 29064).
Kingdon Ward, F., 1740 (E), 3330 (E), 7298 (K), 21155 (A, BM, E), 21278 (A), 21600 (A, BM).
McLaren, H. D., 96 (BM, K).
Perny anno 1858 (P).
Schneider, C., 2503 (G, GH, K).
Tsai, H. T., 53906 (A), 56568 (A), 57410 (A), 57848 (A), 58550 (A), 58910 (A), 58992 (A), 59821 (A).
Wang, C. W., 64296 (A), 66918 (A), 67433 (A), 70406 (A).
Yü, T. T., 19410 (A, E), 20572 (A), 23092 (A, E).

Notes. The type of *B. adenantha* has corollas with many glandular hairs among the stellate ones; in the type of *B. myriantha* the former are few in number. The ovary of the first is stellate-tomentose in the upper half, that of the latter is glabrous. An ovary with stellate-tomentose indumentum in the upper half is observed in, e.g. McLaren 96, a specimen without glandular hairs on the corolla. As no other characters could be found to distinguish *B. adenantha* from *B. myriantha*, the first is reduced to a synonym of the latter. As the type of *B. myriantha* is a much better specimen than that of *B. adenantha*, as the glandular hairs may be absent from the corollas, and as the inflorescences are many-flowered, the name *B. myriantha* is preferred here.

37. **Buddleja nivea** Duthie, Gard. Chron. Ser. 3. 38: 275, f. 102. 1905; Marquand, Kew Bull. 1930: 190. 1930. **Fig. 36, p. 139**

Type: Cult. from seeds collected by Wilson (1428) in China: W. Szechwan: in the Yangtze Valley, ex Hort. Veitch 4 Aug. 1905 (fl.) and 14 Oct. 1905 (fr.) (K, holotype, 3 sheets one of which is a sterile portion of the flowering branch).

Heterotypic synonyms: *B. macrostachya* var. *yunnanensis* Dop, Bull. Soc. Bot. France 57. Mém. 19: 7. 1910. Type: China: W. Szechwan: sin. loc., Wilson (Veitch exp.) 4119 (P, lectotype; isotypes: A, BM, HBG, K). Homotypic synonym: *B. nivea* var. *yunnanensis* (Dop)Rehd. et Wils. in Sargent, Pl. Wilson. 1: 570. 1913, Marquand, l.c., **syn. nov.**

B. stenostachya Rehd. et Wils., l.c. p. 565. Type: China: W. Szechwan: Mupin, Wilson 1351 (A, holotype; isotypes: BM, HBG, K, LE, W).

Shrub 1–3 m high, drying ochraceous or less often white. Branchlets terete or quadrangular, stellate-tomentose. *Leaves* opposite, shortly petiolate; petiole 5–15 mm long, stellate-tomentose; blade narrowly ovate or elliptic, 2–5 × as long as wide, 6–22 × 1.5–11 cm, acute or acuminate at the apex, cuneate, rounded, or subcordate at the base, serrate or crenate, above glabrous or with spreading stellate hairs and/or stellate-tomentose on the costa, beneath stellate-tomentose; venation reticulate, impressed above. *Inflorescence* terminal, thyrsoid or spicate, mostly narrow and almost cylindrical, 5–30 × 2–5 cm (sometimes several of these more or less cylindrical thyrsi together in a panicle or inflorescence interrupted and branches rather long). Lower branches often much longer than the other. At least some *flowers* pedicellate. *Calyx* campanulate, 3–4 mm long, outside stellate-tomentose, inside glabrous or nearly so, tube 0.6–1.5 × as long as the lobes; lobes subequal, triangular or narrowly so, 1.2–2.5 × 1–1.4 mm, acuminate, entire. *Corolla* purple or violet (cult. specimen), with erect lobes 1.5–2.3 × as long as the calyx, 6–8 mm long, outside stellate-tomentose; inside pilose with simple hairs in the upper half of the tube; tube nearly cylindrical, often slightly widened towards the throat, 1.2–1.7 × as long as the calyx, 2.5–4 × as long as the lobes, 4.8–6.2 × (1.2–)1.8–3 mm; lobes suborbicular, 1.2–2 × 1.2–2 mm, subentire, spreading. *Stamens* included, inserted 1–1.5 mm below the corolla mouth; anthers subsessile, with apex at the level of the corolla mouth or just below, oblong or nearly so, 1.3–1.5 × 0.3–0.5 mm, rounded or nearly so at the apex, deeply cordate at the base; cells parallel. *Pistil* 4–5 mm long; ovary ovoid, laterally compressed, about 2 × 2 × 1–1.5 mm, stellate-tomentose, glabrous at the extreme base, abruptly narrowed into the style, 2-celled; style included, stellate-tomentose at the base, further glabrous, with stigma about as long as the ovary; stigma clavate, 0.6–1.3 × 0.3–0.5 mm. In each cell one axile placenta with about 20–30 ovules. *Capsule* ellipsoid, 5–8 × 2–3 × 2–3 mm, stellate-tomentose, glabrescent. *Seed* spindle-shaped, with long slender wings, about 2.5–3 × 0.7 × 0.5 mm, brown, 4-angular, reticulate, with a small ellipsoid grain in the middle.

Distribution: China (Yunnan, Szechwan).

Ecology: In thickets on the mountains; alt. 1100–2500 m.

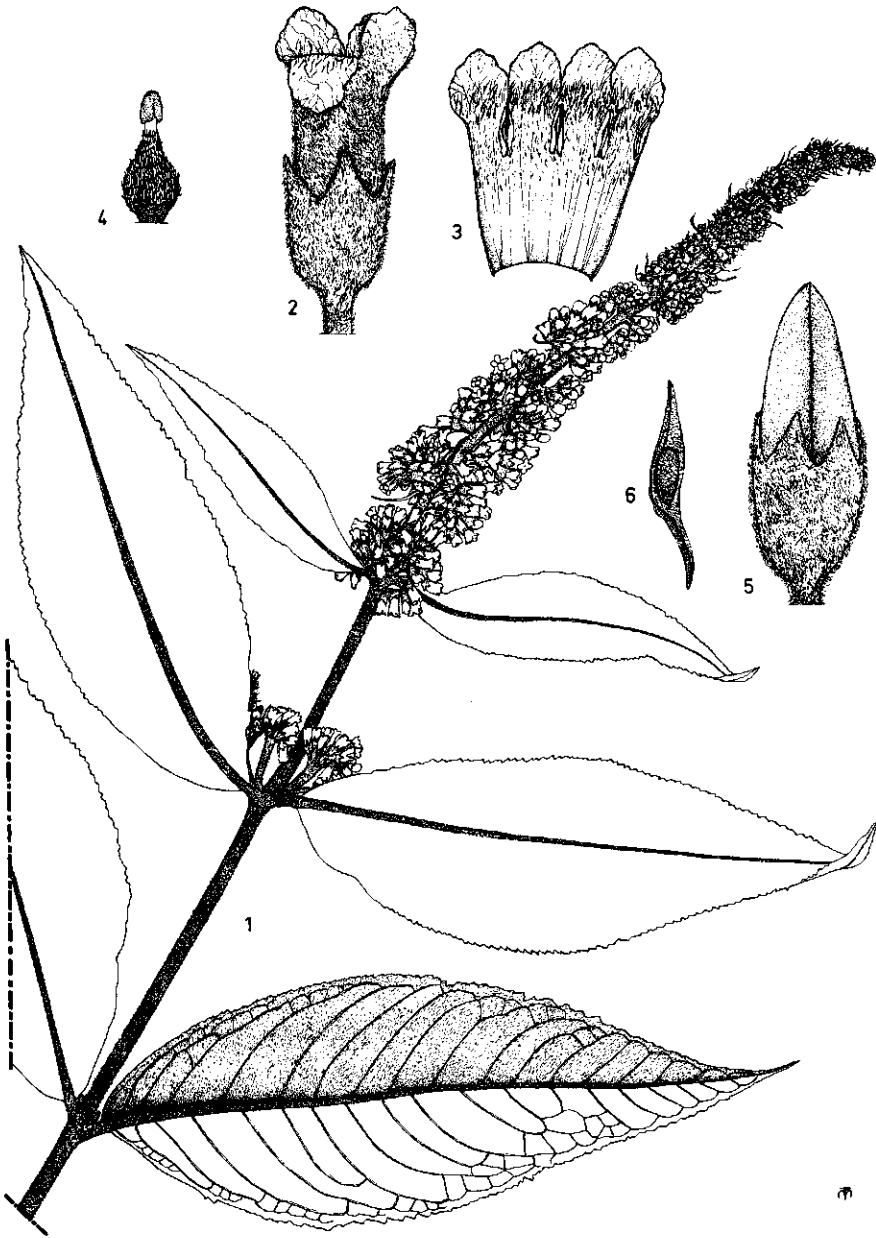


FIG. 36. *Buddleja nivea*: 1. flowering branch, $\frac{1}{3} \times$; 2. flower, $5 \times$; 3. opened corolla, $5 \times$; 4. pistil, $5 \times$; 5. fruit, $5 \times$; 6. seed, $10 \times$ (1-4. Wilson 3353; 5-6. Fang 1493).

A selection of the specimens examined:

Africa (cult.):

S. Africa: Transvaal: Pretoria, Repton 1500 (K, PRE).

Asia and cult. outside Africa:

Bons d'Anty 20 Sept. 1897 (P), 13 Apr. 1910 (P); Chu, K. L., 2993 (BM, W); Edinburgh (cult.) C 13 (BM, E, K), C 14 (BM, CGG, K), C 474 (BM, E, K, WAG), C 474a (E); Fang, W. P., 1493 (A, K, NY, P), 2247 (K, P); Leeuwenberg, A. J. M. (cult.) 3390 (WAG), 11356 (WAG), 11366 (WAG), 11367 (WAG); Legendre 526 (P); Moore, R. J. (cult.) 47-161-46 (E), 49-69-36 (E); Potanin, G. N., 27 Aug. 1893 (LE); Sun, C. L., 1253 (US); Tsai, H. T., 51257 (A), 54267 (A), 54372 (A), 58649 (A); Wang, F. T., 21829 (A); Wilson, E. H. (Arn. Arb. Exp.) 1351 (A, BM, HBG, K, LE, W, type of *B. stenostachya*), 1351a (K), 3351 (K), 3353 (A, BM, HBG, K), 3354 (K), 3356 (BM, K), 3357 (BM, HBG, K, W), 3358 (A, BM, K), 3359 (K), (Veitch Exp.) 1428 (K, type), 4119 (A, BM, HBG, K, P, lectotype of *B. nivea* var. *yunnanensis*), 4121 (BM, K), 4131 (P); Yü, T. T., 1029 (A).

Note. *Buddleja nivea* is very closely allied to *B. candida* (q.v.).

38. *Buddleja officinalis* Maxim., Bull. Acad. Pétersb. 26: 496. 1880.

Fig. 37, p. 141

Type: China: Shensi: Han R. bank, between Peichowlan and Sin-yan-lan, Piasezky 8–20 Mar. 1875 (LE, holotype).

?Heterotypic synonym: *B. officinalis* var. *macrantha* Lingelsh. in Fedde, Repert. Beih. 12: 464. 1922. Type: China: Szechwan: Wushan, Yangtse R. bank, near Tshinshiho, Limpricht 157 (holotype not seen, destroyed in B, no isotype seen).

Shrub 1–2 m high. Branchlets terete or subangular, stellate-tomentose. Leaves opposite, petiolate or subsessile; petiole up to 30 mm long, often winged; blade ovate, elliptic, narrowly ovate, or narrowly elliptic, (1.5–)2–5 × as long as wide, 2–12 × 0.7–5.5 cm, acuminate, acute, or obtuse at the apex, cuneate at the base or more often decurrent into the petiole or the base, entire, sinuate, or repand-dentate; stellate-tomentose on both sides, above glabrescent to entirely glabrous; venation reticulate, impressed above. Inflorescence terminal, paniculate or thyrsoid, very variable in shape and size, lax or congested, 4–15(–30) × 2–10 cm. Flowers fragrant. Calyx campanulate, 2.5–4.5 mm long, outside densely stellate-tomentose and with some glandular hairs, inside with some minute glandular hairs or glabrous; tube 3–6 × as long as the lobes; lobes triangular or broadly triangular, subequal or unequal, 0.6–1.2 × 1–1.2 mm, acute or obtuse; entire or less often sinuate or crenate-serrate. Corolla pinkish, lilac, or pale purple, orange in the throat (always ?), with erect lobes 2.5–5 × as long as the calyx and 9.5–13 mm long, outside densely stellate-tomentose and with some glandular hairs, inside densely pilose from the level of the apex of the ovary to the mouth or sometimes just below, on the lobes glabrous or with some glandular hairs; tube cylindrical or nearly so, 2.1–4 ×



FIG. 37. *Buddleja officinalis*: 1. flowering branch, $\frac{1}{2} \times$; 2. portion of leaf beneath, $5 \times$; 3. portion of leaf above, $5 \times$; 4. flower, $5 \times$; 5. opened corolla with pistil, $5 \times$; 6. open fruit, $5 \times$ (1-5. Wilson 155; 6. Henry 1117).

as long as the calyx, 3.3–6 × as long as the lobes, 7.3–10 × (1.6–)1.8–2.2 mm; lobes suborbicular, 2–3 × 1.8–2.8 mm, subentire or crenate, spreading. *Stamens* included, inserted 3–4 mm below the corolla mouth; anthers subsessile, 0.8–1.3 × 0.4–0.7 mm, rounded or nearly so at the apex, cordate at the base; cells parallel. *Pistil* 3.4–5 mm long; ovary ovoid, laterally compressed, 1.5–2.2 × 1.2–1.8 × 0.8–1.2 mm, stellate-tomentose and with some glandular hairs, but glabrous at the extreme base, rather abruptly narrowed into the style, 2-celled; style included, short, hairy at the base like the ovary, further glabrous; stigma large, clavate, 1.2–2 × 0.4–1 mm. In each cell one axile placenta with about 60–100 ovules outside. *Capsule* ellipsoid, 4–8 × 2–3 × 2–3 mm, stellate-tomentose, glabrescent. *Seeds* narrowly elliptic, reticulate, 1–1.2 × 0.3–0.4 × 0.2–0.3 mm, winged all around, acuminate at both ends.

Distribution: China (Yünnan, Szechwan, Shensi, Hupeh).

Ecology: Forest edges, on riverbanks in the mountains. Alt. 1000–1200 m.

Most of the specimens examined:

Chang, K. Y., 1395 (K); Chien, S. S., 5851 (A); David, A., Mar. 1870 (P); Delavay, J. M., 320 (P); Faber, E., 605 (K); Fan, C. S. & Class 98 (A); Fang, W. P., 12055 (BM, W); Farges 1015 (P); Handel-Mazzetti, H., 741 (W); Henry, A., 1117 (K, LE), 1291 (K, P), 1447 (K), 1527 (K, P), 3110 (K), 3363 (K, LE, P), 7852 (E), 7884 (BM, GH, K), 7884A (LE, P), 9749 (K, LE); Law, Y. W., 316 (K); Leeuwenberg, A. J. M. (cult.) 3382 (WAG); Maries (Ichang Gorge) (K); Piasezky 8–20 Mar. 1875 (LE, type); Potanin, G. N., 20 Feb. 1893 (LE), 1 Mar. 1893 (LE), 29 Mar. 1893 (LE), 5 Apr. 1893 (K, LE, P); Rock, J. F., 12051 (K, P, W); Tai, L. Y., 704 (A), 1510 (A); Wilson, E. H. (Arn. Arb. Exp.) 4005 (A, BM, HBG, K, W), (Veitch Exp.) 155 (HBG, K, LE, P, W), 155a (K, W).

Notes. *B. officinalis* is closely allied to *B. paniculata* with which it is easily confused, and to *B. crispa*. They can be distinguished as follows:

1. Leaves up to twice as long as wide, mostly obtuse or rounded at the apex if entire or nearly so; when the leaves are narrower, their bases are broad and their edges serrate to lobed; corolla tube inside pilose mostly only up to the insertion of the stamens ***B. crispa***
 Leaves twice as long as wide or narrower, at least some acuminate at the apex, entire, serrate, or repand-dentate, cuneate or decurrent at the base 22 of key to the Asiatic species

39. ***Buddleja paniculata*** Wall. in Roxb. Fl. Ind. ed. Carey 1: 412. 1820; Leeuwenberg, Vidal & Galibert in Fl. Camb. Laos Viet. 13: 96. 1972.

Fig. 38, p. 144

Type: Nepal: Arguha Mt., E. Gardner in Wallich 6403a (K-WALL, holotype; isotypes: BM, BR, CGE, G, K, L, OXF, P).

Heterotypic synonyms: *B. acutifolia* C. H. Wright, Kew Bull. 1896: 24. 1896, **syn. nov.** Type: China: Yünnan: Mengtze, Hancock 143 (K, holotype; isotype: P).

B. lavandulacea Kränzl. in Engler, Bot. Jahrb. 50. Beibl. 111: 45. 1913. Type: China: Yunnan: Mengtze, Henry 10178 (K, holotype; isotypes: E, LE, NY).

B. mairei Lévl. in Fedde, Repert. 13: 258. 1914. Type: China: Yunnan: Mo-Tsou, 600 m, Maire May 1911 (E, holotype; isotype: K).

B. mairei f. *albiflora* Lévl., Cat. Pl. Yunnan 171. 1916. Type: China: Yunnan: Mo-Tsou, 700 m, flowers white, Maire April 1911 (E, holotype).

B. gynandra Marquand, Kew Bull. 1930: 184. 1930. Type: Vietnam: Langson, Balansa 930 (K, holotype; isotypes: G, LE, P).

Shrub or small tree 1–6 m high. Branchlets subterete or subquadrangular, stellate-tomentose. Sometimes leafy stipules present. *Leaves* opposite, petiolate or sometimes sessile; petiole up to 20 mm long; blade narrowly elliptic, narrowly ovate, or less often ovate or elliptic, 2–8 × as long as wide, 2–25 × 0.7–9 cm, acuminate or sometimes in some leaves acute or obtuse at the apex, decurrent into the petiole (or leaf base) from a sometimes rather abruptly narrowed base, entire, obscurely sinuate-dentate, or sometimes, especially in large leaves, serrate, above slightly bullate, stellate-tomentulose, often with glandular hairs, and glabrescent, beneath stellate-tomentose and with prominent reticulate venation. *Inflorescences* terminal and in the axils of the upper leaves, 3–25 × 2–12 cm, paniculate or, if very small, thyrsoïd; branches of panicle thyrsoïd, bearing glomerulae of sessile or subsessile flowers. Lower bracts leafy; the others small, linear or nearly so. *Flowers* fragrant or not. *Calyx* campanulate, 2.5–4 mm long, outside stellate-tomentose and mostly with glandular hairs, inside glabrous or with some minute glandular hairs; tube 3–5(–8) × as long as the lobes; lobes equal or subequal, triangular or broadly triangular, 0.3–1.2 × 0.8–1.2 mm, acute or obtuse, entire. *Corolla* white, pink, lavender, or with tube mauve and limb white, furthermore mostly with orange throat, with erect lobes 2.2–3.5 × as long as the calyx and 7–12 mm long, outside stellate-tomentose and with some glandular hairs, inside pilose from the level of the apex of the ovary to that of the insertion of the stamens or to just below the mouth, in the throat glabrous or with glandular hairs as on the lobes; tube cylindrical or nearly so, 1.5–3 × as long as the calyx, 2.4–4.5 × as long as the lobes, 6–10 × 1.2–1.6(–2) mm; lobes suborbicular, 2–2.5 × 1.8–2.2 mm, subentire or crenate, spreading. *Stamens* included, inserted 1.5–3 mm below the corolla mouth; anthers sessile or subsessile, 1–1.2 × 0.3–0.5 mm, rounded or nearly so at the apex, deeply cordate at the base; cells parallel. *Pistil* 4–5 mm long; ovary ovoid, laterally compressed, 1.2–2 × 0.8–1.2 × 0.5–0.8 mm, stellate-pubescent and with glandular hairs except for the glabrous base, 2-celled, rather abruptly narrowed into the rather short included style which is mostly at the base hairy like the ovary, but at least at the apex glabrous; stigma large, clavate, 1.2–1.5 × 0.4–0.6 mm. In each cell one axile placenta with about 50 ovules outside. *Capsule* ellipsoid, 4–7 × 2–3 × 2–3 mm, stellate-pubescent, glabrescent. *Seeds* pale brown, reticulate,

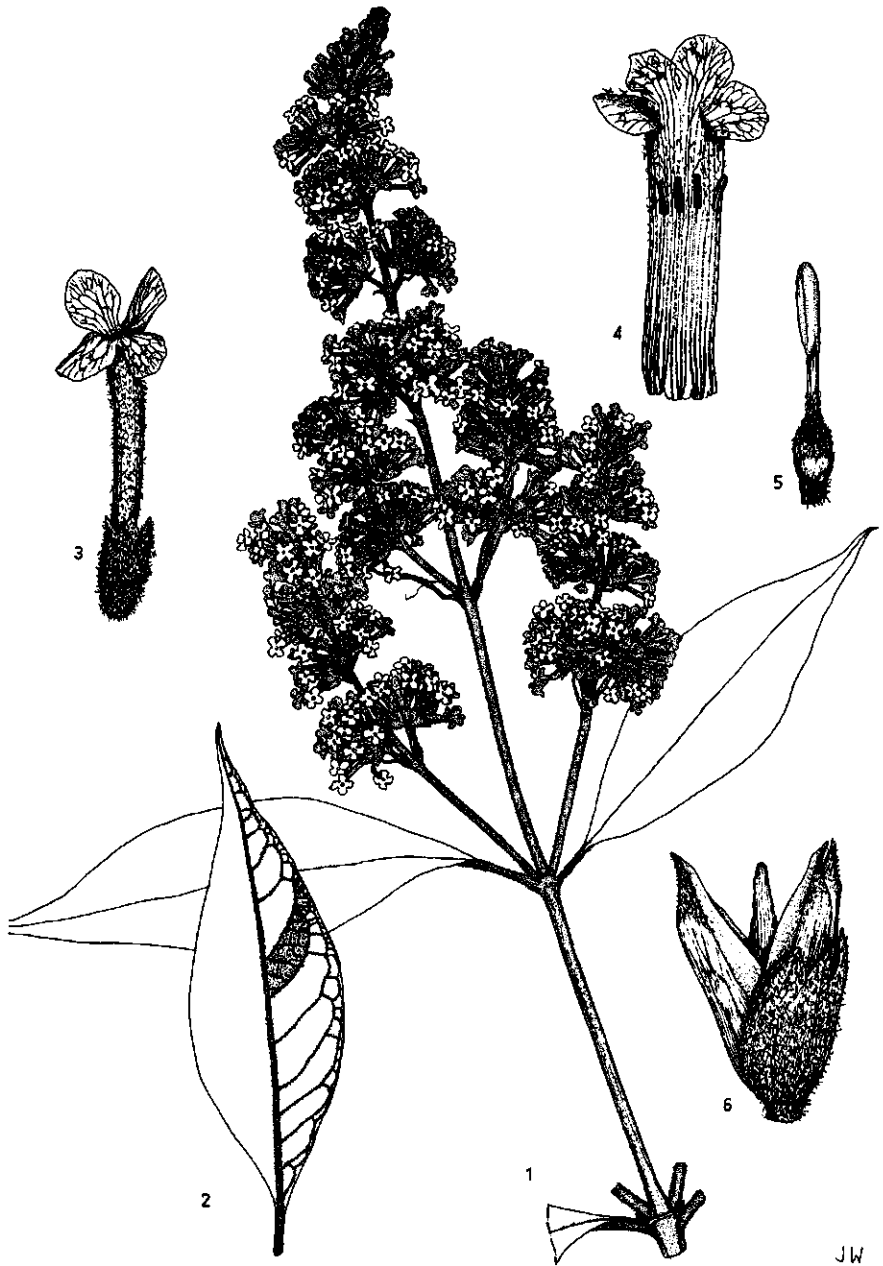


FIG. 38. *Buddleja paniculata*: 1. flowering branch, $\frac{2}{3} \times$; 2. leaf, $\frac{2}{3} \times$; 3. flower, $4 \times$; 4. opened corolla, $4 \times$; 5. pistil, $6 \times$; 6. fruit, $6 \times$ (1-5. Henry 11619; 6. Forrest 7544).

1-1.2 × 0.3-0.4 × 0.2-0.3 mm, winged at both ends; grain 0.6 × 0.3 × 0.2 mm.

Distribution: Northern India, Nepal, Bhutan, Burma, China (Yünnan, Kiangsi, Kwangsi, Kweichow).

Ecology: Forest edges, thickets, and open places, often on riverbanks, in the mountains. Alt. 500-3000 m.

Most of the specimens examined:

Balansa, B., 930 (G, K, LE, P, type of *B. gynandra*); Bis Ram 73 (LE), 121 (LE); Bodinier, E., 44 (E, P), 2255 (E, P); Bons-d'Anty 3 (K), 158 (K), 166bis (P), 292 (P); Bor, N. L., 2818 (K).

Cavalerie, J., 3097 (K, P), 7492 (P), 8082 (K), 8140 (K); Ching, R. C., 20129 (A); Clarke, C. B., 13972 (LE), 13972C (BM); Cooper, R. E., 6028 (E).

Delavay, J. M., 319 (BM, P, WAG), 398 (K, P, WAG), 6788 (P, WAG), Kiang Yu 26 Jan. 1889 (P, WAG), *ibid.* Feb. 1890 (K, P, WAG); Dickason, F. G., 8600 (A, L, LE), 9148 (A, L); Dobremez, J. F., 1795 (BM), 2590 (BM); Ducloux 1155 (E), 2333 (P, WAG), 2392 (P), 6132 (P), 7191 (P).

Esquirol 3535 (E, P).

Feng, K. M., 391 (A), 392 (A); Forrest, G., 2 (E, K), 686 (E), 4728 (BM, E, LE, P), 5019 (E), 7544 (E), 9449 (E), 9494 (E, K), 9550 (E, K), 17790, p.p. (E, rest is *B. fallowiana* and *B. macrostachya*).

Gardner, P. C., 254 (BM), 348 (BM), 917 (BM); Griffith, W., 2443 (BM, G, K), 2444 (BM, K), 3745 (GH, GOET, K, LE, M, P, U).

Hancock, W., 143 (K, P, type of *B. acutifolia*); Handel-Mazzetti, H., 332 (W), 422 (W), 551 (E, W); Hara, H., c.s. 1609 (TI), 3654 (TI), 4343 (TI), 5395 (TI), 10800 (TI); Henry, A., 10178 (E, K, LE, NY, type of *B. lavendulacea*), 10178A (K, LE), 10178B (E, K, LE), 11619 (A, E, K).

Kermode, C. W. D., 16682 (K); Kingdon Ward, F., 269 (BM, NY), 8451 (K), 11119 (BM), 17006 (A, BM), 17043 (A, BM), 21735 (BM).

Lace, J. H., 5779 (K); Lancaster, C. R., 28 (BM); Law, Y. W., 316 (K); Ludlow, F., c.s. 18593 (BM).

MacGregor, R. W., 1188 (E); McLaren, H. D., C8 (BM, E, K); Moore, R. J. (cult.) 46-329-3 (E, K); Morse, H. B., 278 (K), 466 (K), 467 (K).

Nicholson, D. H., 2923 (BM, LE).

Parkinson, C. E., 7281 (K); Pételot, A., 2208 (A), 7661 (P); Poilane, E., 19068 (P, WAG), 32209 (P, WAG); Polunin, O., c.s. 613 (BM).

Rock, J. F., 2409 (W).

Schilling, A. D., 762 (K, LE); Schneider, C., 45 (K), 302 (K), 361 (K), 4067 (A); Schoch, O., 41 (K); Shaik Mokim 63 (BM, K); Su Koe 9117 (K), 9917 (K); Stainton, J. D. A., 5022 (BM), 5299 (BM), 5796 (BM); Stewart, A. N. & H. C. Cheo 67 (A, BM, G, LE, NY, P, W).

Toppin, S., 2617 (E); Tsai, H. T., 50804 (A), 51547 (A), 51885 (A), 53007 (A), 55998 (A), 56313 (A), 56348 (A), 56439 (A), 56483 (A), 56897 (A); Tsang, W. T., 21785 (BM, LE, P), 21852 (BM, P), 21868 (BM, P); Tsiang, Y., 13130 (K).

Wallich, N., 6403a (BM, BR, CGE, G, K, K-WALL, LE, OXF, P, lectotype), 6403b (CGE, K-WALL, P, W, wide leaves, paratype); Wang, C., 39040 (A); Wang, W., 71814 (A), 71998 (A); Watt, G., 6061 (K, M, P), 6108 (E, P), 7380 (E).

Note. *Buddleja paniculata* is closely allied to *B. crispa* and *B. officinalis* (q.v.).

40. *Buddleja yunnanensis* Gagnep., Not. Syst. 2: 187, 192. 1912. Fig. 39, p. 147

Type: China: Yunnan: between Szemao and Chienhung, Bons d'Anty 437 (P, holotype; isotype: K).

Shrub 0.50–2 m high. Branchlets subquadrangular, stellate-pubescent, glabrescent. *Leaves* opposite, very variable in size, subsessile or shortly petiolate; petiole up to 5 mm long; blade elliptic or nearly so, about 3 × as long as wide, 2–12 × 0.6–4.5 cm, acuminate with an often obtuse tip at the apex, cuneate or decurrent at the base, coarsely dentate-serrate to subentire, with scattered stellate hairs above, stellate-tomentose beneath. *Inflorescence* terminal, a dense spike, 2–6 × 1.5–2 cm. *Flowers* sessile, subtended by long-acuminate leafy bracts, at least several of which are longer than the flowers. *Calyx* campanulate, 4–6 mm long, outside stellate-tomentose and with glandular hairs, inside with some minute glandular hairs on the lobes or glabrous; tube 2.5–4 × as long as the lobes; lobes subequal, triangular, longer than wide, 1–2 × 0.8–1.2 mm, acuminate, entire. *Corolla* lilac (teste Henry 12214), with erect lobes 1.6–2.5 × as long as the calyx, 10–12 mm long, outside stellate-tomentose and mostly also with glandular hairs, inside pilose from the level of the apex of the ovary to the mouth and with some glandular hairs on the lobes; tube cylindrical or nearly so, 1.3–2 × as long as the calyx, 3.8–4 × as long as the lobes, 8–9.5 mm long; lobes oblong, 2–2.5 × 1.5 mm, rounded at the apex, subentire, spreading. *Stamens* included, inserted 2.5 mm above the corolla base; filaments very short, 0.2–0.3 × as long as the anthers; anthers suborbicular, 0.7–0.8 × 0.5–0.7 mm, long-mucronate at the apex, cordate at the base; cells parallel. *Pistil* very short, 3 mm long; ovary subglobose, laterally compressed, 2–2.2 × 1.8–2 × 1.4–1.5 mm, stellate-tomentose except for the basal third, subcordate at the apex, 2-celled, abruptly narrowed into the very short glabrous rather thick included style; stigma large, subcapitate, bilobed, 0.5–0.6 × 0.4–0.5 mm. In each cell one axile placenta with about 60 ovules outside. *Capsule* ellipsoid, 4–5 × 2.5–3 × 2.5–3 mm, stellate-pubescent; valves torn at the apex. *Seeds* obliquely ovoid or ellipsoid, 0.4–0.5 × 0.3–0.4 × 0.2–0.3 mm, not winged, slightly angular, acute or obtuse at both ends, rather conspicuously reticulate.

Distribution: China (Yunnan).

Ecology: Thickets in the mountains. Alt. 1500–2300 m.

Specimens examined:

Bons d'Anty 437 (K, P, type); Henry, A., 12214 (A, K, LE, NY, P); Von Wissmann, H., 461 (W), 476 (W); Yü, T. T., 16488 (A, E).

Notes. *Buddleja yunnanensis* is easily recognized by its densely spicate short inflorescences provided with rather long bracts. It shows most resemblance to *B. lindleyana* by the branchlets and leaves. Both species can be distinguished as follows:

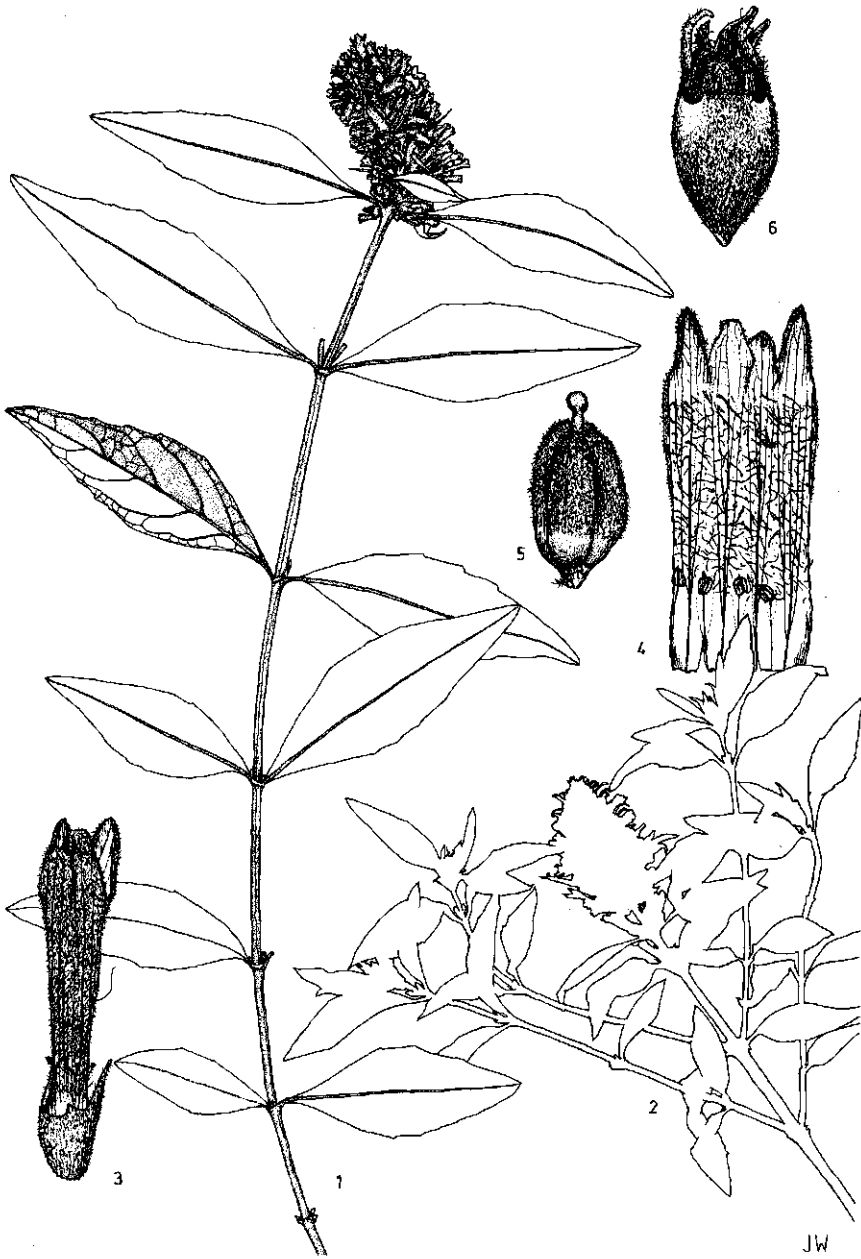


FIG. 39. *Buddleja yunnanensis*: 1-2. flowering branches, $\frac{2}{3} \times$; 3. flower, $4 \times$; 4. opened corolla, $4 \times$; 5. immature fruit with style and stigma, $6 \times$; 6. calyx with open fruit, $4 \times$ (1-5. Henry 12214; 6. Yü 16488).

Inflorescence congested, provided with large bracts several of which are longer than the flowers; flowers 10–12 mm long, sessile; ovary stellate-tomentose **B. yunnanensis**
 Inflorescence rather lax; bracts much shorter than the flowers; flowers 14–20 mm long, mostly pedicellate; ovary glabrous **B. lindleyana**

INTERMEDIATES (POSSIBLE HYBRIDS)

Some specimens collected in the wild are almost perfect intermediates between two species. This became apparent to the author only after having gained experience by completing the present revision.

Africa:

Buddleja indica Lam. × **B. madagascariensis** Lam.

One specimen collected in Madagascar has leaves and inflorescences resembling strikingly those of *B. madagascariensis* and flowers intermediate in the shape of the calyx lobes and the corolla tube. The ovary is 4-celled as in *B. madagascariensis* and contains about 30 ovules in each cell.

Madagascar: Maroambihy, Sambava District, (fl. Sept.) Silasy R. S. 9763 (K, P, WAG).

Three specimens collected in Réunion which resemble each other strikingly are also intermediate between the two species mentioned above. Their leaves resemble the narrowly elliptic entire ones known from some specimens of *B. indica* but are slightly longer. Their inflorescences resemble those of *B. indica*, but have more flowers, their calyx lobes are intermediate like their corollas, but in the two last-named organs they are closer to *B. madagascariensis*. The ovaries, however, are 2-celled and contain about 30 ovules in each cell.

Réunion: Grand Bassin (veg.) Rivals 9 July 1943 (P, TL); above Thermes de Cilaos (fl. Feb.) Cadet 4120 (REUN, WAG); near Col du Taïbit (fl. March) Friedmann 2304 (P).

Asia:

Buddleja × **alata** Rehd. et Wilson in Sargent, Pl. Wilson. 1: 570. 1913.

Type: China: Szechwan: sin. loc., Wilson (Veitch. exp.) 4118 (A, holotype; isotypes: BM, K).

Branchlets quadrangular or nearly so, narrowly winged, practically glabrous. *Leaves*: petiole 10–15 mm long; blade narrowly ovate, 15–25 × 4–8 cm, acuminate at the apex, cuneate at the base, serrate, glabrous and with impressed reticulate venation above, stellate-tomentellous beneath. *Inflorescences* thyrsoid, terminal and in the axils of the upper leaves, slender, interrupted, about 15 × 1.5 cm. *Calyx* about 3 mm long, stellate-tomentose outside; lobes triangular, 1 × 1 mm, acute, entire. *Corolla* lilac, in the mature bud 6.5 mm long, outside stellate-tomentose; tube 5 mm long, inside pilose from the level

of the apex of the ovary to the mouth; lobes 1.5×1.5 mm. *Stamens* inserted at about 1 mm from the corolla mouth. *Ovary* stellate-tomentose.

Distribution: Only known from the type.

Notes. The specimen described above is almost perfectly intermediate between *B. albiflora* and *B. nivea* and resembles strikingly the hybrids between these species grown in botanic gardens. As it is the only collection known with these characters, and as it is so perfectly intermediate, the present author considers it as a possible hybrid of *B. albiflora* and *B. nivea*.

***B. davidii* Franch. × *B. fallowiana* Balf. f. et W. W. Smith**

Branchlets stellate-tomentose as in *B. fallowiana*. Leaves and inflorescence approximately as in *B. fallowiana*. Corolla as in *B. davidii*, but more hairy than usual; tube 9 mm long. Anthers 3 mm below corolla mouth. Ovary stellate-tomentose.

China: Yunnan: near Chungtien, Handel-Mazzetti 4445 (W).

***B. forrestii* Diels × *B. macrostachya* Benth.**

Corolla as in *B. forrestii* and ovary as in *B. macrostachya*.

China: Yunnan: Mengtze, Henry 9025 B (K, paratype of *B. henryi*). See note after *B. forrestii*.

***B.* × *griffithii* (C. B. Clarke) Marquand, Kew Bull. 1930: 194. 1930. = *B. macrostachya* var. *griffithii* C. B. Clarke in Hooker f., Fl. Br. Ind. 4: 81. 1883.** Types: India: East Bengal: Mishmee, Griffith 3747 (K, P, paratype); Bhutan: sin. loc., Griffith 2447 (BM, K, paratype), 3743 (K, lectotype; isotypes: A, LE, P, W).

B. griffithii is based on three specimens; MARQUAND (1930) cited a fourth, Griffith 3747. In the present author's opinion, they are probably all of hybrid origin. The leaves of Griffith 3747 are intermediate between those of *B. asiatica* and *B. paniculata*. The same is true for the inflorescence and the flowers which both approach those of *B. myriantha*. In Griffith 2447 and 3743 the leaves are like those of *B. macrostachya*, the inflorescences are intermediate between those of *B. candida* and *B. macrostachya*, while the calyces and fruits resemble those of *B. candida* in size but those of *B. macrostachya* in shape.

***B.* × *wardii* Marquand, Journ. Linn. Soc. 48: 203. 1929. *B. alternifolia* Maxim. × *B. crispa* Benth.**

Type: China: Tibet: Tsang-po Valley, below Tsetang, Kingdon Ward 5636 (K, holotype; isotype: E).

Shrub 1.50–4.50 m high. Branchlets stellate-tomentose, glabrescent. *Leaves* opposite or alternate, stellate-tomentose, (only young ones seen), elliptic or nearly so, $5-22 \times 3-17$ mm, acute at the apex, cuneate at the base or nearly so, entire or toothed. *Inflorescence*, terminal on main axis and on lateral branchlets, congested, nearly as in *B. alternifolia*. *Flowers* as in *B. alternifolia*,

except for the stellate-tomentose subglobose ovary. *Corolla* pale lilac with an orange throat.

Distribution: China (Tibet). Mountains, riverbanks. Alt. 3000–3600 m.

Only twice collected: the type (see above) and Ludlow c.s. 4098 (BM, E, K). In both cases the collectors collected specimens of both parents in the same locality: *B. alternifolia*, Ward 5616 and Ludlow c.s. 4096 and *B. crispa*: Ward 5635 and Ludlow c.s. 4095.

Note. According to the collectors of the second specimen and to the present author *B. wardii* is perfectly intermediate between *B. alternifolia* and *B. crispa*, also as these two species are the only ones otherwise represented in the area.

ARTIFICIAL HYBRIDS

A great number of artificial hybrids of *Buddleja* species are in cultivation. Those the parent species of which are known are listed below with voucher specimens, if available. Many of them have been produced by R. J. MOORE, Botany Division, Department of Agriculture, Ottawa, Canada, others in the Botanic Gardens of Edinburgh, Kew, and elsewhere. For convenience the authors' names of the species are omitted.

B. albiflora* × *B. nivea

Austria: Ruhonitz Bot. Gard., C. K. Schneider 2965 (A, W); Netherlands: Wageningen, Leeuwenberg 10757 (WAG), 10772 (WAG).

***B. alternifolia* × *B. asiatica* = *B.* × *whiteana*.**

***B. alternifolia* × (*B. asiatica* × *B. paniculata*)**

R. J. Moore XB 14 S1 (K).

***B. alternifolia* × *B. crispa* (see also *B.* × *pikai*)**

R. J. Moore XB 26 (K).

B. asiatica* × *B. crispa

R. J. Moore XB 21 S2 (K), XB 21 S6 (K).

***B. asiatica* × (*B. crispa* × *B. paniculata*)**

R. J. Moore XB '1 (K).

B. asiatica* × *B. davidii

Great Britain: Betchworth Hills, Surrey, J. E. Lousley 23 July 1961 (K).

***B. asiatica* × *B. davidii* 'Eva Dudley'**

U.S.A.: Farquhar Bot. Gard., Dedham, Mass., 15 Sept. 1925 (K).

B. asiatica* × *B. japonica

R. J. Moore XB 456 (K).

***B. asiatica* × *B. madagascariensis* = *B.* × *lewisiana* = *B.* × *madagascatica*.**

***B. asiatica* × *B. officinalis* = *B.* × *farquharii*.**

B. asiatica* × *B. paniculata

R. J. Moore XB 6 S1 (K).

B. candida* × *B. fallowiana

R. J. Moore XB 25 S1 (K).

B. candida × B. forrestii

R. J. Moore XB 31 S1 (K).

B. candida × B. nivea

R. J. Moore XB 24 S1 (K). Great Britain: Hillier's Arboretum, Ampfield, near Romsey, Hampshire, Leeuwenberg 11358 (WAG).

B. × carnea Carr., Rev. Hort. 51: 90. 1879 = *B. japonica* var. *carnea* (Carr.)Wils., Flora and Sylva 3: 338. 1905 (no specimen preserved) = *B. japonica* × *B. lindleyana*. *B. carnea* was published as a distinct species, but is regarded as a hybrid in this paper.

B. crispa × B. fallowiana

R. J. Moore XB 18 (K).

B. crispa × B. lindleyana 'Hever Pride'

Great Britain: Hever Castle Gardens, Edenbridge, Kent, 30 Sept. 1958 (K).

B. crispa × B. madagascariensis

R. J. Moore XB 27 S6 (K), XB 28 S1 (K).

B. crispa × B. paniculata

R. J. Moore XB 8 S3 (K).

B. davidii × B. fallowiana

Great Britain: Edinburgh, C 507 (BM, K), C 2733 (E); Hillier's Arboretum, Ampfield, near Romsey, Hampshire, Leeuwenberg 11352 (WAG).

B. davidii × B. fallowiana 'Loch Inch'

Great Britain: Kew, Leeuwenberg 11368 (WAG).

B. davidii × B. fallowiana 'Mayford Purple'

Great Britain: Cambridge Bot. Gard., Leeuwenberg 11361 (WAG).

B. davidii × B. fallowiana 'Westhill'

Great Britain: Hillier's Arboretum, Ampfield, near Romsey, Hampshire, Leeuwenberg 11354 (WAG).

B. davidii × B. forrestii

R. J. Moore XB 39 S4 (K).

B. davidii × B. globosa = *B. × weyeriana*.

B. × farquharii Farrington ex Rehder, Man. Cult. Trees & Shrubs 768. 1927 (no specimen seen) = *B. asiatica* × *B. officinalis*.

B. × insignis Carr., Rev. Hort. 50: 330. 1878, with coloured plate; A. Van Geert, Cat. 78: 8. 1879 = *B. intermedia* var. *insignis* (Carr.) Rehd. in Bailey, Cyclop. Am. Hort. 1: 188. 1900 = *B. japonica* var. *insignis* (Carr.)Wils., Flora and Sylva 3: 338. 1905. Type: icon. cit. (no specimen preserved) = ? *B. japonica* × *B. lindleyana*. *B. insignis* was published as a good species, but is probably a hybrid according to the present author, who rejects the name as it is not based on a preserved specimen.

B. × intermedia Carr., Rev. Hort. 45: 151. 1873, non H.B.K. (1818), nor Lorenz (1881) (no specimen preserved) = *B. japonica* × *B. lindleyana*.

B. × intermedia var. *robusta* Dippel, Handb. Laubholzk. 1: 154. 1889 (no specimen preserved) = *B. japonica* × *B. lindleyana*.



PHOT. 11. *Buddleja davidii* × *B. fallowiana* 'Mayford Purple' (Leeuwenberg 11361, phot. Leeuwenberg, cult. Cambridge, Great Britain).

B. japonica* × *B. lindleyana

Great Britain: Hillier's Arboretum, Ampfield, near Romsey, Hampshire, BM staff & Hillier 440 (BM); Kew, W. J. Bean 3 Sept. 1903 (K); Warley, Essex, Willmott 8 Sept. 1912 (K). (See also *B. carnea*, *B. insignis*, *B. intermedia*, *B. lindleyana* var. *macrocarpa*, and *B. reflexa*).

B. japonica* var. *salicifolia Wilson, *Flora and Sylva* 3: 338. 1905. No specimen seen. As can be deduced from the description this is intermediate between *B. japonica* and *B. lindleyana*. Therefore it is here listed with the hybrids.

B.* × *lewisiana = *B. asiatica* × *B. madagascariensis*.

B. lindleyana* var. *macrocarpa Leo d'Onous, *Rev. Hortic.* 48: 99. 1876 (no specimen preserved) = *B. japonica* × *B. lindleyana*. Although the author of this taxon did not intend to describe a hybrid, his description refers to a specimen intermediate between *B. japonica* and *B. lindleyana*.

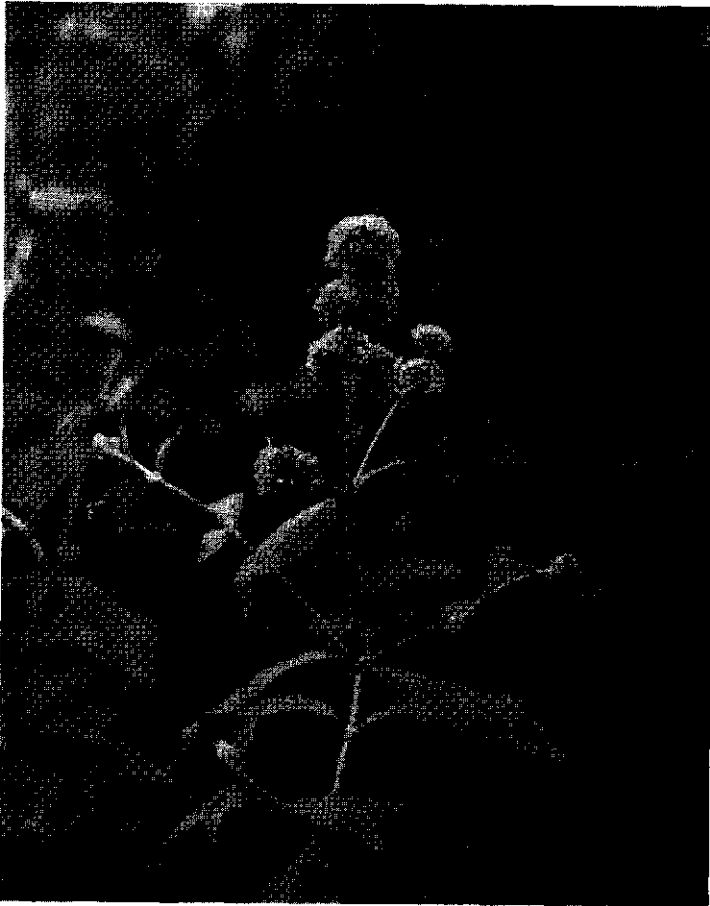
B.* × *madagascatica 'Margaret Pike' = *B. asiatica* × *B. madagascariensis*. Great Britain: Kew, Decorative Dept. 22 Nov. 1967 (K) and Leeuwenberg 7827 (WAG).

B. × pikei Fletcher, Journ. Roy. Hort. Soc. London 79: 21, f. 4. 1954. Type: Great Britain: Hever Castle Gardens, Edenbridge, Kent, A. V. Pike Oct. 1953 (BM, holotype); Edinburgh, C 1180 (WAG, from cutting of type). = *B. alternifolia* × *B. crispa*.

B. × reflexa Carr., Rev. Hortic. 51: 90, f. 18. 1879. Type: icon. cit. (no specimen preserved). = *B. japonica* × *B. lindleyana*. The plate is based on a specimen intermediate between *B. japonica* and *B. lindleyana*.

B. × weyeriana Weyer ex Rehd., Man. Cult. Trees & Shrubs 769. 1927 = *B. davidii* × *B. globosa*.

B. × weyeriana 'Golden Glow' = *B. davidii* × *B. globosa*. Great Britain: Cambridge Bot. Gard., Leeuwenberg 11360 (WAG); Edinburgh, C 7 (BM, WAG); Kew, Leeuwenberg 3397 (WAG).



PHOT. 12. *Buddleja* × *weyeriana* 'Golden Glow' (Leeuwenberg 11360, phot. Leeuwenberg, cult. Cambridge, Great Britain).

B. × weyeriana 'Moonlight' = *B. davidii* × *B. globosa*.
Great Britain: Edinburgh, C 2722 (WAG). Netherlands: Wageningen,
Leeuwenberg 10770 (WAG).

B. × whiteana R. J. Moore, Amer. Journ. Bot. 36: 513. 1949 = *B. alternifolia*
× *B. asiatica*. U.S.A.: Virginia (specimen not seen).

NOMINA NUDA

B. acuminata R.Br. in Salt. Abyss. App. 63. 1814 (non Poiret 1810 nor H. B. K. 1818). Ethiopia: Shelikot, H. Salt 29 Mar. 1810 (BM, G, MO) = *B. polystachya* Fresen.

B. asiatica var. *stipulata* Gagnep., Not. Syst. 2: 189. 1912. = p.p. *B. asiatica* Lour. and p.p. *B. myriantha* Diels. Of the specimens cited the following belong to *B. asiatica*: Wight 1811 (GH, K, M, W), Wallich 6401 (a-o) (K, K-WALL, some duplicates in other herbaria), Jacquemont 175 (P), 320 (P), Watt 5816 (E, P), 6028 (E, K, P), 6104 (E, P), Strachey & Winterbottom 2 (BM, GH, K), Hohenacker (ed.) 442 (BM, BREM, K, M, P, W), and 1422 (HAL, K, M, P, W); while Delavay 3627 (K, P, WAG) belongs to *B. myriantha* and Griffith 3747 (A, K, LE, P, W) is probably a hybrid between *B. asiatica* and *B. paniculata* (see list of hybrids).

The identity of the other specimens cited by GAGNEPAIN could not be checked with certainty as they were not numbered. They probably all belong to *B. asiatica*.

B. davidii var. *glabrescens* Gagnep., l.c. p. 188. The specimens cited, Perny anno 1858, Bodinier 1688, 1688ter, and Ducloux 589, belong to *B. myriantha*.

B. japonica Linden, Cat. n. 19: 52. 1865 = *B. japonica* Hemsl.?

B. saltiana Steud., Nom. 2nd ed. 1: 235. 1841 = *B. acuminata* R.Br. = *B. polystachya* Fresen.

DOUBTFUL SPECIES

B. columbiae Ed. André, Rev. Hortic. 73: 37, f. 7. 1901. No specimen seen. The illustration resembles *B. albiflora* Hemsl. and *B. davidii* Franch.

EXCLUDED SPECIES

Buddleja glaberrima Loiseleur-Deslongchamps, Herb. Gén. Amat. Paris 4: pl. 266. 1820 = *Freylinia cestroides* Colla = *F. oppositifolia* Colla (*Scrophulariaceae*).

B. incompta L.f., Suppl. 123. 1781 (non W. W. Smith, 1914) = *Gomphostigma incomptum* (L.f.) N.E. Brown.

B. missionis Benth., Scroph. Ind. 43. 1835 = *Wendlandia notoniana* Wall. ex Wright et Arn. (*Rubiaceae*).

B. plectranthoidea Lévl., Cat. Pl. Yunnan 171. 1916 = *Leucosceptrum plectranthoideum* (Lévl.) Marquand (*Labiatae*) = *Elsholtzia fruticosa* (D. Don) Rehd. (*Labiatae*), Det. Bob Press, BM, via L. A. Lauener (pers. comm.).

B. sphaerocephala Bak., Journ. Linn. Soc. 21: 425. 1885 = *Nuxia sphaerocephala* (Bak.) Bak.

B. ternata Lour., Fl. Coch. 91. 1790. Not *Buddleja*.

B. virgata L.f., Suppl. 123. 1781 = *Gomphostigma virgatum* (L.f.) Baill.

B. volubilis Lam., Illustr. 1: 291. 1792. Type: Réunion: sin. loc., Commerson s.n. (P-LA, holotype) = *Asclepiadaceae* sp.

Chilianthus triphyllus E. Meyer, Zwei Pfl. Docum. 172. 1843 = *Nuxia floribunda* Benth.

ACKNOWLEDGEMENTS

The present author is greatly indebted to the Directors and Curators of the herbaria cited for putting the material at his disposal:

- A Cambridge, Massachusetts – U.S.A.: Arnold Arboretum.
- B Berlin, Federal Republic of Germany: Botanisches Museum.
- BM London, Great Britain: British Museum (Natural History).
- BO Bogor, Indonesia: Herbarium Bogoriense, Lembaga Biologi Nasional.
- BOL Cape Town, South Africa: Bolus Herbarium, University of Cape Town.
- BR Bruxelles, Belgium: Jardin Botanique de l'Etat.
- BREM Bremen, Federal Republic of Germany: Uebersee-Museum.
- C København, Denmark: Botanical Museum and Herbarium.
- CGE Cambridge, Great Britain: Botany School, University of Cambridge.
- CGG Cambridge, Great Britain: University Botanic Garden.
- COI Coimbra, Portugal: Botanical Institute of the University of Coimbra.
- E Edinburgh, Great Britain: Royal Botanic Garden.
- EA Nairobi, Kenya: The East African Herbarium.
- ENT Entebbe, Uganda: Forest Department.
- FHI Ibadan, Nigeria: Forest Herbarium Ibadan.
- FHO Oxford, Great Britain: Forest Herbarium, Department of Forestry, Commonwealth Forestry Institute, University of Oxford.
- FI Firenze, Italy: Herbarium Universitatis Florentinae, Istituto Botanico.
- FR Frankfurt, Federal Republic of Germany: Forschungsinstitut und Naturmuseum Senckenberg.
- G Genève, Switzerland: Conservatoire et Jardin botaniques.
- GB Göteborg, Sweden: Herbarium, Institute of Systematic Botany, University of Göteborg.

- GENT Gent, Belgium : Laboratorium voor Plantensystematiek.
- GH Cambridge, Massachusetts – U.S.A. : Gray Herbarium of Harvard University.
- GOET Göttingen, Federal Republic of Germany: Systematisch-Geobotanisches Institut, Universität Göttingen.
- GRA Grahamstown, South Africa: Herbarium of the Albany Museum.
- GRO Groningen, Netherlands: Department for Systematic Botany of the Botanical Laboratory.
- HAL Halle, German Democratic Republic: Institut für Systematische Botanik und Pflanzengeographie der Martin Luther-Universität.
- HBG Hamburg, Federal Republic of Germany: Staatsinstitut für allgemeine Botanik und Botanischer Garten.
- J Johannesburg, South Africa: The Moss Herbarium, University of the Witwatersrand.
- K Kew, Great Britain: The Herbarium and Library.
- KAG Herbarium, Kagoshima University, Kagoshima, Japan.
- L Leiden, Netherlands: Rijksherbarium.
- LD Lund, Sweden: Botanical Museum.
- LE Leningrad, U.S.S.R. : Herbarium of the Komarov Botanical Institute of the Academy of Sciences of the U.S.S.R.
- LINN London, Great Britain: The Linnean Society of London.
- LISC Lisboa, Portugal: Centro de Botânica da Junta de Investigações do Ultramar.
- LISJC Lisboa-Belem, Portugal: Jardim e Museu Agricola do Ultramar.
- LISU Lisboa, Portugal: Institute of Botany, Faculty of Science.
- LY Lyon, France: Herbiers de la Faculté de Sciences de Lyon.
- M München, Federal Republic of Germany: Botanische Staatssammlung.
- MAK Tokyo, Japan: Makino Herbarium, Faculty of Science, Tokyo Metropolitan University.
- MARS Marseille, France: Laboratoire de Botanique, Faculté des Sciences.
- MAU The Mauritius Herbarium, Mauritius Sugar Research Institute, Réduit, Mauritius.
- MO Saint Louis, Missouri – U.S.A.: Missouri Botanical Garden.
- MPU Montpellier, France: Institut de Botanique, Université de Montpellier.
- NBG Cape Town, South Africa: Compton Herb., National Botanic Gardens.
- NH Durban, South Africa: Natal Herbarium, Department of Agricultural Technical Services.
- NY New York, New York – U.S.A.: The New York Botanical Garden.
- OXF Oxford, Great Britain: Fielding Herbarium, Druce Herbarium, Department of Botany.
- P Paris, France: Muséum National d'Histoire Naturelle, Laboratoire

de Phanérogamie.

- PRE Pretoria, South Africa: Botanical Research Institute, National Herbarium.
- PRU Pretoria, South Africa: Department of General Botany, University of Pretoria.
- PUC Potchefstroom, South Africa: Potchefstroom University for C.H.E.
- REUN Centre Universitaire de la Réunion, Ste. Clotilde, Réunion.
- ROML Roma, Lesotho: Herbarium of the University of Lesotho.
- S Stockholm, Sweden: Botanical Department, Naturhistoriska Riksmuseum.
- SAM Cape Town, South Africa: South African Museum Herbarium, National Botanic Gardens.
- SBT Stockholm, Sweden: Bergius Foundation.
- SING Singapore, Republic of Singapore: Herbarium and Library, Botanic Gardens.
- SRGH Salisbury, Rhodesia: National Herbarium.
- STE Stellenbosch, South Africa: Government Herbarium, Botanical Research Unit.
- TI Tokyo, Japan: Department of Botany, Faculty of Science, University of Tokyo, Hongo.
- TL Toulouse, France: Laboratoire de Botanique, Faculté des Sciences.
- TNS Tokyo, Japan: National Science Museum, Department of Botany, Shinjuku-ku.
- TO Torino, Italy: Istituto Botanico dell'Università.
- TOM Torino, Italy: Istituto della Missioni della Consolata.
- U Utrecht, Netherlands: Botanical Museum and Herbarium.
- UPS Uppsala, Sweden: Institute of Systematic Botany, University of Uppsala.
- US Washington, D. C. – U.S.A.: National Museum (Department of Botany).
- W Wien, Austria: Naturhistorisches Museum.
- WAG Wageningen, Netherlands: Laboratory of Plant Taxonomy and Plant Geography.
- WRSL Wroclaw, Poland: Instytut Botaniczny, Uniwersytetu Wroclawskiego.
- WU Wien, Austria: Botanisches Institut und Botanischer Garten der Universität Wien.
- YA Yaoundé, Cameroun: Service des Eaux et Forêts du Cameroun, Section de Recherches Forestières.
- Z Zürich, Switzerland: Botanischer Garten und Institut für Systematische Botanik der Universität Zürich.

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REGISTER

(New names are in **bold face**, synonyms in *italics*. Page number of principal entries in **bold face**; those of figures in *italics*. New synonyms are listed as **syn. nov.**)

- Adenoplea* Radlk. 5, 9
baccata Radlk., **syn. nov.** 5, 9, 17
baroniniana (Oliv.) Petit 17
lindleyana (Fortune) Small 130
madagascariensis (Lam.) Eastw. 60
sinuata (Willd.) Radlk. 17
Adenopplusia Radlk. 2, 5, 9
axillaris Radlk. 5, 9, 27, 30
ulugurensis Melch., **syn. nov.** 27, 29
willdenowii Radlk. 27
 Asclepiadaceae 155
 Buddleja L. 5, 10, 11
acosma Marquand 106, 109, 110
acuminata R.Br. 154
acuminata Poir. 5, 6, 9, 13, **17**, 18, 19
acuminatissima Blume 93
acutifolia C. H. Wright, **syn. nov.** 142, 145
adenantha Diels, **syn. nov.** 136, 137
agathosma Diels, **syn. nov.** 105, 108
 var. *glandulifera* Marquand 106, 109, 110
alata Rehd. et Wils. 1, **148**
albiflora Hemsl. 9, 15, **86**, 87, 88, 89, 117, 149, 154
 var. *giraldii* (Diels) Rehd. et Wils. 86
 var. *hemsleyana* (Koehe) Schneider 86
albiflora × *nivea* **150**
alternifolia Maxim. 2, 8, 9, 10, 14, **89**, 90, 92, 149, 150
alternifolia × *asiatica* **150**, 154
alternifolia × (*asiatica* × *paniculata*) **150**
alternifolia × *crispa* **150**, 153
 Series *Alternifoliae* Marquand 8, 10, 11
amentacea Kränzl. 93
americana L. 2, 3, 5, 7
anchoënsis O. Kuntze 8
arborea Meyen 72
arfakensis Kañ. et Hat. 93
aromatica Remy 8
asiatica Lour. 3, 6, 9, 12, 13, 14, 16, 89, **92**, 94, 97, 101, 149, 154
 var. *brevicuspe* Koorders 93
 var. *densiflora* (Blume) Koorders et Valetton 92
 var. *salicina* (Lam.) Koorders et Valetton 92
 var. *stipulata* Gagnep. 154
Buddleja asiatica Lour.
 var. *sundaica* (Blume) Koorders et Valetton 92
asiatica × *crispa* **150**
asiatica × (*crispa* × *paniculata*) **150**
asiatica × *dauidii* **150**
asiatica × *dauidii* 'Eva Dudley' **150**
asiatica × *japonica* **150**
asiatica × *madagascariensis* **150**, 152
asiatica × *officinalis* **150**, 151
asiatica × *paniculata* **150**
aurantiaco-maculata Gilg 78, 81
auriculata Benth. 9, 13, 19, **20**, 21, 22
 var. *euryfolia* Prain & Cummins 20, 24
australis Vell. 2, 7, 9, 11, 12, **24**, 25
axillaris Willd. ex Roem. et Schult. 5, 9, 12, **27**, 28, 29, 30, 37, 86
bhutanica Yamazaki 8, 14, **97**, 98
blattaria Macbr. 8
brachiata Cham. et Schlecht. 8
brachystachya Diels 9, 14, **97**, 100, 129
brasiliensis Jacq. f. ex Spreng. 24, 26
 Section *Buddleja* 6, 7, 10
bullata H.B.K. 8
buxifolia Kränzl. 8
campestris (Vell.) Walp. 8
candelabrum Kränzl. 17, 20
candida Dunn 8, 16, **101**, 102, 140, 149
candida × *fallowiana* **150**
candida × *forrestii* **151**
candida × *nivea* **151**
carnea Carr. **151**, 152
caryopteridifolia W. W. Smith, **syn. nov.** 106, 108, 110
 var. *eremophila* (W. W. Smith) Marquand 106
 var. *lanuginosa* Marquand 106, 109, 110
cestriflora Cham. et Schlecht. 3, 9
chapelana B. Robinson 8
chenopodiifolia Kränzl. 8
 Section *Chilianthus* (Burch.) Leeuwenberg 6, 7, 10
columbiae Ed. André 154
colvillei Hook. f. & Thoms. 9, 14, **103**, 104, 105
comorensis Bak. 27, 29

Buddleja cooperi W. W. Smith, **syn. nov.**
 124, 126
cordata H.B.K. 8, 11, 12, **30**, 31, 32, 33, 34
 subsp. *cordata* 30
cordobensis Griseb. 8
coriacea Remy 8
corrugata (Benth.) Phillips 56
corrugata Jones 3, 8
crispa Benth. 3, 9, 14, **105**, 107, 109, 110,
 142, 145, 149, 150
 var. *decipiens* Schmidt 105, 109
 var. *farrerri* (Balf. f. et W. W. Smith)
 Hand.-Mazz. 106
crispa × *fallowiana* **151**
crispa × *lindleyana* 'Hever Pride' **151**
crispa × *madagascariensis* **151**
crispa × *paniculata* **151**
crotonoides A. Gray 7
cuneata Cham. 8
curviflora Hook. et Arn. 8, 9, 15, **111**, 112,
 113, 129
curviflora hort. ex Carr. 127
 Series *Curviflorae* Marquand 8, 10
cuspidata Bak. 3, 9, 12, 30, **35**, 36, 37, 40,
 86
cylindrostachya Kränzl. 133, 135, 136
dauidii Franch. 1, 2, 6, 9, 13, 15, 16, 89,
 109, **113**, 115, 117, 149, 154
 'African Queen' **117**
 var. *alba* Rehd. et Wils. 114, 117
 'Black Knight' **118**
 'Cardinal' **118**
 'Empire Blue' **118**
 'Fascination' **118**
 'Flaming Violet' **118**
 'Fortune' **118**
 var. *glabrescens* Gagnep. 154
 'Ile de France' **118**
 var. *magnifica* (Wils.) Rehd. et
 Wils. 114, 117, **118**
 var. *nanhoensis* (Chittenden) Rehd. 114,
118
 'Orchid Beauty' **118**
 'Peace' **118**
 'Purple Prince' **118**
 'Royal Red' **118**
 var. *superba* (Veitch) Rehd. et Wils. 114,
 117, **118**
 var. *veitchiana* **118**
 'White Bouquet' **118**
 'White Cloud' **118**
 'White Profusion' **118**
 var. *wilsonii* Rehd. et Wils. 114
dauidii Franch. × *fallowiana* Balf. f. et W.
 W. Smith **149**

Buddleja dauidii × *fallowiana* **151**
dauidii × *fallowiana* 'Loch Inch' **151**
dauidii × *fallowiana* 'Mayford Purple'
151, 152
dauidii × *fallowiana* 'Westhill' **151**
dauidii × *forrestii* **151**
dauidii × *globosa* **151**, 153, 154
delavayi Gagnep. 9, 15, 16, **119**, 120
 var. *tomentosa* Comber, **syn. nov.** 119,
 121
densiflora Blume 92
diffusa Ruiz et Pav. 8
discolor Roth 92
diversifolia Vahl 52
domingensis Urb. 7
duclouxii Marquand, **syn. nov.** 136, 137
dysophylla (Benth.) Radlk. 2, 7, 12, **37**, 38,
 40
eremophila W. W. Smith, **syn. nov.** 106,
 109, 110
euryphylla Standl. et Steyerl. 8
fallowiana Balf. f. et W. W. Smith 3, 9, 16,
121, 122, 123, 135, 145, 149
 var. *alba* Sabourin 121
farquharrii Farrington ex Rehd. 150, **151**
farrerri Balf. f. et W. W. Smith, **syn. nov.** 106,
 108, 110
formosana Hatusima, **syn. nov.** 111, 113
forrestii Diels 9, 14, 15, 105, **124**, 125, 127,
 135, 136, 149
 var. *gracilis* Lingelsh. 124
forrestii Diels × *macrostachya* Benth. **149**
fragifera Leeuwenberg 6, 9, 12, **41**, 42, 59
fusca Bak. 6, 9, 14, 40, **43**, 44
giraldii Diels 86, 89
glaberrima Loisel.-Deslongch. 154
glabrescens W. W. Smith 119, 121
globosa Hope 7, 8, 11, 12, **45**, 46, 47, 48
glomerata Wendl. f. 7, 12, **49**, 50, 55
grandiflora Cham. et Schlecht. 9
griffithii (C. B. Clarke) Marquand **149**
gynandra Marquand 8, 143, 145
 Series *Gynandrae* Marquand 8, 10
hancockii Kränzl., **syn. nov.** 133, 135
hastata Prain ex Marquand, **syn. nov.** 106,
 109, 110
heliophila W. W. Smith, **syn. nov.** 119, 121
 var. *adenophora* Hand.-Mazz., **syn. nov.**
 119, 121
 var. *angustifolia* Marquand, **syn. nov.**
 119, 121
 var. *pubescens* Marquand, **syn. nov.** 119,
 121
hemsleyana Koehne 86, 89
henryi Kränzl. 124, 127

- Buddleja henryi* Rehd. et Wils. 124, 127, 149
 var. *glabrescens* Marquand, **syn. nov.** 124, 127
 var. *hancockii* (Kränzl.) Marquand 133
heterophylla Lindl. 60
 hieronymi Fries 8
hookeri Marquand, **syn. nov.** 133, 135, 136
hosseusiana Kränzl. 133, 135, 136
 hypsophila I. M. Johnston 8
 incana Ruiz et Pav. 2, 8, 59
incompta L.f. 106, 154
incompta W. W. Smith 106, 109
 indica Lam. 5, 6, 9, 12, 13, 14, **51**, 53, 55, 56, 148
 indica Lam. × madagascariensis Lam. **148**
 insignis Carr. **151**, 152
 intermedia Carr. **151**, 152
 var. *insignis* (Carr.) Rehd. 151
 var. *robusta* Dippel **151**
 interrupta H.B.K. 8
 iresinoides (Griseb.) Hosseus 8
 jamesonii Benth. 8
 japonica Hemsl. 9, 15, 113, **127**, 128, 129, 152, 153
 var. *carnea* (Carr.) Wils. 151
 var. *insignis* (Carr.) Wils. 151
 var. *salicifolia* Wils. **152**
 japonica × lindleyana 151, **152**, 153
japonica Linden 154
 lanata Benth. 8
lavandulacea Kränzl. 143, 145
legendrei Gagnep. 89, 92
 lewisiana 150, **152**
limitanea W. W. Smith, **syn. nov.** 124, 126
 lindleyana Fortune 9, 13, 15, 113, **129**, 131, 146, 148, 152, 153
 var. *macrocarpa* Leo d'Onous **152**
 var. *sinuato-dentata* Hemsl. 130, 132
lobulata (Benth.) Phillips 49
 longiflora Brade 9
longifolia Gagnep., **syn. nov.** 124, 126
 longifolia H.B.K. 8
loniceroides (Moldenke) Moldenke 52
 loricatea Leeuwenberg 3, 8, 10, 12, **56**, 57, 59
 Section *Lozada* Benth. 7, 10
 Subsection *Globosae* Benth. 7
 Subsection *Verticillatae* Benth. 7
 macrostachya Benth. 8, 9, 14, 16, 101, 124, 127, **133**, 134, 136, 145, 149
 var. *griffithii* C. B. Clarke 149
 var. *yunnanensis* Dop 138
 madagascariensis Lam. 2, 6, 7, 8, 9, 13, 14, **59**, 61, 62, 148
- Buddleja madagascatica* 150
 madagascatica 'Margaret Pike' **152**
mairei Lévl. 143
 f. *albiflora* Lévl. 143
 marrubiifolia Benth. 8
martii T. A. Schmidt 133
 megaloccephala Donn. Sm. 8
 mendozensis Gillies ex Benth. 7, 8
 misionum Kränzl. 8
missionis Benth. 155
 multiceps Kränzl. 8
 myriantha Diels 1, 9, 16, 89, 101, **115**, 117, **136**, 137, 149, 154
 nana W. W. Smith, **syn. nov.** 99
 nappii Lorenz 8
 Section *Neemda* Benth. 7, 10, 11
 Subsection *Axilliflorae* Benth. 7, 9, 10
 Subsection *Glomeratae* Benth. 7
 Subsection *Macrothyrsae* Benth. 8
 Subsection *Stachyoideae* Benth. 7
 Subsection *Thyrsoideae* Benth. 8
neemda Buch.-Ham. ex Roxb. 92
 var. *philippensis* Cham. et Schlecht. 93
neemda Link 24
nepalensis Colla 52, 56
 Subgenus *Nicodemia* (Tenore) Leenh. 9
 Section *Nicodemia* (Tenore) Leeuwenberg 9, 10, 11
nimda Buch.-Ham. ex Roem. et Schult. 92
 nitida Benth. 8
 nivea Duthie 8, 13, 16, 101, **137**, 139, 140, 149
 var. *yunnanensis* (Dop) Rehd. et Wils., **syn. nov.** 138, 140
 oblonga Benth. 8
 officinalis Maxim. 1, 9, 15, 16, **140**, 141, 142, 145
 var. *macrantha* Lingelsh. 140
oreophila Gilg 68
otophylla Hassk. 24
 ovandensis Lundell ex Norman 8
 paniculata Wall. 1, 8, 9, 10, 16, 72, 124, 135, **142**, 144, 145, 149, 154
 parviflora H.B.K. 8
 perfoliata H.B.K. 8, 24
 pichinchensis H.B.K. 8
 pikei Fletcher 150, **153**
plectranthoidea Lévl. 155
poiretii Spreng. 17
 polycephala H.B.K. 8
 polystachya Fresen. 9, 13, **64**, 65, 66, 71, 154
 var. *parvifolia* Marquand 64, 66
powellii Kränzl. 64
praecox Lingelsh. 106

- Buddleja pterocaulis* A. B. Jackson 124
pulchella N. E. Brown 9, 13, 67, 69, 70, 71
purdomii W. W. Smith, **syn. nov.** 99
racemosa Torrey 3, 8
ramboi L. B. Smith 8
 Series *Rectiflorae* Marquand 8, 10
reflexa Carr. 152, 153
rondeletiaeflora Benth., **syn. nov.** 52, 54, 56
rufa Fresen. 64
salicifolia Jacq. 72
salicina Lam. 92
saligna Willd. 3, 4, 5, 6, 7, 12, 72, 73, 74, 75
saltiana Steud. 64, 154
salviifolia (L.) Lam. 2, 3, 6, 9, 13, 77, 79, 80, 81
scordioides H.B.K. 6, 8
serrulata Roth 92
sessiliflora H.B.K. 7, 8, 11
shimidzuana Nakai, **syn. nov.** 114, 117
simplex Kränzl. 8
sinuata Willd. ex Roem. et Schult., **syn. nov.** 17, 59
skutchii Morton 8
soratae Kränzl. 8
speciosissima Taub. 3, 9, 11
sphaerocalyx Bak. 9, 11, 30, 37, 81, 84, 85, 86
sphaerocephala Bak. 155
stachyoides Cham. et Schlecht., **syn. nov.** 7, 24, 26
stenostachya Rehd. et Wils. 138, 140
sterniana A. D. Cotton, **syn. nov.** 106, 109, 110
suaveolens Kunth et Bouché 8
subherbacea Keenan, **syn. nov.** 124
subserrata D. Don 92
sundaica Blume 92
taliensis W. W. Smith, **syn. nov.** 124, 126
ternata Lour. 155
thyrsoides Lam. 8
tibetica W. W. Smith, **syn. nov.** 105, 109, 110
 var. *farreri* (Balf. f. et W. W. Smith) Marquand 106
 var. *glandulifera* Marquand 106, 109, 110
 var. *grandiflora* Marquand 106, 109
 var. *truncatifolia* (Lévl.) Marquand, **syn. nov.** 106
truncata Gagnep., **syn. nov.** 105, 108
truncatifolia Lévl. 106, 110
tsetangensis Marquand 89, 92
tubiflora Benth. 9
tucumanensis Griseb. 8
- Buddleja usambarensis* Gilg 67, 71
utahensis Coville 8
variabilis Hemsl. 1, 113, 117
 var. *magnifica* Wils. 113
 var. *nanhoensis* Chittenden 114
 var. *prostrata* Schneider 114
 var. *superba* Veitch 114
 var. *veitchiana* Veitch 114
 var. *wilsonii* Wils. 114
venenifera Makino, **syn. nov.** 111, 113
verticillata H.B.K. 7
virgata Blanco 93
virgata L.f. 93, 155
volubilis Lam. 155
wardii Marquand 1, 10, 149, 150
weyeriana Weyer ex Rehd. 151, 153
 'Golden Glow' 153, 153
 'Moonlight' 154
whiteana R. J. Moore 150, 154
whitei Kränzl. 105, 109
woodii Gilg 68, 71
yunnanensis Gagnep. 3, 9, 14, 146, 147, 148
 Buddlejeae 2
Callicarpa paniculata Lam. 72, 77
Chilanthus Burch. 2, 5, 7, 9, 10
 arboreus (L.f.) A. D.C. 72
 var. *rosmarinaceus* O. Kuntze 72, 76
 corrugatus (Benth.) A. D.C. 7, 10, 56
 dysophyllus (Benth.) A. D.C. 37
 var. *rufescens* Sond. 37
 lobulatus (Benth.) A. D.C. 49
 oleaceus Burch. 5, 7, 72
 triphyllus E. Meyer 155
Clerodendrum loniceroides Moldenke, **syn. nov.** 52, 54
Elsholtzia fruticosa (D. Don) Rehd. 155
Emorya Torr. 3
Freylinia cestroides Colla 154
oppositifolia Colla 154
Gomphostigma incomptum (L.f.) N. E. Brown 154
 virgatum (L.f.) Baill. 155
 Labiatae 155
Lantana salviifolia L. 78
Leucosceptrum plectranthoideum (Lévl.) Marquand 155
Nicodemia Tenore 2, 5, 9
 baroniniana Oliv. 17, 20
 diversifolia (Vahl) Tenore 5, 9, 52
 var. *lucida* Scott Elliot, **syn. nov.** 52, 55
 grandifolia Scott Elliot, **syn. nov.** 52, 55
 hermanniana Cordemoy, **syn. nov.** 52, 56
 isleana Cordemoy, **syn. nov.** 52, 55, 56
 madagascariensis (Lam.) R. N. Parker 59

- Nicodemia rondeletiaeflora* (Benth.)
 Benth. 52
 rufescens Solered., syn. nov. 52, 55, 56
 Nuxia Lam. 3, 4
 corrugata Benth. 56
 dysophylla Benth. 37
 floribunda Benth. 4, 155
 lobulata Benth. 49, 51
 saligna (Willd.) Benth. 72
 sphaerocephala (Bak.) Bak. 155
 Peltanthera Benth. 3

Romana Vell. 5
 campestris Vell. 5
Scoparia arborea L.f. 72, 77
 Scrophulariaceae 2, 154
Semnos Rafinesque 5
 paniculata (Lam.) Rafinesque 72
 Solanaceae 2
 Strychnos L. 3
Vitex esquirolii Lévl. 93, 95
Wendlandia notoniana Wall. ex Wright et
 Arn. 155