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REVISION OF THE GENUS
FICUS L. (MORACEAE)
IN ETHIOPIA
(PRIMITIAE AFRICANAE XI)

G. AWEKE

*Laboratory of Plant Taxonomy and Plant Geography,
Agricultural University, Wageningen, The Netherlands*

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CONTENTS

| | page |
|---|------|
| INTRODUCTION | 1 |
| General remarks | 1 |
| Uses, actual and possible, of <i>Ficus</i> | 1 |
| Method and arrangement of the revision | 2 |
| <i>FICUS</i> L. | 4 |
| KEY TO THE <i>FICUS</i> SPECIES IN ETHIOPIA | 6 |
| ALPHABETICAL TREATMENT OF ETHIOPIAN <i>FICUS</i> SPECIES | 9 |
| <i>Ficus abutilifolia</i> (MIQUEL) MIQUEL | 9 |
| <i>capreaefolia</i> DELILE | 11 |
| <i>carica</i> LINNAEUS | 15 |
| <i>dicranostyla</i> MILDBRAED | 18 |
| <i>exasperata</i> VAHL | 21 |
| <i>glumosa</i> DELILE | 25 |
| <i>gnaphalocarpa</i> (MIQUEL) A. RICHARD | 29 |
| <i>hochstetteri</i> (MIQUEL) A. RICHARD | 33 |
| <i>lutea</i> VAHL | 37 |
| <i>mallotocarpa</i> WARBURG | 41 |
| <i>ovata</i> VAHL | 45 |
| <i>palmata</i> FORSKÅL | 48 |
| <i>platyphylla</i> DELILE | 54 |
| <i>populifolia</i> VAHL | 56 |
| <i>ruspolii</i> WARBURG | 60 |
| <i>salicifolia</i> VAHL | 62 |
| <i>sur</i> FORSKÅL | 66 |
| <i>sycomorus</i> LINNAEUS | 72 |
| <i>thonningi</i> BLUME | 78 |
| <i>vallis-choudae</i> DELILE | 84 |
| <i>vasta</i> FORSKÅL | 88 |
| <i>vogelii</i> (MIQ.) MIQ. | 93 |
| SOME NOTES ON FIGS AND FIG-WASPS IN ETHIOPIA | 97 |
| Infrageneric classification of <i>Ficus</i> according to HUTCHINSON, related to wasp-genera | 99 |
| Fig-wasp species collected from Ethiopian figs (Agaonid associations known from extra-limital samples added in parentheses) | 99 |
| REJECTED NAMES OR TAXA | 103 |
| SUMMARY | 105 |
| ACKNOWLEDGEMENTS | 106 |
| LITERATURE REFERENCES | 108 |
| INDEX | 112 |

INTRODUCTION

GENERAL REMARKS

Ethiopia is as regards its wild and cultivated plants, a recognized centre of genetically important taxa. Among its economic resources, agriculture takes first place. For this reason, a thorough knowledge of the Ethiopian plant cover – its constituent taxa, their morphology, life-cycle, cytogenetics etc. – is required.

But the Ethiopian flora is poorly known; collections, facts, documentation are often inadequate, even for a satisfactory survey. Large areas in Ethiopia remained practically unexplored.

The customs and life-habits of the largely pastoral and farmer population led to large scale devastation. In many provinces the vegetation is scarce, the soil is exposed to erosion (possibly irremediably). This most undesirable state of affairs is frequently aggravated by climatic conditions. Evidently, for a people deriving most of its food and other living necessities from agricultural activities, this is a disastrous development, which has to be countered with all possible means.

The rich natural plant-cover being entirely or largely destroyed in increasing parts of the country makes it imperative to study the plants and the vegetation, as much as is feasible and without delay in order to apply the knowledge so obtained to safeguard, rehabilitate and make useful Ethiopia's own heritage of plant resources. It must be known what species there are, how they behave, where they occur, what they can or may produce, in what manner they participate in the Ethiopian plant – animal communities and, finally, how they may contribute towards a sound, balanced and profitable ecosystem. For this reason, a revision of one of the important taxa demanding attention, systematically and wherever possible biosystematically and ecologically, viz. *Ficus*, was attempted. *Ficus* is now one of the most conspicuous groups of Ethiopian trees to be met in the country.

USES, ACTUAL AND POSSIBLE, OF *FICUS*

The *Ficus* trees, because of their size, are often landmarks. Their enormous root-systems hold large masses of soil and counteract erosion; their influence on moisture-contents of the soil, is uncertain (the broad-spreading crown with its (often) dense foliage protects against irradiation, the roots take up water). The shade of the trees certainly provides much appreciated shelter for man and beast, and 'hygrophilous plants can be grown in their shade' (DALE & GREENWAY, 1961, p. 312).

Animals (birds, monkeys (baboons), small mammals) are keen on the ripe

figs; in some cases the figs are eaten by man (and there is also a report that the bark of one of the species is edible). When managing nature reserves it may be interesting to consider promoting certain favoured fig-species as a supply to protected animals.

The leaf, bark, latex and the figs of some species are used in Ethiopian folk-medicine for various complaints; the pharmacology of these products awaits study (and needs as a starting point well-delimited and well-named *Ficus* species). Under the various species reference is made to these uses, as a remedy e.g. against skin-diseases or against paralysis.

Leaves are sometimes used to germinate barley, the latex as a glue or as chewing-gum, the bark for dyeing tissues, and leaves and/or fruits are fed to cows to increase the yield of milk.

Of course, the use of the rough leaves in some species in large parts of Africa as a sand-paper, or polishing, is widely known. The fibrous bark may serve to make ropes and the wood for fuel. One species (*F. sycomorus*) is often preferred as a wood for making caskets for the dead. The rapidly changing living conditions in some parts of Ethiopia stress a need for documentation and recording of applications before they are lost and forgotten. Research may reveal that in some cases valuable facts and products will be obtained from age-old popular belief or customs.

The use of *Ficus* for various purposes in particular as medicine can only be fully evaluated in field research and experimental controls are carried out accompanied by the conservation (herbarium) of the investigated materials.

The present *Ficus* revision should eventually provide material towards a Flora of Ethiopia; preliminary extracts or data may be helpful when teaching botany to students and stimulate their attention for one of the most impressive and biologically interesting plant groups of Ethiopia.

METHOD AND ARRANGEMENT OF THE REVISION

An easy-to-handle key is always an appreciated technical facility in any systematical treatment. Therefore, the key to Ethiopian *Ficus*, now presented, is based, as much as was found possible, on field characters and readily observable characters of herbarium specimens. The early authors (e.g. FORSKÅL, MIQUEL, HOOKER) distinguished in *Ficus* some subgenera, or even genera very closely allied to *Ficus*, e.g. *Urostigma*, and this practice was continued by the authors of our days (e.g. MILDBRAED & BURRET, HUTCHINSON, and CORNER).

When it appeared that the characteristics of some generally accepted subgenera were inconstant – even in the comparatively small number of Ethiopian *Ficus*-species –, it was decided not to adopt them but to treat *Ficus* as one whole without intermediate taxa between genus and species. Moreover, the suggested subgeneric characteristics often are not easily verified and so no useful purpose was served to maintain subgenera in conformity with revisions covering a much wider area and a much larger number of species. This means

that the usually adopted subgenera are not rejected here, they simply are not considered.

The area of distribution was arranged according to province, but much collecting has to be done before a definite delimitation of the areas can be established. The dotted maps of finding localities indicate clearly that large gaps exist between the usually visited easily accessible collecting areas. These maps will serve to guide collectors wanting to collect *Ficus*, which is desirable because the specimens available in many cases are inadequate for an evaluation of specific variability.

Common names in various languages have been included and it appears that widespread allied species may have an identical or slightly varying name in a number of Ethiopian languages (cf. CUFODONTIS (1953), BREITENBACH (1963), MOONEY (1963), and AWEKE (1974)).

Many spelling discrepancies were met when names of localities (or of collectors) had to be recorded; in general the spelling found on relevant labels was adopted. The names found on the map in WESTPHAL, *Pulses in Ethiopia*, 1974 (Belmontia N.S. vol. 3) are followed.

The species-descriptions are accompanied by a citation of the type material, references to the most important (or available) literature, a citation of the herbarium specimens examined, notes on the nomenclature, taxonomy and ecology.

Due to a close and enthusiastic cooperation with Professor dr. J. T. WIEBES (Leyden University), it became possible to ascertain the identity of various wasp-species found in the figs and his suggestions and information led to the addition of a special chapter: 'Some notes on figs and fig-wasps in Ethiopia'.

The drawings were made of Ethiopian material (preferably type specimens). *F. carica* is only figured vegetatively pending the assembling of more and better specimens collected in Ethiopia, in connection with a continued study of *F. palmata*.

Near Lake Zwai, AWEKE & DE WIT (1478, ETH, WAG) found a huge *F. sycomorus* tree with scaly but glabrous figs (red at maturity). All leaves were damaged by insects, all figs teemed with gall-wasps. Further study may show that 'caprificus'-trees may occur in *F. sycomorus*.

FICUS L.

Trees or shrubs, sometimes (temporarily) epiphytes, containing a latex, with simple alternating (sometimes \pm opposite), pinnately nerved or partly palmately-nerved leaves. Stipules 2 or 1, caducous, lateral (2) or axillary (1), and then leaving linear encircling scars on the bark of the branch and enclosing the terminal bud (bud-scales absent).

Flowers on the inside wall of a globular or pear-shaped, hollow receptacle ('fig'), small, numerous, unisexual, monoecious (or rarely dioecious), perianth (2-)4(-6)-lobed, membranous, often lacerate, white or brown, sometimes very small or even absent.

Male flowers containing 1 or 2 stamens (rarely more), rarely accompanied by a rudimentary ovary, when paired the anthers face each other. Anthers as a rule comparatively large, 2-loculed. Locules dehiscent length-wise, often free in lower part (pseudo-dorsifix).

Female flowers containing an ovoid, usually \pm asymmetrical ovary. Style laterally inserted, usually in the upper half, short ('gall-flower') or long ('fertile flower'). Stigma oblique, rough, small or large.

Fruit an achene; pericarp thin, caducous, smooth; albumen present (sometimes almost wanting); embryo curved.

Receptacle \pm lignescent or fleshy, with an apical pore ('ostiole') which is closed by some (outer) scales (ostiole bracts) and numerous (inner) thin, flat, appressed scales (inner bracts). At or near the base of the receptacle 3 (or 2) usually partly fused peduncular bracts; rarely a few exterior bracts on the outer receptacle-wall. Male flowers almost always close to the inner bracts.

Type species: *Ficus carica* L.

Taxonomical notes: *Ficus* is a circumtropical genus, which is also occasionally found in warmer regions and contains 800-1000 species.

Check-lists of Ethiopian *Ficus* species were made by SCHWEINFURTH & ASCHERSON (1867), SCHWEINFURTH (1893) and by CUFODONTIS (1953).

Of the 31 (32) species listed by CUFODONTIS 21 are accepted in the present revision, while 3 species are excluded (*F. scassellatii*, *F. somalensis*, and *F. zambesiaca*) because no collecting record exists within the Ethiopian borders. On the other hand, 3 species not listed by CUFODONTIS are treated in this revision (*F. dicranostyla*, *F. ovata*, *F. vogelii*) because they occur in Ethiopia.

The revision is by no means final. Collections are far too occasional and the specimens often poor. Much collecting has to be done to arrive at a satisfactory knowledge of the morphology, ecology and distribution of Ethiopian *Ficus*-species. There is little or no knowledge of practically all wild figs regarding the fig-development from young to full maturity.

The state of affairs is reflected in e.g. HUTCHINSON's treatment of *Ficus* in

tropical Africa. While adopting 174 species, he based 59 species each on a single specimen, while another 23 were based on 2 specimens. It is obvious that this material cannot be adequate to study the variability of these 'species' and most probably, many of the species adopted by HUTCHINSON will prove to be identical when a wider range of specimens becomes available. The present study already contains some examples.

The systematic place in *Ficus* is isolated because of the most characteristic shape of the inflorescence: the fig. This suggests a much derived and specialized place, a view further strengthened by the symbiosis with insects (pp. 97-102). Another character stressing specialization is in the single style, whereas in *Moraceae* a forked style is generally present. A few taxa in *Ficus* also have a forked style (e.g. *F. dicranostyla*, *F. palmata* (JANSEN 5213) and *F. carica*), but it seems very possible that this branching of the style is not directly related to the forked style in *Moraceae*. The style branches in *Ficus* usually are irregular, both in number and size, and suggest a secondary acquisition, not an 'original' character.

Ecological notes: *Ficus* is more frequent at lower altitudes although they are found from sea-level to 2600 m alt., or occasionally still higher. They may grow in arid areas (near rivers though), and are able to survive when the surrounding vegetation has been destroyed, and they are common in forest. In the forest their epiphytic way of life (when young) may result in killing (strangling) the supporting tree; finally a pseudo-trunk (the hollow casket of anastomosing roots) remains, this *Ficus*-'tree' replacing its former support.

KEY TO THE FICUS SPECIES IN ETHIOPIA

1. Leaf-edge serrate or remotely crenate-denticulate. Blade lobed or not.
 2. Figs (axillary) on the outer branches.
 3. Deciduous shrubs or small trees, cultivated. Figs up to 7 cm long. **F. carica**
 3. Wild growing evergreens, sometimes deciduous. Figs up to 3 cm in diam.
 4. Leaf smooth. **F. vallis-choudae**
 4. Leaf rough, at least on one surface.
 5. Figs scabrous. Leaves coarsely scabrous on both surfaces. **F. exasperata**
 5. Figs not scabrous, pubescent to tomentose. Leaves more or less smooth, at least on lower surface.
 6. Leaves more or less indistinctly crenate. . . **F. gnaphalocarpa**
 6. Leaves serrate, often lobed. **F. palmata**
 2. Figs on branching panicles, pendent or not, on trunk and branches.
 7. Receptacle (scaly-)puberulous to glabrous. **F. sur**
 7. Receptacle tomentose to densely pubescent. **F. mallotocarpa**
 1. Leaf-edge (sub)entire. Blade not lobed.
 8. Figs on branching panicles, (almost) all cauliflorous. . . . **F. sycomorus**
 8. Figs usually axillary on the outer branches.
 9. Base of leaf-blade not cordate; cuneate to rounded or obtuse.
 10. Leaves (sub)opposite, apex (often) tridentate, rough at least on lower surface. Figs rough, bristly hairy, ca 2 cm in diam. Ostiole gaping. **F. capreaefolia**
 10. Leaves alternating, apex acuminate or blunt, rough or smooth on both surfaces. Figs smooth, glabrous or pubescent.
 11. Leaf-blade (ob)ovate to elliptic(-ovate), up to 2 times as long as wide.
 12. Ostiole linear or not (ostiolar bracts invisible from the outside).
 13. Leaf-blade glabrous and very smooth on both surfaces. Figs sessile.
 14. Ostiole bilipped, linear. Lateral veins (leaf-blade) 12-25, not conspicuous. Figs ca 1½ cm in diam. **F. thonningi**
 14. Ostiole four-lipped, cross-shaped. Lateral veins (leaf-blade) 6-8, conspicuous and prominent on lower surface. Figs 1-1½ cm in diam. **F. vogelii**
 13. Leaf-blade at least pubescent on the midrib of the lower, sparsely pubescent surface; surface often not

- quite smooth. Figs short-pedicelled to sessile. **F. hochstetteri**
12. Ostiole a pore, (partly) closed by visible bracts.
15. Ostiolar bracts glabrous, imbricate, slightly prominent on mature receptacles. Figs pedunculate. **F. dicranostyla**
15. Ostiolar bracts ciliate, not imbricate, in ripe figs surrounded by the raised, ring-shaped top. Figs sessile. **F. ovata**
11. Leaf-blade oblong, ca 3 times as long as wide.
16. Leaf-blade entirely glabrous, the midrib usually with a distinct gland or (in dry specimens darker coloured) glandular tissue at the base on the lower surface. Petiole glabrous. **F. salicifolia**
16. Leaf-blade glabrous, except on the upper surface around the insertion of the petiole. Midrib (on the lower surface) and petiole densely pubescent to rufous-hirsute. **F. ruspolii**
9. Base of leaf-blade cordate, sometimes only slightly so, rarely truncate.
17. Leaf-blade quite glabrous.
18. Leaf-blade heart-shaped, light green when dry, chartaceous. Petiole slender. Figs peduncled. Branchlets twiggy, slender, greenish-yellow. **F. populifolia**
18. Leaf-blade (oblong-)ovate to suborbicular or elliptic. Figs sessile or peduncled.
19. Stipules glabrous or nearly so. Figs $2\frac{1}{2}$ –5 cm in diam. **F. ovata**
19. Stipules hirtellous to tomentose. Figs less than 2 cm in diam.
20. Leaf widest near middle. **F. vasta**
20. Leaf widest near base. **F. lutea**
17. Leaf-blade not quite glabrous, sometimes hairy on (the nerves of) the lower surface.
21. Leaf-blade not acuminate, rounded or blunt.
22. Basal lobes of leaf-blade touching (overlapping).
23. Petiole glabrous or almost so. Figs glabrous, mottled, stipitate above the bracts. Peduncle glabrous. Basal bracts reduced to an oblique rim or cup. **F. abutilifolia**
23. Petiole softly puberulous. Figs densely pilose to glabrous, not mottled. Peduncle densely pubescent. Basal bracts 2, connate at base. **F. platyphylla**
22. Basal lobes of leaf-blade not touching. Figs tomentose, woolly or silky.

- 24. Figs (sub)sessile (peduncle up to 5 mm long). **F. vasta**
- 24. Figs peduncled. Peduncle usually much longer than 5 mm.
 - 25. Peduncle 1–3 cm long. Young buds (stipules) densely (and shaggily) pilose, dorsally, on and near midrib. Fig up to over 2 cm in diam. **F. gnaphalocarpa**
 - 25. Peduncle 2–5 cm long. Young buds (stipules) densely tomentose. Fig up to 1 cm in diam. **F. platyphylla**
- 21. Leaf-blade at least (sub)acuminate (acumen sometimes blunt).
 - 26. Figs pedunculate (penduncle ca 1 cm long).
 - 27. Leaf-blade subcordate, \pm elliptic. Figs puberulous. **F. dicranostyla**
 - 27. Leaf-blade deeply cordate. Figs glabrous, mottled **F. abutilifolia**
 - 26. Figs (sub)sessile (peduncle absent to \pm 3 mm long).
 - 28. Stipules glabrous, or almost so. Figs $2\frac{1}{2}$ –5 cm in diam. Leaves (6–)12–25 cm long; petiole glabrous or puberulous. **F. ovata**
 - 28. Stipules partly hirsute. Figs up to 2 cm in diam. Leaves (3–)10(–15) cm long; petiole (at first) softly tomentose. Ostiole bilipped. **F. glumosa**

ALPHABETICAL TREATMENT OF ETHIOPIAN FICUS SPECIES

Ficus abutilifolia (MIQUEL) MIQUEL

Fig. 1

MIQUEL 1867, p. 288; MILDBRAED & BURRET 1911, p. 214; HUTCHINSON 1916, p. 192; CHEVALIER 1920, p. 598; ANDREWS 1952, p. 272; CUFO-DONTIS 1953, p. 9; KEAY 1958, p. 609; BREITENBACH 1963, p. 121; JAEGER 1964, no. 132.

Ficus discifera WARBURG. WARBURG 1905, p. 210; HUTCHINSON 1917, p. 196; CHEVALIER 1920, p. 598; ID. 1939, p. 75; ANDREWS 1952, p. 272; CUFO-DONTIS 1953, p. 10; KEAY 1958, p. 609.

Urostigma abutilifolium MIQUEL. MIQUEL 1847, p. 551; ID. 1849, p. 133 and tab. 3; SONDER 1850, p. 136.

Urostigma catalpaeifolium MIQUEL. MIQUEL 1847, p. 551.

Tree up to 10 m high, branchlets light red, glabrous.

Leaves broadly ovate to suborbicular, up to 20 cm long and almost as wide, chartaceous to (sub)coriaceous, base deeply cordate (the basal, broadly rounded lobes often overlapping), above smooth, dull and glabrous, below dull and minutely and densely pubescent (glabrescent at last), apex obtusely short-acuminate, margin (sub)entire. Nerves almost plane above, slightly prominent below, there a large gland on the base of the midrib. Laterals 5–9 (the 2–3 lowermost arising together at the base of the midrib), often forked; intercostals weakly developed except from the lowermost nerves. Petiole 5–10(–12) cm long, stout, glabrous to white or yellowish tomentose.

Figs 'axillary, solitary or in clusters' (fide ANDREWS), pedunculate, stipitate, mottled, globular to \pm ovoid, 1–1½ cm in diam., glabrous or nearly so. Ostiole prominent, without visible outer bracts. Ostiolar bracts all pointing downward into the receptacle. Peduncle up to 1 cm long. Basal bracts connate, together saucer-shaped.

Flower-perianth consisting of 3–4 membranous, acute, lobes, half as long as the ovary, finally desintegrating.

Male flowers: A few near the ostiole, pedicellate, stamen solitary, anther broadly ellipsoid, small, not apiculate. Stamen when fully mature with a slender ca 2 mm long filament, attached dorsally to the connective, half way up the loculi, which are free in their lower half, above the insertion with a dorsal gland on the connective near the apex. Loculi longitudinally and widely dehiscent.

Female flowers short and thick pedicelled, with a short 3-lobed perianth, style slender.

Gall-flowers with a short style and a large, oblique, 2–3-branched, fringed stigma.

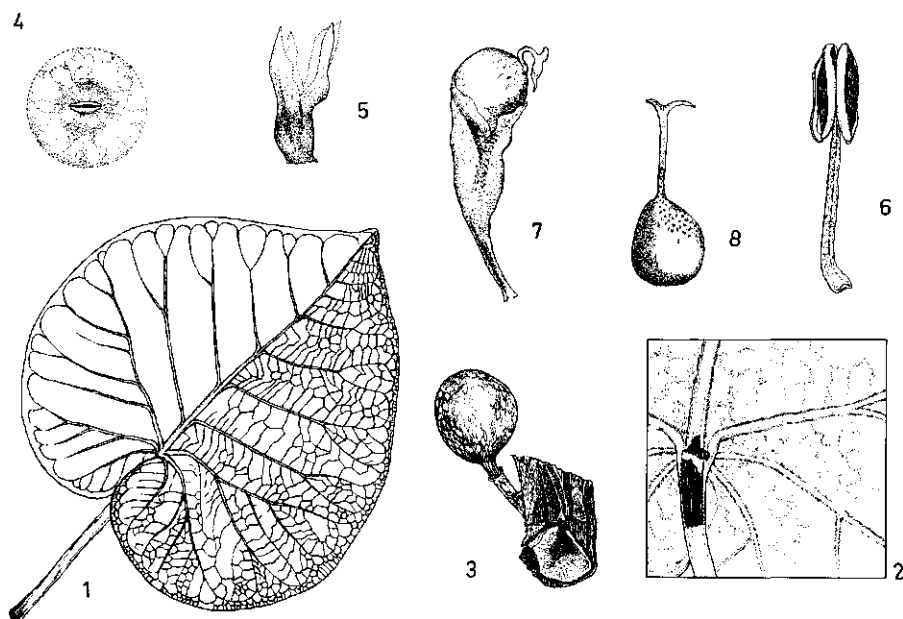


FIG. 1. *Ficus abutilifolia* (MIQ.)MIQ. - 1: Leaf ($\times \frac{1}{2}$); 2: Leaf-blade, petiolar area, lower surface ($\times 2$); 3: Fig ($\times 1$); 4: Ostiole ($\times 4$); 5: Perianth male flower ($\times 10$); 6: Stamen ($\times 10$); 7: Gall-flower ($\times 10$); 8: Female flower ($\times 10$). (1-8: KOTSCHY 462).

Taxonomical notes: MIQUEL described *Urostigma abutilifolium* (1847) as a new species, citing KOTSCHY 462 (regnum Fazokel) and BURKE s.n., Macalisberg, Africae merid. subtrop. He noted in the protologue that BURKE's Magaliesberg specimen (near Pretoria) differed from KOTSCHY 462. In 1849 MIQUEL redescribed *U. abutilifolium* and pictured KOTSCHY 462 in detail. It seems justified to select KOTSCHY 462 as the lectotype for *U. abutilifolium* MIQ., a view adopted by e.g. MILDBRAED & BURRET (1911, p. 215).

In 1867 MIQUEL reduced *Urostigma* to a subgenus in *Ficus* and published the new combination *Ficus abutilifolia* (MIQ.)MIQ. (cf. notes p. 58).

WARBURG published *Ficus discifera* (1905) basing this new species on a single specimen, SCHWEINFURTH 548 (holotype; isotype: P). SCHWEINFURTH collected this at Jebel Arrang (zwischen Gedari (Bedaci) und Abu Harres (Abutaccaze)), which is in the Sudan.

HUTCHINSON (1917) maintained *F. discifera*, though MILDBRAED & BURRET (1911) had expressed doubt as to a synonymy with *F. abutilifolia*.

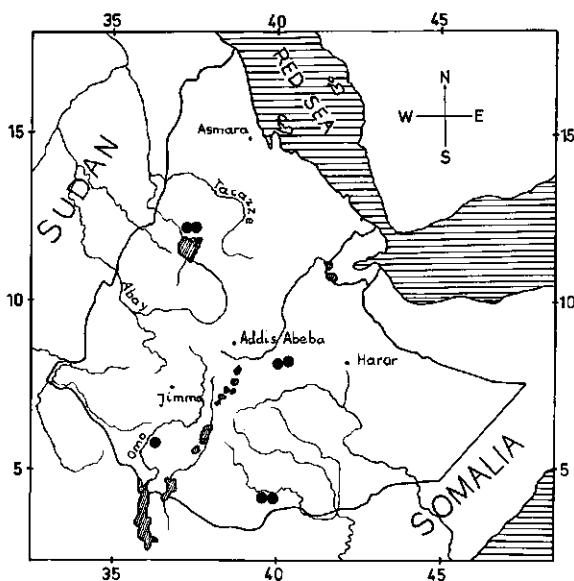
ANDREWS (1952) reduced *F. discifera* to *F. abutilifolia* and so did KEAY (1958); but CUFODONTIS (1953) maintained *F. discifera* as a separate species.

In this revision *F. discifera* was made a synonym of *F. abutilifolia*, because it seems that WARBURG mistook the remnant of a broken-off receptacle above the bracts as a 'disc'.

Ecological notes: BREITENBACH (1963) cited 'semi-humid lowland-savannah, thicket-savannah', sea-level up to 800 m as its habitat.

Distribution: Specimens of *F. abutilifolia* were seen from Cameroon, Central African Rep., Dahomey, Nigeria, Somalia and Sudan and the species is reported from almost all tropical Africa.

However, the type was collected at Fazokel (Fazokl or Fazogli) close to the present Ethiopian-Sudan border, i.e. possibly in the Sudan or in Gojam prov.



Ficus abutilifolia (Miq.)Miq.

Specimens examined:

Begemdir prov.: Dembia: Chiovenda 1759; id. 2667 (FI).

Gojam prov.: Fazokel: Kotschy 462 (BM, K. P).

Arussi prov.: Galla: Negri 906; id. 1003; id. 1419 (FI).

Sidamo prov.: Ruscello di El Dire: Corradi 5887; id. 5888 (FI).

S. loc.: ?Ethiopia. 2me voyage aux sources du Nil-Blanc, 1841, avril, Arnaud s.n. (P); s.loc., Kotschy 'Ethiopia' 415 (K).

Ficus capreaefolia DELILE

Fig. 2

DELILE 1843, p. 94; SCHWEINFURTH 1893, p. 65 ('capreifolia'); ENGLER 1895, p. 161 ('capreifolia'); ALMAGIA 1903, p. 116 ('capraefolia'); WARBURG & DE WILDEMAN 1904, p. 36, tab. XXII; FIORI 1910b, p. 371; MILDBRAED & BURRET 1911, p. 202 ('capreifolia'); HUTCHINSON 1916, p. 107; CHIOVENDA 1916, p. 165; CHIOVENDA 1932a, p. 410; LEBRUN 1934b, p. 34; SENNI 1935, p.

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251; LEBRUN & BOUTIQUE 1948, p. 126; CODD 1951, p. 21; ANDREWS 1952, p. 268, fig. 94 ('*capreifolia*'); CUFODONTIS 1953, p. 10; KEAY 1958, p. 605 ('*capreifolia*'); DALE & GREENWAY 1961, p. 315; WATT & BREYER-BRANDWIJK 1962, p. 775; BREITENBACH 1963, p. 122; DE WOLF 1964, p. 3, 7 ('*capraefolia*').

Ficus antithetophylla MIQUEL. MIQUEL 1848, p. 236, tab. 5B ('*F. capraeefolia*' *err.cit.* '*Schimper 866*'); RICHARD 1850, p. 272; SOLMS-LAUBACH 1867, p. 189; MARTELLI 1886, p. 78; MILDBRAED & BURRET 1911, p. 202; HUTCHINSON 1916, p. 107; CUFODONTIS 1953, p. 10; BREITENBACH 1963, p. 122; MOONEY 1963, p. 55.

Ficus paolii PAMPANINI. PAMPANINI 1915, p. 15; CHIOVENDA 1932a, p. 410.

Ficus tridentata FENZL. FENZL 1844, p. 311, nom.; SOLMS-LAUBACH 1867, p. 189; MILDBRAED & BURRET 1911, p. 202; HUTCHINSON 1916, p. 107; CUFODONTIS 1953, p. 10; BREITENBACH 1963, p. 122.

A shrub or tree, up to 7 m tall, dbh \pm 80 cm. Bark grey or grey-brown. Latex milky white. Leaf-bearing parts of the branches brownish (when dry), sparsely to densely puberulous to hirsute. Older parts greyish, not peeling.

Leaves in spirals, in two rows, often (sub)opposite. Stipules free, lateral, tardily caducous, ca $\frac{1}{2}$ – $1\frac{1}{2}$ cm long, sparsely hirsute outside, subcarinate to dorsally lengthwise with a prominent ridge, tapering from the base. Petiole up to 1.3 cm long, 1.5 mm wide, minutely puberulous to hirtellous. Blade oblong to lanceolate, 3 times as long as wide, drying greenish or pale brown, 4–16 $\frac{1}{2}$ cm long, 1–6 cm wide, chartaceous, often scabrous on both surfaces, glabrous or the midrib with sparse hairs, edge subentire. Apex acuminate to acute or sometimes tridentate. Base cuneate to rounded. Veins almost plane above, midrib \pm grooved, more or less prominent beneath, 6–10 pairs of laterals. Basal pairs hardly distinct, intercostals absent. A pair of glands in the axils of the basal veins.

Figs solitary in the axils of the leaves, scabrous, bristly hairy. Peduncle up to 2 cm long, slender, puberulous. Basal bracts 3, ovate to triangular, \pm 2 mm long, ciliolate, imbricate at base, acute. Receptacles ellipsoid to subglobose to sub-pyriform up to 3 $\frac{1}{2}$ cm long, and 1.0 cm wide; stipitate or not. Ostiole more or less prominent, ca 3 mm wide, outer scales puberulous, ciliolate, triangular, acute, the closing bracts all or partly horizontally directed.

Male flowers: Long pedicelled, scattered through the receptacle, often in groups; stamen solitary, often accompanied by an abortive ovary. Tepals longer than the stamens, membranous. Anthers not apiculate.

Female flowers: Pedicelled. Perianth splitting to the base. Tepals 5, narrow, long-tapering, longer than the short-stiped ovary. Style lateral, near the top, short; stigma small, purple, the truncate ending of the style, usually slightly broadened or sublobed.

Taxonomical notes: DELILE (1843, p. 94) based *Ficus capraeefolia* (the specific epithet often misspelt afterwards) on a specimen 'Herbier de M. GALINIER', 'grand arbrisseau près de l'eau du Tacazzé'. This holotype was



FIG. 2. *Ficus capreaefolia* DEL. - 1: Branch ($\times \frac{1}{2}$); 2: Leaf, upper surface ($\times \frac{1}{2}$); 3-4: Female flower ($\times 10$); 5: Gall-flower ($\times 10$); 6: Male flower ($\times 10$); 7: Ostiole ($\times 2$). (1: AWEKE 696 & JANSEN 5760; 2, 5-6: AWEKE 696; 3-4, 7: DE WILDE & DE WILDE-DUYFJES 7858).

examined at Montpellier (MPU).

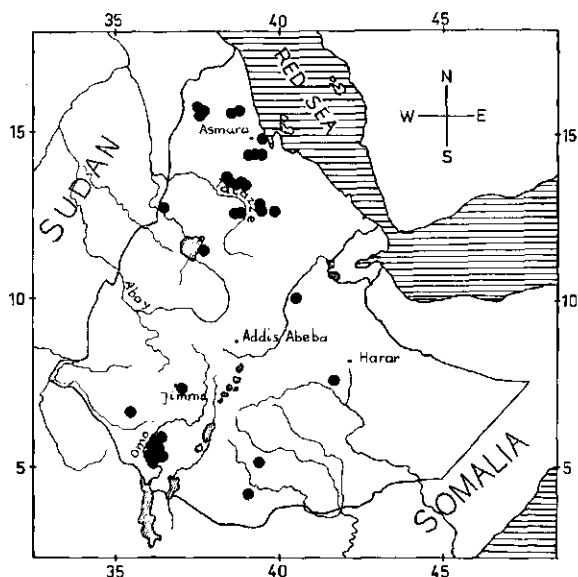
Ficus antithetophylla MIQUEL (1848) was based on 'ad ripas fluminis Tacazze, 28 Maji, 1840 (SCHIMPER)'. MIQUEL gave a picture Tab. V, B, and referred to STEUDEL in SCHIMPER, Fl. Abyss. Sect. II. The full author's citation is: (STEUDEL in SCHIMP.) ex MIQUEL. However, MIQUEL cited in the protologue '*Ficus capreaefolia* DELILE', which invalidates *Ficus antithetophylla*.

Ficus paolii PAMPANINI (1915) was based on 'Rive del Giuba a Ferdadale, 21.X.1913 (n. 983)'. The type was not seen. CHIOVENDA (1932a) declared *F. paolii* PAMPANINI to be synonymous with *F. capreaefolia*; this opinion is accepted here.

Ficus tridentata FENZL (1844) mentioned by CUFODONTIS (1953, p. 10) as a synonym to *F. capreaefolia* is a nomen nudum (?KOTSCHY 167, 202, 228, 298, L, P, UPS); it probably came from Sennaar (Sudan).

Ecological notes: Most collectors noted that *F. capreaefolia* occurred in river valleys or on river banks (e.g. SCHIMPER, MOONEY, BURGER, DE WILDE & DE WILDE-DUYFJES). BREITENBACH (1963, p. 122) described it as a 'willow-like shrub or tree up to 8 m high' and DE WOLF as a 'thicket-forming or suckering shrub, on stream-banks'. In Ethiopia all specimens were collected above 1000 m alt.; the highest altitude on record is 2600 m (PAPPI 2083).

BURGER (1972) collected *F. capreaefolia* in the Ramis river bed but MOONEY found it at 1500 m on a river bank associated with *Salix subserata* (rainfall ca 500 mm). *F. capreaefolia* there was 'a large shrub or small tree, 4–5 m high, with a smooth, pale bark'. The immature receptacles were up to 2 cm in diam., and the latex 'milky, not very abundant'. P. C. M. JANSEN (5760) at 1300 m found no latex at all; the leaves were 'scabrous', and the fruits yellow green.



Ficus capreaefolia DEL.

DE WILDE & DE WILDE-DUYFJES (7857) also noted that the figs were 'yellowish-green' (they found latex!) and both the latter collectors commented on the conspicuous light-coloured veins in the leaf. The specimen collected by the DE WILDE's appears to have no ♂ flowers, while the receptacle contains numerous styleless (abortive?) flowers and rather long-styled ♀ flowers, which have a comparatively large stigma.

Use: The leaf is sometimes used as a sand-paper (cf. *F. exasperata*) in Tanganyika and in South-Africa, but there is no Ethiopian report extant.

Vernacular names: Amharic: *belles* (BURGER, MOONEY); Galla: *lugo*, *wallanti* (BURGER, BREITENBACH); Tigrina: *belas*, *ballas* (BREITENBACH, MOONEY); Somali: *muki hubeto* (BREITENBACH).

Specimens examined:

Eritrea prov.: 33 km S. of Nefasit, *Aweke* 696 (ETH, WAG); Presso Keren, *Beccari* 70 (FI); Bogos: Ausebu tra Adik-Adi e Habi Mantel, *Fiori* 22 (FI); Beni-Amer, *Pappi* 8769, 8798 (FI); Presso Dabicar, *id. Herb. Gavioli* 25795 (FI); Bogos: Beggiucch, presso Adi Mendid, *id.* 8523 (FI); Ocule-Cusai, *id.* 1817 (FI, P, W); Ocule-Cusai oggi sardo Degghalen, *id.* 2083 (FI, L); Keren, *Tellini* 797 (FI).

Tigre prov.: Tigre: Scire, Mai-Timket, *Chiovenda* 589 (FI); bords du Tacazze et Adua, *A. Petit*, 3me envoi, 4e centurie 18, 426 (P); Chire, *id.* 89 (P); Tchessu Hechequenne, *Quartin-Dillon et Petit s.n.* (P); N. of Adua, *Rochet d'Héricourt* 132 (BR, P); Djeladjeranne, *Schimper s.n. in 1855* (P); Sud Tacazze, a Mai-Timket, *Senni* 1634, 1635 (FI).

Begemdir prov.: Dembia, Gondar nella citta, *Chiovenda* 1759 (FI); près de l'eau du Tacazze, *Gulinier* 117 (MPU, holotype); Gondar, *Rochet d'Héricourt s.n.* (P); fluv. Tacazze, *Schimper* 886, *It. Ab. Sect. II* (BR, L. P, UPS, U: isotype of *F. antithetophylla*); Tacazze 'Winssen-Daroe', *id.* 1446 (P); Callabat, Umgegend von Matamma, *Schweinfurth* 550 (BM, K, P); Staude am Tacazer-strand, *id.* 535 (43) (FI).

Gojam prov.: Blue Nile, *Schweinfurth s.n.* (L).

Shoa prov.: Awash river, near Nazareth, *Mooney* 9095 (BR, K); ?Baher Salem, *Pappi* 9055 (FI); sine loc., *Rochet d'Héricourt in 1843* (BR, P); sine loc., *Rochet d'Héricourt* 132 (P).

Hararge prov.: S.W. of Bedenno, *Burger* 1972 (ACD, K).

Gamu Gofa prov.: Murle, Rive del Omo, *Corradi* 5901, 5902, 5903, 5904, 5905 (FI); Nargi, Rive del Omo, *id.* 5921, 5929, 5930, 5932, 5933 (FI).

Kefa prov.: Godjeb farm of Catholic Mission, *Jansen* 5760 (ACD, WAG); about 60 km S.W. of Jimma along Bonga road, *De Wilde & De Wilde-Duyfjes* 7857 (BR, C, ETH, WAG).

Sidamo prov.: Neghelli, *Ash* 826 (K); Nel Ferr, Dei Borana, *Cufodontis* 82 (FI).

Also seen from Cameroon, Moçambique, Nigeria, Senegal, S. Africa, Sudan, Tanzania, Uganda, Zaire and Zanzibar.

Ficus carica LINNAEUS

Fig. 3

LINNAEUS 1753, p. 1059; FORSKÅL 1775, p. 180, CXXIV; THUNBERG 1786, p. 6; LINK 1822, p. 451; GASPARRINI 1845; MIQUEL 1849, p. 127; 1867, p. 289; SCHWEINFURTH & ASCHERSON 1867, p. 290; SCHWEINFURTH 1868, p. 686; BOISSIER 1879, p. 1154; DE CANDOLLE 1886, p. 295; BAKER 1894, p. 341; HIERN

1900, p. 1008; SCHWEINFURTH 1896, p. 127; WARBURG 1904, p. 365, 367; MILDBRAED & BURRET 1911, p. 189; HUTCHINSON 1916, p. 79; BLATTER 1923, p. 443; WERTH 1932, p. 539; POST (& DINSMORE) 1933, p. 515; SCHWARTZ 1939, p. 25; ANDREWS 1952, p. 256; CUFODONTIS 1953, p. 10; KEAY 1958, p. 611; WATT & BREYER-BRANDWIJK 1962, p. 775; MOONEY 1963, p. 55; CORNER 1965, p. 36; HILL 1967, p. 10, 45; TÄCKHOLM 1974, p. 55.

A small deciduous tree or a shrub, often \pm 3 m high, locally cultivated in Ethiopia; latex copious, white.

Leaves 3-lobed (central lobe longest, sinus rounded) to cordate-ovate, edge serrate, upper surface \pm smooth, lower surface glabrous to softly puberulous (pubescent especially on the nerves). Nerves pinnate, palmate at the base of the lamina, viz. a pair of large side-nerves and usually some weaker nerves; above this 4–6 pairs of side-nerves. Intercostals present; numerous slender short side-veins at a right angle between the pairs of side-nerves. Glandular tissue near the top of the petiole.

Figs pyriform, green or purple.

Male flowers: Not seen.

Female flowers pedicelled, with long slender style, upper part shrunk and without a distinct stigma. Sometimes forked. Perianth segments colourless, membranous and acute. Receptacle without wasps.

Gall-flowers with a short, laterally attached style, shorter than the ovary, and a clavate stigma. Wasps exceptionally numerous.

Taxonomical notes: WARBURG (1904, p. 367) discussed the origin of *F. carica* and preferred to leave the problem where the mediterranean ancestor of *F. carica* is found, undecided. He pointed out, however, that the species of *Ficus* are often endemics ('groszen Endemismus'), and it seems therefore probable, WARBURG declared, that more than one single wild species would be the ancestor of the cultivated fig. This seems a rather weak argument because, on the contrary, many *Ficus* species have an unusually large area of distribution.

WARBURG (l.c., p. 368) supports HUTCHINSON's view that *F. carica* as a domesticated plant reached Europe through the Arabs, and *F. palmata* might be the most nearly related species. On the other hand, WARBURG declared, an African origin of the cultivated fig is not at all confirmed by recently collected herbarium specimens, and he seems inclined to assume that the ancestry of *F. carica* is to be found in Sinai, Kurdistan, Syria or Iran. LINNAEUS named *F. carica* after 'Caria', a vernacular name in the middle East.

BLATTER (1923, p. 443) mentioned 2 varieties in *F. carica*: var. *leucocarpa* SCHWEINF. and var. *rupestris* HAUSSKN. MIQUEL (1867, p. 289) commented on GASPARRINI's work on *F. carica*. The numerous forms GASPARRINI treated as species (see GUSSONE 1843, p. 880) and which BOISSIER accepted (1879, p. 1154), MIQUEL did not accept; it is beyond the scope of the present revision to consider this problem.



FIG. 3. *Ficus carica* L. ($\times \frac{1}{2}$). (AWEKE & GILBERT 697).

Ecological notes: HILL (1967) in his study of Hongkong figs made a valuable and careful study of *F. carica* in that area. GASPARRINI's work (1844 and 1845) remains the most exhaustive source of information on the ecology and morphology of mediterranean *F. carica*. Indispensable for the study of the ecology and taxonomy (morphology) are CONDIT, The fig (1947) and (with ENDERUD) his articles in Hilgardia (23, 1955, p. 323–538; 25, 1956, p. 1–663).

As regards the origin and history of *F. carica*, see also A. DE CANDOLLE (1886) and notes sub *F. palmata*.

It appears that *F. carica* sheds its leaves according to the seasons prevailing in its growing locality (cf. HIERN 1900, p. 1008).

G. AWEKE 429 was a small tree, ca 3 m tall, cultivated at Addis Ababa; together with GILBERT he found it in Eritrea (33 km Massawa Rd), a shrub, 1 m tall. WESTPHAL and WESTPHAL-STEVELS collected it at 1980 m alt., on red loamy soil, 3½ km Alemaya-Harar Rd at the fruit farm of Mrs. DIGGS.

Uses: The growing of commercial figs was occasionally tried in Ethiopia by private enterprise but so far without satisfactory results.

Medicinally there are many uses reported in other parts of the world summarized by WATT & BREYER-BRANDWIJK (1962, p. 775–778) who added much chemical information.

Vernacular names: Amharic: *belās, beless, etse-beles* (MOONEY), *beles* (AWEKE); Tigrina: *etse-beles* (MOONEY).

Specimens examined:

Eritrea prov.: 33 km along Massawa road, *Aweke & Gilbert 697* (ETH, WAG).

Shoa prov.: British Embassy Compound, Addis Ababa, *Aweke 429* (ETH, WAG).

Hararge prov.: Fruit farm Mrs DIGGS, 3½ km from road Alemaya-Harar, side road from Hamarassa, *Westphal and Westphal-Stevens 630* (WAG).

Ficus dicranostyla MILDBRAED

Fig. 4

MILDBRAED & BURRET 1911, p. 204; HUTCHINSON 1916, p. 119; CHEVALIER 1920, p. 596; AUBREVILLE 1936, p. 62; id. 1950, p. 336, 339, 346; KERHARO & BOUQUET 1950, p. 132; EGGELING (& DALE) 1951, p. 247; ANDREWS 1952, p. 265; KEAY 1958, p. 607.

Tree up to 8 m high with spreading and branched crown; dbh 130 cm. Bark grey-brown, rough and fissured, not peeling. Leaf-bearing parts of the branches light to pale-brown, pubescent at first, older parts brownish, glabrescent. Slash pale brown, with lighter streaks; latex colourless. Stipules caducous, fully amplexicaul.

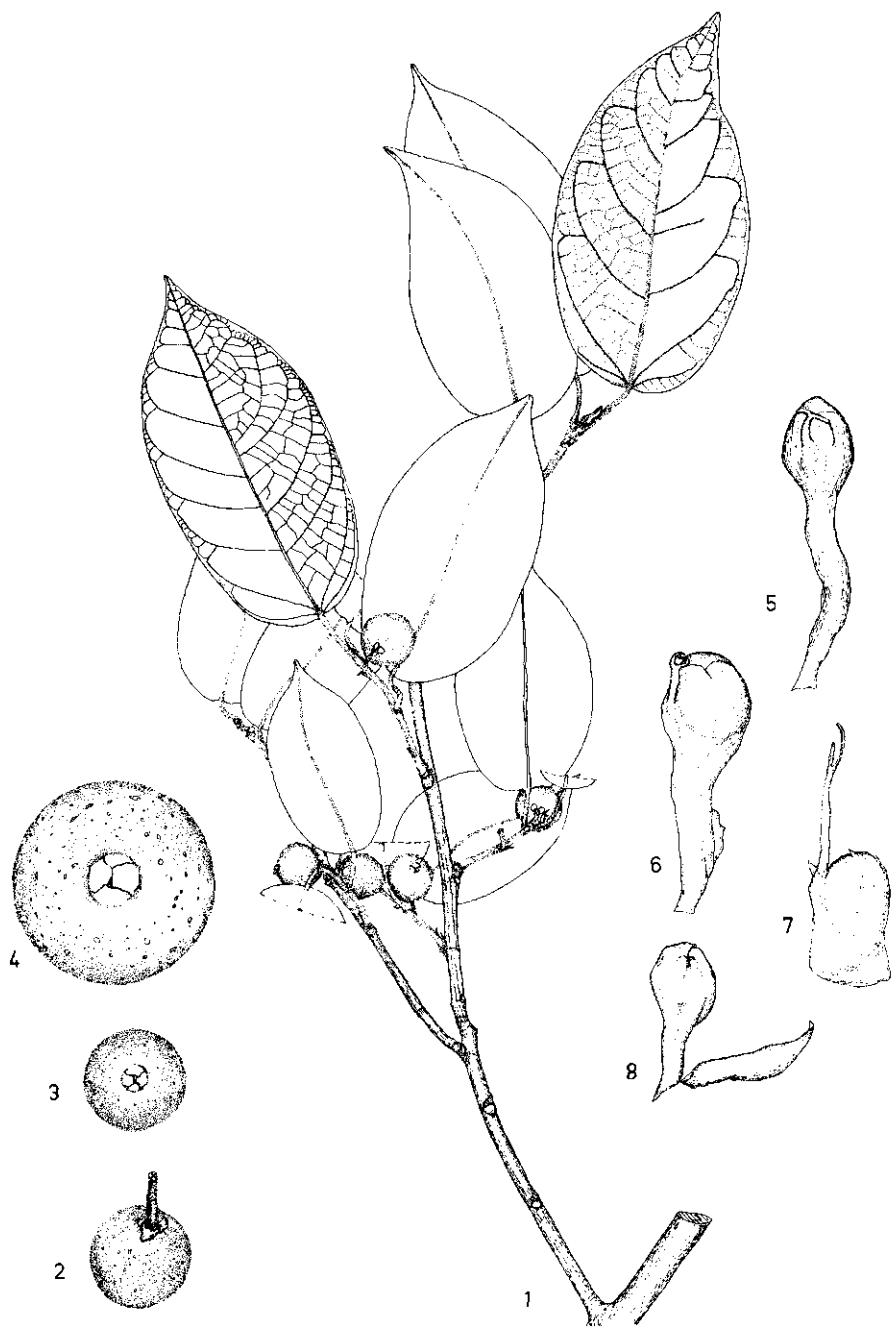


FIG. 4. *Ficus dicranostyla* MILD BR. - 1: Branch ($\times \frac{1}{2}$); 2-3: Fig ($\times 1$); 4: Ostiole ($\times 2$); 5-6: Gall-flower ($\times 10$); 7: Female flower ($\times 10$); 8: Male flower, closed? ($\times 10$). (1-8: JANSSEN & AWEKE 5087).

Leaves in spirals, tending to be distichous. Blade oblong to ovate- to oblong-elliptic, $6\frac{1}{2}$ – $12\frac{1}{2}$ cm long and $3\frac{1}{2}$ – $6\frac{1}{2}$ cm wide, drying pale green, chartaceous, dull, scabrous, and glabrous on both surfaces. Base rounded, sometimes \pm inequilateral, apex acuminate. Margin entire, minutely puberulous. Lateral nerves 6–9 on either side of the midrib (which is prominent on both surfaces, more so on the lower surface), plane above, prominent beneath, the first pair emerging at an acute angle. Intercostals present. A single gland at the base of the midrib. Petiole up to $3\frac{1}{2}$ cm long, ribbed, slender, densely pilose, shallowly and widely grooved above.

Figs axillary, solitary, pedunculate. Peduncle \pm 1 cm long. Basal bracts 3, ovate-triangular, obtuse at the apex, puberulous outside. Receptacle subglobose, ca 2 cm in diam., minutely puberulous, somewhat glaucous when dry. Ostiole \pm prominent, closed by 3–5 imbricate, ovate to rounded scale-like glabrous bracts.

Male flower: Pedicel very short. A solitary stamen entirely enclosed by the perianth, filament shorter than the anther (when young only?).

Female flower sessile or pedicellate. Style slender, stigma forked, 2 linear laciniae, sometimes 3–6 parallelous laciniae. Perianth lobes 3.

Gall-flower pedicellate. Style short, blackish. Stigma the (curling) forked ending (the curled laciniae sometimes suggesting a palatal ending). Perianth soon desintegrating, lobes broadly ovate, very thinly membranous.

Taxonomical notes: MILDBRAED based *F. dicranostyla* on CHEVALIER 582, KERSTING III, 31, no 632 and DOERING 303. CHEVALIER 582 is designated as the lectotype (P).

Ficus bembicarpa WARBURG was cited in synonymy with *F. dicranostyla* in the protologue but considered to be a msc. name ('in scheda, nec ex K. SCHUM. et LAUTERBACH'). CHEVALIER 582 (P) carries a label having '*Ficus bembicarpa* WARB.', a name without nomenclatorial status.

Ecological notes: CHAFFEY collected it (625) at Abobo at 1600 ft by a riverside on a village clearing, 8 m tall tree, dbh 130 cm, with spreading and branching crown. Bark grey-brown, rough and fissured. Slash pale brown with lighter streaks. A sparing, clear exudate becoming sticky. Fruit when ripe red, 2 cm in diam.

JANSEN & AWEKE (5087) found it at 590 m alt. in a dense rain forest near Gambella among very high trees. A tree, c. 15 m high, broad spreading crown; latex copious, colourless; slash chocolate, turning white, branches brown, leaves leathery, light green with yellow veins at both sides; fruits in pairs, light green with whitish spots.

Use: No Ethiopian records extant but KERHARO & BOUQUET (1950, p. 132) reported the use of its leaves in Ivory Coast and Upper Volta, where a decoction is administered (as a drink or a bath) as a sedative and sleep promoting medicine for children.

Specimens examined:

Illubabor prov.: Abobo, *D. R. Chaffey* 625 (K); ca 50 km south of Gambella, *Jansen & Aweke* 5087 (ACD, WAG).

Specimens examined from Senegal (Kankan, type); *F. dicranostyla* is reported also from Sierra Leone, Togo, and Uganda.

Ficus exasperata VAHL

Fig. 5

VAHL 1805, p. 197; MIQUEL 1848, p. 231, fig. 14C; ENGLER 1895, p. 161; MILDBRAED & BURRET 1911, p. 200; HUTCHINSON 1916, p. 110; CHEVALIER 1920, p. 595; BLATTER 1923, p. 444; LEBRUN 1934b, p. 34; LEBRUN & BOUTIQUE 1948, p. 126; AUBRÉVILLE 1950, p. 346; KERHARO & BOUQUET 1950, p. 132; EGGELING (& DALE) 1951, p. 248; ANDREWS 1952, p. 268; CUFODONTIS 1953, p. 11; 1958, p. 105; KEAY 1958, p. 605; DALE & GREENWAY 1961, p. 316; JUNG-HANS 1961, p. 345; CUFODONTIS 1962, p. 302; WATT & BREYER-BRANDWIJK 1962, p. 779; BREITENBACH 1963, p. 122; MOONEY 1963, p. 55; DE WOLF 1964, p. 8; CORNER 1965, p. 74; BOUQUET & DEBRAY 1974, p. 124; HEPPER 1976, p. 78.

F. scabra WILLD. WILLDENOW 1798, p. 102, tab. II; MIQUEL 1848, p. 228.

F. serrata FORSK. FORSKÅL 1775, p. 179; VAHL 1805, p. 202; MIQUEL 1848, p. 231.

Shrub or *tree*, 3–20 m high, dbh up to 50 cm, buttresses up to 150 cm. Slash pale brown. Latex not copious, colourless, slightly milky in young shoots. Leaf-bearing parts of the branches slender, brownish or greyish, scabrous, older parts brown, periderm peeling off.

Leaves distichous. Stipules free, lateral, caducous, long pointed, narrowly oblong, ca $\frac{1}{2}$ cm long, puberulous. Petiole $\frac{1}{2}$ –2 cm long, slender, scabrous. Blade ovate to ovate-elliptic or obovate, (widest at or above the middle), (slightly) inequilateral, 2–5 cm long, 2–3 cm wide, chartaceous to subcoriaceous, drying dark green to brownish, scabrous and dull on both surfaces, on the lower surface bristly hairy on the rough nerves, shortly acuminate to obtuse at the apex, rounded to cordate or acute to cuneate at the base, margin irregularly crenate to subentire. Veins almost plane above, more or less prominent below, lateral veins 2–5 pairs often opposite, the basal lateral veins not very distinct. A pair of glands in the axils of the basal lateral veins. Inter-costals present.

Figs solitary or sometimes in pairs, axillary or behind the leaves, sessile or stipitate, peduncle (0–)4–7 mm long, slender, scabrous, 3 triangular bracts on top of the peduncle or lower, and also some bracts on the receptacle, persistent. Receptacle globose to almost pyriform, $\frac{1}{2}$ –1 cm in diam., scabrous, greenish-yellow or red at maturity. Ostiole more or less prominent, ca 3 mm wide. Orifice covered by many visible bracts.

Male flowers: Sessile or pedicellate, with a solitary stamen. Of two kinds:

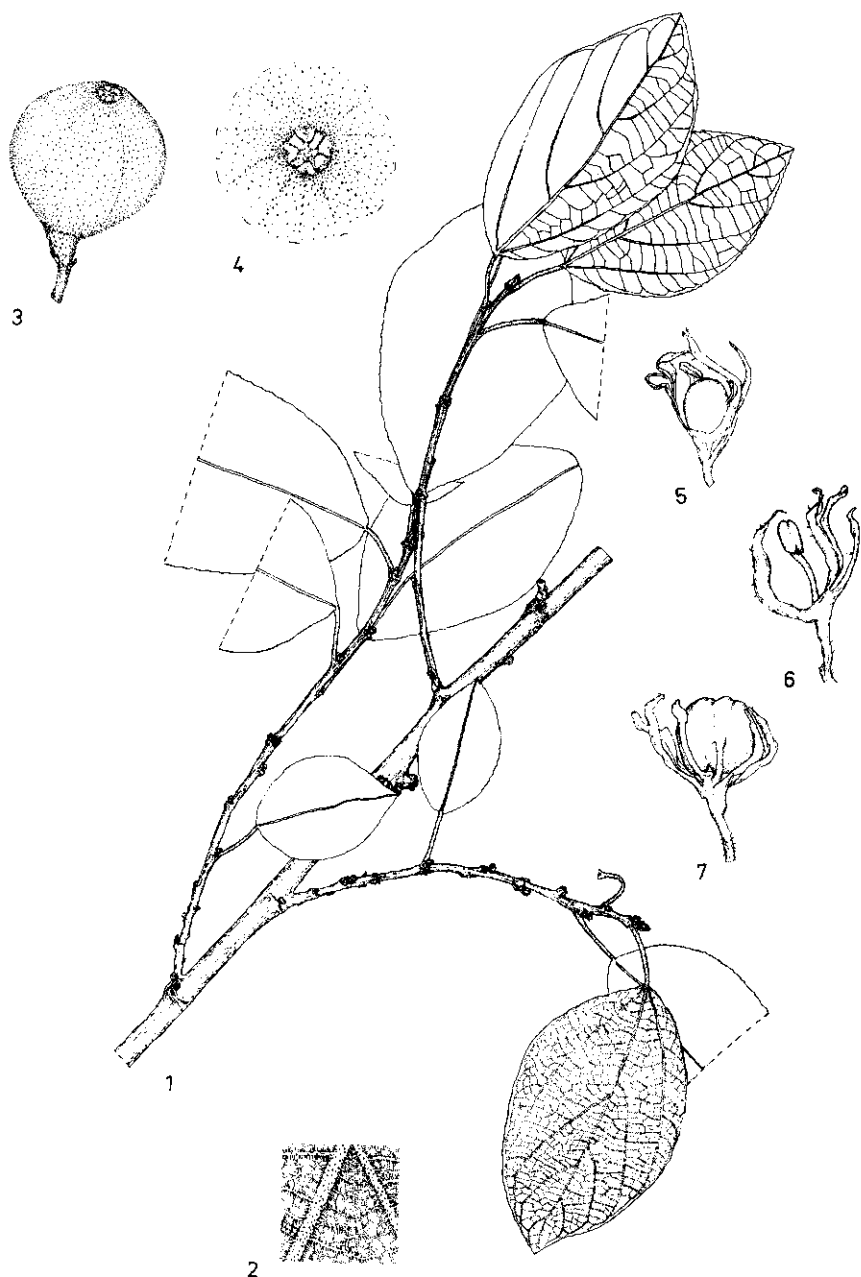


FIG. 5. *Ficus exasperata* VAHL - 1: Branch ($\times \frac{1}{2}$); 2: Leaf-blade, lower surface ($\times 3$); 3: Fig ($\times 1$); 4: Ostiole ($\times 2$); 5: Gall-flower ($\times 5$); 6: Male flower ($\times 5$); 7: ?Aborted male or female flower ($\times 5$). (1-2: FRIIS, HOUNDE & JACOBSEN 567; 3-7: CHAFFEY 269).

both with 5 narrowly oblong, membranous perianth lobes: one with a cubical large anther, dorsifixed on a slender, ca 1 mm long filament, the perianth ca equalling the stamen (a galled anther?), the other with a very much smaller ellipsoid anther, half as long as the filament.

Female flowers: Not seen.

Gall-flowers: Pedicellate. Perianth similar to the male flower but colourless. Ovary stipitate. Style short, laterally attached, with a small truncate stigma.

Taxonomical notes: FORSKÅL first described *F. exasperata* as *Ficus serrata* (1775, p. 179) but this name cannot stand because of *Ficus serrata* L. (1759, p. 1315). LINNAEUS's name is not a nomen nudum, as CUFODONTIS incorrectly declared (1953, p. 11), and it refers to an American *Ficus* species. *F. exasperata* was again described in 1798: *Ficus scabra* WILLD. (p. 102). However, *Ficus scabra* FORSTER (1786, p. 76) has priority, an Asian species of *Ficus*. VAHL published (1805, p. 197) *F. exasperata*, which becomes the correct name.

Ecological notes: *F. exasperata* often invades abandoned cultivated grounds (AUBRÉVILLE, 1950). CHAFFEY found it at Illubabor as a 5 m tall tree (10 cm in diam.), at 2000 m alt., and noted that the green fruits were turning red (April, 1975). He described the exudate as 'milky watery'. FRIIS c.s. (567) found 'milky juice only in younger parts'. This observation rests on a specimen growing at 1300 m alt., in open forest where *Albizia*, *Millettia ferruginea* were accompanying trees. BREITENBACH added 'in semi-humid lowland-woodland, *Croton*-thicket, and semi-arid lower highland forest, *Acacia* forest, between 1200–2200 m alt.' (1963, p. 122).

CUFODONTIS (1962, p. 302) cited that water shoots carry as a rule conspicuously lobed leaves. The tree has a smooth bark, like beech (CUFODONTIS 1958, p. 105). In brief: *F. exasperata* may be found in widely different growing localities and it may act as a pioneer plant.

A receptacle was examined in which the above described two kinds of male flowers (?galled ♂ flowers, see fig. 5:7) were present, together with many gall-flowers and only aborted female flowers (see also ecological notes sub *F. thonningi*).

Uses: In Ethiopia, as in all Africa, leaves of *F. exasperata* are used as a sand-paper. WATT and BREYER-BRANDWIJK (1962, p. 779) summarized its medical properties and its application outside Ethiopia. The leaves contain a high percentage of calcium silicate and may be capable of causing intestinal inflammation (see also BOUQUET & DEBRAY 1974, p. 124, and KERHARO & BOUQUET 1950, p. 133).

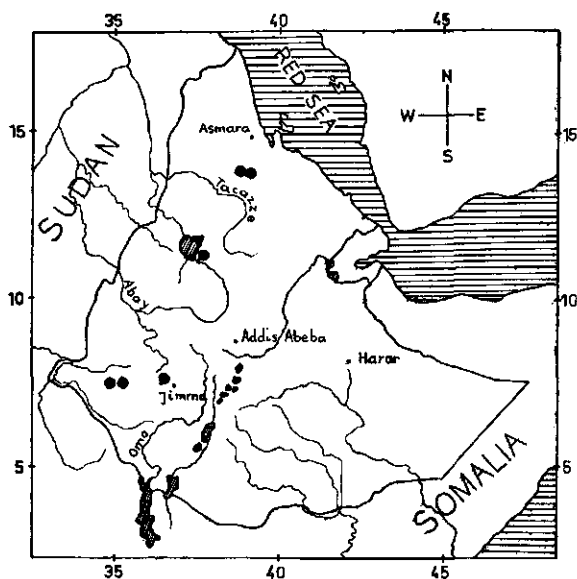
A large number of applications are reported: tonsillar inflammations and inflammation of the throat-region are treated by rubbing the affected part with a leaf wrapped around a finger (one would think that a courageous patient is required!), a treatment continued till the surface is bleeding. The leaf may

serve as a plaster on ringworm and a decoction (with the figs) as an anthelmintic, this decoction also applied against a sore throat. The ash or charcoal of the wood is applied to lesions of leprosy. Water, shaken with leaves or the juice (watery latex), to treat ophthalmic conditions and bark scrapings to be used for friction all over the body as a stimulant and tonic.

On wounds the leaf is said to be a hemostatic and healing. Drops, obtained by pressing the leaves and put on wounds, which should be covered after treatment by a whole leaf, would promote healing.

A decoction of the bark should be drunk against hemorrhoids and of the roots against 'blennorrhagie'. These decoctions are also administered to ease abdominal pains and as an antidote. There are warnings (locally) that *F. exasperata* is poisonous to goats and sheep.

Vernacular names: Sidamo: *lati* (CUFODONTIS); Arabic: *haschref* (CUFODONTIS); Galla: *harbu*; Arabic: *hashref* (BREITENBACH); Galla-Sidamo: *lati* (MOONEY).



Ficus exasperata VAHL

Specimens examined:

Illubabor prov.: Illubabor, Chaffey 269 (K); N. of Nopa, village on road to Gabba bridge, Friis, Hounde & Jacobsen 567 (BR, ETH, C, WAG).

Also seen from: Kenya, Somalia, Ivory Coast, Liberia, Nigeria, Moçambique, Tanzania, Burundi, Cameroon, Arabia, N. Rhodesia, Portugal, Zaire.

DELILE (CAILLIAUD) 1826, p. 63; RICHARD 1850, p. 266; MIQUEL 1867, p. 288; MARTELLI 1886, p. 76; SCHWEINFURTH 1893, p. 65; 1896, p. 131; ALMAGIA 1903, p. 115; MILDBRAED & BURRET 1911, p. 217; HUTCHINSON 1916, p. 171; CHEVALIER 1920, p. 598; BLATTER 1923, p. 444; LEBRUN 1934b, p. 60; LEBRUN & BOUTIQUE 1948, p. 147; AUBRÉVILLE 1950, p. 336, 340, 346; EGGELING (& DALE) 1951, p. 248; ANDREWS 1952, p. 270; CUFODONTIS 1953, p. 11; KEAY 1958, p. 609; DALE & GREENWAY 1961, p. 317; BREITENBACH 1963, p. 124; MOONEY 1963, p. 55; JAEGER 1964, no. 133.

F. glumosa var. *lanuginosa* MARTELLI (1886, p. 76).

F. glumosa var. *intermedia* MARTELLI (1886, p. 76).

F. glumosa var. *glaberrima* MARTELLI (1886, p. 76).

F. fazokelensis (MIQUEL) MIQUEL (1867, p. 288).

Urostigma fazokelense MIQUEL (1847, p. 552); id. 1849, p. 136, tab. IV A.

U. fazokelense forma *minor* MIQUEL (1847, p. 553).

U. glumosum (DELILE) MIQUEL (1847, p. 552); id. 1849, p. 136; MARTELLI 1886, p. 76.

A shrub or tree (deciduous) up to 10 m tall, dbh 80 cm; several spreading branches from the base. Bark pale brown or greyish brown, smooth, fissured or finely lengthwise scaly, sometimes with scars. Latex milky white, sticky. Slash light red-brown. Leaf-bearing parts of the branches brownish, the young endings shaggily hairy to hirsute or puberulous, later becoming glabrous or nearly so. Stipules free, early caducous, russet, fully amplexicaul, ovate-oblong to linear-lanceolate, top rounded, mucronate, up to 3 cm long with broad glabrous margins and a hirsute central zone outside, inside glabrous. Petiole pale green, up to 4 cm long, slender, woolly pubescent to puberulous or almost glabrous.

Leaves in spirals. Blade broadly ovate to elliptic or (ob)ovate-oblong, 3–10(–15) cm long, 2–5 cm wide, thickly coriaceous to herbaceous, above smooth, dark green and (almost) glabrous, beneath very much paler green and finely reticulate, glabrous when fully grown. Base (narrowly) cordate, apex obtusely and short acuminate to broadly rounded, margin entire. Nerves distinct above, prominent below and minutely puberulous, 5–7 lateral veins (including the basal nerves) more or less rectangular on the midrib. Basal bracts with a caducous upper part, connate in the basal half, becoming a flat cup with repanding edges.

Figs globose, 1–2 cm in diam., light green, white or yellow spotted. Receptacle axillary, when young with a dehiscent calyptra, solitary or in pairs, (sub) sessile or pedunculate, glabrous or glabrescent, sometimes hirsute when young; peduncle stout, pubescent or not, up to 3 mm long. Ostiole bilipped (no bracts visible); slightly protruding. All perianth-segments with a thinly membranous, broad margin and a more fleshy central part, much differing in size in a single flower, long acute, shorter than stamen and ovary.

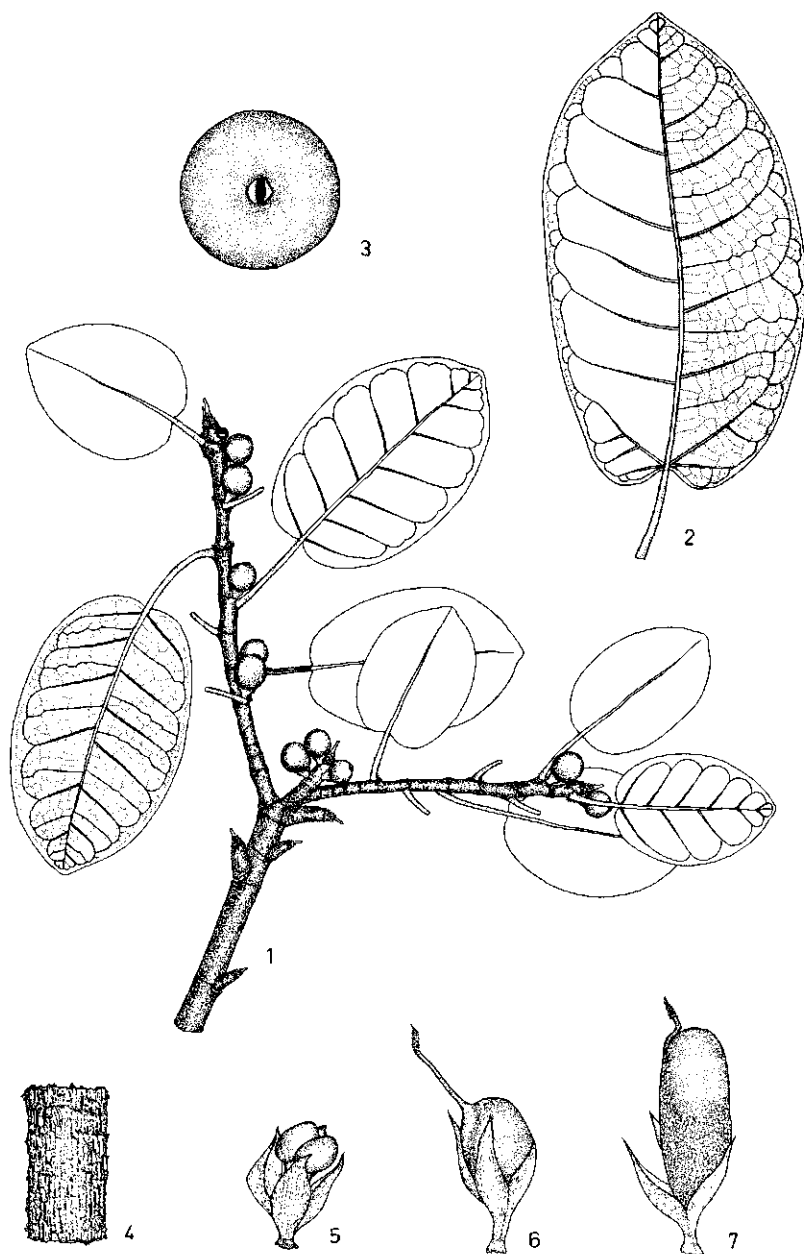


FIG. 6. *Ficus glumosa* DEL. - 1: Branch ($\times \frac{1}{2}$); 2: Leaf, lower surface ($\times \frac{1}{2}$); 3: Ostiole ($\times 3$); 4: Bark ($\times 1$); 5: Male flower ($\times 10$); 6: Female flower ($\times 10$); 7: Gall-flower (note nourishing ?ariloid tissue) ($\times 10$). (1, 3-7: J. J. F. E. DE WILDE 5458; 2: AWEKE & GILBERT 684).

Male flowers (sub)sessile, with a solitary stamen (filament thick, \pm as long as the anther), anther small, connective apiculate.

Female flowers (sub)sessile with a slender style, longer than the ovary and one large oblong stigma.

Gall-flowers pedicellate; perianth-lobes acute, shorter than ovary; style short, laterally near the top of ovary, on an obconical reticulate fleshy stipe, produced in a double ridge upwards to the insertion of the style (?ariloid tissue).

Taxonomical notes: DELILE (1826, p. 63) founded *Ficus glumosa* on a specimen collected by CAILLIAUD; it could not be traced in MPU.

MIQUEL (1847, p. 552) basing on KOTSCHY 495 a new species (*Urostigma fazokelense*) noted that a 'forma minor' (KOTSCHY 496) was more or less intermediate between *U. glumosum* and *U. kotschyianum* (based on KOTSCHY 527; also collected at Fazokel).

MARTELLI (1886, p. 76) distinguished 3 varieties on account of hairiness of the leaves, viz. *lanuginosa* (type: BECCARI, Pl. Bog. 17), *intermedia* (type: BECCARI, Pl. Bog. 19), and *glaberrima* (type: BECCARI, Pl. Bog. 40).

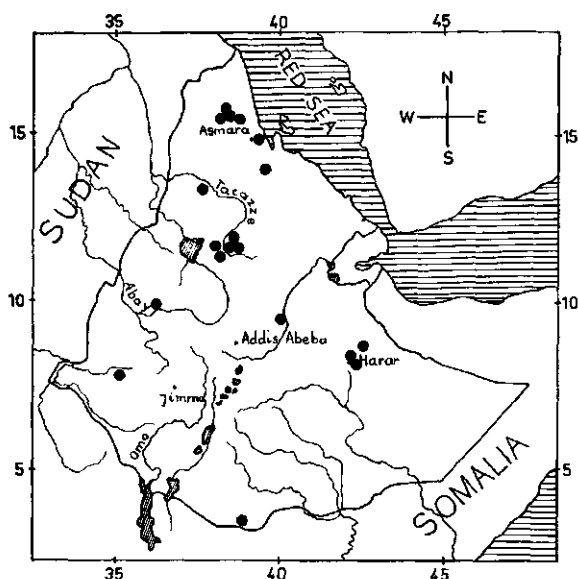
HUTCHINSON (1916, p. 171) differed in the delimitation of *F. glumosa* DELILE from MILDBRAED & BURRET (1911, p. 217) and adopted *F. sonderi* MIQUEL as a distinct species. Whether segregating *F. glumosa* and *F. sonderi* MIQUEL is justified or not, we leave undecided (*F. sonderi* being a taxon ascribed to Africa, S. of Ethiopia) but it may be remarked that HUTCHINSON's key characters to distinguish *F. glumosa* and *F. sonderi* (l.c. p. 39) are at variance with my findings. *F. sonderi*, in case of synonymy, as a name dates from 1867, and has no priority over *F. glumosa* anyway.

Ecological notes: *F. glumosa* may be found between 500–1650 m alt. in Ethiopia. CAILLIAUD, at the type locality, noted that this large tree was growing at Djebel Mouyl, carrying figs that were eaten.

F. glumosa was found associated with *Ziziphus*, *Dodonaea viscosa* and *Anogeissus* in deciduous woods on sandy rocky soils by AWEKE & GILBERT, at 1220 m alt. (1022). FRIIS c.s. met with it as a small tree in riverine forest (close to the river bed). It carried green, white spotted figs (1921) at 550 m alt. BURGER noted limestone formations in its growing locality (Gobelli river (2945A) and Galacia river (3356)) and so did J. J. F. E. DE WILDE (5458). The latter remarked on the abundant white latex, especially near the cambium, the pale green nerves of the dark green, coriaceous leaves and the branches rising from the base of this shrubby small tree on dry slopes with open scrub vegetation. JANSEN (6034) confirms these characters and also found the light green fig with yellow spots. He collected this shrub in dry *Acacia*-country, alt. 1000 m (no 7266).

Vernacular names: *gymeyz* (also used for *F. sycomorus*, fide CAILLIAUD, at Djebel Mouyl); *cioghonte*, *tcecomti*, *tschog(h)onte*, *tciahamte*, *chekemte* (Ti-

grina; fide CUFODONTIS, MOONEY, AWEKE); *deer-ad, berdeh* (Somali; fide CUFO-DONTIS).



Ficus glumosa DEL.

Specimens examined:

Eritrea prov.: 56 km from Asmara along Keren road, *Aweke & Gilbert 684* (ETH, WAG); Zeban, S. of Keren, *Shishiftu, id. 690* (ETH, WAG); Abita, Keren, *O. Beccari 2, 17* (BM, FI, K, L); *ibid., id. 19* (FI, K, L); *ibid., id. 40* (BM, FI, K, P); Cherender, *N. Beccari 242, 243* (FI); Bogos, *Fiori 29* (FI); Hamasen, Ghinda, *id. 30* (FI); Ocule-Cusai, *id. 42* (FI); Bogos: Adik-Adi, *id. 33* (FI); Ocule-Cusai, Chenafena, *id. 31* (FI); Mai-Baria, *Chiovenda 317* (FI); Gheleb, *A. Pappi 1217* (FI); Adi-caje, *id. 5203* (BR, FI, L, W); Amasen, *id. 2264, 3264* (FI); Eritrea, *id. 2600* (FI); Debelas: Mai-Albo, *id. 6070* (FI); Ocule-Cusai, *id. 1777* (FI); Schimenanza, *id. 851* (FI); Habab, *id. 8335* (FI); Keren, *Schweinfurth 806* (FI, K); Elaberet, *id. 180* (K); Lande du Djur, *Seriba, id. 1973* (FI); Montis Cordofani, Kohan, *Schimper 215* (BR, HBG, K, L, MPU, P, UPS); Eritrea, *id. 1137* (L, P).

Begemdir prov.: Village Gorgora, *Pichi Sermolli 2374, 2375, 2376, 1726* (FI); N. of Tana, *id. 1725* (FI); fluvium Tacazze, *Schimper 696* (B, BM, E, L, MPU, UPS); Callabat, Mattama, *Schweinfurth 551* (BM, L, P); *id. 552* (BM); Adi-Arkai, Debark, *Aweke & Gilbert 964* (ETH, WAG).

Gojam prov.: Blue Nile Gorge, *Aweke & Gilbert 1022* (ETH, WAG); Fazokel, Gebbel Akkaro, *Kotschy 496 (469?)* (L, P), 495 (BM, K, P).

Shoa prov.: 2 km E. of Awash station, *De Wilde & De Wilde-Duyfjes 10592* (WAG).

Hararge prov.: Road to Borale, *Burger 3356* (ACD, FI, K); W. of Dalleti, *id. 2945A* (FI, K, WAG); road to Jijiga, about 50 km from Harar, *Jansen 6034* (ACD, WAG); road Dire Dawa-Djibouti (30 km), *id. 7266* (WAG); 2 km S. of Dire Dawa, along road to Harar, *J. J. F. E. de Wilde 5458* (ACD, WAG).

Illubabor prov.: Baro river, near the bridge on Gore-Gambella track, 33 km W. of Bure, *Friis, Aweke, Rasmussen & Vollesen 1921* (C, ETH, K); Gambella around town, *Jansen & Aweke 5064* (ACD, WAG).

Sidamo prov.: Boran Moyale, *J. B. Gillett 12840* (BR); 4 km N.E. of Javellow along road to Hagere/Mariam, *J. J. F. E. de Wilde & Gilbert 407* (ETH, WAG).

Specimens examined from Angola, Cameroon, Ivory Coast, Kenya, Nigeria, Senegal, Sierra Leone, Tanzania, Rwanda and Zaire.

RICHARD 1850, p. 270 (*Ficus gnaphalocarpa* STEUDEL); MIQUEL 1867, p. 295; SCHWEINFURTH 1892, p. 190; MILDBRAED & BURRET 1911, p. 190; HUTCHINSON 1916, p. 104; CHEVALIER 1920, p. 593; LEBRUN 1934b, p. 33; LEBRUN & BOUTIQUE 1948, p. 119, photo 8; AUBREVILLE 1950, p. 336, 342, pl. 70; KERHARO & BOUQUET 1950, p. 133; EGGELING (& DALE) 1951, p. 250; ANDREWS 1952, p. 265; CUFODONTIS 1953, p. 11; ID. 1958, p. 105; SCHNELL 1953a, no 10; KEAY 1958, p. 606; DALE & GREENWAY 1961, p. 317; WATT & BREYER-BRANDWIJK 1962, p. 779; BREITENBACH 1963, p. 124; MOONEY 1963, p. 55; PALMER & PITMAN 1972, p. 443, 445.

Ficus trachyphylla (MIQ.) MIQ. (1867, p. 295); ENGLER 1895, p. 161.

Sycomorus gnaphalocarpa MIQ. (1848, p. 113); 1849, p. 125, tab. II, B (a-f).

Sycomorus trachyphylla MIQ. (1848, p. 110); ID. 1849, p. 121, tab. I, fig. C.

A large spreading tree, 4–20 m tall, trunk 60 cm dbh, bark pale brown, scaly. Latex cream. Slash pale pink. Branches brown when dry, glabrous, bark peeling with thin, brownish rectangular scales, and under the scales finely lengthwise rugose. When young hairy near the nodes and the top densely hairy (long and short hairs; hairs crinkled). Terminal bud enclosed by brown, \pm ovate-oblong, sharp-tipped stipules, ca $\frac{1}{2}$ cm long, hairy on and along the dorsal rib; glabrous inside, deciduous, ca 1 cm long. Petiole 1–4 cm long, stout, pilose to scaly-glabrescent.

Leaves in spirals, tending to be distichous. Blade ovate to suborbicular to elliptic, base rounded to cordate, top rounded, margin (sub)entire to remotely crenate, above scabrous, below less scabrous, 4–9(–11 $\frac{1}{2}$) cm long and up to 7 cm wide. Nerves distinct above, prominent below, pilose to glabrescent, palmately 3-nerved, followed by 3–4(5) nerves on either side of the midrib. Basal side-nerves with regularly-spaced secondary side-nerves towards the leaf-edge and close to the margin anastomosing. Veinlets areolate, sometimes in subcoriaceous leaves swollen. Basal glands in the axils of the main nerves may be present.

Figs borne on the (thin) branches below the crowded terminal leaves, solitary or sometimes paired, rising from the nodes. Peduncle 1–3 cm long, verruculose-pubescent. Bracts 3, at the base of the fig, broadly triangular to ovate, 3–6 mm long, outside pubescent, sometimes lower on the peduncle or a few on the exterior of the fig. Receptacle obovoid to subglobular, $\frac{1}{2}$ –over 2 $\frac{1}{2}$ cm in diam., densely pubescent to tomentose, sometimes with an exterior bract. Ostiole with a swollen outer margin, consisting of ca 3 triangular hairy teeth, and closed at first by brown, blunt, concave, smooth, in the upper part glabrous scales, and by some dozens of inner, perpendicular scales; finally the closing scales come erect and slightly apart when the fig matures and the ostiole becomes prominent.

Male flower: Filament \pm 2 mm long, glabrous. Anther dorsifix, apiculate, (a)symmetrical, \pm 1 mm long.

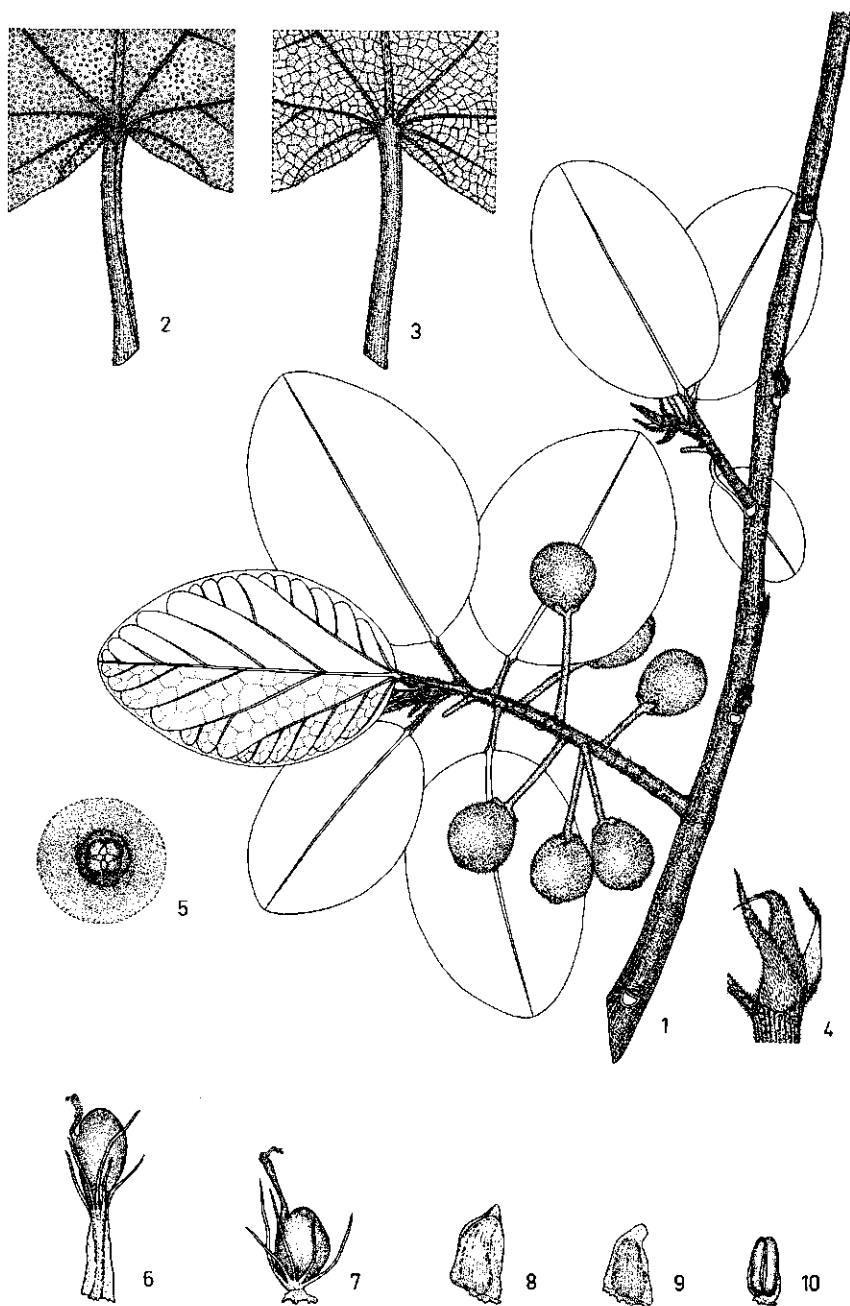


FIG. 7. *Ficus gnaphalocarpa* (MIQ.) A. RICH. - 1: Branch ($\times \frac{1}{2}$); 2: Leaf, upper surface ($\times 1\frac{1}{2}$); 3: Leaf, lower surface ($\times 1\frac{1}{2}$); 4: Stipules ($\times 1\frac{1}{2}$); 5: Ostiole ($\times 2$); 6: Gall-flower ($\times 5$); 7: Female flower ($\times 5$); 8-9: Male flower ($\times 5$); 10: Stamens ($\times 5$). (1-10: DE WILDE & DE WILDE-DUYFJES 10270).

Female flower: Short pedicelled, with brown, 3–4-partite perianth, appressed to and longer than the ovary, margin subentire to incised, a brown central nerve in each perianth-lobe. Style laterally attached, brown. Stigma yellow, swollen at the base. Fruit glossy, light-brown, smooth, globular-ovoid, with a darker brown low rim on the outside, if containing an insect larger and dull-brown.

Taxonomical notes: On May 1, 1840, SCHIMPER collected on a mountain side, near Tacazze river, below 'Dscheleddjerranne'. The specimens were distributed as 'SCHIMPER It. Abyss. Sectio secunda'; no 874 was named by STEUDEL (on a printed label accompanying no 874) '*Ficus gnaphalocarpa*'. MIQUEL, when publishing the nomenclaturally legitimate name for the species adopted STEUDEL's proposed epithet but placed the species in *Sycomorus* GASPARR.: *S. gnaphalocarpa* MIQ. (1848).

MIQUEL adopted *Sycomorus* as a distinct genus because of the morphology of the sexual organs and the habit, added to the racemose grouping of the figs on leafless branches inserted on the trunk or on old branches (1849, p. 125).

RICHARD (1850, p. 270) rejected *Sycomorus* as a genus and referred *S. gnaphalocarpa* to *Ficus*: *Ficus gnaphalocarpa* (MIQ.)A. RICH., which is the correct author's citation (LEBRUN 1934b, p. 33; PALMER & PITMAN 1972, p. 443), not '(MIQ.)STEUD. ex RICH.' (CUFODONTIS 1953, p. 11, and others).

Ficus trachyphylla FENZL, a nomen nudum, was referred to by MIQUEL. When publishing *Sycomorus trachyphylla*, MIQUEL (1848, p. 110) also referred to FENZL's specimen, KOTSCHY 518. This becomes the holotype of *Sycomorus trachyphylla* FENZL ex MIQ., later recombined by MIQUEL as *Ficus trachyphylla* (MIQ.)MIQ. (1867, p. 295).

The P isotype of '*F. trachyphylla* FENZL' has a label stating that KOTSCHY 518 was collected at 'Gebbel Kassan: Tumad' (probably in the Sudan).

Ficus sycomorus and *F. gnaphalocarpa* are closely allied. MILDBRAED & BURRET (1911), HUTCHINSON (1916), LEBRUN (1934b), LEBRUN & BOUTIQUE (1948), EGGELING (& DALE) (1951), ANDREWS (1952), CUFODONTIS (1953), BREITENBACH (1963), and DALE & GREENWAY (1961) kept them apart. PALMER & PITMAN (1972) however, reduced *F. gnaphalocarpa* to the synonymy of *F. sycomorus*, declaring: 'Originally those trees bearing axillary figs were separated as *F. gnaphalocarpa* (MIQ.)A. RICH., but they have now been included in *F. sycomorus*'.

PALMER & PITMAN's remark indicated the problem correctly: the only difference, it would appear judging the data in literature, seems that *F. sycomorus* is cauliflorous and *F. gnaphalocarpa* bears figs in the leaf-axils. WIEBES (in list) stated that the gall wasps found in what is reputed to be *F. sycomorus* are identical with those found in *F. gnaphalocarpa*.

Possibly PALMER & PITMAN were right. However, so little is known about the phenomenon of cauliflory in *Ficus*: the degree of constancy in relation with the environment or with age, that no final decision seems warranted. Closer (field)studies may reveal other characteristics. It was decided to maintain both species, pending further observations and research.

Ecological notes: *F. gnaphalocarpa* is one of the most commonly occurring fig trees in Ethiopia. It occurs from below 900 m to over 1900 m alt.

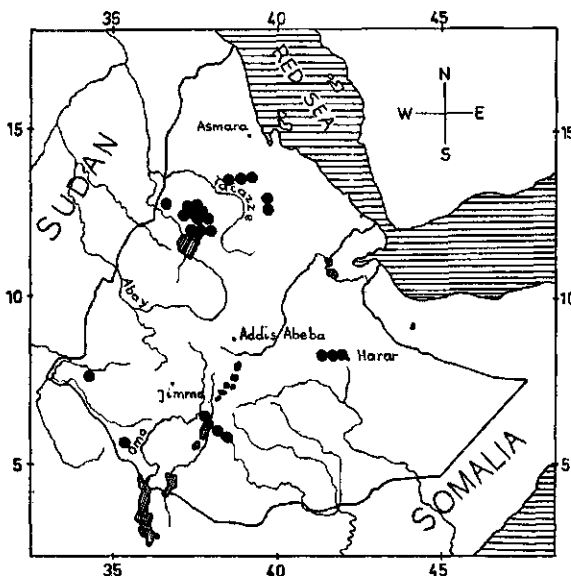
There is, as far as known, no marked preference for humid soils. In West Africa, however, *F. gnaphalocarpa* may grow in the Sahel zone near water-courses (AUBRÉVILLE 1950, p. 342).

The latex is copious, milky white or watery; the slash dark red or pink, turning darker when exposed to the air.

It was observed among mixed deciduous low trees 'on grassland' by ASH (1498) who noted *Entada abyssinica*, *Gnidia glauca*, and *G. lamprantha*, *Acacia sieberiana*, *Piliostigma thonningii*, and *Stereospermum*. FRIIS c.s. (131) saw it as a large tree on grassland, associated with *Acacia* (507), and in *Stereospermum-Combretum* wooded grassland near Bonga (2265). BEALS described it as a 'deciduous shrub' in *Croton*-dominated thicket. AWEKE & GILBERT (985) observed it in re-growth after cutting as a small tree associated with *Dodonaea viscosa* and *Cassia* sp. This recovery was also noted by AUBRÉVILLE (1950, p. 342) who reported that the leaves are shed in the dry season in the drier parts of West-Africa.

WESTPHAL C.S. noted red loamy soil (at 1840 m alt.), near Gelemso, in its growing places and Dr. & Mrs. W. DE WILDE met with it in the savannah at 1500 m alt., near Omo bridge. AWEKE & GILBERT found it planted as an ornamental at 1870 m alt., in Begemdir prov., along the main road (948).

Uses: WESTPHAL C.S. (2588) noted that the figs were edible (Gelemso) and so did TADESSE EBBA (599) near Dilla. In Ethiopia the fruits are described as green, yellow or brown (JANSEN 5687) or pale red (AWEKE & GILBERT 720).



Ficus gnaphalocarpa
(Miq.) A. RICH.

AUBRÉVILLE noted from December to March in the wooded savannah 'soudano-guinéenne' of West Africa fruits shaped like peaches, which were much in favour with birds, goats and sheep. WATT & BREYER-BRANDWIJK (1962, p. 779) reported that in Angola the fruit is used to prepare an alcoholic beverage, 'with the taste of gin'. A decoction of the bark is applied against sore throats (l.c., p. 779).

The leaves together with *Bridelia ferruginea* form an appreciated remedy against snake-bite in the region of Banfora.

The Mossi tribe use the decoction of the bark against cough (KERHARO & BOUQUET 1950, p. 133). Also used against chest complaint in W. Africa (PURI & TALALAJ 1964, no. 102).

Vernacular names: *bamba* (Amharic, fide CUFODONTIS; MOONEY); *kondagutu* (Galla (Arussi), fide MOONEY); *worka* (Amharic, fide CUFODONTIS).

Specimens examined:

Tigre prov.: 32 km from Indeselassie, along Gondar road, Ekoy Limam, *Aweke & Gilbert* 855 (ETH, WAG); near Mai-Teklit, *id.* 961 (ETH, WAG); 37 km from Adi-Arkai (Zerima to Debarak), *id.* 965 (ETH, WAG); 17 km W. of Indeselassie, along Gondar road, *id.* 852, 853 (ETH, WAG); Daro-Tekli, along road Adua-Asmara, *id.* 720 (ETH, WAG).

Begemdir prov.: Tacazze valley, Mai-Kulkwal, main bridge, Gondar-Chire road, *Aweke & Gilbert* 919 (ETH, WAG); Adi-Arkay, *id.* 948 (ETH, WAG); villaggio di fume (Zeghie) *Pichi Sermolli* 2396 (BR); Muhet (Alefa), *id.* 2395 (FI); Collina Mucara, presso Zara Enda Michael, *id.* 2394 (FI); Tra la collina, Atahunsa il villaggio di fume (Zeghie), *id.* 2396 (BR, FI); ovest di Gorgora, *id.* 2397 (FI); Region di Uoretta, *id.* 2398 (FI); Missione del Tana, villaggio do Scenti (Quonzela), *id.* 2401 (W); Callabat, Mattama, *Schweinfurth* 543 (BM, P); *ibid.*, *id.* 544 (BM, U); fluvium Tacazze, *Schimper* 874 (P), isotype (L); Dembia, Gondar, *id.* 1433 (BM).

Gojam prov.: 25 km from Bahr Dar along road to Gondar, *Aweke & Gilbert* 985 (ETH, WAG).

Shoa prov.: S.W. of Bishoftu, E. side of green lake, *Beals* 123 (FI).

Hararge prov.: Road Gelemso-Bedessa, 9 km from Gelemso, *Westphal & Westphal-Stevens* 2588 (ACD, WAG); Road Gelemso-Mechera, 17 km from Gelemso along road, *id.* 2580 (WAG).

Illubabor prov.: Gambella around airport, *Jansen & Aweke* 4944 (ACD, WAG).

Kefa prov.: 44 km N.E. of Bonga on road to Jimma, Gojeb river valley, *Ash* 1498 (K); 23 km W. of Bonga, along road to Jimma, *Friis, Aweke, Rasmussen & Vollesen* 2265 (C, ETH, WAG); at road between Jimma and Bonga, 20 km S.W. of Jimma, near Saka, *Friis, Hounde & Jacobsen* 131 (BR, C, ETH); near Omo Nadda, some 10 km from Addis Ababa road, *id.* 507 (BR, C); 30 km from Bonga, *Jansen* 5687 (ACD, WAG); 11 km S.W. of Jimma, *Meyer* 8047 (K); Jimma road, 10 km S.W. of bridge crossing Omo River, *De Wilde & De Wilde-Duyffjes* 10270 (BR, WAG).

Sidamo prov.: Guonguo, 15 km S. of Dilla, *Ebba* 599 (ACD, WAG).

Ethiopia: ?Gebbel Kassar, Tumad, *Kotschy* 518 (holotype: P; isotype: BM, K); sine loco, *Quartin-Dillon & Petit s.n.* (P); Piana di Maggio, albero maestals, *Senni* 1439 (FI).

Also seen from: Burundi, Cameroon, Central Africa, Kenya, Moçambique, North Rhodesia, Portugal, Rwanda, Senegal, South Rhodesia, Sudan, Tanzania, Uganda.

Ficus hochstetteri (MIQUEL) A. RICHARD

Fig. 8

A. RICHARD 1850, p. 267; MIQUEL 1867, p. 289; SCHWEINFURTH 1892, p. 192; *id.* 1893, p. 65; *id.* 1896, p. 139; MILDBRAED & BURRET 1911, p. 253; HUTCHINSON 1916, p. 174; LEBRUN 1934b, p. 71; LEBRUN & BOUTIQUE 1948, p.

153; CUFODONTIS 1953, p. 12; MOONEY 1963, p. 55.

Ficus hochstetteri MIQ. var. *glabrior* MIQ. (1867, p. 289); WARBURG 1894, p. 164.

Ficus pubicosta WARB. (WARBURG & DE WILDEMAN 1904, p. 16); LEBRUN 1934b, p. 71.

Ficus schimperi (MIQ.) A. RICH. var. *hochstetteri* (MIQ.) MILDBRAED & BURRET (1911, p. 253); LEBRUN 1934b, p. 71.

Urostigma hochstetteri MIQ. (1847, p. 555); ID. 1849, p. 142, tab. VB; LEBRUN 1934b, p. 72.

A shrub or tree up to 10 m high. Straight bole up to 3 m. Slash almost white, very rapidly turning brown, latex middling, milky white. Bark (younger parts) light brown, minutely puberulous to finally glabrescent. Branchlets twiggy, woolly pubescent. Stipules caducous, half amplexicaul, linear-lanceolate, pubescent outside, ± 1 cm long.

Leaves in spirals. Petiole $\frac{1}{2}$ –3 cm long, slender, densely pubescent. Leaf-blade ovate to oblong, elliptic or oblanceolate, very often widest above the middle, chartaceous, 4–10 cm long, 2–4 cm wide; apex shortly acuminate or rounded; base obtuse or rounded. Margin entire. Midrib densely pubescent on the sparsely pubescent lower surface, on the upper pubescent, especially on the midrib and in the lower half, more or less smooth on both surfaces, yellowish-green. Lateral veins 8–10 on each side of the midrib including the 2 basal veins. Intercostals present. Midrib flat above, prominent below.

Figs axillary, in pairs, crowded, short-pedicelled (peduncle pubescent) to sessile, minutely pubescent to glabrescent. Bracts 3–4, pubescent outside, ovate-triangular at the deciduous membranous apex, fused at the base. Receptacles (sub)globose, umbonate (umbo glabrous) sparsely pubescent, up to 1 cm in diam. Ostiole \pm bi-lipped, linear, not prominent. Ostiolar bracts not visible from the outside.

Male flowers short pedicellate, the stamen enclosed in the ca 4, acute or blunt perianth-segments. Stamen solitary, anther somewhat longer than the thick filament, not apiculate.

Female flowers sessile, perianth-lobes 2, broadly rounded, longer than the ovary. Style slender, stigma large, oblique.

Gall-flowers pedicellate, perianth similar to ♀ flowers, with a short, thicker style and similar stigma.

Taxonomical notes: MIQUEL published *Ficus hochstetteri* (1867, p. 289) referring to *Urostigma hochstetteri* (1847, p. 555 and to 1849, tab. V, fig. B). He added a variety 'glabrior' in *Ficus hochstetteri* and based this on *Ficus schimperi* HOCHST. msc. MIQ. (1847, tab. 22, fig. B). This latter figure was named when published by MIQUEL '*Urostigma acrocarpa*'. This implies that MIQUEL wanted to incorporate *U. acrocarpa* in *Ficus hochstetteri*.

However, MIQUEL published simultaneously (1867, p. 288) *Ficus acrocarpa* referring to 1847, p. 557 and tab. 22, fig. B. Obviously, this is impossible and it

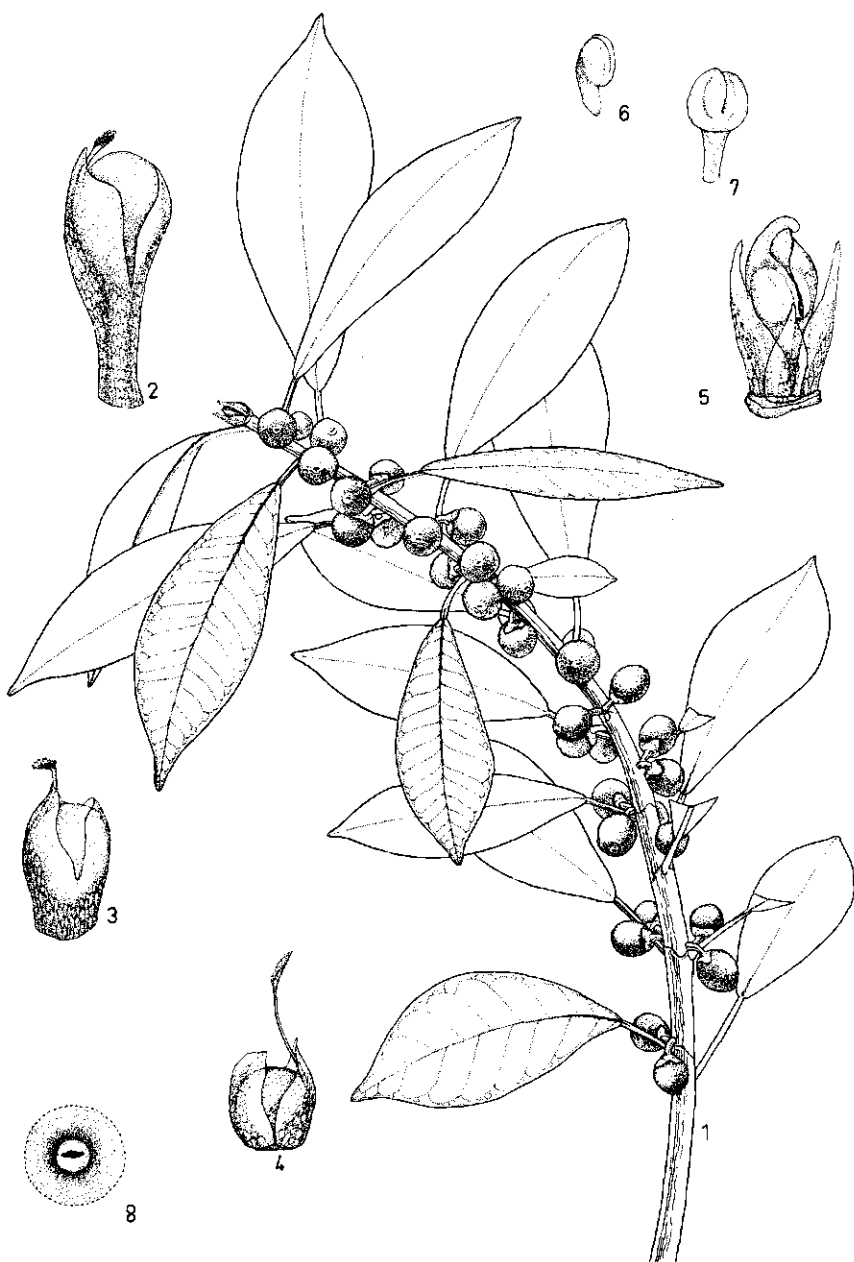


FIG. 8. *Ficus hochstetteri* (MIQ.) A. RICH. — 1: Branch ($\times \frac{1}{2}$); 2–3: Gall-flower ($\times 10$); 4: Female flower ($\times 10$); 5: Male flower ($\times 10$); 6–7: Stamen ($\times 10$); 8: Ostiole ($\times 3$). (1–8: AWEKE & GILBERT 826).

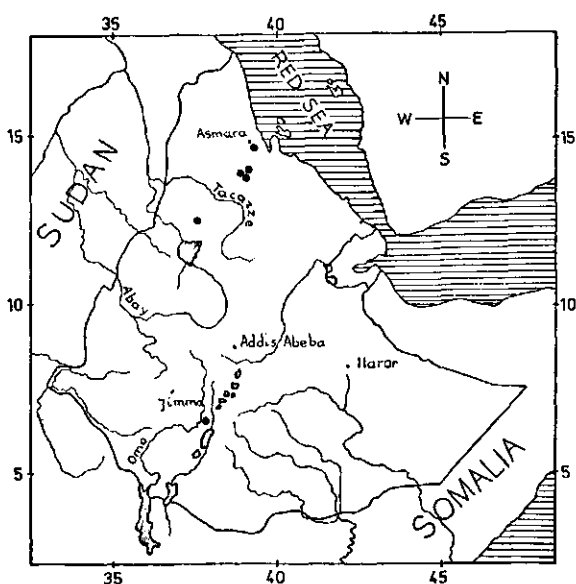
would seem that MIQUEL wishing to establish a variety '*glabrior*' in *F. hochstetteri* forgot to eliminate *Ficus acrocarpa* from his enumeration.

MILDBRAED & BURRET adopted *F. schimperi* while admitting a var. *hochstetteri* [(MIQ.) A. RICH.] MILDBRAED & BURRET (1911, p. 253).

In the present revision *F. schimperi* HOCHST. ex A. RICH. is reduced to *Ficus thonningi*, in accordance with the earlier views of HUTCHINSON (1916, p. 188) and of LEBRUN (1934b, p. 73).

Ecological notes: In Ethiopia, as far as known, a *Ficus* of higher altitudes (ca 1900 m). In the North (e.g. at Adua) it may be locally very common, an erect tree, ca 10 m tall. The latex may be very sticky because it is sometimes employed to catch birds resting on a glued branch (e.g. in Zaire; cf. LEBRUN 1934b, p. 9).

Vernacular names: *afa-kamo*, *afa-kumo* (Tigrina; fide MOONEY).



Ficus hochstetteri (MIQ.) A. RICH.

Specimens examined:

Eritrea prov.: Mai goua-goua, *Quartin-Dillon & Petit* 373 (P); environs de Saganeiti, *Schweinfurth & Riva* 1819 (BR, K, P); Col. Eritr., *Schweinfurth* 2072 (FI, P); district Hazamat: prope Geraz, *Schimper* 1096 (BM, L, P).

Tigre prov.: Market at Adua, *Aweke & Gilbert* 826 (ETH, K, WAG); 55 km N. of Kwiha, *id.* 627 (ETH, WAG); Mt. Schagene, along road from Adua to Adigrat, *id.* 782 (ETH, WAG); Chire, *Chiovenda* 3270 (FI); Montium regionis Schagenni, *Schimper* 373 (holotype: K; isotype: BM, BR, FI, L, MPU, P, UPS).

Begemdir prov.: Gondar nella citta Dembia, *Chiovenda* 1758, 2663 (FI).

Sidamo prov.: Camp d'Soddu, *Vatoya* 1419 (FI).

Other specimens examined: Kenya, Tanzania, Zaire.

VAHL 1805, p. 185; SCHUMACHER 1828, p. 45; MIQUEL 1867, p. 288; MARTELLI 1886, p. 76; PENZIG 1893, p. 320; SCHWEINFURTH 1893, p. 65; WARBURG 1906, p. 139; FIORI 1910b, p. 373, fig. 45; MILDBRAED & BURRET 1911, p. 209 (partim); ENGLER 1915, p. 42; HUTCHINSON 1916, p. 121; ID. 1917, p. 215; CHEVALIER 1920, p. 597; BLATTER 1923, p. 444; SCHWARTZ 1939, p. 26; LEBRUN & BOUTIQUE 1948, p. 121; AUBRÉVILLE 1950, p. 346; JUNGHANS 1961, p. 345; HEPPER 1976, p. 78.

Ficus caffra (MIQ.) MIQ. (1867, p. 288); WARBURG 1906, p. 139.

Ficus ingens MIQUEL (1867, p. 288); ENGLER 1892, p. 191; WARBURG 1894, p. 161; ALMAGIA 1903, p. 115; MILDBRAED & BURRET 1911, p. 209; HUTCHINSON 1916, p. 121; ID. 1925, p. 529; HUTCHINSON & BRUCE 1941, p. 124; LEBRUN & BOUTIQUE 1948, p. 121, 124; AUBRÉVILLE 1950, p. 336, 340, 346; CODD 1951, p. 21; EGGELING (& DALE) 1951, p. 250; ANDREWS 1952, p. 268; CUFODONTIS 1953, p. 12; KEAY 1958, p. 607; DALE & GREENWAY 1961, p. 317; WATT & BREYER-BRANDWIJK 1962, p. 779; BREITENBACH 1963, p. 125; MOONEY 1963, p. 56; PALMER & PITMAN 1972, p. 455.

Ficus ingentoides HUTCHINSON (1915, p. 319); ID. 1916, p. 123; ANDREWS 1952, p. 268; CUFODONTIS 1953, p. 12; KEAY 1958, p. 607.

Ficus stuhlmannii var. *glabrifolia* WARB. (1894, p. 162).

Ficus schimperiana HOCHST. ex FERRET et GALINIER (1847-48, tab. 2); RICHARD 1850, p. 266; MARTELLI 1886, p. 76; ALMAGIA 1903, p. 115.

Ficus xanthophylla STEUD. ex MARTELLI (1886, p. 76); RICHARD 1850, p. 266; MIQUEL 1867, p. 288.

Urostigma caffrum MIQUEL (1847, p. 554, sine nomine, pro var.); ID. 1849, p. 141.

Urostigma ingens MIQUEL (1847, p. 554); ID. 1849, p. 140; RICHARD 1850, p. 266; PALMER & PITMAN 1972, p. 455.

Urostigma luteum MIQUEL (1847, p. 554); ID. 1849, p. 140, tab. 5A; MARTELLI 1886, p. 76.

Urostigma xanthophyllum MIQUEL (1847, p. 554); ID. 1849, p. 141; MARTELLI 1886, p. 76.

Shrub to tree, 4-15 m tall; dbh 30-40 cm. Slash pale brown to dark reddish. Latex milky white. Leaf-bearing parts of the branches pale brown, glabrous to tomentose, white yellowish or greyish to brown when dry, lengthwise rugose.

Leaves in spirals. Stipules free, caducous, fully amplexicaul, $\frac{1}{2}$ - $3\frac{1}{2}$ cm long, (densely) white tomentose to sparsely puberulous. Petiole 2-5 cm long, 2-3 mm wide, puberulous in the lower part, otherwise sparsely pubescent to glabrous. Blade ovate to oblong-lanceolate, drying pale brown to greenish, the nerves lighter coloured to bright yellow, 6-16 cm long, 2-7 cm wide, coriaceous, acute to acuminate at the apex, cordate to rounded, \pm asymmetrical at the base, margin entire, more or less revolute, above more or less shiny and

glabrous, beneath dull and glabrous. Midrib and other veins plane above, 7–15 pairs of lateral veins; midrib very prominent below, glabrous to sparsely pilose. Intercostals slender and inconspicuous glands at the base of the midrib.

Figs solitary, in pairs or crowded in the axils of the leaves or just behind the leaves, subsessile to shortly pedunculate; peduncle up to 4 mm long, puberulous on top with 2–3 broad, blunt, scale-like, outside pubescent bracts. Receptacle depressed-globose, 6–11 mm in diam., glabrous or tomentellous, when dry yellowish and often with dark brown dots, often wrinkled. Ostiole more or less prominent, 1–2 mm in diam., closed by 3 imbricate outer, minutely puberulous, broadly rounded bracts. Perianth 3-lobed, ovate, acute, \pm membranous, shorter than ovary and stamen.

Male flower: One stamen exerted from the perianth. Anther ca as long as filament, as broad as long. Connective not apiculate. Loculi opening by a wide central pore.

Female flower with a laterally attached slender style and small, acute stigma.

Gall-flower sessile or pedicellate, stipitate, style short with a small stigma.

Taxonomical notes: The type of *F. lutea* VAHL (a THONNING specimen from W. Africa; cf. SCHUMACHER, JUNGHANS and HEPPER) appears to be lost. A neotype is needed. Pending a designation of a neotype *F. lutea* VAHL was accepted and circumscribed in the present revision.

MILDBRAED & BURRET (1911, p. 209–211) stated that *F. lutea* occurred in Ethiopia, but CUFODONTIS (1953, p. 12) did not admit *F. lutea*.

F. schimperiana HOCHST. was cited by MIQUEL (1847, p. 554) in synonymy with *Urostigma ingens* MIQUEL and referred to SCHIMPER 1771. FERRET & GALINIER published in 1847–48 (tab. 2) a full drawing of *F. schimperiana* (based on SCHIMPER 1771); *F. schimperiana* FERRET & GAL. became a legitimate name.

Urostigma ingens MIQ. also rests on SCHIMPER 1771. RICHARD, when describing *F. schimperiana* in 1850 cited *Urostigma ingens* MIQUEL in synonymy. This invalidated *F. schimperiana* A. RICH. (the epithet 'ingens' ought to have been adopted), a name already published by FERRET & GALINIER. SCHIMPER 1771 belongs in *F. lutea*, which from a taxonomical point of view eliminates all eventual nomenclatural problems in connection with *F. schimperiana* or *F. ingens* (MIQ.) MIQUEL.

F. xanthophylla STEUD. ex MARTELLI (= *Urostigma xanthophyllum* MIQ.) rests on SCHIMPER, It. Abyss. II, no. 943. This is *F. lutea*. *Urostigma caffrum* MIQ. (= *F. caffra* (MIQ.) MIQ.) was described by MIQUEL at first as a variety (without name in *U. xanthophyllum*) in 1847 (p. 554), and subsequently raised to the rank of a species: *Urostigma caffrum* in 1849, p. 141. The taxon rests on BURKE, Macalisberg, s.n. It seems best to reduce *U. caffrum* to *F. lutea*.

HUTCHINSON based *F. ingentoides* (1915, p. 319) on SCHWEINFURTH & RIVA 1687, STUHLMANN 750, 4144, and 4585. SCHWEINFURTH & RIVA 1687 is designated as the lectotype; the specimen belongs in *F. lutea*.

Ecological notes: *F. lutea* is a tree of variable size, with a smooth bark.

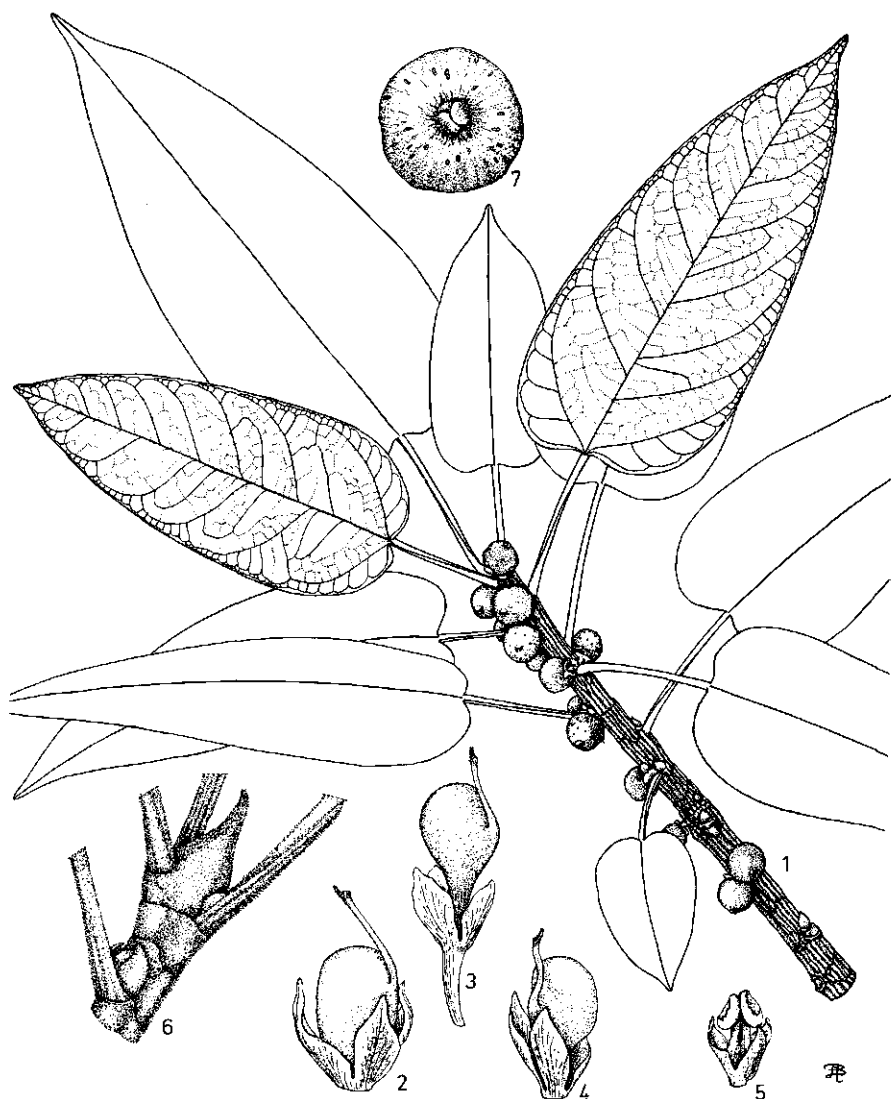


FIG. 9. *Ficus lutea* VAHL – 1: Branch ($\times \frac{1}{2}$); 2: Female flower ($\times 10$); 3–4: Gall-flower ($\times 10$); 5: Male flower ($\times 10$); 6: Axillar buds ($\times 1\frac{1}{2}$); 7: Ostiole ($\times 2$). (1–5, 7: J. J. F. E. DE WILDE 7043; 6: FRIIS, AWEKE, RASMUSSEN & VOLLESEN 1696).

Slash pale brown to reddish. Latex milky white. In Ethiopia it was often collected between 1200–2000 m alt.

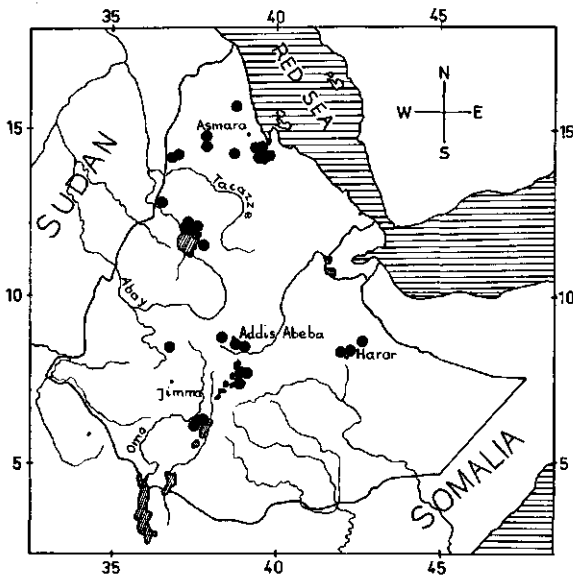
Associated are e.g. *Cordia abyssinica*, *Acacia lahai*, *Phoenix reticulata*, *Euphorbia tirucalli*, *Olea* and *Albizia* (AWEKE & GILBERT 850). Other species associated were *Rhus abyssinicus*, *Calpurnia*, *Rumex nervosus*, *Euclea* (AWEKE & GILBERT 839).

J. J. F. E. DE WILDE (4339) noted *Juniperus* and open scrub vegetation on a much grazed mountain slope; the figs were reddish inside. It appears that *F. lutea* is accompanied by a much wider range of species, such as *Piliostigma thonningii*, *Stereospermum kunthianum*, *Dodonaea viscosa* etc.

The growing localities are described as 'granitic slope', 'evergreen bush land', 'limestone mountain top', 'eroded mountainous hills, locally bare sandstone', 'wooded grassland', 'degraded Juniper forest' &c.; *F. lutea* can be found in many widely different stations.

Bos (7779) stated: 'a large tree, about 8 m tall, pale grey bole, rather wide crown. Leaves dark green, nerves and reticulation greenish yellow, pale green below. Figs pale pink tinged, cream and reddish around the stoma'. JANSEN, DE WIT and AWEKE (4681) met with it as a 20 m tall tree, near river, (latex not copious), branches light brown, petioles light green, leaves green with yellow veins on both surfaces. Fruits light green with white spots and a brown spot on the top, depressed-globose, $\frac{1}{2}$ – $\frac{3}{4}$ cm in diam. (near Ambo; Guder waterfall).

Vernacular names: *kafunu* (Amharic); *djerande-harmas*, *djeranta-gihe*, *cokonte*, *chekemte* (Tigre); *deer-ad*, *lufo* (Somali); *beddah*, *duruf* (Arabic) (fide CUFODONTIS, BREITENBACH, MOONEY, and AWEKE).



Ficus lutea VAHL

Specimens examined:

Eritrea prov.: Ocule-Cusai, *Almagia* 3723 (FI); Mt Zeban, prope Keren, *Aweke & Gilbert* 693; 18 km S.W. of Asmara on Adua road, *id.* 701 (ETH, WAG); Arghesana, *Baldrati* 2063 (FI); Seraé: Adi Urgi, *Bellini* 437 (FI); Ocule-Cusai: Chenafi, *Fiori* 42, 43 (FI); *ibid.*, Mt Cohaito, *id.* 41 (FI); Amasen: Monte Faghenat, *Pappi* 5357 (FI, L); Eritrea, *id.* 3287 (FI); Alighede, *id.* 5111, 5118 (FI); Cohain: Adi-Catina, *id.* 1009 (FI); Assaorta: Haddas, *id.* 2658, 2712 (P); In Bellagass, *Schimper* 1098 (P); Gheleb: Colonia Eritrea, *Schweinfurth* 1419 (K); environs d'Acrou, *Schweinfurth & Riva* 1687 (syntype: BR, K; paratype: BR, FI, MPU); Saganeiti, Gorge Gorra, *id.* 881 (FI); Saganeiti, Valle de Degerra, *id.* 1317 (P).

Tigre prov.: 31 km Axum-Chire road, near Ada-Komala, *Aweke & Gilbert* 839 (ETH, WAG); 23 km W. of Makale, *id.* 637a (ETH, WAG); near old church Indesellasse, *id.* 850 (ETH, WAG); Tigre, *Chiovenda* 514 (FI); prope Djeladjeranne, *Schimper* 1771 (isotype cf. *F. ingens*: BR, FI, L, MPU, P, UPS); ex Tigre v. Beghemder, *id.* 875 (E); Discheranthe Gibe, *id.* 943 (isotypes of *F. xanthophylla*: BM, FI, L, MPU, P, UPS); near Amba Sea, *id.* 875 (BM, K); 43 km along road Adua-Adigrat, *J. J. F. E. de Wilde* 7043 (ACD, WAG).

Begemdir prov.: Gorgora, N. of Lake of Tana, *Archer* 9397 (K); Ovest di Gorgora, *Pichi Sermolli* 1716 (FI); Birghade Mariam, Isola presso Gorgora, *id.* 1721 (FI, W); Isola Deck, nella parte orientale di essa, *id.* 1717 (FI); colline ovest di Gorgora-Sud del villaggio, *id.* 1719 (BR, FI); Lago a Gorgora, *id.* 1718 (FI); Monte Cicia e Monte Vollghelia, *id.* 1720 (FI); della pensiola di Zeghie, *id.* 1722 (FI); Zeghie, *id.* 1723 (FI); Callabat, Matama, *Schweinfurth* 555 (BR, K, L, P).

Gojam prov.: Blue Nile gorge, *Aweke & Gilbert* 1018 (ETH, WAG); Fazokel: Choor Kebir, *Kotschy* 485 (K, P); *ibid.*, *id.* 469 (L).

Shoa prov.: Around Guder waterfall, *Jansen, De Wit & Aweke* 4681 (ACD, WAG); Royaume de Shoa, *Rochet d'Héricourt s.n.* (P); Galila, *Vatova* 2331 (FI); L. Shala, *id.* 2267, 2269, 2337 (FI); 50 km S.E. of Addis Ababa, near Debre Zeit, *De Wilde & De Wilde-Duyffjes* 6138 (BR, WAG).

Hararge prov.: Chercher highlands near Kersa – 12 km from Dire Dawa-Harar road junction, *Bos* 10030 (ACD, WAG); Dengago Mts – between Dire Dawa and Alemaya, *id.* 7779 (ACD, WAG); 18 km from Dire Dawa on road to Harar, *J. J. F. E. de Wilde* 4339 (ACD, WAG).

Arussi prov.: Lake Langan, Rift valley, *Ash* 316 (K, WAG); Lake Zwai, *Aweke* 559 (ETH, WAG); Adami Tulu, *Senni* 638 (FI); Lake Zwai, *Vatova* 2315, 2331 (FI).

Illubabor prov.: 1 km N. of Didessa river along the road Agaro-Bedelle, *Friis, Aweke, Rasmussen & Vollesen* 1696 (BR, C, ETH, WAG); 50 km W. of Lekemti, near bridge crossing Didessa river, *De Wilde & De Wilde-Duyffjes* 10730 (BR, WAG).

Sidamo prov.: Camp di Soddu, Lago R. Margherita, *Vatova* 1605, 1503, 1441, 1330 (FI).

Ethiopia: sine loco, *Rochet d'Héricourt* 147 (P); sine loco, *Vatova* 1991, 1992 (FI).

Ficus mallotocarpa WARBURG

Fig. 10

WARBURG 1894, p. 154; ENGLER 1895, p. 161; LEBRUN & BOUTIQUE 1948, p. 113; CUFODONTIS 1953, p. 12; *id.* 1958, p. 105; KEAY 1958, p. 606; DALE & GREENWAY 1961, p. 315; CUFODONTIS 1962, p. 302; BREITENBACH 1963, p. 125; PALMER & PITMAN 1972, p. 447.

Ficus capensis THUNB. var. *mallotocarpa* (WARB.) MILDBR. & BURR. (1911, p. 198).

Tree up to 25 m tall, low branching with a broad open crown. Bark pale grey, peeling in irregular flakes or small scales. Latex abundant, white. Slash dark red brown, exuding copious latex. Leaf-bearing parts of the branches brown, finely flaky, young internodes sometimes glaucous.

Leaves spirally arranged, stipules fully amplexicaul, caducous, finely appressed golden silky outside, $\frac{1}{2}$ –1 cm long. Petiole glabrescent to glabrous,

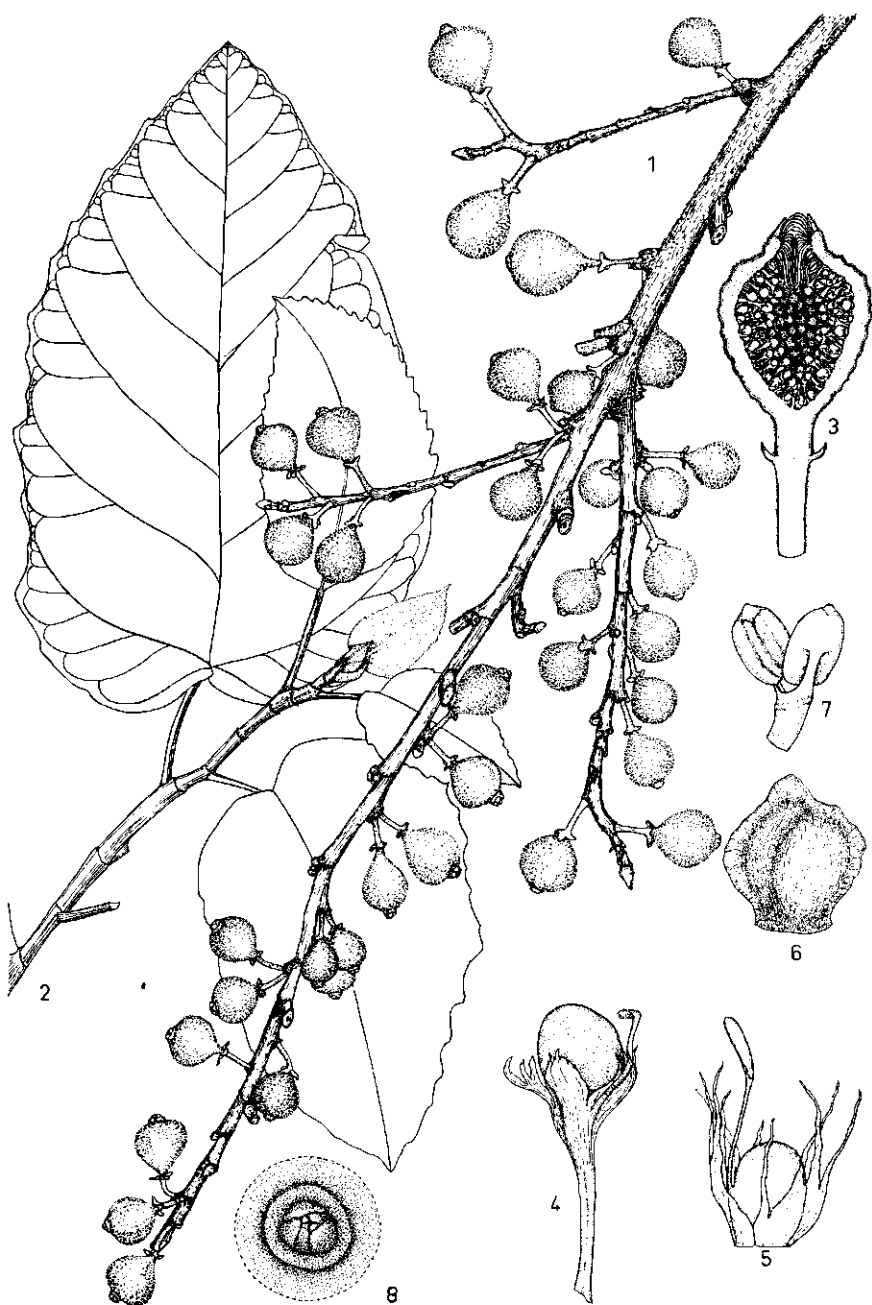


FIG. 10. *Ficus mallotocarpa* WARB. - 1: Inflorescence, part ($\times \frac{1}{2}$); 2: Branch ($\times \frac{1}{2}$); 3: Fig. section ($\times 1\frac{1}{2}$); 4: Gall-flower ($\times 10$); 5: Female flower ($\times 10$); 6: Male flower, closed? ($\times 10$); 7: Stamens ($\times 10$); 8: Ostiole ($\times 2$). (1-8: J. J. F. E. DE WILDE 6310).

(1-)4½ cm long. Periderm rugose or peeling off. Blade ovate to elliptical, slightly asymmetrical, 10-15(-17) cm long, 5½-10 cm wide, apex acute to subobtus, base cordate to truncate to cuneate or rounded, margin irregularly dentate to sinuate, above ± smooth, sparsely pubescent, beneath softly velvety when young. Veins ± prominent, especially beneath and there woolly pubescent. Laterals 5-7 pairs, rather irregularly inserted, intercostals very evident on lower surface, one (or more) glands in the axils of the basal veins.

Figs on a pendulous inflorescence, starting at 1 m above the ground on the trunk, higher on thick branches, the inflorescence branching from near the base, up to 60 cm long. Peduncle 1-1½(-2) cm long, velvety, carrying 3 scale-like bracts on the top. Receptacles obovoid to turbinate, 1½ cm in diam., whitish, tomentose to densely pubescent, nearly sessile, brownish, finely dotted with green. Ostiole protruding from the flattened upper surface and closed by pubescent broad rounded bracts.

Male flower with 1-2(-4) stamens, entirely enclosed by the perianth, almost sessile. Filament short, thick. Anther apiculate, loculi free at base.

Female flower sessile, the perianth longer than the ovary, fringe-like, variously incised, lobes narrow, long attenuate. Style slender, long, ending in a large, oblong stigma.

Gall-flower long pedicelled, with a short, erose perianth and a laterally attached short style, stigma narrowly spoon-shaped.

Taxonomical notes: WARBURG described *F. mallotocarpa* (1894, p. 154) basing it on VOLKENS 465 (holotype) collected in 'Moçambique' (Ugwen mountains, Kilimandjaro). CUFODONTIS (1953, p. 12) and BREITENBACH (1963, p. 125) recorded this for Ethiopia. It appears that the material cited by CUFODONTIS (1958, p. 105 and 1962, p. 302) are specimens collected by KULS (177, 981, 1007), all sterile and therefore not identifiable with certainty. However, *F. mallotocarpa* occurs in Ethiopia; fertile specimens are e.g. J. J. F. E. DE WILDE 6310 and AWEKE & GILBERT 953.

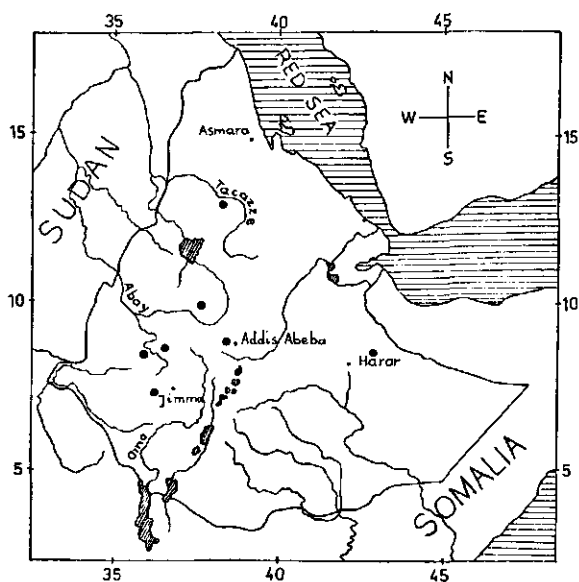
Ficus mallotocarpa is intermediate between *F. sur* and *F. sycomorus* (see notes sub *F. sur*).

Ecological notes: J. J. F. E. DE WILDE described *F. mallotocarpa* as a medium-sized tree, in savannah at 1600 m alt. (6310) on loose, dark brownish-black soil. The bark was 'pale grey' and peeling off in irregular flakes. G. AWEKE, at the same altitude (569) noted a dark brown bark; while DE WILDE noted cauliflory, starting at 1 m above ground, and additional infructescences on the thick branches, AWEKE adds that bunches of fruits were also present near the endings of the branches. He also noted that *F. mallotocarpa* was associated with *Combretum*, *Acacia* and *Albizia*. I. FRIIS, G. AWEKE, F. RASMUSSEN & K. VOLLESEN (no. 2318) noted *Combretum*, *Terminalia*, *Stereospermum* and *Piliostigma* in a wooded grassland but apparently saw *F. mallotocarpa* also in the same area (Kefa prov.) in riverine forest, with *Syzygium* and *Sapium*. The figs were 'dark violet'; DE WILDE described them as 'brownish,

finely dotted with green' (the figs seen by FRIIS c.s. were very young). AWEKE and GILBERT (953), at 1900 m in riverine forest noted green fruits with 'conspicuous white hairs'. *Combretum* and *Stereospermum* were also noted by JANSEN (6398). WARBURG noted that the figs were edible (1894, p. 154).

Uses: In Ethiopia, it is used in some areas as a remedy of gonorrhea.

Vernacular name: Galla: *harbu* (fide BREITENBACH and MOONEY).



Ficus mallotocarpa WARB.

Specimens examined:

Tigre prov.: 1 km N. of Adi-Arkai, Mai-Teklit, on the way to Debark, near river, *Aweke & Gilbert* 953 (ETH, WAG).

Gojam prov.: Centre of Debre Markos, *Aweke & Gilbert* 1013 (ETH, K, WAG).

Wellega prov.: Lower Fincha, 1 km from the power house, *Aweke* 569 (ETH, WAG); road Nekemt(Lekemt)-Ghimbi, near Dedessa river, *Jansen* 6398 (WAG).

Shoa prov.: British Embassy Compound, Addis Ababa, *Aweke* 431 (ETH, WAG).

Hararge prov.: Galla pass, *Gillett* 5135 (FI, K, P).

Kefa prov.: near the bridge across Gojeb river at the road Jimma-Bonga, *Friis, Aweke, Rasmussen & Vollesen* 2318 (BR, C, ETH, WAG); slope above the Gojeb river along road Bonga-Jimma, *J. J. F. E. de Wilde* 6310 (ACD, WAG).

Other specimens examined: Kenya, Ugueno mountains, Kilimandjaro, *Volgens* 465 (BR; isotype), Liberia, S. Rhodesia, Tanzania, and Zaire.

VAHL 1805, p. 185; SCHUMACHER 1828, p. 46; MIQUEL 1867, p. 288; MILD-BRAED & BURRET 1911, p. 243; HUTCHINSON 1916, p. 164; LEBRUN 1934b, p. 58; AUBRÉVILLE 1936, p. 54, 57, 68; LEBRUN & BOUTIQUE 1948, p. 160; AUBRÉVILLE 1950, p. 337; ANDREWS 1952, p. 270; KEAY 1958, p. 608; JUNGHANS 1961, p. 345; MOONEY 1963, p. 56; HEPPER 1976, p. 78.

Ficus brachypoda HUTCHINSON (1915, p. 339); ID. 1916, p. 164; CHIOVENDA 1937, p. 527; LEBRUN & BOUTIQUE 1948, p. 173; EGGELING (& DALE) 1951, p. 242; CUFODONTIS 1953, p. 10; ID. 1958, p. 104; DALE & GREENWAY 1961, p. 315; BREITENBACH 1963, p. 121; MOONEY 1963, p. 55.

A tree (often epiphytic at first and then a 'liana'), 15–40 m tall. Bark grey. Slash red to pale brown, exuding milky white latex. Branches when dry brown and sulcate, minutely puberulous; older parts turning blackish. Terminal bud enclosed by free, fully amplexicaul, caducous, $\frac{1}{2}$ –5(–8) cm long stipules entirely glabrous or minutely puberulous at base.

Leaves spirally arranged. Petiole 3–9 cm long, glabrous or puberulous, light green. Blade elliptic, oblong to ovate, or suborbicular, up to more than twice as long as broad, 6–30 cm long, 3–10 cm wide, drying brown to blackish, base rounded to acute or subcordate, apex (sub)acuminate, margin entire, above \pm shiny or dull on both surfaces, glabrous, on the lower surface glabrous to more or less pubescent especially on the nerves. Nerves almost plane above (midrib slightly impressed), prominent below. Laterals 7–14 pairs, the first pair emerging at the base of the blade and at a more acute angle than the upper laterals. Intercostals absent or nearly so; a single gland at the base of the midrib.

Figs borne on the branches, often axillary, sessile to short-pedunculate. Peduncle up to 3 mm long. Basal bracts paired, connate at base, semi-orbicular, wavy, pubescent on the outside. Receptacle oblong to subglobose, $2\frac{1}{2}$ –3(–5) cm in diam., densely or sparsely puberulous to glabrous, at maturity often more or less warty. Ostiole small, prominent in ripe figs, surrounded by the raised ring-shaped top ('umbo'), closing bracts sometimes visible.

Male flowers: Near the ostiole and also scattered lower in the receptacle, pedicellate, one or two stamens. Anthers equalling the filament or much shorter. Perianth enclosing the stamen(s) entirely.

Female flowers pedicellate or sessile. Style lateral, slender, stigma large or small. Achene smooth, as a rule light coloured. Perianth reddish brown. Sometimes (in one-stamened flowers) the stamen is accompanied by an abortive ovary.

Gall-flowers pedicellate, short-styled, style produced dorsally on the ovary by a rim down to the base of the ovary; stigma simple or forked.

Taxonomical notes: CUFODONTIS listed *Ficus brachypoda* HUTCH., and *F. brachypoda* HUTCH. var. *scioana* CHIOV. for Ethiopia (1953, p. 10). However,

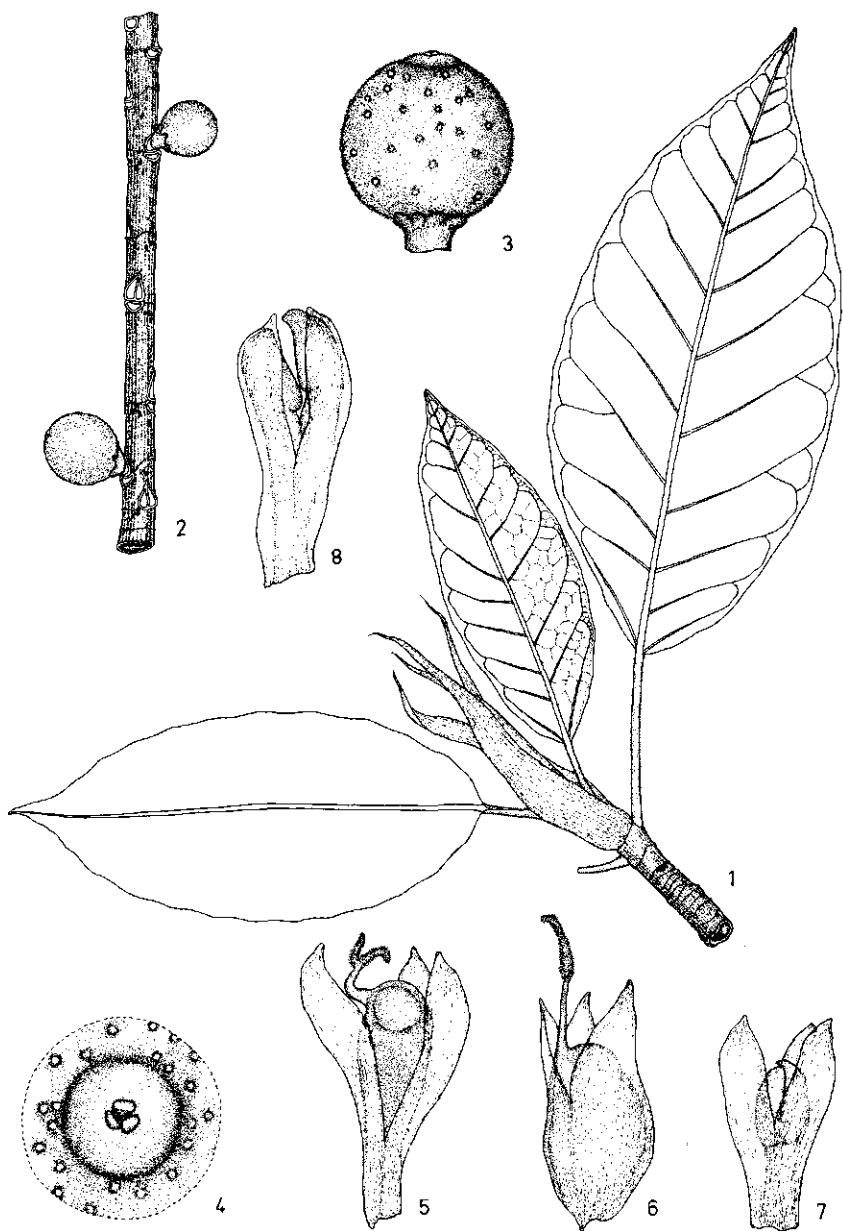


FIG. 11. *Ficus ovata* VAHL - 1-2: Branch ($\times \frac{1}{2}$); 3: Fig ($\times 1$); 4: Ostiole ($\times 2$); 5: Gall-flower (note nourishing ?ariloid tissue) ($\times 10$); 6: Female flower ($\times 10$); 7-8: Male flower ($\times 10$). (1: FRIIS, HOUNDE & JACOBSEN 531 and JANSEN 5543; 2, 5-8: JANSEN 5543; 3-4: FRIIS, HOUNDE & JACOBSEN 531).

F. brachypoda HUTCHINSON (1915, p. 339) cannot stand because of *F. brachypoda* (MIQ.) MIQ. (1847, p. 552, 562; 1861, p. 238; 1867, p. 287). HUTCHINSON's type of *F. brachypoda* is DAWE 290 (K) from Budu. This differs widely from MIQUEL's *F. brachypoda* which is indigenous in Australia. DAWE 290 belongs in *F. ovata* VAHL.

CHIOVENDA described in *F. brachypoda* HUTCH. a var. *scioana* (1937, p. 527). The type is TASCHDJIAN 145, collected near Kachissy in Shoa prov. (FI); this also belongs in *F. ovata*.

When describing *F. brachypoda*, HUTCHINSON mentioned its affinity to *F. ovata*; differences were the peduncled receptacles and small basal bracts. The descriptions given by HUTCHINSON in 1916 mention that *F. ovata* has 'sessile or very shortly pedunculate receptacles' and *F. brachypoda* HUTCH. has 'shortly pedunculate'. The bracts, the descriptions suggest are in *F. brachypoda* at least as large as in *F. ovata*; in fact, there exists no specific difference at all.

In JANSEN 5543 some flowers were seen in which 1 stamen and 1 pistil in various stages of development were found associated. The male flowers contain 1 or 2 stamens.

Ecological notes: AWEKE & GILBERT found it (964) on a steep rocky slope in deciduous woodland, associated with *Boswellia*, *Anogeissus*, *Piliostigma*, in a riverine forest, at 1300 m alt. at Adi-Arkai, Debark. The figs had fallen off (Sept.). Bracts pale yellow green.

JANSEN collected it (5471) at ca 1960 m in Kefa prov., on 23 March 1976, an epiphyte, containing white milky sap, branches grey-green, leaves leathery, dark green with yellowish veins on both surfaces. Young brown-green buds in leaf-axis. Many specimens carry green brown conical calyptra's on the branches. He also noted it (5543) as a \pm 20 m high tree, at 1850 m alt., in secondary rain forest. Branches grey white, youngest parts green, petioles yellow green, leaves dark green with yellowish veins and red midrib. Fruits like small apples, red-brown green, up to 5 cm in diam. (24 March 1976).

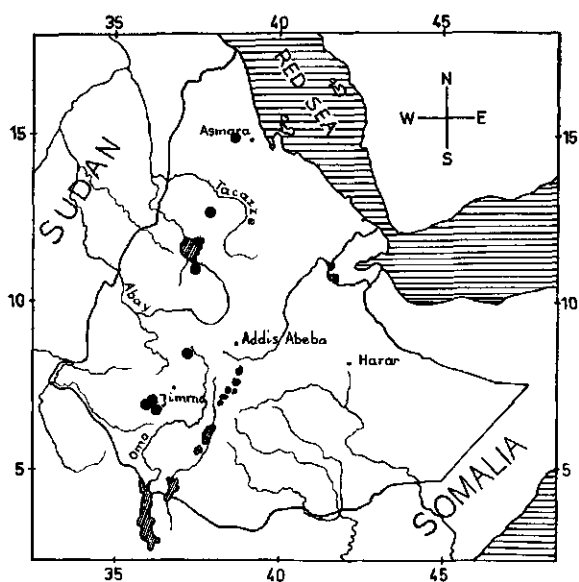
FRIIS, HOUNDE and JACOBSEN (531) collected it as a 6–7 m tall tree, at 950 m alt., in wooded grassland (*Combretum*, *Cussonia*, *Acacia*) where *Ficus* and *Stereospermum* were dominating trees and *Hypericum* and *Dodonaea* were found in the shrub layer.

Uses: CUFODONTIS stated (1958, p. 104) that it is 'mostly planted as a sacred tree' in S. Ethiopia.

Vernacular names: *chabero* (Kaffa, Jimma); *marua* (Wolamo; fide CUFODONTIS); *giltu*, *qilitu* (Gudje; fide CUFODONTIS); *charo*, *gromheh* (Kaffa; fide MOONEY); *dembi* (Galla; fide MOONEY); *shola* (Amharic); *eta*, *oda*, *grome* (Galla; fide BREITENBACH).

Specimens examined:

Eritrea prov.: Road to Keren, 57 km from Asmara, Aweke & Gilbert 685a.



Ficus ovata VAHL

Gojam prov.: missione del Tana, Est di Bahr-Dar, *Pichi Sermolli* 2390 (BR, FI).
 Shoa prov.: presso Nilo Azzuro, *Rupalioni* 1308 (FI); presso Kachissy, *Taschdjian* 145 (holotype of *F. brachypoda* var. *scioana*: FI).
 Illubabor prov.: sine loco, *Thomerson* 726 (K).
 Kefa prov.: sine loco, *Chaffey* 503 (K); ca. 15 km North of Ghibe-bridge, S.E. of Folla (Addis-Jimma road), *Friis. Hounde & Jacobsen* 531 (BR, C, ETH, WAG); path to Bonga waterfall, *Jansen* 5543 (ACD, WAG); Wush-Wush tea plantation, *id.* 5471 (ACD, WAG); Jimma town, *Seegeler* 2674 (ACD, WAG).
 Gamu Gofa: Arba Minch, N.E. Lake Abaya, *Aweke & De Wit* 1531 (ETH, WAG).
 Sidamo prov.: Ghidami, *Benedetto* 641 (FI).
 Also seen from: Cameroon, Dahomey, Ivory Coast, Nigeria, N. Rhodesia, Sierra Leone, Tanzania, Uganda (Buddu, *Dawe* 290, type of *F. brachypoda* HUTCH. (K), and Zaire.

***Ficus palmata* FORSKÅL**

Fig. 12

FORSKÅL 1775, p. 179; VAHL 1790, p. 84, tab. 24; MIQUEL 1848, p. 225; SCHWEINFURTH & ASCHERSON 1867, p. 290; SCHWEINFURTH 1893, p. 65; ID. 1896, p. 124; ALMAGIA 1903, p. 116; WARBURG 1904, p. 366; FIORI 1910b, p. 370, 371; MILDBRAED & BURRET 1911, p. 189; HUTCHINSON 1916, p. 93; BLATTER 1923, p. 444; WERTH 1932, p. 539; CHIOVENDA 1937, p. 527; SCHWARTZ 1939, p. 25; AUBRÉVILLE 1950, p. 335; ANDREWS 1952, p. 263; CUFODONTIS 1953, p. 13; ID. 1958, p. 105; BREITENBACH 1963, p. 128; MOONEY 1963, p. 56; CORNER 1965, p. 36.

Ficus palmata var. *morifolia* (FORSK.) WARBURG (1904, p. 367).

Ficus palmata β *petitiiana* (A. RICH.) FIORI (1910b, p. 371); CUFODONTIS 1953, p. 13; BREITENBACH 1963, p. 128.

- Ficus palmata* γ *pseudocarica* (MIQ.) FIORI (1910b, p. 371).
Ficus morifolia FORSKÅL (1775, p. 179); MIQUEL 1849, p. 127; CHIOVENDA 1923, p. 116; CUFODONTIS 1953, p. 13; BREITENBACH 1963, p. 128.
Ficus forskalii VAHL (1805, p. 196); CUFODONTIS 1953, p. 13; BREITENBACH 1963, p. 128.
Ficus petitiiana A. RICHARD (1850, p. 271); CUFODONTIS 1953, p. 13; BREITENBACH 1963, p. 128.
Ficus pseudo-carica MIQUEL (1848, p. 225); ID. 1849, p. 130, tab. 2, fig. D; RICHARD 1850, p. 271; MIQUEL 1867, p. 290; SOLMS-LAUBACH 1867, p. 189; ENGLER 1892, p. 192; ALMAGIA 1903, p. 116.
Ficus pseudo-carica MIQ. var. α *tomentosa* A. RICHARD (1850, p. 271); CUFODONTIS 1953, p. 13; BREITENBACH 1963, p. 128.

An (epiphytic) *shrub* or small *tree*, up to 5 m tall. Branches and branchlets purplish-brown, when dry, bark \pm smooth, not peeling. Latex not copious, white milky. Leaf-bearing parts of the branches paler brown, puberulous to pubescent.

Leaves in spirals. Stipules free, caducous, fully amplexicaul, puberulous to pubescent. Petiole up to $4\frac{1}{2}$ cm long, reddish or purplish-green or brown-green, dull, pubescent. Blade variable, 3.0–7.2 cm long, 2.4–9.2 cm wide, serrate, more or less entire on the lower but 3-lobed on the higher branches, the entire ones ovate, acute to \pm acuminate, the lobed ones ovate in circumference, acute base truncate to rounded or shallowly cordate, chartaceous, pale green to olive green with whitish veins, dark green above, paler green beneath, more or less scabrous, glabrous to \pm pubescent on both sides, especially below, in particular on main and lateral veins. Midrib slightly impressed above, prominent below, lateral nerves 5–7, the first pair palmate at the base of the blade. Peduncle up to $1\frac{1}{2}$ cm long, reddish green or lighter green, puberulous, slender. Bracts 3, ovate at the apex and cuneate at the base, hairy.

Figs solitary or axillary. Young fruits green, whitish, sometimes pubescent, yellowish to deep purple at maturity, sometimes paler spotted, stipitate, $1\frac{1}{2}$ cm long. Ostiole protruding, often with numerous, scale-like, light coloured bracts. Receptacle globose or pyriform, light green but at maturity with a dark purplish flush, smooth outside, glabrous.

Male flower with 3–5 stamens, pedicelled or sessile, the majority near the ostiole, filament shorter than the anther, perianth lobes 5, shorter than the stamens, blunt or acute, smooth or minutely sparsely muricate-setose outside.

Female flower (sub)sessile, ovary minutely sparsely setose, the style at an angle of ca 90° degrees deviating, perianth-lobes acute, longer than the ovary, minutely muricate-setose outside. Stigma filiform.

Gall-flower pedicelled to (sub)sessile, ovary smooth, with a short upright style, the stigma very small, the ending of the style. Perianth lobes similar to female flower.

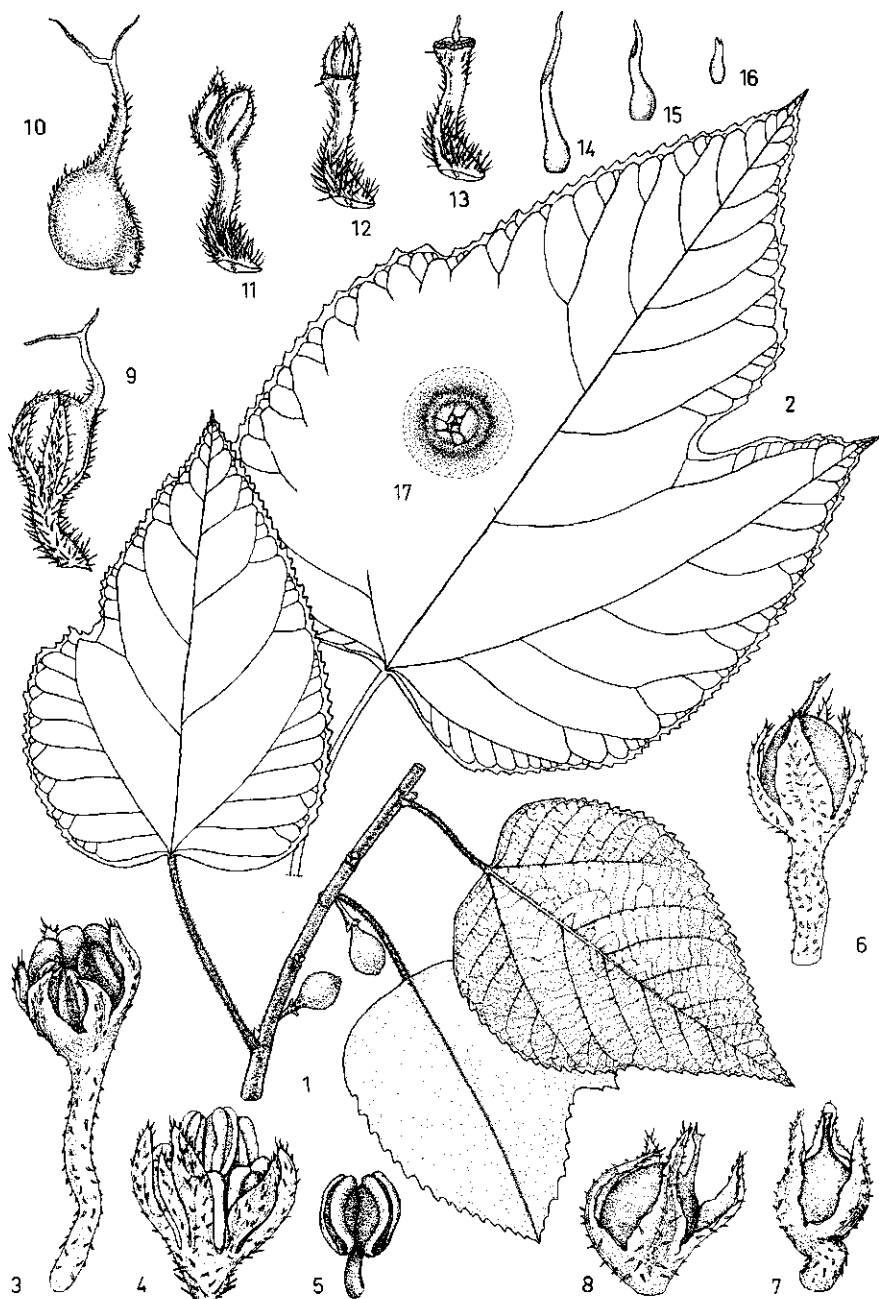


FIG. 12. *Ficus palmata* FORSK. - 1: Branch ($\times \frac{1}{4}$); 2: Leaf ($\times 1$); 3: Male flower, long pedicel, 3 stamens ($\times 10$); 4: Male flower, subsessile, 5 stamens ($\times 10$); 5: Stamen ($\times 10$); 6-8: Gall-flower ($\times 10$); 9-16: Female flower (9-13: $\times 10$; 14-16: $\times 20$); 17: Ostiole ($\times 2$). (1, 3-8, 17: DE WILDE & DE WILDE-DUYFJES 6089; 2: FRIIS, HOUNDE & JACOBSEN 163; 9-16: JANSEN 5213).

p. 211) to '*Ficus foliis palmatis*' LINN. h. Cliff. 471'. LINNAEUS referred to *Ficus foliis palmatis* in Hortus Cliffortianus 1737, p. 471 under '*Cryptogamia plantae*, *Ficus* g. pl. 776'.

In 1753 (Sp. Pl. 2, p. 1060) he declared to be convinced by MUNCHAUSEN that *Ficus* belongs in '*Polygamia polyoecia*' and not in '*Cryptogamia*'; LINNAEUS then published binomials in *Ficus*, while referring *Ficus foliis palmatis* to *Ficus carica* L., the cultivated fig, which was most probably the correct disposition.

CHIOVENDA (1923, p. 116) published *F. Baeles* FORSK. var. α *morifolia* (FORSK.) CHIOVENDA nov. comb. basing this on *F. forskalii* VAHL and '*F. palmata* var. *morifolia* (FORSK.) SCHWEINF.'. He came to this new combination because FORSKÅL referred to '*baeles*' (1775, p. CXXIV) sub '*F. morifolia*' and also joined *F. palmata* (nos. 622 and 623) a '*Idem nomen*'. CHIOVENDA's new combination is against the Code.

HUTCHINSON (msc., K) noted that SCHIMPER, It. Ab., sect. I, no. 157 (Adoa region) was 'an excellent match of the type of *Ficus palmata* FORSKÅL, compared Nov. 25th, 1913'. It was similar to the type of *F. morifolia* FORSK. also (HUTCH.). Now, SCHIMPER 157 is the holotype of MIQUEL's *Ficus pseudo-carica*.

Some varieties were segregated in *F. palmata* FORSKÅL: var. *genuina* WARBURG (1904, p. 366), var. *somalensis* (FORSK.) WARBURG (1904, p. 366), var. *morifolia* (FORSK.) WARBURG (1904, p. 367), var. *stipitata* WARBURG (1904, p. 367), var. *pseudo-carica* (MIQ.) WARBURG (1904, p. 367). In 1850 was published *F. pseudo-carica* MIQ. var. α *tomentosa* A. RICHARD (p. 271). Hairy specimens may be referred to the last mentioned variety but there is not sufficient evidence to maintain any of these 'varieties' as taxonomically distinct taxa. A biosystematic study of *F. palmata* throughout its area of distribution is needed to arrive at a systemacy within that species. The point of view was most convincingly defended by SCHWEINFURTH already in 1896 (p. 126–128).

The locality Oued Jerad on the label 'Ex herb. a. de FRANQUEVILLE 87' (P) is rendered by A. RICHARD (1850, p. 271) as 'Ouadgerate'.

Ecological notes: *Ficus palmata* is one of the most common figs in Ethiopia. It is usually found between 1700–2400 m alt., a tree exuding white latex when slashed. The soil is as a rule loamy, reddish-brown (pH 6.5–7.8) or blackish, or black light soil (HAGOS 191), and there is a preference for growing localities near water courses. The size may vary between a shrub (sometimes without milky latex), sometimes even prostrate, to a small, rather slender tree (ca 5 m tall); FRIIS, HOUNDE & JACOBSEN (1963) found it in riverine scrub epiphytic on *Salix subserata*. MOONEY (1885) noted in similar station a rainfall of ca 1100 mm. Associated were e.g. *Maytenus* sp. and *Rumex nervosus* (AWEKE and GILBERT 1974, 825); a degraded Juniper forest on rocky soil, planted with *Catha* was noted by J. J. BOS (1979) between Dire Dawa and Alemaya.

Uses: The fruits can be eaten; they may be of some importance for purposes of native conservation. Ethiopian records are extant for the use of the latex,

some in treating some skin complaints and against warts.

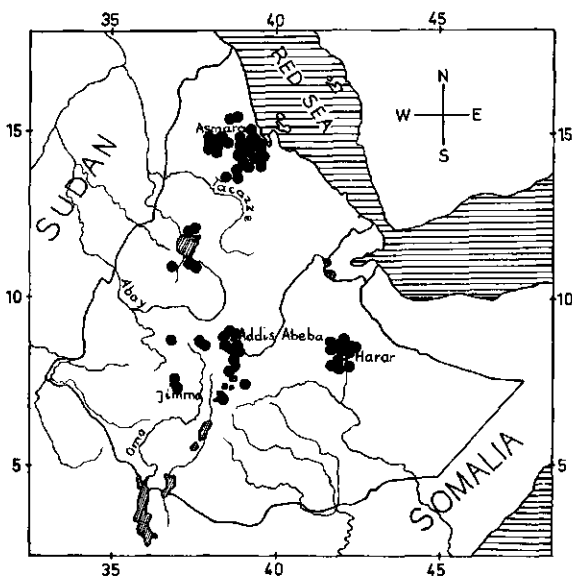
SCHIMPER (no. 1099) noted that the figs were edible, and Mr. and Mrs. JANSEN (5207, 5213) noted that the figs were light-green, some with a dark purple flush (var. *tomentosa*), confirmed by JANSEN, DE WIT and AWEKE (4603) on other occasions, while ASH (no. 1629) noticed a 'pleasant smell' when collecting young figs near a stream at Addis Ababa. SEEGLER (3062) confirmed SCHIMPER's statements; the figs were eaten 'when still green outside, but red inside'. BOS (7779) saw 'pale pink cream' figs, reddish around the stoma in the Dengago mts., ca 1850 m alt.

AWEKE and GILBERT (740, 825) observed very deep purple figs at maturity, but Mr. and Mrs. W. J. J. O. DE WILDE stated 'yellowish' at maturity.

It may be noted that *Ficus palmata* and *F. carica* are both known in Ethiopia as *balas*, *beles*, *etse-beles*, *belas* (MOONEY 1963, p. 55, 56) meaning that ADAM and EVE were forbidden to eat this fruit. This indicates that the fruit was known as edible and attractive; the fruit was, in the Ethiopian view, edible and tempting. We derive from this no support for our opinion of a possible origin of *F. carica*, however it is evidence of similar weight as WERTH's Indian names (1932).

The numerous wild, or supposedly wild, forms of *F. carica* in Western Asia can be seen as escapes from its cultivation, practised during so many centuries. As regards the relations of *F. palmata* and associated wasps, some remarks are found on p. 98.

Vernacular names: Amharic: *belas*, *balas*, *etse-beles* (adopted in Arabic); Tigrina: *belless* or *bellass*; Galla: *lugo* (Kottu name, fide JANSEN, near Harar; CUFODONTIS, MOONEY).



Ficus palmata FORSK.

Specimens examined:

Eritrea prov.: Aba-Mati, *Baldradi* 2059 (FI); Mai-Oza, *id.* 4888 (FI); Adi-Rai, *id.* 4887 (FI); Bet Ghiorgis, *id.* 2355 (FI); Keren, *id.* 995 (FI); Mai-Hinzi, *id.* 943 (FI); valle di Sageneiti, *id.* 729, 734 (FI); Hamasen, fiume Mai-Hinzi, *id.* 282 (FI); Adi-hipotics, *Beccari* 244 (FI); Adi-Ugri, *Bellini* 39 (FI); Hamasen, *Fiori* 21 (FI); Seraé: Enda-Abba-Abata, *id.* 20 (FI); Oculé-Cusai: Sageneiti, *id.* 19 (FI); Hamasen: Aztecletan, *id.* 16, 18 (FI); Oculé-Cusai, Adi Careh a Zecouda, *id.* 17 (FI); Amasen: Adi-Rassi, *Pappi* 4925 (FI, P); Oculé-Cusai, *id.* 1319, 3883 (FI); Amasen, *id.* 3523, 3601 (W); Amasen, Asmara, *id.* 2492, 248 (FI); Seraé: Gaza-goba, *id.* 89 (FI); Amasen de Belas a Dega-Tros, *id.* 3604 (BR, U, W); Oued Jerad, *Quartin-Dillon & Petit* 87 (K, P); Amasen, *Schimper* 1440 (P); Serraba, *id.* 1099 (P); Aman, *id.* 1440 (P); Mai-Hinzi, unter Asmara, *Schweinfurth* 563 (P); Sageneiti, Mai golgol, *id.* 850 (FI); Addi Lozi pri Acrou, *id.* 1152 (K); Sageneiti, valle Markat, *Schweinfurth & Riva* 1674 (FI, MPU, P); Sageneiti, *Vatova* 2353 (FI).

Tigre prov.: near Asem river, a compound of Asem Hotel, *Aweke & Gilbert* 825 (ETH, WAG); Mai-gougoua, near Adua, *id.* 740 (ETH, WAG); Adigrat, *Ginditi* 1 (FI); Adua, *Quartin-Dillon & Petit s.n.* (P); Etcheucote, *id. s.n.* (P: syntype of *F. pseudocarica* Miquel var. α tomentosa A. RICHARD); Masawa, a Adua, *id. s.n.* (P); Chire, *id. s.n.* (P); ad rivos prope Adoam, *Schimper* 157 (BM, L, MPU, UPS; isotype of *F. pseudo-carica*: K, P, U); about 55 km S. of Qwiha, *J. J. F. E. de Wilde* 4455 (ACD, WAG).

Begemdir prov.: Dembia, Gondar, *Chiovenda* 1082 (FI); *ibid.*, *Senni* 1542 (FI).

Wollo prov.: Komboltcha, a few miles from Dessie, *Hagos* 191 (C).

Gojam prov.: Zeghie to Bahr-Dar, Lake Tana basin, *Pichi Sermolli* 1730, 1731 (FI); Agew-medder, presso Dangila, *Taschdjian* 371 (FI).

Shoa prov.: private garden central Addis Ababa, *Ash* 1629 (K); 90 km from Addis Ababa on road to Shashamene, *id.* 762 (K); 47 km S. of Addis Ababa, *id.* 116 (K); Akaki, near Addis Ababa, *Buscalioni* 1990 (FI); Scioa, *id.* 1975 (FI); Ambo, *Giordans* 2121, 2125 (FI); Debre Zeit, *Hovda s.n.* (UPS); Guder, hill at side of waterfall, 5 km from Ambo, *Jansen, De Wit & Aweke* 4603 (ACD, WAG); Gudella, *Mooney* 7805 (ETH, K); Scioa, *Negri* 92 (FI); Anbesso nel vallone dell'Akaki, *id.* 92 (*Herb. Gavioli* 25793) (FI); Choa, *Petit s.n.* (P: type of *Ficus petitiiana* A. RICHARD); Sciao, *Senni* 849 (FI); Sciao, Tefki, *id.* 1194 (FI); Entoto, Addis Ababa, *id.* 516 (FI); Valone Kabana, *id.* 407 (FI); Bishoftu (Debre Zeit), *id.* 229 (FI); about 35 km S. of Addis Ababa, *De Wilde & De Wilde-Duyffes* 6089 (BR, C, WAG); Addis Ababa, *id.* 10941 (BR, WAG); *ibid.*, *id.* 6171 (BR, ETH, K, WAG).

Hararge prov.: Harar, *Bricchetti* 159, 163 (FI); Campus Agric. College, Alemaya, *Bos* 7760 (ACD, WAG); Dengago Mts., between Dire Dawa and Alemaya College, *id.* 7779 (ACD, WAG); College area, 2 km N. of College (Alemaya), *Burger* 1555 (ACD, K); Erer valley, 22 km S.E. of Harar, *id.* 1158, 1622 (K); around Bati village between Chat or in fences, *Jansen c.s.* 5207, 5213 (ACD, WAG); Awady, near Alemaya, in the direction of Harar, *Seegeler* 3062 (WAG); 4 km from road Alemaya-Harar, side road from Hameressa, fruit farm Mrs Diggins, *Westphal & Westphal-Stevens* 583 (ACD, WAG); road from college to Alemaya, about 1 km from College entrance, *id.* 811 (ACD, WAG); Erer valley, about 20 km S.E. of Harar, *De Wilde & De Wilde-Duyffes* 9965.

Arussi prov.: Galla, *Negri* 816 (FI); 78 km from Nazerete, road from Ethaya to Asella, *Westphal & Westphal-Stevens* 1576 (WAG); 10 km W. of Asella, in plain E. of Lake Zwai, *De Wilde & de Wilde-Duyffes* 9162 (ETH, WAG).

Kefa prov.: Ghibe river, about 8 km S. of Jimma, *Friis, Hounde & Jacobsen* 163 (BR, C, ETH, WAG); 7 km of Jimma, *Meyer* 7820 (K); Kaffa, *Thomerson* 774 (K).

Ethiopia: sine loco, *Chiovenda* 148 (FI); sine loco, *Bricchetti* 6221 (FI); sine loco, *Schimper s.n.* (P); sine loco, *id.* 591 (FI); sine loco, *id.* 287 (BM); sine loco, *Vatova* 2426 (FI).

Also seen from Arabia, Egypt, Sudan and Yemen.

DELILE 1826, p. 62; KOTSCHY 1865, p. 4; MILDBRAED & BURRET 1911, p. 212; HUTCHINSON 1917, p. 197; CHEVALIER 1920, p. 597; CHIOVENDA 1929, p. 312; SENNI 1935, p. 254; AUBRÉVILLE 1950, p. 336, 339, 344; KERHARO & BOUQUET 1950, p. 133; ANDREWS 1952, p. 272; CUFODONTIS 1953, p. 13; KEAY 1958, p. 609; BREITENBACH 1963, p. 128; EL HADIDI & BOULOS 1970, tab. 22.

Ficus kotschyana (MIQ.) MIQ. (1867, p. 288).

Ficus lateralis WARBURG (WARBURG & DE WILDEMAN 1904, p. 5).

Urostigma kotschyannum MIQUEL (1847, p. 551); ID. 1849, p. 137, tab. IVB.

Urostigma platyphyllum KOTSCHY ex SCHWEINFURTH et ASCHERS. (1867, p. 291).

A large robust *tree* with large, smooth leaves, 4–20–25 m high with spreading crown. Trunk 1 m in diam. Bark pale brown, scaly, fissured. Latex white, slash pink. Leaf-bearing parts of the branch brownish, minutely pubescent. Older parts brownish or rusty brown, minutely puberulous or glabrous or nearly so. Periderm peeling off.

Leaves in spirals. Stipules free, caducous, fully amplexicaul, up to 2.7 cm long, ovate to triangular, tomentose outside. Petiole up to 12 cm long, 4–6 mm thick, stout, minutely puberulous to softly pubescent. Blade obovate to ovate-elliptic, 4–25 cm long, 2½–17 cm wide, coriaceous, obtuse at the apex and deeply cordate at the base (basal lobes \pm touching). Margin entire, medium green with pale green veins above, slightly glaucous and paler green beneath. Lateral veins 9–11, including 2 basal veins, often forking, conspicuous. Midrib plane above, prominent below. Veins pale both sides, dark reticulate venation beneath. Glandular spots at the base of the midrib.

Figs axillary, crowded in the axils of the leaves or behind the leaves. Peduncle 2–5 cm long, pubescent, slender. Basal bracts 2, ovate, connate at the base, the membranous apical part deciduous. Receptacle globose, paler green, \pm 1 cm in diam., somewhat lenticellate, pubescent.

Male flower (sub)sessile, with a solitary stamen. Filament thick and short at first (and stamen entirely enveloped), later filament longer than the anther and the locules free in lower part. Perianth membranous, shorter than the mature stamen.

Female flower sessile, with a slender, laterally attached, long style. Stigma oblique, the slightly increased style-ending. Perianth lobes ovate, apiculate.

Gall-flower (sub)sessile, the ovary enveloped by very thin perianth-lobes; style short, near the top of ovary, stigma recurved, large.

Taxonomical notes: DELILE based *Ficus platyphylla* on material collected by CAILLIAUD (s.n.), preserved at MPU; it was collected in Méroé (Sudan), a long way from the present Ethiopian border. However, KOTSCHY 527 (type of *Urostigma kotschyannum* MIQ.) was collected at Fazokl, which probably is in the Sudan but, anyway, very near the Ethiopian border. KOTSCHY also collected

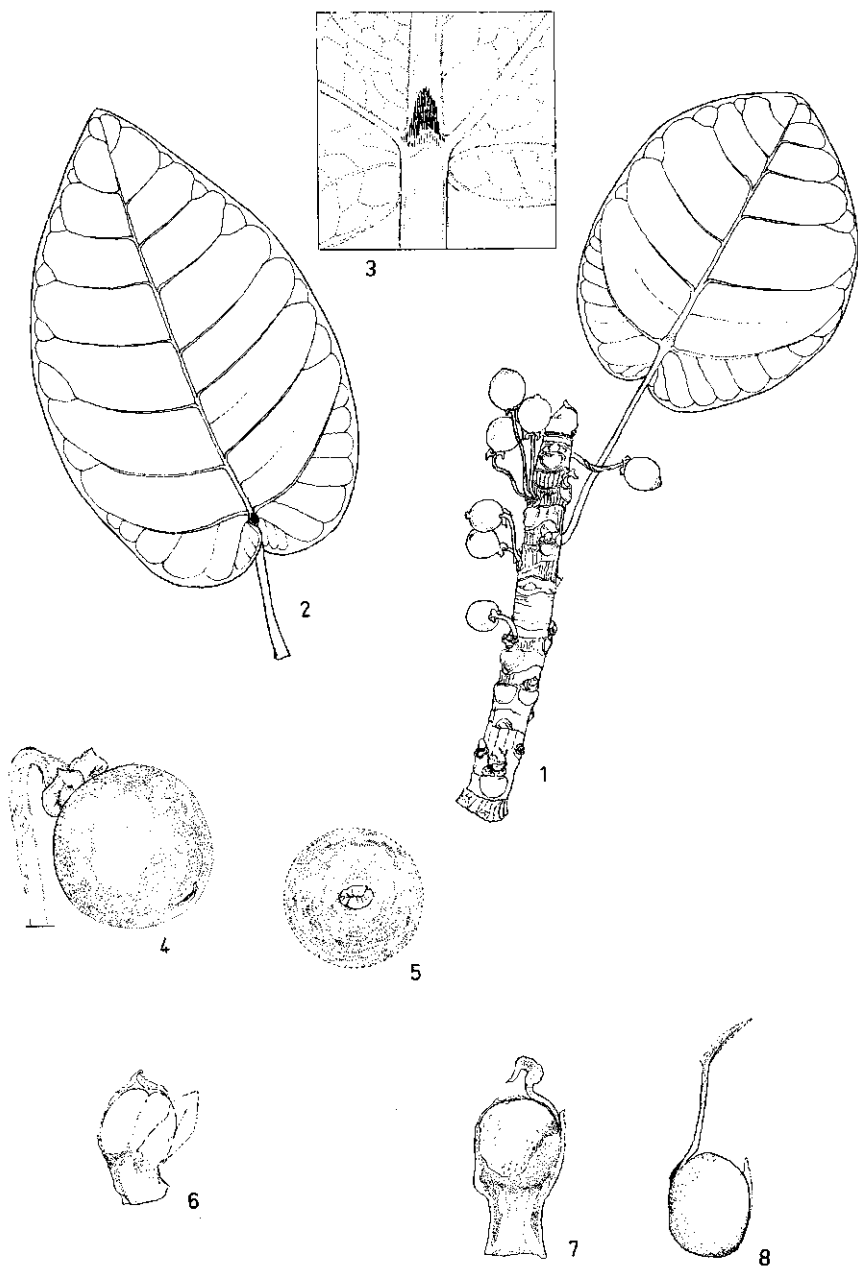


FIG. 13. *Ficus platyphylla* DEL. — 1: Branch ($\times \frac{1}{2}$); 2: Leaf ($\times \frac{1}{4}$); 3: Leaf, petiolar area, lower surface ($\times 2$); 4: Fig ($\times 2$); 5: Ostiole ($\times 2$); 6: Male flower ($\times 10$); 7: Gall-flower ($\times 10$); 8: Female flower ($\times 10$). (1, 2, 5–8: WICKENS 3127 (K; Sudan); 3–4: KOTSCHY 527).

F. platyphylla at Beneschangul, situated ca 100 km S. of Fazokl, in Ethiopia.

Ficus lateralis WARB. was based on SCHWEINFURTH 1288 and CHALTIN s.n. in 1899 at Bahr-el-Ghazal. SCHWEINFURTH 1288 (Lande der Djur, Seriba Ghattas; K) is designated as the lectotype.

Ecological notes: CAILLIAUD noted that many fruits contained larvae of 'Cynips'. In Ethiopia *F. platyphylla* is practically unstudied as regards its ecology. AUBREVILLE (1950, p. 344) reported it as a large *Ficus* of wooded savannahs in the Sudan-zone, up to 20 m tall and 2 m in diam., conspicuous by its large crowns, heavy branches, and very large, dark green leaves. The figs are reddish and found in December–January, on up to 3½ cm long peduncles on the end of very plump branches.

Vernacular names: *gymeyz* (Arab; fide CAILLIAUD); *mincho* ('paiens'; fide CAILLIAUD).

Specimens examined:

Beneschangul, Kotschy 527 (isotype of *U. kotschyannum*; K, P); Méroé (Sudan), Cailliaud s.n. (holotype; MPU); Scelok (nr 12° N.L.), Figari Mag s.n. (FI).

Also seen from: Cameroon, Central Africa, Ivory Coast, Mali, N. Nigeria, Senegal, Somalia, Sudan, Tchad, White Nile, Zaïre.

Ficus populifolia VAHL

Fig. 14

VAHL 1790, p. 82, tab. XXII; ID. 1805, p. 181; RICHARD 1850, p. 265; ENGLER 1895, p. 162; SCHWEINFURTH 1896, p. 129; MILDBRAED and BURRET 1911, p. 214; HUTCHINSON 1916, p. 189; CHIOVENDA 1929, p. 312, tab. XLII, fig. 1, 2; ID. 1932a, p. 410; ANDREWS 1952, p. 270, fig. 96; CUFODONTIS 1953, p. 13; KEAY 1958, p. 609; DALE & GREENWAY 1961, p. 319; BREITENBACH 1963, p. 128.

Ficus religiosa FORSKÅL (1775, p. 180), non L.; SCHWEINFURTH 1896, p. 129. ? *Ficus umbellata* VAHL (1805, p. 182); MIQUEL 1849, p. 134; ID. 1867, p. 288.

Ficus intermedia DELILE (1826, p. 64).

Urostigma catalpaefolium MIQUEL (1847, p. 551; haud '*catalpifolium*' auctt.); ID. 1867, p. 288; SCHWEINFURTH & ASCHERSON 1867, p. 290.

Urostigma populifolium (VAHL) MIQUEL (1847, p. 552); SCHWEINFURTH & ASCHERSON 1867, p. 291.

Shrub or *tree*, up to 30 m tall. Bark rather smooth, grey. Latex watery or slightly milky. Branches rather slender, brownish when dry, glabrous. Older parts pale brown to greyish, lengthwise rugose.

Leaves in spirals, stipules free, fully amplexicaul, caducous, 0.5–1.5 cm long. Petiole 3–13 cm long, slender, glabrous. Blade cordiform (like *Populus tremula*), 0.7–1.5 × as long as wide, drying greenish, 4–15 cm long, 3–15.5 cm wide, chartaceous to subcoriaceous, apex acutely acuminate to caudate, base widely cordate (lobes broadly rounded), margin entire to slightly repanding, both

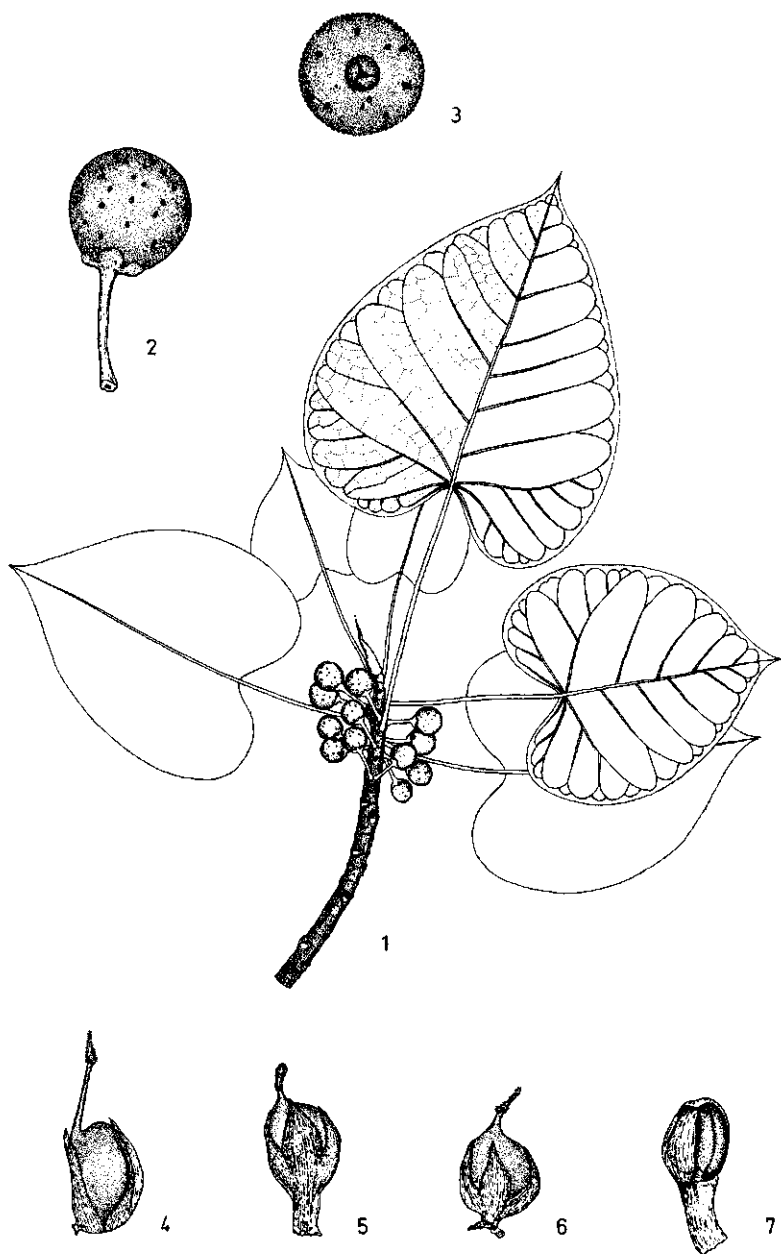


FIG. 14. *Ficus populifolia* VAHL - 1: Branch ($\times \frac{1}{2}$); 2: Fig ($\times 2$); 3: Ostiole ($\times 5$); 4: Female flower ($\times 10$); 5-6: Gall-flower ($\times 10$); 7: Male flower, one tepal removed ($\times 10$). (1-6: BURGER 3810; 7: J. J. F. E. DE WILDE & GILBERT 400).

surfaces glabrous. Veins plane to slightly prominent above. Lateral veins 5–10 pairs including 2 pairs of basal veins, no distinct intercostal, glandular spot at the base of the midrib on both surfaces.

Figs solitary or in pairs in the leaf-axils or just below the leaves. Peduncle ca 0.5–2 cm long, slender, sparsely minutely puberulous to glabrous. Basal bracts 3, broadly ovate, base connate, outside sparsely puberulous, the upper parts membranous, persistent or caducous. Receptacle subglobose, 5–12 mm in diam., minutely puberulous or glabrous, when dry pale brownish (with dark brown spots) and reticulate. Ostiole not protruding, small. Orifice small, round.

Male flower: numerous, near the ostiole, (sub)sessile to pedicelled, perianth equalling the solitary anther, anther not apiculate.

Female flower (long) pedicellate, style slender, stigma small, perianth pallid, hardly longer than the ovary, the fertile flowers short-styled (stigma very small).

Gall-flower: Similar to female flowers but short-styled.

Taxonomical notes: VAHL when describing *Ficus populifolia* (1790) added to his description a table XXII, clearly showing its characteristics. VAHL's description and table are to be accepted as the type. VAHL referred in the protologue to *F. religiosa* FORSK. Descr. p. 180, but seems to have been aware of the priority of LINNAEUS's *F. religiosa* (Syst. Nat. II, 1759, p. 1315).

MIQUEL published *Urostigma catalpaefolium* in 1847 (p. 551) as a new species, citing 'KOTSCHY 415 (regnum Sennar, circa Resaes et ad ripas Nili coerulei)' as the only specimen (holotype; isotype: K).

As MIQUEL's description contains no differential character and because *Urostigma catalpaefolium* was reduced by later authors to *Ficus abutilifolia*, this synonymy was accepted. MIQUEL himself (1867, p. 288) reduced *U. catalpaefolium* to *Ficus umbellata* VAHL. VAHL's *Ficus umbellata* rests on a specimen collected by THONNING in 'Guinea', and was published in 1805. If MIQUEL's reduction were right, this would imply that the here adopted synonymy had to be extended to reducing *F. abutilifolia* to *F. umbellata*, a name dating from 1805. In KEAY (1958) *Ficus umbellata* VAHL is placed in section '*Fasciculatae*' whereas *F. abutilifolia* is placed in section '*Axillares*'. This latter view is not in conflict with the synonymy *F. abutilifolia* = *F. catalpaefolia* (cf. notes p. 10).

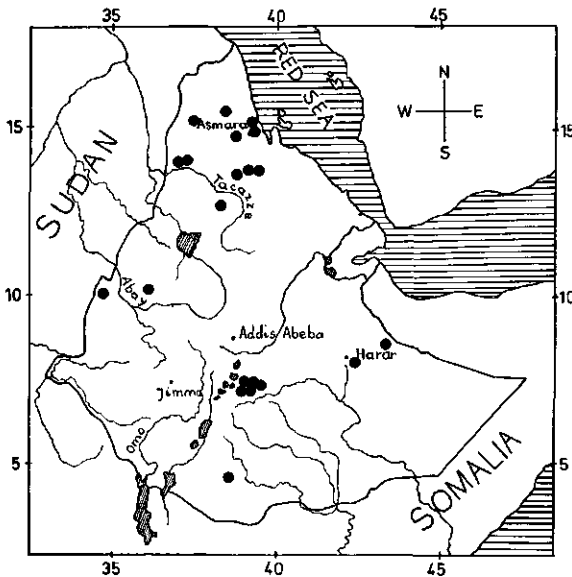
Ecological notes: GILLET 12578 (Kenya – Ethiopian boundary Comm. 1952/3 at Dandu 3°26' N × 39°54' E) has the note: 'Rainfall perhaps between 300–400 mm, with maxima in April and probably November. In 1952 the main rains started on 27th March. Rock red granite. Alt. 2600 ft, a 2 m tall shrub, once seen in a rich *Commiphora-Acacia* scrub with scattered larger trees such as *Delonix*, *Terminalia* and *Pterocarpus*' (BR, W).

POLHILL and S. PAULO (938; BR) noted in the Taiba district, Kenya, that *F. populifolia* was 'growing on rocky outcrops, rooting in crevices', in an 'open growth of mostly *Euphorbia* and *Commiphora*'. The figs were pale green with white spots, ripening orange'.

DE WILDE and GILBERT collected it on the 'E. slope of granitic outcropping, covered partly with grasses and scattered trees'. They described it as a 'tree, about 8 m high, much stemmed and branched from base, stems erect. Cloudy latex. Leaf nervation conspicuous, pale' (no 400).

Bos (9049) found it in a tree savannah with rocky outcrop as a small woody strangler, firmly lodged in cracks of a large boulder. Latex watery, white. BURGER, in the same region at ca 1600 m alt. (no 3810), found it growing high up among the granite boulders 'in open woodland, some trees to 16 m on gravelly granitic soil'.

Vernacular names: Arabic: *mudah*, *vudah*; Somali: *berd*, *berde*, *nidir*, *hamash*, fide CUFODONTIS.



Ficus populifolia VAHL

Specimens examined:

Eritrea prov.: Ghinda, *Baldrati* 2062 (FI); Abita, Sciotel, falde dello Zede Amba, *Beccari* 110 (FI, L); Habab: Aide Leca, *Pappi* 1020 (FI); Amba Yeca Mariam, *id.* 699 (FI); Assaorta: del Col-haile, *id.* 5221 (FI); Assaorta: Alighede, *id.* 3311, 5112 (FI); Assaorta: Haddis, *id.* 2586 (FI).

Tigre prov.: prope Djeladjeranne, *Figari Mag s.n.* (FI); sine loco, *Kotschy* 415 (K; type of *U. catalpaefolium* MIQ.); prope Djeladjeranne, *Schimper* 1576 (L, P).

Begemdir prov.: Sine loco, *Courbon* in 1860 (*Mer rouge* 297 (BR, P)); Semen mts, *Schimper* 1389 (BR, P); Tacazze river, *id.* 880 (BR, E, K, L, MPU, UPS).

Hararge prov.: Dacate valley (40 km S. of Harar-Didjiga road), *Bos* 9049 (ACD, WAG); Rock valley, *Burger* 3810 (C, FI, K).

Arussi prov.: Asella, *Corradi* 8262, 8263, 8264, 8265 (FI); Arussi, *Negri* 1252 (FI).

Sidamo prov.: Kenya-Ethiopian Border, *Gillett* 12578 (BM, BR, W); 74 km along track Mega-Yavello, *J. J. F. E. de Wilde & Gilbert* 400 (WAG); sine loco, *Caillaud* 12 (MPU); sine loco, *Corradi* 8268 (FI); sine loco, *Ruspoli & Riva* 1012 (FI); sine loco, *Schimper* 185 (BR, P); sine loco, *Schweinfurth* 177 (K).

Also seen from: Arabia, Cameroon, C. Africa, Kenya, Somalia, Tanzania, Tchad, Yemen, Zaire.

WARBURG 1905, p. 211; MILDBRAED & BURRET 1911, p. 261; HUTCHINSON 1917, p. 200; CUFODONTIS 1953, p. 14.

A (shrubby) tree, a few m high. Branches terete, irregularly sparsely lengthwise rugose, bark not peeling, sparingly whitish-pilose. Stipules very narrow, pubescent, deciduous.

Leaves oblong-lanceolate to oblong-elliptic, the apex bluntly (sub)acuminate, narrowing to the top, obtuse, rounded to subcordate at the base, 6–10 cm long, $1\frac{1}{2}$ –3 cm wide, entire, chartaceous, brown on the upper surface when dry, lighter on the lower surface, dull on either surface, glabrous or very slightly pubescent towards the base of midrib above, below more or less grey-hairy, midrib above shallowly and narrowly grooved, prominent and rufous-hirsute below; lateral nerves 8–10 on each side of the midrib, looped, the loops forming a wavy crenate nerve, at 1–3 mm from the margin; veins fairly closely reticulate and prominent below, petiole 1–2 cm long, slender, reddish pubescent. Receptacles axillary, sometimes in pairs, pedunculate, substipitate, globose, in the type specimen young and scarcely 3 mm in diam., minutely pubescent. Peduncle 2 mm long, puberulous. Basal bracts 2, connate at the base, puberulous on the outside, up to $1\frac{1}{2}$ mm long, upper part membranous, acute, deciduous. Ostiole minute and not prominent; bracts not visible from the outside, all descending into the receptacle, oblong, with membranous margins, glabrous.

Male flowers very few, mostly near the ostiole, occasionally in the interior, sessile, with a solitary stamen. The perianth enclosing the stamen entirely. Filament shorter than the anther. Anther broadly ellipsoid, connective not apiculate.

Female flowers aborted, accompanied by an equally large narrowly ovate, acute bract. Perianth reduced.

Gall-flower sessile, perianth segment obovate-oblancheolate, obtuse, reddish, with membranous margins. Achene (young) ellipsoid, smooth; style shorter than the achene, with a thick stigma.

Taxonomical notes: *Ficus ruspolii* was based by O. WARBURG on a single specimen: RUSPOLI & RIVA n. 526 (holotype: FI). Of the holotype one leaf and some fragments of the receptacles are at K. The label with the holotype also carries the numbers 582 and 1163.

The specimen was collected at 'Ciaffa, Boran Uata' in the Galla country in the far South of Ethiopia, close to the Somalia border, on high mountain; medio July 1903. More collections in that area are urgently needed; the differences with *F. cyphocarpa* MILDBRAED and *F. rhodesiaca* WARB. ex MILDBRAED & BURRET need to be checked by a wider range of specimens. MILDBRAED & BURRET declared *F. persicifolia* (1911, p. 257, 261) a near ally of *F. ruspolii*. Here *F. persicifolia* is not accepted as a synonym; however, there remains to be

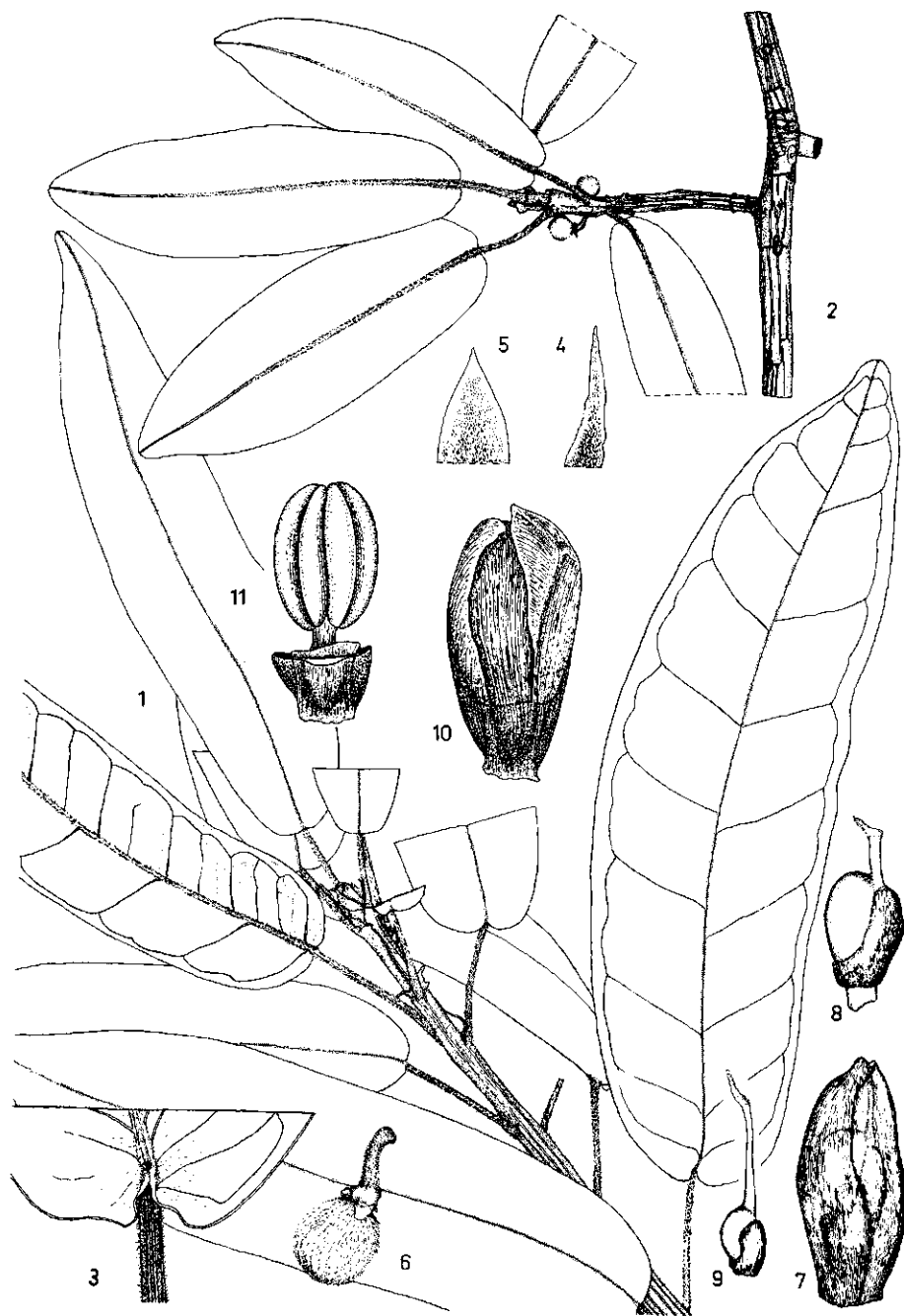


FIG. 15. *Ficus ruspolii* WARB. - 1-2: Branch ($\times 1$); 3: Leaf, petiolar area, upper surface ($\times 3$); 4: Lateral stipule ($\times 3$); 5: Terminal intrapetiolar stipule ($\times 3$); 6: Fig ($\times 3$); 7-8: Gall-flower ($\times 24$); 9: Female flower ($\times 24$); 10: Male flower ($\times 24$); 11: Stamen ($\times 24$). (1-9: RUSPOLI & RIVA 526; 10-11: DE WILDE & DE-WILDE-DUYFJES 6824).

studied, when more materials become available, the status of *F. persicifolia* var. *pubicarpa* WARB. and *F. bongoensis* WARBURG (cf. l.c., p. 256, 257). The entire set of problems mentioned here may be solved when a clear delimitation of '*F. dekdena*' (= *F. thonningi*) by means of cytological studies is established, in addition to field studies.

Ecological notes: DE WILDE & DE WILDE-DUYFJES found it at ± 1800 m alt., a shrubby tree, about 3 m high. Dark green leaves, pale green beneath, nerves pale green. Abundant white latex.

Specimens examined:

Galla Highlands: Ciaffa, Boran Uata, *Ruspoli & Riva* 526 (holotype: FI; isotype: K).

Kefa prov.: 100 km N.E. Jimma, crossing Omo Riv., *De Wilde & De Wilde-Duyffes* 6824 (WAG).

***Ficus salicifolia* VAHL**

Fig. 16

VAHL 1790, p. 82, tab. 23; ID. 1805, p. 195; LINK 1822, p. 450; MIQUEL 1848, p. 431; MIQUEL 1849, p. 144; MARTELLI 1886, p. 77; BAKER 1894, p. 341; ENGLER 1895, p. 162; SCHWEINFURTH 1896, p. 133; ALMAGIA 1903, p. 116; WARBURG 1906, p. 138; FIORI 1910b, p. 370, 375; MILDBRAED & BURRET 1911, p. 206; HUTCHINSON 1916, p. 115; BLATTER 1923, p. 445; CHIOVENDA 1929, p. 312; SCHWARTZ 1939, p. 26; HUTCHINSON & BRUCE 1941, p. 124; LEBRUN & BOUTIQUE 1948, p. 121; AUBRÉVILLE 1950, p. 347, fig. 72; ANDREWS 1952, p. 265; CUFODONTIS 1953, p. 14; SCHNELL 1953b, no. 34; BREITENBACH 1963, p. 130; BURGER 1967, fig. 6 (3); TÄCKHOLM 1974, p. 54.

Ficus salicifolia var. *australis* WARBURG (1906, p. 133); CUFODONTIS 1953, p. 13; BREITENBACH 1963, p. 129.

Ficus indica FORSKÅL (1775, p. 179) (haud L.); SCHWEINFURTH 1896, p. 133; CUFODONTIS 1953, p. 14.

Ficus neriifolia A. RICHARD (1850, p. 267); HUTCHINSON 1917, p. 213; CUFODONTIS 1953, p. 12.

Ficus praetoriae BURTT-DAVY (1912, p. 365); BURTT-DAVY & POTT-LEENDERTZ 1912, p. 122; HUTCHINSON 1916, p. 116; ID. 1920, p. 528; CUFODONTIS 1953, p. 13; WATT & BREYER-BRANDWIJK 1962, p. 779.

Urostigma salicifolium (VAHL) MIQUEL (1847, p. 556, 557); ID. 1849, p. 144; BALFOUR 1888, p. 282; CUFODONTIS 1953, p. 14; BREITENBACH 1963, p. 130.

Shrub or medium-sized *tree*. Trunk dbh up to 1 m. Leaf-bearing parts of the branches brownish grey, minutely puberulous to glabrous; the older parts brown, periderm peeling off. Stipules fully amplexicaul, glabrous, caducous, $1\frac{1}{2}$ cm long.

Leaves in spirals. Petiole 2–7 cm long, slender, glabrous or minutely puberulous, mainly on the lower part, on the upper surface above with a wide flat groove to nearly canaliculate. Blade lanceolate, 3–4 $\frac{1}{2}$ times as long as wide,

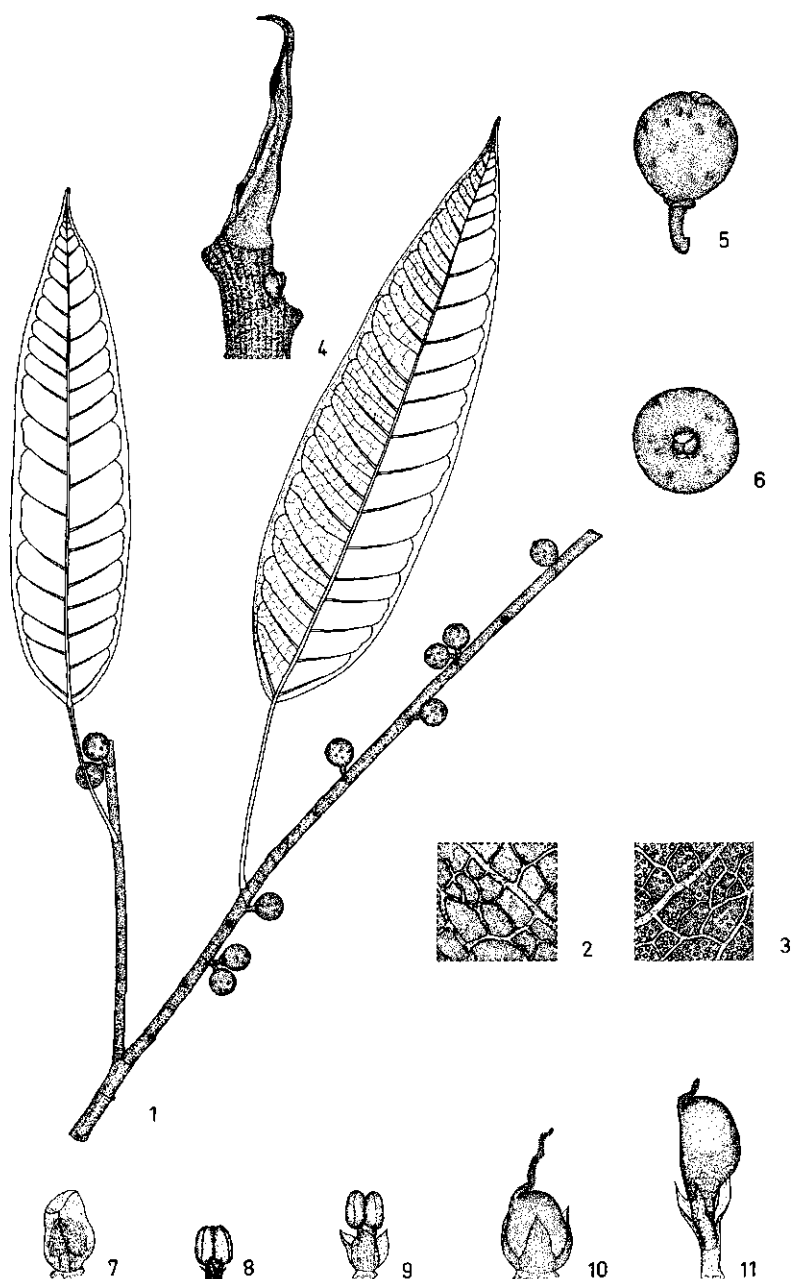


FIG. 16. *Ficus salicifolia* VAHL - 1: Branch ($\times \frac{1}{2}$); 2: Leaf, upper surface ($\times 5$); 3: Leaf, lower surface ($\times 5$); 4: Stipules ($\times 3$); 5: Fig ($\times 2$); 6: Ostiole ($\times 2$); 7: Male flower, closed ($\times 10$); 8: Stamen ($\times 10$); 9: Male flower, opened ($\times 10$); 10: Female flower ($\times 10$); 11: Gall-flower (note nourishing ?ariloid tissue) ($\times 10$). (1-11: AWEKE 1016).

when dry, greenish, 5–15 (–25) cm long to (0.7–) 1.5–5.5 cm wide, subcoriaceous, apex acute to acuminate, subacute to obtuse or rounded or slightly cordate at the base; margin entire; on both surfaces reticulate and glabrous, above more or less shiny, beneath rather dull. Veins light coloured, more or less prominent, (5–)8–15 pairs of laterals. Intercostals slender, indistinct, an inconspicuous gland at the base of the midrib.

Figs solitary, in rows, or in pairs in the axils of the leaves or just behind the leaves. Peduncle 2–4 mm long, puberulous. Basal bracts 3, ovate, ca 1 mm long, puberulous. Receptacles globose, 4–5 mm in diam., minutely puberulous when young, when dry wrinkled, greenish-brown, dotted. Ostiole more or less prominent, 1–1.5 mm wide with 3–4 protruding, glabrous, imbricate, ovate bracts.

Male flowers almost sessile, with a solitary stamen (anther nearly sessile, minutely apiculate, a few hairs at the base of the filament). Perianth 3, (2–4) lobes enclosing the anther.

Female flowers: Perianth shorter than the ovary; 3–4-lobed, lobes narrow acute.

Gall-flowers: Stigma in gall- and female flower long decurrent on the style, rows of minute hairlike papillae.

Taxonomical notes: VAHL mentioned '*F. indica* FORSK.' in synonymy. SCHIMPER proposed on a herb. label 'var. *fructibus sessilibus*' (942, HBG) and WARBURG published a var. *australis* (1906, p. 133).

The figs are sessile to very shortly pedunculate in this species, and in the southern parts of its distributional area the leaves become somewhat wider (and may be slightly cordate).

MILDBRAED & BURRET (1911, p. 206) referred *F. neriifolia* A. RICH. to *F. salicifolia* VAHL as a later synonym. They did not see the type, but supposed an error in the description 'receptaculis ... granum uvae aequantibus...'. The receptacles then must have been very young, they suggested. The type specimen at Paris is accompanied by one (crushed) receptacle of normal 'pea size'.

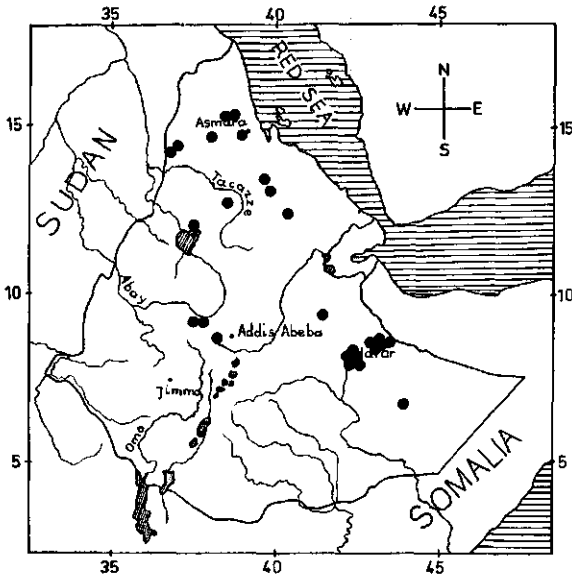
Ecological notes: *Ficus salicifolia* is a medium-sized or tall tree, found between ca 1000–2300 m alt. (PAPPI, mt Arbaroba, Eritrea). It prefers rocks, rocky slopes, lava-flows, is indifferent whether the rocks are granitic or limestone and slopes can be very steep, while hardly any soil may seem to be available to the roots.

There is no preference for riverine or moist areas; on the contrary, all collectors refer to dry stations; e.g. JANSEN (4813, 4814) found it in *Calpurnia*, *Dracaena*, and *Cadia purpurea* vegetation in dry rocky areas. BEALS (B 966) met with it on 'recent lava flows'; there was 'virtually no soil, only crevices', and this supports ROCHET D'HÉRICOURT's (55) century-old observation in Shoa province 'volcanic lava'.

Nevertheless, the white latex is abundant. The leaves have yellow-green petioles, are shiny and lively green, with a yellow, pale midrib. The figs become red

at maturity, when young they are light green with lighter dots. Birds are keen on them.

Vernacular names: *agow*: Dolonsa (fide SCHIMPER); *ta-ab*, *tel(o)ukat*: Arabic (fide CUFODONTIS and BREITENBACH); *jemat*: Amharic and *shola*: Tigri-na (fide AWEKE).



Ficus salicifolia VAHL

Specimens examined:

Eritrea prov.: Mt Zeban S. of Keren, Shishiftie, Aweke & Gilbert 689 (ETH, WAG); Yohannis Tedir, Baldrati 2356 (FI); Enda-Yohannis, *id.* 2354 (FI); sine loco, *id.* D 17 (FI); Abita, Keren, O. Beccari 39 (BM, FI, K, L); Ocule-Cusai, Fiori 44 (FI); Haddas tra Majo Adi-Caje, Pappi 5205 (FI, L, P); Amasen: Monti-Arbaroba, *id.* 3415 (C, FI); Assaorta: Haddas, *id.* 2616, 2695 (BR, FI, U); Assaorta, *id.* 5200 (FI); Assaorta: Alighede, *id.* 3223 (FI), 5110 (FI, WAG); Habab: Oazat, *id.* 8336 (FI); Habab: Tzebadt, *id.* 8057 (FI); Mai-gougoua, Quartin-Dillon & Petit *s.n.* (P; type of *F. neriifolia*); sine loco, *id.* *s.n.* (P); sine loco, Schimper 1296a (P); bei Mahio im Thale Haddas valley, Schweinfurth 176 (K).

Tigre prov.: Adua, Petit 335 (K, P).

Begemdir prov.: In Semen, Schimper 1256 (P); *id.* 1256a (P).

Gojam prov.: Blue Nile Gorge, Aweke 1016 (ETH, WAG).

Shoa prov.: Boli river near Mulu Farm, Bally 3063 (K); 161 km on Addis Ababa-Awash station road near Garibaldi pass, Beals B 966 (K); Ambo, Giordans 742 (FI); Royaume de Choa, Rochet d'Héricourt 14, 55, 99 (P); 5 km W. of Ambo, 125 km W. of Addis Ababa along Guder river, De Wilde & De Wilde-Duyffes 6506 (BR, C, WAG).

Hararge prov.: sine loco, Bricchetti 1511 (K); near Harla slopes of Dengago escarpment S. of Dire Dawa, Bos & Jansen 9861 (ACD, WAG); East of Curfacelli & West of stone bridge, Burger 3125 (ACD, FI, K); 15 km S.E. of Dire Dawa along road to Harar, *id.* 2540 (C, FI); sine loco, *id.* 1511 (K); Harar tra Dire Dawa, Buscalioni 542 (FI); Mt between Alemaya and Dire Dawa, Jansen 4813, 4814 (WAG); Ogaden, Ruspoli & Riva 270 (FI); near Cotton factory Dire Dawa, Seegeler 2910 (WAG); Road Ourso-Jilboa, $\frac{1}{2}$ km from Ourso, Westphal & Westphal-Stevens 2558 (ACD, WAG); 13 km on road Dire Dawa to Harar, J. J. F. E. de Wilde 4718 (ACD, WAG).

Also seen from: Arabia, Cameroon, Egypt, Djibouti, Ivory Coast, S. Africa, Somalia, Sudan (Sennaar, *Kotschy* 257, K), Yemen, Zaire.

Ficus sur FORSKÅL

Fig. 17

FORSKÅL 1775, p. 180; MIQUEL 1848, p. 115; SCHWEINFURTH 1896, p. 140; FIORI 1910b, p. 372; MILDBRAED & BURRET 1911, p. 199; HUTCHINSON 1916, p. 100; BLATTER 1923, p. 445; CHIOVENDA 1937, p. 527; SCHWARTZ 1939, p. 26; CUFODONTIS 1953, p. 15; ID. 1958, p. 105; CUFODONTIS 1962, p. 302; BREITENBACH 1963, p. 130; MOONEY 1963, p. 56; CORNER 1965, p. 35; BURGER 1967, fig. 6 (3).

Ficus sur var. *erythraea* FIORI (1910a, p. 164, 166); CUFODONTIS 1953, p. 15; BREITENBACH 1963, p. 130.

Ficus capensis THUNBERG (1786, p. 6, 13); VAHL 1805, p. 197; MIQUEL 1848, p. 113, tab. III; ID. 1849, p. 124; SONDER 1850, p. 138; WARBURG 1894, p. 153; ENGLER 1895, p. 161; SCHWEINFURTH 1896, p. 140; DE WILDEMAN & DURAND 1901, p. 215; SENNI 1905, p. 12; WARBURG 1906, p. 134; FIORI 1910b, p. 166, 370; MILDBRAED & BURRET 1911, p. 195; HUTCHINSON 1915, p. 336; ID. 1916, p. 101; CHEVALIER 1920, p. 594; HUTCHINSON 1920, p. 527; AUBRÉVILLE 1936, p. 62; SCHWARTZ 1939, p. 26; HUTCHINSON & BRUCE 1941, p. 124; LEBRUN & BOUTIQUE 1948, p. 116; AUBRÉVILLE 1950, p. 335, 336, 340, 346; KERHARO & BOUQUET 1950, p. 131; CODD 1951, p. 20; EGGELING (& DALE) 1951, p. 243; ANDREWS 1952, p. 265; KEAY 1958, p. 606; DALE & GREENWAY 1961, p. 315; WATT & BREYER-BRANDWIJK 1962, p. 774; PURI & TALALAJ 1964, nr. 100; PALMER & PITMAN 1972, p. 447; BOUQUET & DEBRAY 1974, p. 124.

Ficus capensis var. *trichoneura* WARBURG (1894, p. 153).

Ficus capensis var. *pubescens* WARBURG (DE WILDEMAN & DURAND 1901, p. 215); LEBRUN & BOUTIQUE 1948, p. 116.

Ficus lichtensteinii LINK (1822, p. 451); KUNTH 1846, p. 22; SONDER 1850, p. 138; SCHWEINFURTH 1896, p. 140; PALMER & PITMAN 1972, p. 447.

Ficus panifica DELILE ('*F. panificus*', 1843, p. 94); FERRET & GALINIER 1847-1848, tab. 16; A. RICHARD 1850, p. 269; SCHWEINFURTH & ASCHERSON 1867, p. 290; SCHWEINFURTH 1893, p. 65; ID. 1896, p. 140; CUFODONTIS 1953, p. 15; BREITENBACH 1963, p. 131.

Ficus riparia HOCHST. ex A. RICHARD (1850, p. 270); MIQUEL 1848, p. 114 (in synonym.); SCHWEINFURTH 1896, p. 140; MILDBRAED & BURRET 1911, p. 196; HUTCHINSON 1916, p. 101; EGGELING (& DALE) 1951, p. 243; CUFODONTIS 1953, p. 14; CUFODONTIS 1962, p. 302; BREITENBACH 1963, p. 129; MOONEY 1963, p. 56.

Sycomorus capensis (THUNB.) MIQUEL (1848, p. 113); ID. 1849, p. 124; PALMER & PITMAN 1972, p. 447.

Sycomorus panifica MIQUEL (1848, p. 111, tab. IIIa); ID. 1849, p. 122; CUFODONTIS 1953, p. 15; BREITENBACH 1963, p. 131.

Sycomorus riparia MIQUEL (1848, p. 114); ID. 1849, p. 126.

Sycomorus sur MIQUEL (1849, p. 121).

Shrub or *tree* up to 30 m tall, trunk up to ca 120 cm dbh, with buttresses. Bark brown to grey, latex copious milky white, slash greenish white to pinkish, exuding copious milky latex. Leaf-bearing part of the branches pale to dark brown and bronzed, densely pubescent to hirsute or almost glabrous, periderm peeling off, older parts brown.

Leaves (almost) distichous, stipules free or basally fused, fully amplexicaul, caducous, villous outside, inside glabrous or nearly so. Petiole up to 7 cm long, puberulous to pubescent, sometimes brown, hairy, periderm peeling off. Blade ovate to elliptic or oblong-lanceolate, drying greenish or brown, 4–20 cm long, 2–12 cm wide, acuminate to almost acute or obtuse at the apex, subobtusate to cordate at the base, repanding to coarsely, bluntly, dentate. Above dull, nearly glabrous, beneath rather sparsely puberulous to pubescent. Veins plane or grooved above, prominent beneath, glabrous to brown-hairy. Lateral veins 5–6 pairs, sometimes opposite, the larger basal veins not very distinct, intercostals present, a pair of glands in the axils of the larger basal veins.

Figs on branched or simple inflorescences (up to about 70 cm long), pendulous on the trunk or main branches, or occasionally solitary in the axils of leaves; peduncle up to 2 cm long, puberulous. Receptacle globose to broadly obovoid, $\frac{1}{2}$ –2 cm in diam., densely scaly-puberulous to scaly-pubescent, often short stipitate, when ripe grey-orange. Ostiole more or less prominent.

Male flower sessile, 1–2 stamens, entirely enveloped in perianth, filament at first short and thick but finally longer than the anther; at the base of the filament often some setulae. Anther ellipsoid, very delicately brown punctate, locules free at base, slightly over 1 mm long.

Female flower sessile or pedicellate. Perianth as in gall-flower. Style laterally attached, long, stigma lighter coloured, the attenuate ending of the style. Achene brown, rimmed.

Gall-flower pedicellate, perianth 3–4-lobed, irregularly incised, shorter than ovary. Style slightly longer than ovary, laterally attached near the base, stigma the subclavate ending of the style.

Taxonomical notes: FORSKÅL described *F. sur* from 'Djöbla'. The Arabic name was 'Sur'. It looks, said FORSKÅL, like *F. sycomorus*, has the fruits close to the trunk, which are large as a pigeons' egg and edible (1775, p. 180).

MIQUEL (1848, p. 115) apparently saw no specimen but composed a description from the data given by FORSKÅL and by VAHL (who saw FORSKÅL's specimen).

CUFODONTIS stated (1953) that 'Djöbla' is in Arabia and MILDBRAED & BURRET referred to Yemen (1911, p. 200).

FIORI (1910b) used *F. capensis* in his key to the *Ficus* species of Eritrea but in the descriptions adopted *F. sur* and referred to '*F. capensis*' in synonymy.

MILDBRAED & BURRET segregated *F. sur* from *F. capensis* by the number of stamens: *F. sur* one stamen, *F. capensis* 2. Also because in *F. sur* the nervation in the upper leaf-surface is impressed, they declared (l.c.).

HUTCHINSON (1916, p. 100) segregated *F. sur* and *F. capensis*: the first having

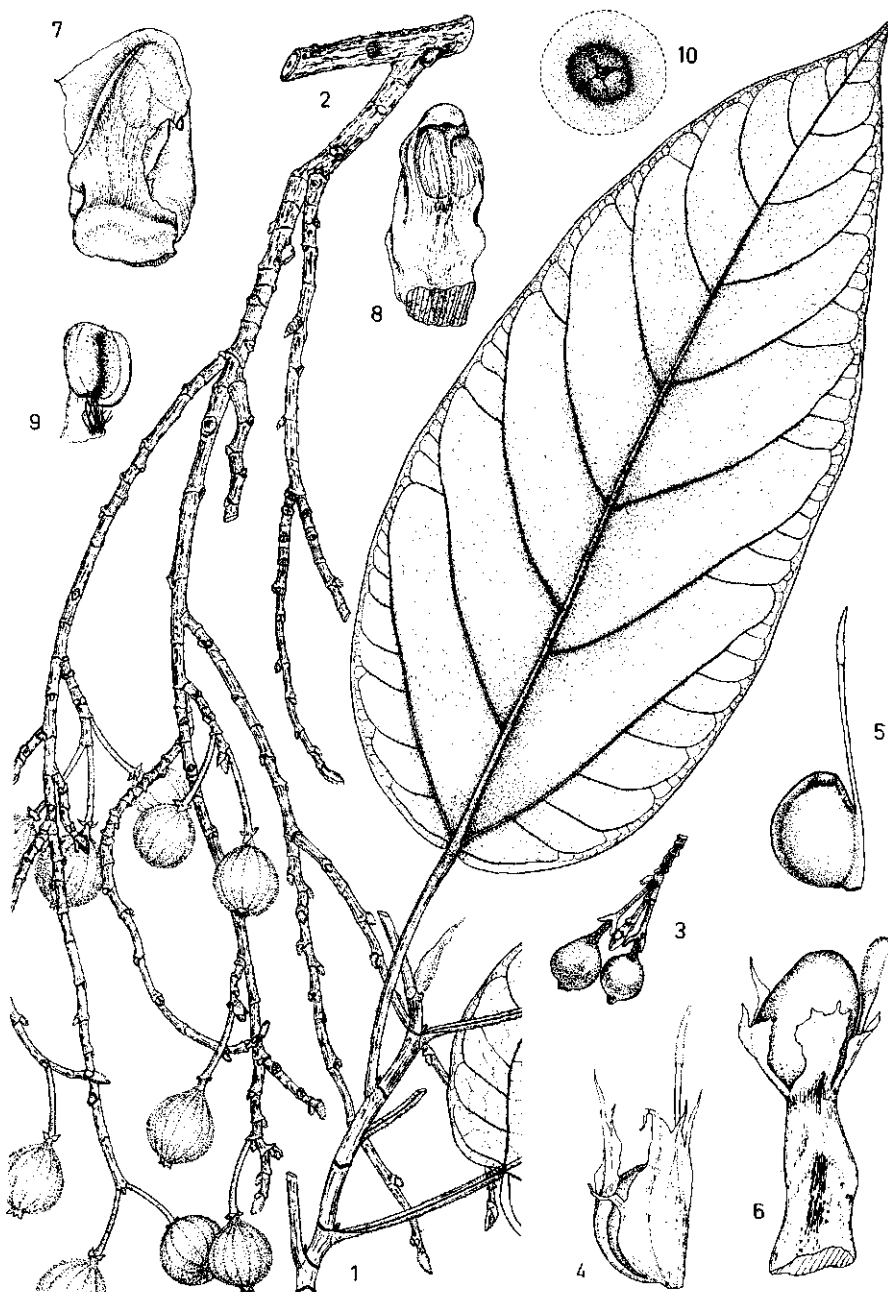


FIG. 17. *Ficus sur* FORSK. - 1: Branch ($\times \frac{1}{2}$); 2: Inflorescence ($\times \frac{1}{2}$); 3: Figs ($\times \frac{1}{2}$); 4: Female flower ($\times 10$); 5: Female flower, tepals removed ($\times 10$); 6: Gall-flower ($\times 10$); 7: Male flower ($\times 10$); 8: Male flower, one tepal removed ($\times 10$); 9: Stamen ($\times 10$); 10: Ostiole ($\times 2$). (1-2: DE WILDE & DE WILDE-DUYFJES 7206; 3, 10: DE WILDE & DE WILDE-DUYFJES 6014; 4-9: AWEKE & GILBERT 626).

a solitary stamen and a scaly, papillose deciduous indumentum on the receptacle; the latter 2 stamens and glabrous receptacles.

HUTCHINSON & BRUCE (1941, p. 124) mentioned *F. capensis* THUNB.; the specimen they cited is GILLET 5135 (K), but this is *F. sur*.

HUTCHINSON and BRUCE (l.c.) were cited by CUFODONTIS (1953) and by BREITENBACH (1963) who referred HUTCHINSON and BRUCE's specimen to *F. sur* while stating that *F. capensis* THUNB. was misunderstood by 'auct.'.

CUFODONTIS (1962) however, finally reached the conclusion that *F. capensis* THUNB. was conspecific with *F. sur*.

It became necessary to check the number of stamens in the male flower of *F. sur* (solitary stamen) and *F. capensis* (2 stamens) according to many authors.

FORSKÅL's type (782 Herb. FORSKÅLII, Fl. Aeg. Arab. p.c. XXIV, no. 619, p. 180, cent. VI, no 99 '*Ficus sur* F.', C) is a leafy branch without receptacle.

P. JANSEN 6214 is, by all its vegetative characters, referable to *F. sur*. In a single receptacle 24 male flowers had a single stamen, 1 male flower had 2 stamens. Another receptacle of the same specimen had 22 male flowers with a single stamen, and 3 male flowers with two stamens. In P. JANSEN 5167, another specimen belonging in *F. sur* not a single male flower with 2 stamens was found.

W. J. J. O. DE WILDE C.S. nr. 7206, which according to its general characters is best placed in *F. capensis*, had male flowers with 2 stamens, but in several receptacles, single-stamened male flowers appeared to be present among the two-stamened.

Although, it can be maintained that in *F. sur* auctt. male flowers contain a single stamen, and in *F. capensis* auctt. as a rule male flowers with 2 stamens; this seems insufficient as a specific distinction and, moreover, it is the only character available. *F. sur* and *F. capensis*, therefore ought to be united.

Ficus lichtensteinii LINK (1822, p. 451) was based on a specimen of Cape of Good Hope Prom. collected by THUNBERG. C. KUNTH (1846, p. 22) redescribed it but mentioned that the species was reduced in SPRENGEL (Syst. 3, p. 783) to *F. capensis*. SONDER (1850, p. 138) reduced *F. lichtensteinii* LK to *Sycomorus capensis* MIQ., which is identical to *Ficus capensis* THUNB. It is to be noted that no *Ficus* species was reported to occur on the Cape Peninsula by R. S. ADAMSON and T. M. SALTER (Flora Cape Pen. 1950).

DELILE based *F. panifica* on a specimen 'herbier de M. GALINIER' stating that it was found near Gotho in Tigre province. The bark of this tree is eaten like bread. MIQUEL (1848, p. 111, sub *Sycomorus*) made a detailed description basing this on SCHIMPER, Pl. Abyss. sect. I, 27 Dec. 1837 locis aquosis vallium angustarum ditionis Memsack and mentioned the vernacular name '*choddo*'. Possibly DELILE's '*Gotho*' is the same as the vernacular name '*Choddo*' (cf. '*vallis-choudae*' and cf. '*Kottu*', p. 52 and '*Khoddo*', p. 71).

The holotype, collected by GALINIER, was not found at MPU, where the GALINIER specimens are conserved. Whether MIQUEL's *Sycomorus panifica* is identical with DELILE's taxon is uncertain. It seems best to follow current opinion and reduce *F. panifica* DEL. to *F. sur* FORSKÅL.

Sycomorus? riparia was published and described by MIQUEL (1848, p. 114)

who placed *Ficus riparia* HOCHST. in sched. (SCHIMPER 1585) only with considerable doubt in '*Sycomorus*'. He remarked, in addition, that the receptacle and the leafy branch, lab. as SCHIMPER 1585 actually may not belong together.

In our opinion they do, and SCHIMPER 1585 ought to be accepted as the lectotype of *Ficus riparia* HOCHST. ex A. RICH. (1850, p. 270).

MILDBRAED & BURRET (1911, p. 196) reduced *F. riparia* to *F. capensis* THUNB., which is the correct disposition. This implies that *F. riparia* is reduced to synonymy with *F. sur*. Further studies are required to decide on CORNER's opinion (1967, p. 35) that *F. riparia* is identical with *F. racemosa* L. var. *elongata* (KING) BARRETT.

It was unfortunate that FORSKÅL collected and described a specimen (the holotype) found in a marginal station (Yemen), which promoted the publication of a number of specific names which, it may be supposed, are referable to infraspecific taxa in *F. sur* (e.g. '*F. capensis*'). *F. mallotocarpa* (see there) differs by the non-scaly indumentum on the figs, by some characters of the ♀ flower and, possibly, some vegetative characters, but may prove to be an infraspecific taxon in *F. sur*.

Ecological notes: *F. sur* is a small or large tree, found from ca 1500–2400 m alt.; sometimes it is an epiphyte (Dr. and Mrs. WESTPHAL 1707, near Shashamane, in a forest with *Podocarpus*).

AWEKE & DE WIT (1587) found it near the hot source at Wondo Genet, a ca 30 m tall tree (ETH, WAG).

Dr. and Mrs. DE WILDE noted 'brownish-green figs with whitish spots' near Shashamane (7110), while the mature figs (40 km from Lekemt, at 1600 m alt.) were ca 2½ cm in diam. (8868).

Dr. and Mrs. DE WILDE observed in March 1965 that many birds ate the mature fruits near Addis Ababa (Asmara rd). The stipules were reddish-brown, the leaves dark green above and very pale green on the lower surface (6014). The figs that the DE WILDE's collected near Asella (10040) contained many empty ovaries of exceptional size and with an underdeveloped style. No wasps were found. Possibly the altitude (ca 2400 m) is connected with this phenomenon.

Uses: WATT and BREYER-BRANDWIJK (1962, p. 774) summarized the medicinal uses in Africa of '*F. capensis* THUNB.', in both human and veterinary medicine. Its use as a galactagogue in several regions may suggest efficiency but, on the other hand, there is a possibility that nothing but 'signature' is involved. The sap is used as eye-drops against conjunctivitis.

The white, very porous, light wood serves as brake-blocks on wagons. Fire-making by means of the dry sticks was practiced by the Xhosa in S. Africa.

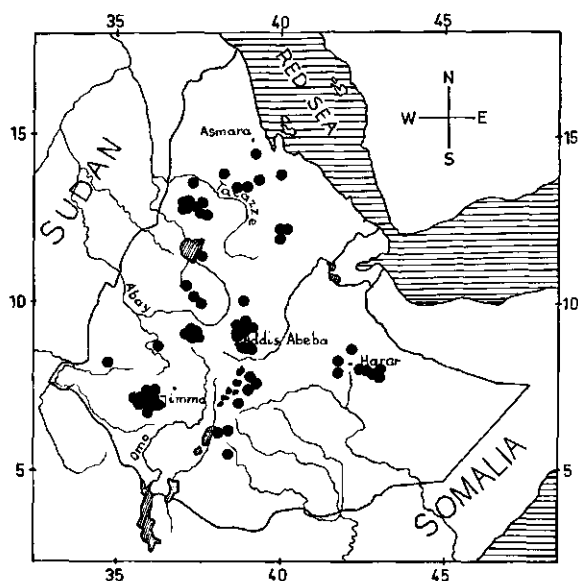
The yellow or pinkish-yellow ripe fig is as large as a small plum and eaten by monkeys and birds.

The abundant clustered figs suggest fertility (mimetic magic) and are used in various ways as a charm to promote fertility and to ensure an abundant crop

(l.c. p. 775). In East Africa many of the trees of *F. sur* are sacred shrines or places of sacrifice to the ancestral spirits.

KERHARO & BOUQUET (1950, p. 131) noted its use in W. Africa as a remedy against epilepsy, poisoning, dysentery, as a diuretic and as an aphrodisiac.

Vernacular names: *shola* (Amharic); *harbu* (Galla); *koddo* (Tigrina); *sur* (Arabic), fide CUFODONTIS and BREITENBACH; *shola*, *wachia*, *wachio* (Amharic); *worka* (Amharic, Tigrina, Galla); *khoddo* (Tigrina); *harbu* (Galla-Harar), fide MOONEY.



Ficus sur FORSK.

Specimens examined:

Eritrea prov.: Outskirt of Senkata, Aweke & Gilbert 670 (ETH, WAG); Seraé, Courbon s.n. (P); Ocule-Cushai, Fiori 40 (FI: isotype of *F. sur* FORSK. var. *erythraea* FIORI); Schimenzana: Alppino di Gheleb, Pappi 819 (FI); Schimenzana: Guna-Guna, id. 684 (FI); Ouder-gate, Quartin-Dillon & Petit s.n. (P); Halai, Schweinfurth 178 (K).

Tigre prov.: Mt Ayebe, Wodeko, near Adua, Aweke & Gilbert 749 (ETH, WAG); 21 km W. of Indeselassie on Gondar road, id. 894 (ETH, WAG); 55 km of Kwiha, along roadside, id. 626 (ETH, WAG); 20 km from Adua, Adigrat near Mai-Gebremariam, id. 780; Chire, Quartin-Dillon & Petit 1585 (BM, K, L, U: isotype of *F. riparia*); vallium angustarum ditonionis Memsack, Schimper 149 (BM, K, L, P, UPS, U); District Mandel, id. 1585 (isolectotype of *F. riparia*: K).

Begemdir prov.: 1 km from Adi-Arkai, on the way to Debark, Aweke & Gilbert 954 (ETH, WAG); Dembia, Chiovenda 1972, 1843, 2634, 2816 (FI); Tekur-Dengay, Pichi Sermolli 2384, 1724 (FI); N. of Gondar, monete Guranghe, id. 2383 (FI, W).

Wollo prov.: 8 km N.E. along Dessia road, Ash 126 (K).

Gojam prov.: Lake Tana, Pichi Sermolli 2379 (K); 5 km from Elias along road to Debre-Markos, Seegeler 2977 (ACD, WAG); Gojam sine loco, Taschjidan 368 (FI).

Wellega prov.: Ridge between Amarti-Fincha, Aweke 606 (ETH, WAG); 70 km before Lekemt, Jansen 6214 (ACD, WAG); 10 km N. of Lekemt, De Wilde & De Wilde-Duyffes 6719 (ETH, BR, WAG); 40 km N. of Lekemt, id. 8868 (WAG); 20 km W. of Lekemt, id. 7206 (C, WAG).

Shoa prov.: 80 km N.W. of Addis Ababa, Debra Libanos, *Ash 244* (K, WAG); 20 km from Addis Ababa, Shola dairy farm on Dessie road, *Aweke 428* (ETH, WAG); 180 km from Addis on the way to Ghedo Lekemt road, *id. 568* (ETH, WAG); 34 km W. of Ambo, *Meyer 7667* (K); Foot of Entoto, Addis Ababa, *id. 7703* (K); Entoto, *Senni 972, 967, 317, 1000* (FI); 5 km E.N.E. of Addis Ababa along road to Asmara, *De Wilde & De Wilde-Duyfjes 6014* (BR, C, WAG).

Hararge prov.: Harar, sine loco, *Bricchetti 160* (FI); between Bedenno & Gara Mullata, *Burger 1490* (FI, K); 23 km W. of Jijiga, *id. 568a* (K); 4 km from Agricultural College, Gendeboro village, *Jansen 5167* (ACD, WAG); 5 km from Bati along road to Komboltcha, *Seegeler 2885* (ACD, WAG); 6 km from Kobbo, road to Deder, *Westphal & Westphal-Stevens 1040* (WAG).

Arussi prov.: Lake Zwai, *Senni 619* (FI); 9 km from Shasamene, road to Koffele, *Westphal & Westphal-Stevens 1707* (WAG); Asella, about 180 km S. of Addis Ababa, *De Wilde & De Wilde-Duyfjes 10040* (BR, WAG); 20 km W. of Shashamene, *id. 7110* (BR, WAG).

Illubabor prov.: Dembi-Dollo, *Ginghiarelli 579* (FI).

Kefa prov.: Kaffa, sine loco, *Chaffey 446* (K); Belleta forest, *Friis, Hounde & Jacobsen 249, 246* (BR, C, ETH, L, WAG); Bonga on cultivated slope above catholic mission, *id. 411* (C); Bonga catholic mission, *Jansen 5397* (ACD, WAG); Wush-Wush tea plantation, *id. 5444, 5469* (ACD, WAG); road Jimma-Bonga, *id. 5287* (ACD, WAG); along Gojeb river at Gojeb farm of Catholic mission, *id. 5818* (WAG); above Gojeb, S. of Catholic mission Bonga, *De Wilde & De Wilde-Duyfjes 9367* (BR, WAG).

Sidamo prov.: Galla Sidamo, sine loco, *Benedetto 640* (FI); Wondo, *Foretale 178* (FI); Galla Sidamo, sine loco, *Senni 178* (FI); Adola, *id. 2335* (FI); Wondo, *Vatova 965* (FI).

Ethiopia: sine loco, *Courbon s.n.* (P); sine loco, *Figari Mag s.n.* (FI); sine loco, *Quartin-Dillon & Petit 83* (BM); sine loco, *Schimper 889* (K, P); sine loco, *Vatova 1750* (FI).

Also seen from: Burundi, Kenya, Liberia, Tanzania (Ugueno mt near Kilimandjaro; BR; iso-type), Zaire.

Ficus sycomorus LINNAEUS

Fig. 18

LINNAEUS 1753, p. 1059; SCHWEINFURTH & ASCHERSON 1867, p. 290; SCHWEINFURTH 1868, p. 686; BOISSIER 1879, p. 1155; MARTELLI 1886, p. 78; TERRACCIAO 1897, p. 20; ENGLER 1901, p. 292; ALMAGIA 1903, p. 117; SENNI 1908, p. 49; FIORI 1910a, p. 164; *id.* 1910b, p. 371; MILDBRAED & BURRET 1911, p. 183; HUTCHINSON 1916, p. 95; CHIOVENDA 1916, p. 166; HUTCHINSON 1920, p. 526; BLATTER 1923, p. 445; CHIOVENDA 1929, p. 312; *id.* 1932a, p. 409; WERTH 1932, p. 552; POST (& DINSMORE) 1933, p. 516; LEBRUN 1934b, p. 25; SENNI 1935, p. 254; CHIOVENDA 1937, p. 527; SCHWARTZ 1939, p. 25; LEBRUN & BOUTIQUE 1948, p. 113; EGGELING (& DALE) 1951, p. 260; CODD 1951, p. 25; ANDREWS 1952, p. 263; CUFODONTIS 1953, p. 15; BRANCA 1960, p. 631, 632; DALE & GREENWAY 1961, p. 321; WATT & BREYER-BRANDWIJK 1962, p. 773; BREITENBACH 1963, p. 131; MOONEY 1963, p. 56; BURGER 1967, p. 144, fig 6 (2); EL HADIDI & BOULOS 1970, fig. 25; PALMER & PITMAN 1972, p. 443.

F. sycomorus vera FORSKÅL (1775, p. 180); MILDBRAED & BURRET 1911, p. 191; BLATTER 1923, p. 445; CUFODONTIS 1953, p. 15; BREITENBACH 1963, p. 130.

F. chanas FORSKÅL (1775, p. 219); MIQUEL 1848, p. 116; MILDBRAED & BURRET 1911, p. 191; BLATTER 1923, p. 445; CUFODONTIS 1953, p. 15. BREITENBACH 1963, p. 130.

Sycomorus antiquorum GASPARRINI (1845, p. 86); MIQUEL 1848, p. 109; *id.* 1849, p. 119, 120; KOTSCHY 1865, p. 4; MARTELLI 1886, p. 78; CUFODONTIS 1953, p. 15; BREITENBACH 1963, p. 130.

Sycomorus rigida MIQUEL (1848, p. 110); ID. 1849, p. 120; KOTSCHY 1865, p. 4; CUFODONTIS 1953, p. 15; BREITENBACH 1963, p. 130.

A shrub or wide-spreading large tree up to 30 m tall, \pm 350 cm dbh. Trunk with buttresses. Bark grey-brown to grey to cream or yellowish. Slash pale brown to brown yellow. Latex copious, milky white. Branches brown to greyish, when dry minutely puberulous to tomentellous to hirsute. Periderm peeling off, flaky. Budding leaf enclosed by grey-brown or pale yellow stipules (the scar of the stipule with a fringe of long, whitish hairs), up to $1\frac{1}{2}$ cm long; glabrous and glossy inside. Stipules fully amplexicaul, caducous, ovate, narrowing to an acute apex, villous to pubescent esp. on the median part outside, with glabrous margins. Petiole up to 3.5 cm long, more or less slender, puberulous to hirtellous, periderm peeling off.

Leaves almost distichous. Leaf-blade ovate to (broadly) elliptic to sub-orbicular, apex rounded, rarely short and blunt acuminate, base rounded to cordate, margin subentire to vaguely crenate-dentate, $3\frac{1}{2}$ –16 cm long, 2– $10\frac{1}{2}$ cm wide, above dull, slightly scabrous or smooth, puberulous to pubescent on the main veins, beneath scabrous or smooth and more or less densely puberulous or, on the veins, pubescent, dry yellowish green to pale brown. Nerves almost plane above, prominent beneath, indistinctly palmately 3-nerved. Side-nerves 4–6(–8) pairs. Basal side-nerves with a regularly spaced but indistinct row of secondary side nerves towards the leaf edge and close to the margin anastomosing. Veinlets aerolate. Intercostals present; a pair of inconspicuous glands in the axils of the main basal veins.

Figs borne on leafless branching peduncles, in bunches, on the trunk and along larger branches. Peduncle up to 1.5 cm long, rather stout, tomentellous to tomentose. Bracts 3, wider than long, ovate to triangular, 3–4 mm long, puberulous to pubescent outside, inside glabrous. Receptacle broadly obovoid to subglobose, often stipitate, 1.8–2.5 (up to 6 cm and $5\frac{1}{2}$ cm in diam.) cm, puberulous to hirtellous. Ostiole prominent, with a swollen outer margin consisting of 3–5 triangular, glabrescent teeth and closed at first by brown, blunt, concave, partly glabrous scales.

Male flower sessile, perianth membranous, enclosing the 1–3 stamens. Anther cells free at the base, very large, twice as long as the filament (only when young?).

Female flower sessile or not, with a brown, 3-lobed perianth (lobes erose and irregularly incised, longer than the ovary). Style laterally attached near the top of the ovary, stigma narrowly oblong, attenuate, almost half as long as the style, yellow.

Gall-flower pedicellate, the free perianth-lobes irregularly incised and shorter than the ovary. Style short, swollen towards the truncate ending.

Taxonomical notes: LINNAEUS described *Ficus sycomorus* in 1753 as follows: – *Ficus foliis cordatis subrotundis integerrimis*. – He referred to a number of earlier publications of which the first 3 are to be considered.

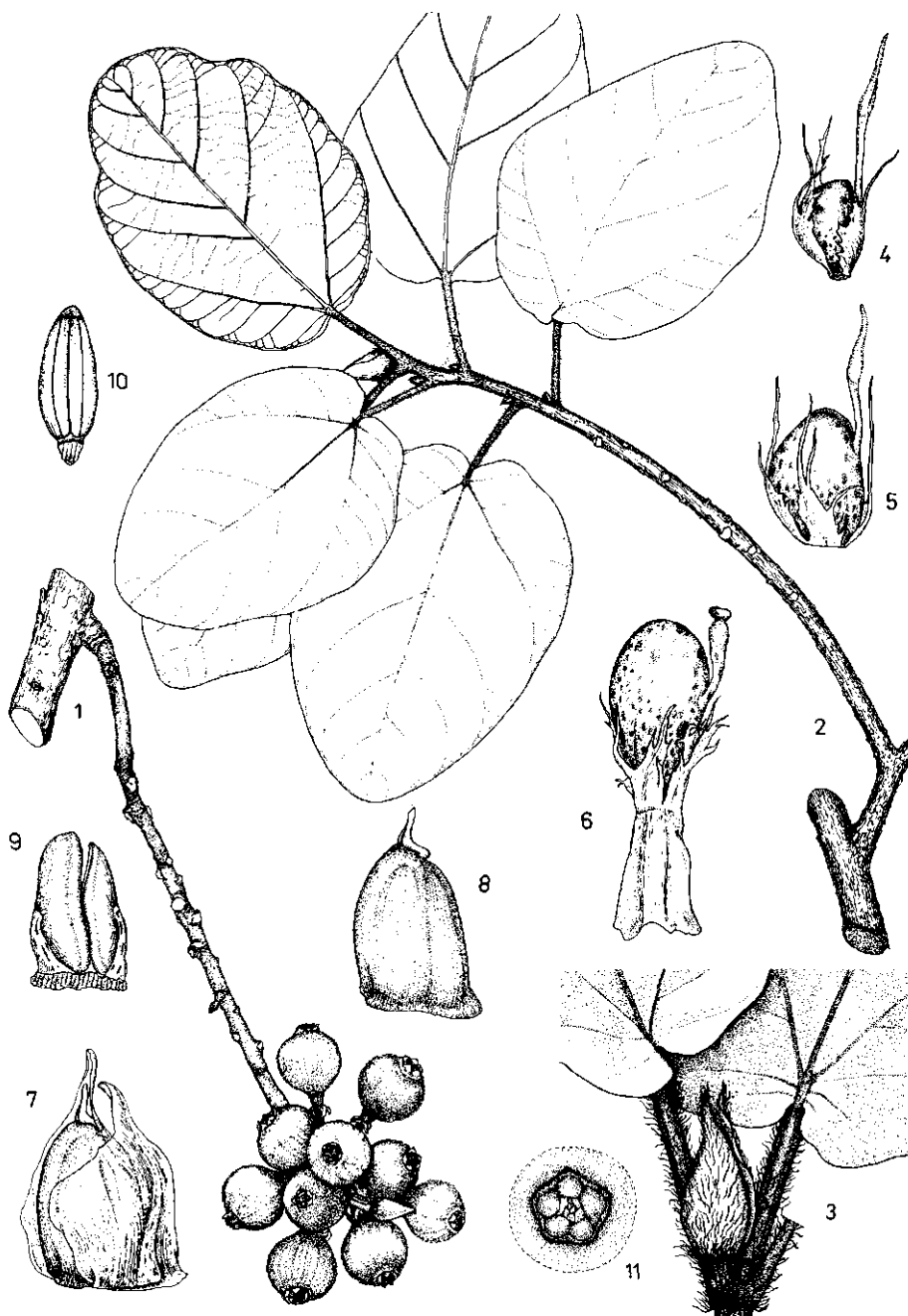


FIG. 18. *Ficus sycomorus* L. - 1: Inflorescence ($\times \frac{1}{2}$); 2: Branch ($\times \frac{1}{2}$); 3: Stipules ($\times 1$); 4-5: Female flower ($\times 10$); 6: Gall-flower ($\times 10$); 7: Male flower ($\times 10$); 8: Male flower, two tepals removed ($\times 10$); 9: Stamens ($\times 10$); 10: Stamen, frontal ($\times 10$); 11: Ostiole ($\times 1$). (1-3, 11: DE WILDE & DE WILDE-DUYFJES 6218; 4-10: J. J. F. E. DE WILDE 7372).

1. Hort. Cliff. 1737, p. 471 was cited by LINNAEUS and marked by an asterisk which means to refer to a good description (STEARN, Bot. Lat. 1966, p. 365). In Hort. Cliff. the name '*Sycomorus*' is not found. LINNAEUS placed *Ficus* in 'Cryptogamia Plantae'. Sub '3' he described *Ficus foliis cordatis subrotundis integerrimis*; in 1753 he repeated this description. He added in Hort. Cliff. '*Ficus nymphaeae folio. vulgo*' and he stated that the plant occurred in Barbados ('ut fertur') certe in America. A full description follows of leaves, stipules, and branches. The receptacle is not described and LINNAEUS stated that it never produces fruits with us.

2. ROY. lugdb. 1740, p. 211. In Flora Leydensis Prodr., A. VAN ROYEN mentioned '*Ficus nymphaeae folio*', citing the description in Hort. Cliffortianus.

3. Amoen. acad. 1, 1749, p. 26. A list of *Ficus* names was drafted by a student, CORNEL. HEGARDT. The name *Sycomorus* is used but LINNAEUS did not adopt HEGARDT's synonyms in the protologue (1753).

In the protologue LINNAEUS copied the description in Hort. Cliff., but now he ascribed the species to Egypt.

The specimen in LINN (1240.2) is a single leaf, more or less matching the descriptions but the species number of Sp.Pl. was not added. Instead there is a pinned label '12. *Ficus ex horto...*?' at the bottom of the sheet, '*Sycomorus*' (in LINNAEUS's handwriting), below the leaf '*nymphaeae folio*' (possibly also by LINNAEUS), and *benghalensis* HB (See SAVAGE, Cat. Linn. 1945, p. 185). Although it is very possible that the leaf was not used by LINNAEUS when writing Sp. Pl., nevertheless it ought to be accepted as the type. It will never be decided whether LINNAEUS had material of *F. sycomorus*, as currently interpreted, at his disposal before or in 1753. LINN 1240.2 is to be adopted as the type, irrespective whether one wants to have it as the holotype, lectotype or neotype. Adopting Hort. Cliff. 1737, p. 471, '3', as the type does not improve matters. LINNAEUS accepted in 1753 *Ficus* as belonging in *Polygamia Polyoezia*, therefore he no longer considered *Ficus* as cryptogamous.

Ficus sycomorus vera FORSKÅL (1775, p. 180) seems a trinomial, but possibly FORSKÅL discussed the presence of true *F. sycomorus* in Egypt.

FORSKÅL described *F. chanas* (1775, p. 219). The holotype is from 'Surdid, in montosis', which apparently is extra-Ethiopian. MILDBRAED & BURRET (1911, p. 191-193) did not see the type. Synonymy was also accepted by HUTCHINSON (1917) and CUFODONTIS (1953).

MIQUEL accepted *Sycomorus* GASPAR. as a genus in 1848 and for that reason changed the name *Ficus sycomorus* L. into *Sycomorus antiquorum* GASPAR. MIQUEL referred SCHIMPER no. 1834 to *S. antiquorum* which implies that he recorded *Ficus sycomorus* L. for Ethiopia.

MIQUEL based his *Sycomorus rigida* on 2 specimens, KOTSCHY n. 227, Sennaar distr., Abyssinia and AUCHER-ELOY no. 1319, regno Mascat. The picture was made from the Mascat specimen, one leaf excepted. MIQUEL declared that the leaves of the Mascat-specimen were much rougher and more rigid than the specimen from Sennaar. MILDBRAED & BURRET referred *S. rigida* MIQ. to the synonymy of *F. sycomorus* L., and so did HUTCHINSON (1917) and CUFODONTIS

(1953). For a lectotype the Mascat specimen obviously should be designated.

HUTCHINSON (1916, p. 96, 97, 100, 101) distinguished in his description between *F. sycomorus* and the 3 taxa *F. mallotocarpa*, *F. sur* and *F. capensis*. He declared that *F. sycomorus* had 2 basal, opposite bracts. This contradicts MILDENBRAED & BURRET (1911, p. 174) who segregated a subgenus *Sycomorus*, which first of all was reported to have 3 basal bracts. This latter statement is correct. HUTCHINSON may have seen 2 basal bracts, which occasionally occurs among receptacles on a fruiting branch, but as a rule 3 bracts are present. HUTCHINSON (1916, p. 80) ascribed '3 basal bracts arranged in a whorl' to subgenus *Sycomorus*.

Ecological notes: In Trees of Southern Africa, PALMER & PITMAN (1972, p. 443–6) gave a highly commendable survey of ecological data on *F. sycomorus* in Southern Africa. The following notes apply to Ethiopia.

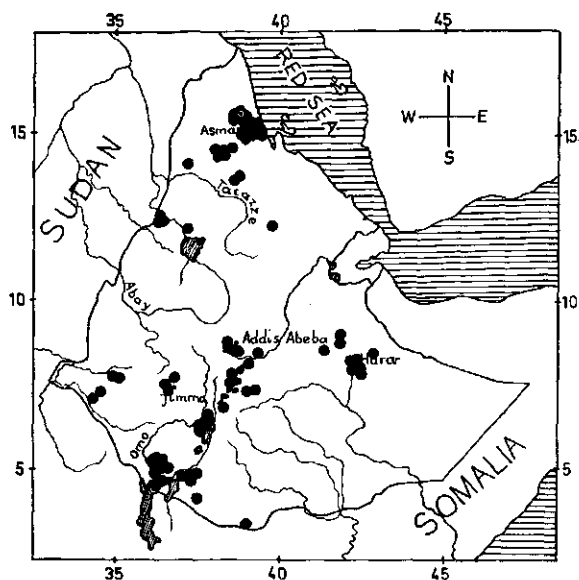
F. sycomorus often is an enormous tree, though rarely higher than 25 m; because of its heavy branches, which rise within a few meters above the surface of the soil, it has an enormous canopy. It occurs from 500–2000 m alt.

CARR (679) found it as the only common *Ficus* in the lower Omo river valley, at ca 400 m lat., and a low annual irregular precipitation. He commented on the 'greyish white bark with brown peeling flakes', and saw figs along 'larger branches (sec. and tert. only)'. ASH (384) in Arussi (Lake Zwai) met with *F. sycomorus* as the dominant component of 'riverine line of trees bordering marginal swampy grasslands'. The bark was a 'light orangy-buff', fairly smooth. ASH noted 'large growths of parasites' on the trees ('*Viscum* and *Loranthus*, both orange and red-flowered species'), also epiphytic fig trees. The 'very beautiful giant trees' (stout trunks, buttress-roots) harboured colonies of *Dendrohyrax* and Vervet monkey. The yellowish-brown fruit was sweet-smelling and edible, 'in clusters on the main branches'. ASH stressed the proximity of water (which was confirmed by many other collectors). Animals are generally fond of the ripe figs (birds; AWEKE & GILBERT 893). Associated with *F. sycomorus* were *Acacia* (1750 m alt., Jimma-Bonga, FRIIS c.s. 507); there is an indication that the (shade of the) tree is utilized for horticultural purposes. AWEKE (427) noted coffee (wild?) growing near the trunk and (403) on another occasion *Adathoda schimperi*. It is a component of high forest (FRIIS, AWEKE, RASMUSSEN & VOLLESEN 1929 and JANSEN & AWEKE 5093, at Gambella) but it is also found in rocky savannah (usually at short distance of water courses). On the other hand DE WILDE & DE WIT found it at 1650 m alt. in a rocky savannah without a visible trace of water.

Use: In Ethiopia, the roots of *Sycomorus* trees are used as a prophylactic against typhoid (GRIAULE 1930, p. 79). On the other hand AWEKE (1974) reports that ripe figs squeezed in a form of pulp are given to animals with heart complaints.

Vernacular names: Amharic: *shola*, *worka*, *bamba* (fide CUFODONTIS,

BREITENBACH and MOONEY); Galla: *lugo, woda, wada, arbu* (fide CUFODONTIS, BREITENBACH, MOONEY and AWEKE); Somali: *makkoy-adda, makkoy-ghedud-durreh* (fide CUFODONTIS and BREITENBACH).



Ficus sycomorus L.

Specimens examined:

Eritrea prov.: 57 km from Asmara along Keren road, *Aweke & Gilbert* 687 (ETH, WAG); *ibid.*, *id.* 685 (ETH, WAG); Ghinda, *Baldrati* 2400 (FI); *ibid.*, *id.* 2330 (FI); *ibid.*, *id.* 2147 (FI); Cheren, *id.* 496 (FI); Sarghilla, *id.* 3423 (FI); Keren, *Beccari* 72 (FI); Serae Adi Negri, *Bellini* 276, 210 (FI); Ibamaren, Embatcalla, *Buscalioni* 429 (FI); Sarae, *Chiovenda* 321 (FI); Hamasen, *Fiori* 38 (FI); Eritrea, *id.* 140 (FI); Ghinda-Baresa, *id.* 456 (FI); Om-Ager, *Gandear* 363 (FI); Assarita, *A. Pappi* 5087 (FI); Assaorta, *id.* 5085 (FI); *ibid.*, *id.* 3261 (FI); Guna-Guna, *id.* 689 (FI); Eritrea, *Ruspoli & Riva* 1043 (FI); Keren (Djuffa), *Schweinfurth* 992 (K); bei Djeladjeranne, *Schimper* 553 (134) (FI); prope Sabra, *id.* 1280 (isotype of *Sycomorus schimperiana* MIQUEL); *ibid.*, *id.* 1834 (BM, K. L. MPU, UPS); Keren-Ag Racleran, *A. Tellini* 1286 (FI); Eritrea, *A. Vatova* 2346 (FI).

Tigre prov.: Near Alamata, *Aweke* 403 (ETH, WAG); Tacazze valley, near bridge; along main road to Indeselassie-Gondar, *Aweke & Gilbert* 893 (ETH, WAG); Chire, *Chiovenda* 599 (FI); presso de Tacazze, Djeladjeranne, *Figari Mag* s.n. (FI).

Gojam prov.: Agew-meder, *Tuschdjun* 286 (FI).

Shoa prov.: 50 km from Addis Ababa, Bole valley, *Aweke* 427 (ETH, WAG); Viaggio Addis Ababa-Nil Azzurro, *Buscalioni* 1189 (FI); *ibid.*, *id.* 1121 (FI); 100 km S.S.E. from Addis Ababa along Awash river near Wonji, *De Wilde & De Wilde-Duyffjes* 6218 (WAG); road from Hosana to Silti, *Westphal & Westphal-Stevens* 3246 (WAG); Koka 8°25' N 39°2' E, *Chojnacki* 72 in *Mooney* 9686 (ACD).

Hararge prov.: 40 km S. of Harar, Jijiga road, *Bos* 9050 (ACD, WAG); Erer valley, 22 km S.E. of Harar road to Jijiga, *Burger* 813 (ACD, K); 45 km E.S.E. of Harar, *id.* 819 (ACD, K); Idi valley 45 km E.S.E. of Harar road to Jijiga, *id.* 2444 (FI, K, WAG); 5-10 km upstream, Dire Dawa, *id.* 2544 (FI, K, WAG); 10 miles S.E. of Harar, *Kumsa B-56* (ACD); 21 km from Harar, Erer valley, *Perdue jr.* 6347 (K); Erer-gota farm, *Westphal & Westphal-Stevens* 561 (WAG); 35 km from Jijiga along road to Harar, *id.* 1171 (WAG); 2 km along road Harar-Jijiga, *J. J. F. E. de Wilde* 7372 (ACD, WAG).

Arussi prov.: Lake Zwai, Arussi valley, *Ash* 384 (K, WAG); near Maki, 2 km from the main road, *D. Hundessa* 64 (K); Galla, Arussi, *Negri* 913 (FI).

Illubabor prov.: 33 km W. of Bure, at Baro river, *Friis, Aweke, Rasmussen & Vollesen* 1929 (C, ETH, K, WAG); Abobo, 50 km S. of Gambella, *Jansen & Aweke* 5093 (ACD, WAG); Illubabor, *Thomerson* 602 (K).

Kefa prov.: near Nadda, *Friis, Hounde & Jacobsen* 507 (BR, C, WAG); 2–3 km S.W. of Jimma, *id.* 128 (C); 20 km S.W. of Jimma, near Saka, *id.* 131 (BR, C, WAG); Agaro, *Patti* 348 (FI); 17 km from Jimma along road to Bonga, *Seegeler* 2647 (ACD, WAG).

Gamu Gofa prov.: lower Omo valley, *Carr* 679 (BR, K); *ibid.*, *id.* 529, 907 (K); Fiume-sagan (Gondaraba), *Corradi* 5919, 5935 (FI); Murle Rive dell'Omo, *id.* 5899, 5900, 5915 (FI); Nargi Rive dell'Omo, *id.* 5920 (FI); *ibid.*, *id.* 5931 (FI); E. slope Mt. Delo, Amaro, *Gillett* 15055 (FI, K); Woito river, 5 km from junction with Sagan, *M. G. & S. B. Gilbert* 1569 (K); Lago Regina Margherita, campo di Cenci, *Vatova* 1804 (FI); Lago Ciamo, *id.* 1993 (FI); *ibid.*, *id.* 2344 (FI).

Sidamo prov.: Nargi, presso ill villaggio, *Corradi* 5922 (FI); rive del Caschei, *id.* 5890 (FI); *ibid.*, *id.* 5916 (FI); *ibid.*, *id.* 5886 (FI); *ibid.*, *id.* 5889 (FI); Pozzi di el Banno (teriale), *id.* 5911, 8266 (FI); Mega, R., *id.* 5896 (FI); Boran, Moyale, *Gillett* 12831 (BR); Lago, R. Margherita, Campo di Soddu, *Vatova* 1331 (FI); *ibid.*, *id.* 1506 (FI); *ibid.*, *id.* 1535 (FI); *ibid.*, *id.* 1297 (FI); *ibid.*, *id.* 1459 (FI); *ibid.*, *id.* 1824 (FI); Awassa, *De Wilde & De Wilde-Duyfjes* 11032 (BR, WAG).

Ethiopia: Sine loco, Abyssinia, *Galinier* 44 (MPU); sine loco, *Kotschy* 405 (P); *id.* 330 (K); sine loco, *Schimper* 1128 (P); sine loco, Abyssinia, *id.* 1118 (P); sine loco, *Westphal* 3155 (WAG).

Also seen from: Sudan (Sennaar) isosyntype of *F. sycomorus*, *Kotschy* 227 (BM, E, FI, K, P, UPS), Egypt, Kenya, Moçambique, N. Rhodesia, Somalia, Sudan and Tanzania.

***Ficus thonningi* BLUME**

Fig. 19

BLUME 1836, p. 17, 19; HUTCHINSON 1916, p. 188; CHEVALIER 1920, p. 604; LEBRUN 1934b, p. 72; *id.* 1935, p. 69; AUBRÉVILLE 1936, p. 72, pl. 19 (fig. B); HUTCHINSON & BRUCE 1941, p. 124; AUBRÉVILLE 1950, p. 347, pl. 71 (fig. 6, 7); KERHARO & BOUQUET 1950, p. 133; EGGELING (& DALE) 1951, p. 260; ANDREWS 1952, p. 270; CUFODONTIS 1953, p. 15; *id.* 1958, p. 105; KEAY 1958, p. 610; DALE & GREENWAY 1961, p. 321; JUNGHANS 1961, p. 345; WATT & BREYER-BRANDWIJK 1962, p. 780; BREITENBACH 1963, p. 131; MOONEY 1963, p. 56; HEPPER 1976, p. 79.

Ficus microcarpa VAHL (1805, p. 188; non L.F.); LINNAEUS FIL. 1781, p. 442; LINK 1822, p. 450; SCHUMACHER 1828, p. 48; BLUME 1836, p. 19; CUFODONTIS 1953, p. 15; JUNGHANS 1961, p. 345; BREITENBACH 1963, p. 131; CORNER 1965, p. 22; *id.* 1967, p. 68; HILL 1967, p. 32.

Ficus Tjielu HOCHST. in SCHIMP. ex MIQ. (1847, p. 558; nomen ill.).

Ficus dekdekana A. RICHARD (1850, p. 268); MARTELLI 1886, p. 77; SCHWEINFURTH 1892, p. 191; *id.* 1893, p. 65; *id.* 1896, p. 135; ALMAGIA 1903, p. 116; FIORI 1910b, p. 375, fig. 45 (3); MILDBRAED & BURRET 1911, p. 255; HUTCHINSON 1917, p. 211; CHIOVENDA 1937, p. 528; EGGELING (& DALE) 1951, p. 247; ANDREWS 1952, p. 272; KEAY 1958, p. 610; DALE & GREENWAY 1961, p. 316.

Ficus dekdekana var. *acrocarpa* (STEUD.) ALMAGIA (1903, p. 116).

Ficus dekdekana var. *pubiceps* MILDBR. & BURRET (1911, p. 256); CUFODONTIS 1953, p. 9.

Ficus schimper (MIQ.) HOCHST. ex A. RICH. (1850, p. 267); MIQUEL 1848, p. 555; CHEVALIER 1920, p. 603; LEBRUN 1934b, p. 73.

Ficus acrocarpa (MIQ.) STEUD. ex MIQUEL (1867, p. 288); CUFODONTIS 1953, p. 9.

Ficus acrocarpa var. *saligna* MIQUEL (1867, p. 288).

Ficus rokko WARBURG & SCHWEINFURTH (WARBURG 1894, p. 164, 165); DE WILDEMAN & DURAND 1901, p. 216; LEBRUN 1934b, p. 72.

Ficus rocco WARBURG & SCHWEINFURTH (WARBURG 1908, p. 63).

Ficus goetzei WARBURG (ENGLER 1900, p. 378); ENGLER 1901, p. 293.

Urostigma dekdekena MIQUEL (1847, p. 558).

Urostigma acrocarpum MIQUEL (1847, p. 557, tab. XXII); CUFODONTIS 1953, p. 9.

Urostigma schimperii MIQUEL (1847, p. 555, tab. XXII); ID. 1848, p. 555; SCHWEINFURTH & ASCHERSON 1867, p. 291; CUFODONTIS 1953, p. 15.

Urostigma thonningi (BLUME) MIQUEL (1848, p. 558); CUFODONTIS 1953, p. 15.

Urostigma macrocarpum MIQUEL errore cit.; cf. ALMAGIA 1903, p. 116.

Shrub or tree, 4–12 m high up to ca 50 cm dbh. Slash red, exuding white latex. Leaf-bearing parts of the branches brownish to greyish, and lengthwise rugose when dry, glabrous to \pm puberulous. Older parts brown to greyish. Stipule glabrous, ciliate on edge, or with a pubescent midrib outside, or more or less pubescent on the outer surface, deciduous, lateral, ovate-apiculate to almost linear and long-acute, membranous to chartaceous.

Leaves spirally arranged, petiole ca 2–3(–5) cm long, slender, glabrous or almost so, flattened on the upper surface. Blade at the base transversely decurrent on the top of the petiole, petiole and midrib (and also the blade) glandulose at their juncture, oblong to lanceolate, or also \pm elliptic, as a rule widest in the upper half, drying greenish to brownish, 5–11 cm long, 2–4 cm wide, chartaceous to subcoriaceous, apex acuminate to acute or subobtuse or (broadly) rounded, acute to cuneate to subobtuse or even rounded at the base, glabrous and dull on both surfaces. Margin entire. Venation almost plane above, reticulate and more or less prominent beneath. Lateral veins 12–25 pairs, not conspicuous, sometimes opposite, basal veins not distinct, intercostals absent.

Figs in axillary pairs or just below the leaves, sessile or shortly pedunculate, basal bracts 3, \pm orbicular, basally fused, the upper parts often caducous, outside puberulous. Receptacle subglobose, 4–6 mm in diam., glabrous or very nearly so, when dry pale brown with darker spots. Ostiole almost plane to slightly depressed; orifice 2-lipped, small, usually the receptacle umbonate at the apex.

Male flowers subsessile with one solitary stamen. Anther large, longer than the thick filament, entire stamen shorter than the enveloping perianth.

Female flowers sessile with a long, thread-like style and a lateral stigma.

Gall-flowers: a short lateral style and large stigma; subsessile to pedicellate.

Taxonomical notes: BLUME (1836, p. 17) replaced the name *Ficus microcarpa* VAHL (1805, p. 188) by the name *Ficus thonningi*. *Ficus microcarpa* had



FIG. 19. *Ficus thonningi* BLUME – 1: Branch ($\times \frac{1}{2}$); 2-3: Male flower ($\times 10$); 4-5: Stamen ($\times 10$); 6: Gall-flower ($\times 10$); 7: Female flower ($\times 10$); 8: Pedicelled gall-flower ($\times 10$); 9-9A: Leaf, petiolar area, upper surface ($\times 1\frac{1}{2}$); 10: Ostiole ($\times 3$). (1, 9-10: DE WILDE & DE WILDE-DUYFJES 7635; 2-8: LEEUWENBERG 10146 (WAG; Cameroun)).

been published previously by L.F. (1781, p. 442), so *F. microcarpa* VAHL must be rejected. *Ficus thonningi* BLUME ('ex Ora Africae') is another name for *F. microcarpa* VAHL. Of *Ficus microcarpa* VAHL no type material is extant (JUNGHANS 1961, p. 345). HEPPER (1976, p. 79) referred THONNING 325 to *F. thonningi*.

Ficus Tjiela was mentioned by MIQUEL (1847, p. 558) in synonymy to *Urostigma dekdekena*; it was a name on a label in SCHIMPER (Pl. Abyss. I, no. 220). The specific epithet, later on, was spelt '*tsjela*'. MIQUEL, it seems, did not adopt '*tsjela*' because of *Ficus tuela* ROXB. (Fl. Ind. III, 1832, p. 549).

FIORI (1910b, p. 375-6) distinguished in *F. dekdekena* 2 taxa, 'A' having ovate or ovate-elliptic leaves, 2-6 cm wide, with conspicuous reticulations below and a 1-3 cm long petiole and 'B' having elliptic-lanceolate leaves, 2-3½ cm wide, with a much lesser reticulation and a 2-6 cm long petiole. In 'A' he adopted '*typica*' (*F. Tsjela* HOCHST. ex MIQ. 1847), which has the leaves entirely glabrous and short-pedunculate receptacles, and β *Hochstetteri* (A. RICH.) FIORI which has a hairy lower leaf-surface and sessile receptacles, rather hairy when young. Both '*typica*' and '*Hochstetteri*' are trees. A third taxon '*Schimper* HOCHST. (pr. sp.) ex MIQ.' has elliptic leaves, both the apex and the base rounded, glabrous (or not and then: b. *pubescens* SCHWF. 1896), has sessile receptacles and is a shrub or treelet. In 'B' FIORI placed *acrocarpa* STEUD. (pr. sp.) ex MIQ. FIORI rejects '*macrocarpum* A. RICH.' which is, FIORI declared *F. saligna* HOCHST. ex MIQ. and that, again, is *F. dekdekena* SCHWF. (1896). The receptacle has a slender peduncle, 5-7 mm long. FIORI's taxon 'ε' *dissocarpa* STEUD. (pro sp.) in SCHIMPER (exs. 629) has sessile receptacles. In our opinion a very much wider range of specimens than is now available, is needed for a warranted subdivision of *F. thonningi*.

Ficus schimper (MIQ.) A. RICH. rests on HOCHSTETTER, SCHIMPER Pl. Abyss. II, no. 1096, collected in the Haramat mountains near Geraz. The type (BR, K, P) belongs in *F. thonningi*.

Ficus acrocarpa STEUDEL is an unpublished name on a label to SCHIMPER, Pl. Abyss. II, no. 627. *Ficus dissocarpa* HOCHST. accompanied SCHIMPER, Pl. Abyss. II, no. 629 and is also illegitimate, and so is *Ficus saligna* HOCHST. (name to no. 709).

F. rokko WARB. et SCHWF. (WARBURG 1894, p. 164) was based on SCHWEINFURTH 3038, 3236, 3511, 3518, 3592, 3640 (Niam-niam (Ubangi) and Mombutu). The authors declare this to be an 'important' species. A figure was published in 1908 (WARBURG, p. 63, tab. II). MILDBRAED and BURRET reduced this to the synonymy of *F. schimper* (MIQ.) A. RICH. and in consequence '*F. rocco*' is placed here in *F. thonningi*, as was done by HUTCHINSON previously (1916, p. 188).

F. goetzei WARB. was based on GOETZE 1442, Unyika, near village Manayema, on bank of watercourse, ca 1500 m alt. (15 Oct. 1899). This was reduced to *F. thonningi* by MILDBRAED & BURRET (1911, p. 250, 252).

CORNER noted in the THUNBERG Herbarium (C; attached to sheet 24365; 13.VIII.1958) that *F. reflexa* THUNBERG (holotype present) belongs in 'the

complex of *F. thonningi* BL.'. It is identical, CORNER said, with *F. rubra* LAM. (and both *F. aldabarensis* BAKER, and *F. sechellarum* BAKER seem 'the same'). CORNER believes that the THUNBERG specimen may originate from Mauritius.

It remains to be decided whether *F. reflexa* THUNBERG and *F. thonningi* are conspecific; if so, *F. reflexa* is the correct name for the species.

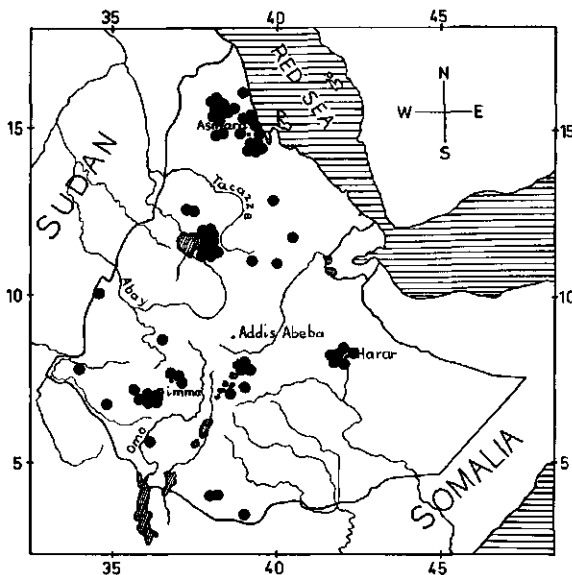
Ecological notes: *F. thonningi* is, in Ethiopia, a large tree, though rarely higher than ca 20 m, or a shrub, sometimes an epiphyte (when young). The crown is wide, spreading, sometimes low branching. It is commonly found above 1500 m alt., and sometimes may be (partly) deciduous.

FIORI (1910b) found *F. thonningi* between 1300 and 2200 m alt. in Eritrea, along streams, and mentioned Hamasen, Seraè, Bogos and Mensa.

JANSEN (6254) found it as an epiphyte on *Croton macrostachys*, in woodland where *Acacia*, *Combretum*, *Terminalia* were characteristic trees. AWEKE and GILBERT (691) noted *Cassia*, *Commiphora* and *Calpurnia*. They also noted (Wollo prov., 1 km N. of Haik, no. 608, WAG) *Capparis*, *Acacia*, *Euphorbia*, *Euclea* and *Aloe*. FRIIS c.s. (2117) met with it in *Olea*-forest with much *Dracaena*. AWEKE & DE WIT (1479) found it near the water of Lake Zwai.

F. thonningi shows no marked preference for moist localities and may occur in rocky (both granitic and limestone) areas with very little soil. It is a component of Ethiopian forests.

The figs are green (yellowish to purple) and always marked by yellow, orange, or purple spots. The varying size of the stamens suggests the possibility that male flowers can be gall-flowers (cf. fig. 19, 2-5). See also ecological notes sub *F. exasperata*.



Ficus thonningi BLUME

Uses: The bark is said to be used as rope (Ethiopia) or for making cloth (Zaire). BREITENBACH (1963, p. 131) described the process of making bark-cloth. The tree is decorticated by 'two horizontal cuts and one longitudinal, the whole cylinder of bark being removed'. The tree recovers by throwing out many slender, red adventitious roots, which unite to form a matted covering over the wound.

KERHARO & BOUQUET (1950, p. 133) noted in Haute Volta that it enters into a remedy against poisoning. WATT & BREYER-BRANDWIJK (1962, p. 780) mention the use as galactagogue in Southern and East Africa. The edible fruits are used in beer-making, they stated, and they comment on the 'pinkish' latex used in West Africa as a bird-lime. In Ethiopia sometimes this 'pinkish' tinge was also noted.

Vernacular names: Tigrina: *dekdekena*, *sibacu*, *afa-kamo*, *tschoghonte*, *dscherande*, *talqûs*; Galla: *damba*, *dembi* (also Amharic), (fide CUFODONTIS, BREITENBACH and MOONEY).

Specimens examined:

Eritrea prov.: Mt. Zeban, S. of Keren, *Aweke & Gilbert* 691 (ETH, WAG); 58 km from Asmara along Keren road, *id.* 686, 687A (ETH, WAG); *ibid.*, *id.* 688 (ETH, WAG); 3 km of Nefasit, *id.* 695A (ETH, WAG); Arghesana, *Baldrati* 2055 (FI); Keren, *id.* 2056 (FI); Abita, Keren, *Beccari* 307 (FI); Seraë: Mai Metere, presso Addi-Negri, *Bellani* 248 (FI); Bogos: Keren-Daari, *Fiori* 25, 28 (FI); Hamasen, *id.* 457 (FI); Bogos: Habi-Mantel, *id.* 27 (FI); Hamasen, Asmara, *id.* 26 (FI); Hamasen, Elaberet, *id.* 23, 24 (FI); Hazamot: Nenfêrê, *Pappi* 130 (FI); Schimenzana: Monte Matara, *id.* 3139 (FI); Schimenzana: Guna Guna, *id.* 609 (FI); a valle, Makalo, *id.* 3710 (FI, WAG); Asmara: Harar presso Ghinda, *id.* 4466 (FI); Amasen: Til-Til, *id.* 5454 (FI); Cunama: Bara, *id.* 7737 (FI); Bogos: Tzabab, *id.* 8469 (FI); Insola nole Coerula, *Quartin-Dillon & Petit s.n.* (P); near Ferrokoba, *Schimper* 709 (UPS); Anseba near Keren, *Schweinfurth* 761 (FI, K); Lower Gheleb, *id.* 1313 (K); near Acroure, *Schweinfurth & Riva* 790, 1221 (BR, FI, K, MPU, P); *ibid.*, *id.* 1765 (BR, FI, P); Saganeiti, valle Market, *id.* 2084 (BR, FI, MPU, P); Passage de Mogod, *id.* 2078 (K); Mensa Katalaben valley, *Terracciano & Pappi* 1580 (FI).

Tigre prov.: Mai-Owa near Adua, *Aweke & Gilbert* 709 (ETH, WAG); Makale, along the main road, *id.* 653 (ETH, WAG); Mt Aywe-Wodeko, near Adua, *id.* 750 (WAG); Mt. Hesti, between Gendekta and Adua, *id.* 775 (ETH, WAG); Mai-Camel, Adua, *Chiovenda* 390 (FI); prope Mai Dogale, *Schimper* 627 (isotype of *F. acrocarpa*; BM, L, MPU, P, UPS); Monte Scholoda, *id.* 220 (BM, K, L, P, UPS).

Begemdir prov.: 70 km from Gondar along Bahar-Dar road, *Aweke & Gilbert* 982 (ETH, WAG); N. of Tana, Kebra Kuddis Gabriel, *Pichi Sermolli* 1666 (FI, P); Tana, Zara-Enda-Michael, *id.* 1664 (FI); Tana, presso Gorgora, *id.* 1665 (C, FI); Tana, villaggio di Selcien, *id.* 1663 (BR, FI, K); Tana, Debra Tabor, *id.* 1668 (FI); Tana, Kuddus Gheorghis, Quonzela, *id.* 1669 (FI, WAG); Tana, presso Quonzela, *id.* 1672, 1673 (FI); Tana, di Gumbat Kuddus Michael, *id.* 1670 (FI); Tana, Isola Deck nella parte orientale di essa, *id.* 1671 (FI); Tana, Birghida Mariam, Isola presso Gorgora, *id.* 1667, 2408 (FI); Tana, Isola Daga, *id.* 1674 (FI); Tana, collina a sud del villaggio di Gorgora, *id.* 1675 (FI); monte prope Ferrokob, *Schimper* 709 (BM, P, herb. WEBB, FI).

Wollo prov.: 1 km N. of Haik, *Aweke & Gilbert* 608 (WAG).

Wellega prov.: Sajo, Dembidollo, *Benedetto* 184 (FI); 45 km before Lekemt, *Jansen* 6254 (ACD, WAG); 20 km E. of Lekemt, *De Wilde & De Wilde-Duyffes* 8792 (BR, C, K, WAG).

Shoa prov.: Guder, *Birano* 186 (FI); Bole, *Chaffey* 304 (K); near Maki, along river, *Hundessa* 68 (K); Lake Hayk, *Vatova* 2435 (FI).

Hararge prov.: 4 km S. of Harar, Dire Dawa, road junction, *Bos* 8118, 9679 (ACD, WAG);

5 km S. of the radio tower at Harar city along the Feddis road, *Bos & Getahun* 9680, 9681 (ACD, WAG); near Amaressa, *Burger* 1762 (FL, K); between Langhei and Kollubi, Harar, *id.* 2645 (FI, K, WAG); Gara Achim above (S.W.) of Harar city, *id.* 3109 (ACD, FI, K, WAG); Harar, *Gillett* 5061 (FI, K, P); fields around Harar town, *Jansen* 5245 (ACD, WAG); about 15 km from Kulubi, on road to Asbe Tafari, *Westphal & Westphal-Stevens* 1017 (ACD, WAG); 6 km past Harar along road to Jijiga, *J. J. F. E. de Wilde* 5166 (WAG).

Arussi prov.: Lake Zwai, *Aweke & De Wit* 1479 (ETH, WAG); Lake Zwai, Eth. Rift valley, *Ash* 382 (K); Lago Zwai, *Senni* 618 (FI); Con-Colaris, about 30 km S. of Shashamene, *De Wilde & De Wilde-Duyffes* 10331 (BR, K, WAG).

Illubabor prov.: 15 km E. of Yaiyo on road to Bedelle, *Friis, Aweke, Rasmussen & Vollesen* 1988 (C, ETH).

Kefa prov.: Bonga, between Catholic mission and the waterfall, *Bos* 9423 (ACD, WAG); 7–8 km Jimma-Addis road, *id.* 8585 (ACD, WAG); Bonga, waterfall, behind the Catholic mission, *Friis, Aweke, Rasmussen & Vollesen* 2117 (BR, C, ETH, K, WAG); some 30 km N. of Jimma along Cossa road, *Friis, Houde & Jacobsen* 524 (BR, C, ETH, K, WAG); road Jimma-Bonga, 15 km before Bonga, *Jansen* 5647 (ACD, WAG); path to Bonga waterfall, *id.* 5538 (ACD, WAG); Wush-Wush tea plantation area, *id.* 5402 (WAG); road Bonga-Djeka, *id.* 5387 (ACD, WAG); Bonga, around Catholic Mission, *id.* 5324 (ACD, WAG); S.W. of Kaffa, *Thomerson* 782 (K); 7 km past Agaro, on road Jimma-Agaro-Dembi, *J. J. F. E. de Wilde* 6135 (WAG); Bonga, above Catholic Mission, *id.* 5355 (WAG); 10 km E. of Jimma, *De Wilde & De Wilde-Duyffes* 7635 (BR, C, WAG).

Sidamo prov.: 2 km S.W. of Neghellie, *Burger* 1844 (K); Mega, *Corradi* 5895, 5898, 5979 (FI); Moyale (Dembi) Boran, *Gillett* 12926 (FI); Wondo, Gennet, *Houda s.n.* (UPS); W. of lower Omo, *Strecker* 153 (K); Camp d'Soddu, *Vatova* 1489, 1407 (FI); Neghelli, *id.* 150 (FI); Lago R. Margherita, Camp d'Soddu, *id.* 1328 (FI); E. of Mega, *J. J. F. E. de Wilde & Gilbert* 387 (WAG).

Ethiopia: sine loco, *Gioli* 21 (FI); sine loco, *Pappi* 2527 (FI); sine loco, *Schimper* 264 (BR, K, P); sine loco, *id.* 629 (BM, P); sine loco, *id.* 981 (BM).

Also material seen from: Central Africa, Ghana, Ivory Coast, Niger, N. Rhodesia, Rwanda, Sudan (Sennaar, *Kotschy* 337 (BM, UPS)), Tanzania, Tchad, Upper Volta, Zaire.

Ficus vallis-choudae DELILE

Fig. 20

DELILE, 1843, p. 94; FERRET & GALINIER 1847–1848, plate 6; WARBURG 1894, p. 154; DE WILDEMAN & DURAND 1901, p. 216; WARBURG & DE WILDEMAN 1904, p. 26, pl. 23; MILDBRAED & BURRET 1911, p. 194; HUTCHINSON 1916, p. 103; CHEVALIER 1920, p. 594; LEBRUN 1934b, p. 32; AUBRÉVILLE 1936, p. 54; LEBRUN & BOUTIQUE 1948, p. 119; KERHARO & BOUQUET 1950, p. 134; AUBRÉVILLE 1950, p. 344, pl. 69 (1); EGGELING (& DALE) 1951, p. 261, fig. 57d; ANDREWS 1952, p. 265; CUFODONTIS 1953, p. 16; KEAY 1958, p. 606; DALE & GREENWAY 1961, p. 323, fig. 61; CUFODONTIS 1962, p. 302; BREITENBACH 1963, p. 131.

Ficus schweinfurthii MIQUEL (1867, p. 295); SCHWEINFURTH & ASCHERSON 1867, p. 290; SCHWEINFURTH 1868, p. 686; CUFODONTIS 1953, p. 16; BREITENBACH 1963, p. 131.

Sycomorus schimperiana MIQUEL (1848, p. 112); *id.* 1849, p. 122, tab. IIA; WARBURG 1894, p. 154; CUFODONTIS 1953, p. 16; BREITENBACH 1963, p. 131.

A shrub or large tree, up to 25 m tall, trunk up to 30 cm dbh. Bark grey. Latex milky white. Slash crimson exuding copious latex. Branches light brown when

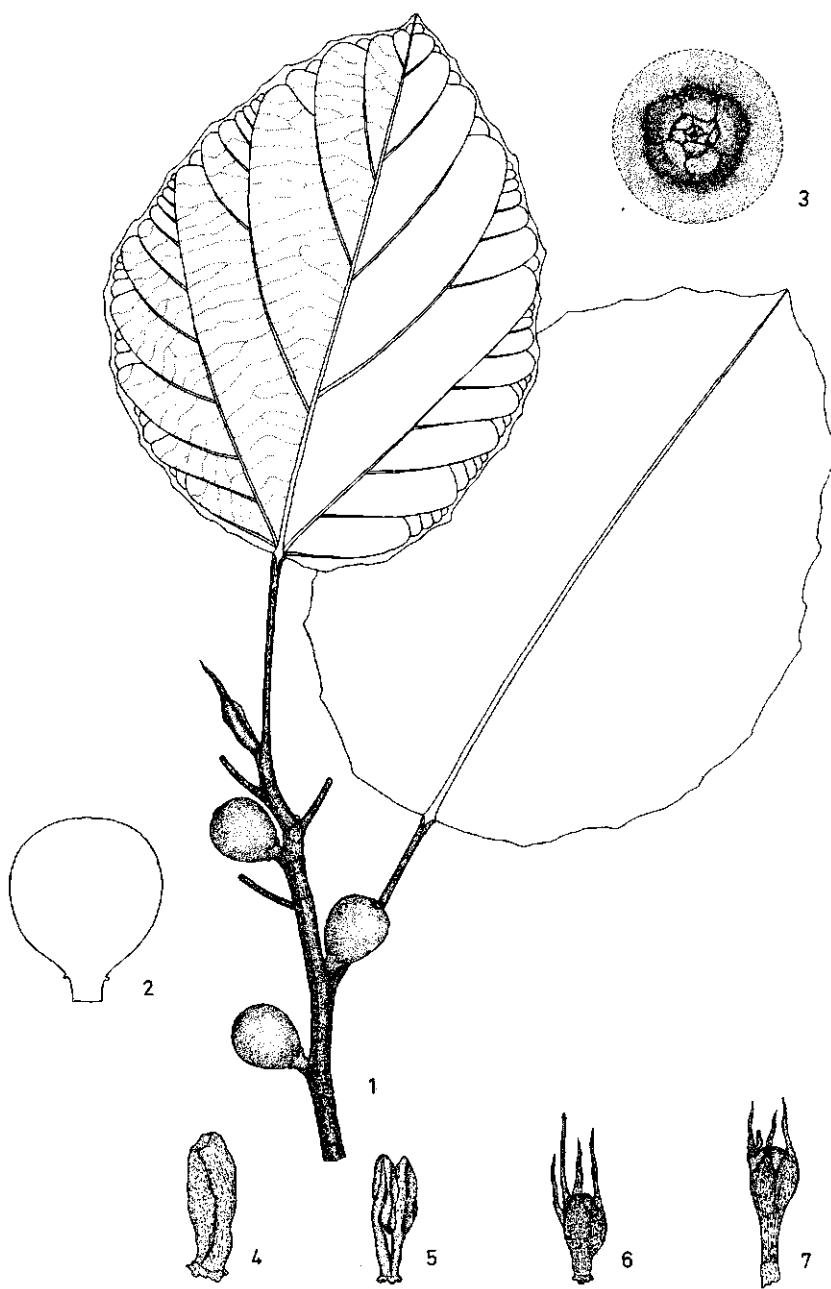


FIG. 20. *Ficus vallis-choudae* DEL. – 1: Branch ($\times \frac{1}{2}$); 2: Outline fig ($\times \frac{1}{2}$); 3: Ostiole ($\times 2$); 4: Male flower ($\times 5$); 5: Stamens ($\times 5$); 6: Female flower ($\times 5$); 7: Gall-flower ($\times 5$). (1, 4–7: BOS 8500; 2: FRIIS, HOUNDE & JACOBSEN 568; 3: FRIIS, AWEKE, RASMUSSEN & VOLLESEN 1928).

dry, glabrous; periderm peeling with thin, brownish rectangular scales and under the scales finely lengthwise rugose and dull greyish, finely minutely puberulous. When very young velvety, soon glabrous, the younger twigs hollow. Terminal bud enclosed by a grey green stipule, which narrows gradually from the base into a sharp tip, minutely and finely velvety outside, \pm 2 cm long, glabrous and glossy inside.

Leaves more or less distichous. Petiole 1–13 cm long, ribbed, minutely puberulous. Blade broadly ovate to almost orbicular, 17–21(–30) cm long and 15–18(–24) cm wide. Base cordate to rounded, to cuneate, apex obtuse to shortly acuminate or acute, margin repanding to repanded-dentate, above dull when dry, glabrous and smooth on both surfaces. Nerves plane above, prominent below, only slightly puberulous on lower surface, palmately 3-nerved, followed by 4–6 pairs of side nerves; basal side-nerves with a regularly spaced row of secondary side nerves towards the leaf edge and close to the margin anastomosing. Veinlets aerolate. Intercostals present. Basal glands in the axils of the main nerves may be present.

Figs borne on the branches in the axils of or below the terminal leaves, solitary, rising from the nodes. Peduncle thick and short, up to 5 mm long, verruculose and minutely scaled. Bracts 3, at the base of the fig, wider than long, repanding or wavy, upper part caducous, the fused bases persistent. Receptacle (sub)globose, 2–3 cm in diam. densely white or grey puberulous to velutinous; ostiole with a swollen outer margin consisting of ca triangular glabrescent teeth and closed at first by brown, blunt, concave, smooth, in the upper part glabrous scales.

Male flowers sessile, very numerous near the ostiole with a thin membranous perianth, enclosing when young the 2 stamens. Anthers dorsifixed, apiculate, narrow, in bud longer than the filaments. A reduced ovary is usually present.

Female flowers short and long pedicelled, pedicel up to 5 mm long, with a brown, multi-partite perianth (the tips of the lobes long and almost acicular). Styles low and laterally attached, brown, short, often not exerted above the young fruit. Stigma slightly swollen. Fruit glossy, light brown, smooth, glabrous-ovoid or globular.

Gall-flowers pedicelled, the short style ending in a clavate stigma, almost entirely enclosed by the long-attenuate perianth lobes.

Taxonomical notes: DELILE (1843) based *F. vallis-choudae* on a single specimen (GALINIER), conserved at Montpellier.

MIQUEL (1848) published *Sycomorus schimperiana* and added as a synonym *F. vallis-choudae* DELILE, citing the holotype (GALINIER). This makes *Sycomorus schimperiana* contrary to the Code. MIQUEL also referred to 'SCHIMPER in Hb. HOOK. no. deperd. n. 1280'. Apparently it was impossible to establish SCHIMPER's herb. no. with certainty.

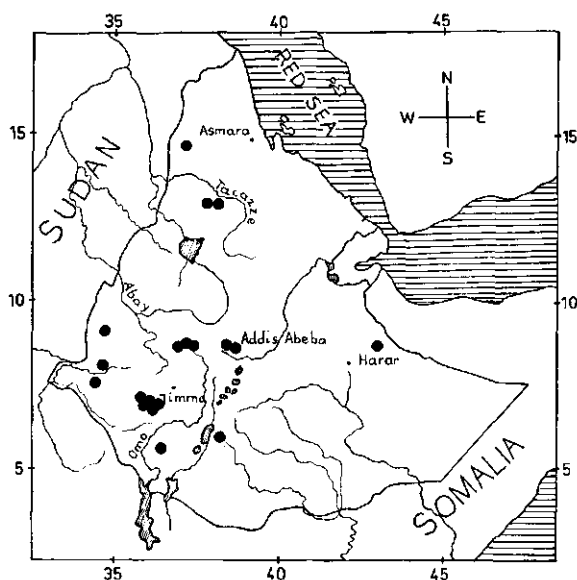
MIQUEL cited '*F. schimperiana* HOCHST. mss' as a synonym to *F. ingens* MIQ., a misprint for *F. schimperi* (in Ann. Mus. Bot. Lugd.-Bat. III, 1867, cf. Index ibid. p. 307).

MIQUEL published the name *Ficus schweinfurthii* in 1867, referring to Pl. SCHWEINF. n. 547; he described *Ficus* (*Sycomorus*) *schweinfurthii* in 1868. MILDBRAED & BURRET referred '*F. schweinfurthii*' to *F. vallis-choudae* (1911, p. 194/5), HUTCHINSON followed this reduction (1916, p. 103).

Ecological notes: *F. vallis-choudae* was found as a large tree in the Choudae river valley by GALINIER who first collected it, and noted that the fruits were edible. The tree (or shrub) occurs from 700 to over 1800 m alt. (JANSEN 6275). It may grow near water-courses in gallery-forest (near Bonga, W. J. J. O. DE WILDE c.s. 10197); along the upper Mugher river (a 25 m tall tree) in riverine humid scrub (FRIIS c.s. 1150), or on igneous rocks (mainly lava), where GILLET (14873) saw it at the eastern foot of Amara mountain, on fire-swept tree grassland. FRIIS c.s. (568) also observed it on rocks at the river bank. JANSEN (6275) found it associated with *Acacia*, *Combretum*, *Stereospermum* near Lekemt. Near Gondar (Adi-Arkai) AWEKE & GILBERT (943) collected it at 1900 m alt. in 'deciduous woodland' as a 10 m tall deciduous tree.

The ripe figs may be a 'fine red' and are eaten by birds (Zaire). MICHELSON (638) stresses that in Zaire the species is always in wet stations, where it is 'activement exploité pour son bois'. MAYENS (14) noted in Zaire (Ituri forest) that the wood is very difficult to work, and though light, it was not attacked by 'worms'.

In the Parc National Albert in Zaire, the figs are 5–6 cm in diam., yellow orange with green streaks when ripe (LEBRUN 7929). In Ethiopia few reports are available about the ripe figs, which are found in December (FRIIS c.s. 568, 1928) and the figs were described as dirty purplish-brownish green (DE WILDE's 10197).



Ficus vallis-choudae DEL.

Use: No uses are reported in Ethiopia. KERHARO & BOUQUET (1950, p. 134) noted the decoct of the leaves being applied against jaundice, dizziness and the like in W. Africa.

Vernacular names: Amharic: *bambulede*, *bambuledeh*, *bambelada* (fide CUFODONTIS, BREITENBACH and AWEKE).

Specimens examined:

Eritrea prov.: Tezellenti: ta Ceu Berr, *Chiovenda* 761 (FI); Tezellenti: a Mai-Vasalit, *id.* 703 (FI); Sabra, *Figuri Mag s.n.* (FI); ?Mogala (marro), *Ruspoli & Riva* 688 (FI); Sabra, *Schimper* 534 (FI); *ibid.*, *id.* 312 (BR, P).

Begemdir prov.: Mai-Teklit, Adi-Arkai, *Aweke & Gilbert* 960 (ETH, WAG); 4 km E. of Adi-Arkai, *id.* 943 (ETH, WAG); flumen Beleghez in valle Choudae (Semen), *Galinier* 161 (holotype of *F. vallis-choudae*; MPU); Callabat, *Schweinfurth* 547 (isotype of *F. schweinfurthii*; BM, P, U).

Wellega prov.: 25 km before Lekemt, *Jansen* 6275 (ACD, WAG).

Shoa prov.: 50 km from Addis Ababa (Bole valley), *Aweke* 426 (ETH, WAG); in the upper part of Mughher rougher river system, *Friis, Gilbert, Rasmussen & Vollesen* 1150 (C, ETH); Addis Ababa, *Senni* 34 (FI).

Illubabor prov.: at Baro river, near bridge on the Gore-Gambella track, 33 km W. of Bure, *Friis, Aweke, Rasmussen & Vollesen* 1928 (C, ETH, WAG); N. of Noppa, village at bridge across Gabba river, *Friis, Hounde & Jacobsen* 568 (BR, C, ETH, WAG); 1 km of Tippi, *Meyer* 8032 (K).

Kefa prov.: 395 KP Jimma-Bonga road, *Bos* 8500 (ACD, WAG); along Godjeb river, road Jimma-Bonga, *Jansen* 5762 (WAG); near bridge crossing Godjeb river, Bonga road, *De Wilde & De Wilde-Duyffes* 10197 (BR).

Sidamo prov.: Ghidami, *Benedetto* 639 (FI); Kelli, S. of Ethiopia (Amara mt.), *Gillett* 14873 (K); Lake of R. Margherita, *Vatova* 1576 (FI).

Ethiopia: sine loco, *Quartin-Dillon & Petit* 18 (BR); sine loco, *Schimper* 319 (K).

Other specimens examined from: Burundi, Cameroon, Central Africa, Ivory Coast, Kenya, Mozambique, Rwanda, Sudan, Tanzania, Tchad and Zaire.

Ficus vasta FORSKÅL

Fig. 21

FORSKÅL 1775, p. 179 and CXXIV n. 621; MIQUEL 1867, p. 288; SCHWEINFURTH 1893, p. 65; *id.* 1896, p. 129; ALMAGIA 1903, p. 116; FIORI 1910a, p. 165; *id.* 1910b, p. 372; MILDBRAED & BURRET 1911, p. 216; HUTCHINSON 1917, p. 194; BLATTER 1923, p. 446; EGGELING (& DALE) 1951, p. 262; ANDREWS 1952, p. 271; CUFODONTIS 1953, p. 16; DALE & GREENWAY 1961, p. 323; BREITENBACH 1963, p. 132; MOONEY 1963, p. 56.

Ficus vasta var. *velutina* FIORI (1910a, p. 166); *id.* 1910b, p. 373.

Ficus vasta var. *glabrescens* HUTCHINSON (1917, p. 195); CHIOVENDA 1932b, p. 451; CUFODONTIS 1953, p. 16.

Ficus dahro DELILE (1843, p. 94); FERRET & GALINIER 1847-48, p. 159, tab. XV; MIQUEL 1867, p. 288; MARTELLI 1886, p. 77; ENGLER 1892, p. 191; SCHWEINFURTH 1896, p. 129; FIORI 1910a, p. 165; *id.* 1910b, p. 372; MILDBRAED & BURRET 1911, p. 216; CUFODONTIS 1953, p. 10; BREITENBACH 1963, p. 122; MOONEY 1963, p. 55.

Ficus socotrana BALFOUR F. (1883, p. 96); BALFOUR 1888, p. 281; SCHWEINFURTH 1896, p. 129; FIORI 1910a, p. 165; HUTCHINSON 1917, p. 195.

Ficus callabatensis WARBURG (1905, p. 210); FIORI 1910a, p. 165.

Ficus rivae WARBURG (1905, p. 211).

Ficus hararensis WARBURG (1905, p. 212); HUTCHINSON 1917, p. 195.

Ficus indica FORSKÅL (1775, p. 179, haud LINN.).

Ficus benghalensis A. RICHARD (1850, p. 265, haud LINN.).

Urostigma socotrana BALFOUR F. (1883, p. 96); nom. alt.

A tree, 10–45 m tall, crown dome-shaped, ca 22 m in diam., trunk irregularly canaliculate, not cauliflorous; dbh 1–1½ m, epiphytic when young. Bark (pale) grey, fairly smooth. Latex copious, sticky, milky. Branches (leaf-bearing part) brownish, hirsute, the older parts deeply and irregularly lengthwise rugose. Terminal budding leaf up to 4½ cm long, when dry bright brown, papery stipules, hirsute-tomentellous outside, glabrous inside, long-tapering and fully amplexicaulous. Petiole 2–8 cm long, ribbed in the lower part, hirtellous or velutinous, carrying a large patch of glandular tissue on the lower surface.

Leaves in spirals. Blade (sub)orbicular to elliptic or broadly ovate, subcoriaceous, 10–25 cm long and 10–22 cm wide, broadly rounded or with a small acumen, base shallowly cordate. Leaf rarely glabrous but usually upper surface smooth and when mature glabrescent, lower surface puberulous to hirtellous on the nerves or velutinous, hairy all over, pallid green. Veins conspicuously light-coloured; lateral veins 6(–8) on either side, at the base of the midrib two or three opposite pairs, one strong, one (or two) more slender.

Figs solitary or irregularly grouped on the branches, thinly hairy to glabrescent or densely velutinous-tomentose, sessile to short-pedunculate (peduncle up to 5 mm), pale green with pale yellow dots, often warty. Bracts at the base of the receptacle large, connate, 2 or 3, densely hirtellous outside, circumscissile (leaving a hairy rim after the caducous upper part is shed). Receptacle (sub-)globose, (½–)1–(2) cm in diam., tomentose to lanate. Ostiole finally protruding, 2-lipped, glabrous, finally gaping and vertical inner bracts then visible.

Male flowers with two basal opposite, narrow, long-pointed bracts, ± equalling the male flowers, on a short thick pedicel, with a solitary stamen enclosed by an ovate, acute, membranous perianth. Stamen with a short thick filament and a longer elliptic-ovate anther; connective apiculate.

Female flowers sessile, the perianth-lobes long-pointed, longer than the ovary, style slender, long and stigma oblique-clavate. Achene light brown, smooth.

Gall-flowers short-pedicelled, short-styled. Perianth bifid.

Taxonomical notes: FORSKÅL's type-specimen consists of one leaf (776) at C. In the protologue FORSKÅL stated 'In Yemen ubique', and the Arabic name was 'Talak'.

MIQUEL reduced *F. vasta* to *F. populifolia* (l.c.); his reasons are unknown, and his decision is wrong. SCHWEINFURTH recorded the vernacular name 'daro', and noted on the label accompanying the type: syn. *F. dahro* DEL., while HUTCHINSON added 'vix'.

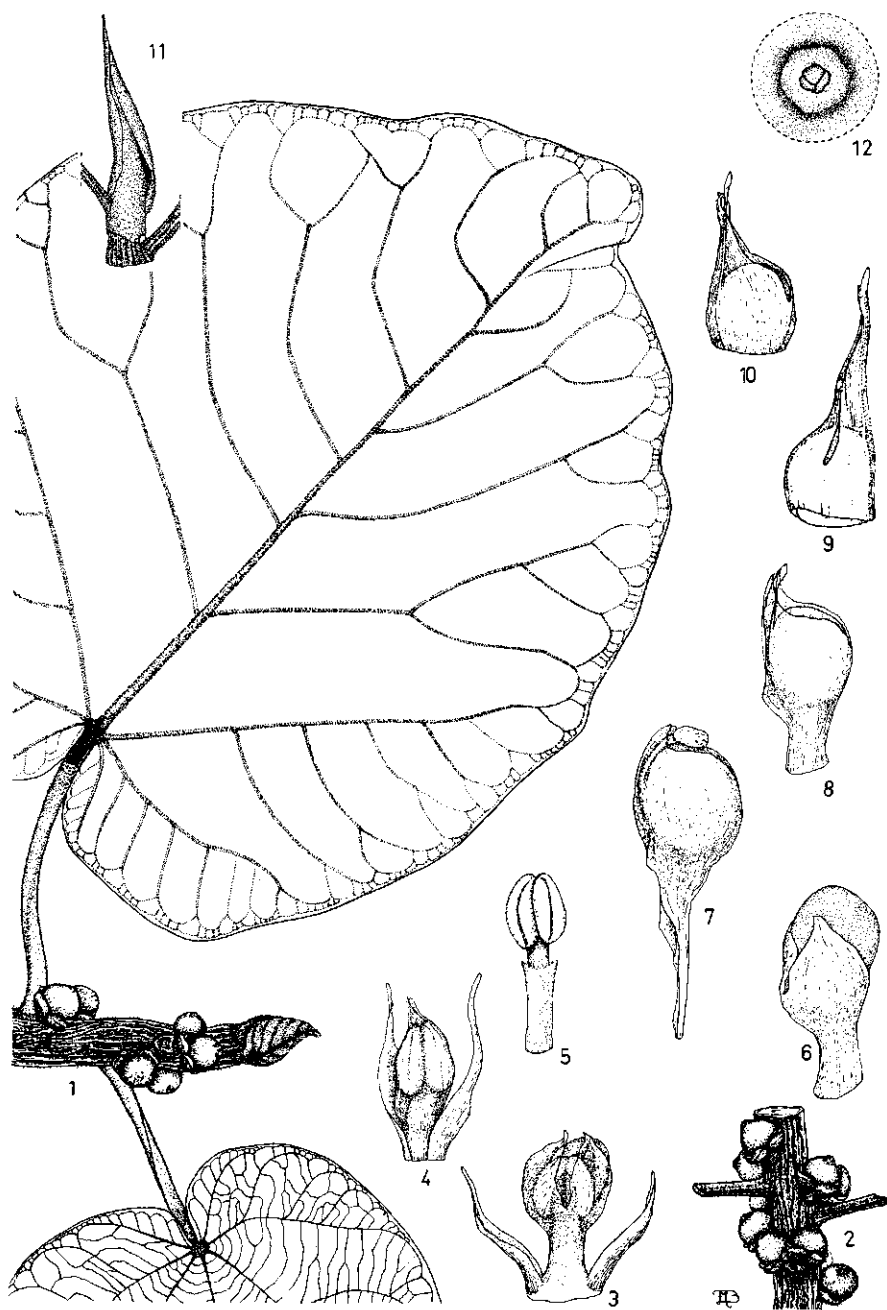


FIG. 21. *Ficus vasta* FORSK. – 1–2: Branch ($\times \frac{1}{2}$); 3–4: Male flower ($\times 10$); 5: Stamen ($\times 10$); 6–8: Gall-flower ($\times 10$); 9–10: Female flower ($\times 10$); 11: Stipules ($\times \frac{1}{2}$); 12: Ostiole ($\times 2$). (1, 2, 12: J. J. F. E. DE WILDE & GILBERT 395; 3–10: JANSSEN 5246; 11: JANSSEN 5474).

MILDBRAED & BURRET accepted *F. vasta* as the earliest name for *F. dahro* DEL., *F. socotrana* BALF. F., *F. callabatensis* WARB., *F. riva* WARB., and *F. hararensis* WARB.

HUTCHINSON agreed with MILDBRAED & BURRET but considered *F. dahro* DEL. as a separate species and so did CUFODONTIS and BREITENBACH.

SCHIMPER 1934 e.g., named on the label '*Ficus indica* L. ROXB., *F. benghalensis* L. et WILLD.' (Hook. J. Bot. III (1841), tab. XIII et XIV) was cited by HUTCHINSON as *F. dahro*. Duplicates conserved at BR, L, P, show a full identity with '*Ficus dahro*' DELILE, of which the type (196) is conserved at MPU. There is, however, no character distinguishing this from *F. vasta* and therefore in this revision the opinion of MILDBRAED & BURRET is accepted.

Varieties in *F. vasta* were distinguished by FIORI (1910): var. *velutina* (distinguished by pubescent-tomentose leaves), and var. *typica* (with glabrous leaves, pale beneath). HUTCHINSON (1917) published var. *glabrescens* (mature leaves glabrous below or nearly so).

F. hararensis WARB. is based on ROBECCHI BRICCHETTI 156 and 162 (FI); these specimens belong in *F. vasta*.

Ecological notes: MOONEY (5757) found *F. vasta* in Shoa prov. on black soil, open land, embracing an equally large *Acacia* tree on which it was originally epiphytic; alt. \pm 2000 m, rainfall 75–90 cm. In Sidamo prov., at 1900 m alt., on a bare hillside (remnant of originally woody area?) DE WILDE & GILBERT (395) collected it. FRIIS c.s. (1396) observed at Jimma white spotted fruits. A relict tree, in degraded forest with coffee and grazing, at 1800 m alt., near Jimma (Bos 8603).

Near Bonga (path to waterfall) in secondary rainforest, JANSEN (5542) noted a light brown stem, red stipules, red brown, densely white hairy petioles, and light green leaves with yellowish veins; light green figs with yellow spots.

AWEKE & GILBERT (632) collected *F. vasta* in Tigre prov., 15 km N.E. of Makale at \pm 2100 m alt., a medium-sized tree (slash pale brown) associated with *Carissa* and *Acacia*, in Chire (Mai-Emunt) they noted (alt. 1900 m) a pink slash with copious white latex, which was used by children for chewing-gum (also approved by the collectors).

DE WILDE & DE WILDE-DUYFJES (6492) collected *F. vasta* in gallery forest along Guder river, at 2000 m alt., a 8 m tall tree; petioles pale-brown, leaves dark green above, pale green beneath, nerves much paler; figs glaucous green, paler spotted, grey hairy. BURGER (854), 40 km E.S.E. of Harar, noted it among boulders near crest of hill, at ca 1600 m alt., among large granite boulders in open wood-land, in gravelly granitic soil.

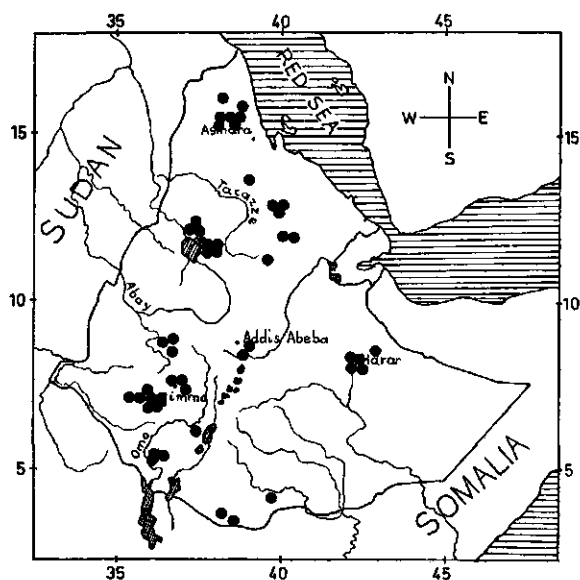
AWEKE & GILBERT (611) collected it in Wollo prov. (Woldeya) as a secondary scrub, a shade tree in coffee plantation. SEEGLER (2603) confirmed this. AWEKE further noted it as a tree \pm 25 m high, associated with *Cordia abyssinica* and *Adathoda schimperi*.

GALINIER noted (196, holotype *F. dahro*, MPU): the most magnificent tree of Ethiopia. It is found at 6000 ft on the plateau. The travelers confound it

with the Sycamore. GALINIER's tree had figs and leaves on nov. 20.

Uses: JANSEN noted near Harar that the smoke of the leaves was reputed to be a remedy against paralysis.

Vernacular names: Amharic, Galla, Shuola: *worka, warka* (fide MOONEY); Tigrina: *dahro* (fide MOONEY); Galla, Kottu: *dembi, kilti* (fide MOONEY); Arabic: *delb, talak* (fide DELILE); Kaffa: *melo* (fide JANSEN); Somali: *berdeh* (fide CUFODONTIS, BREITENBACH).



Ficus vasta FORSK.

Specimens examined:

Eritrea prov.: 3 km S. of Nefasit, *Aweke & Gilbert 695* (ETH, WAG); Baccolto: Fil-fil, *Baldrati 3422* (FI); Abba metai, *id. 2060* (FI); Ghinda, *id. 255* (FI); Abita, Keren, *Beccari 282* (FI); Seraè: Adi Negri, *Bellini 281* (FI); Annura presso Godafey, *Chiovenda 236* (FI); Hamasen: Ghinda, *Fiori 36, 37* (FI); Hamasen: Elaberet, *id. 35* (FI); Lalamba, *Pappi 25796* (FI); Ocule-Cusai: Daghira presso Saganeiti, *id. 5250* (FI); Hamasen: zazega lungo il torrente Anseba, *id. 5041* (FI); Assaorta: Agametta, *id. 3144* (FI); Acran: Mai-Dahro, *id. 3044* (FI); Schimazano: Guna-guna, *id. 611* (FI); Bogos: Lalamba, *Terracciano & Pappi 2563* (FI); Mensa valle Catalaben, *id. 1586* (FI); Asmara, *id. 2294, 156* (FI); Saganeiti valle di Degerra, *Schweinfurth & Riva 1240* (BR, FI, K, MPU, P); *ibid.*, *id. 1320* (BR, K); Ghinda, Baressa, *id. 129* (K); Ghinda, Baressa-Thal, *Schweinfurth 259* (FI, K); auf dem Lalambia, Keren, *id. 1806* (P).

Tigre prov.: Chire (Mai-Emunt), *Aweke & Gilbert 851* (ETH, WAG); 15 km N.E. of Makale, *id. 632* (ETH, WAG); Mt. Hesti, between Gendekta & Adua, *id. 779* (ETH, WAG); 23 km W. of Indeselassie, along Gondar road, *id. 854* (ETH, WAG); 23 km W. of Makale, *id. 637* (ETH, WAG); Chire, *Quartin-Dillon & Petit 69* (P); prope Adoam, 30 Dec. 1837, *Schimper 249* (L); around Adua, *id. 1934* (BM, BR, FI, K, MPU, P); Auchan (Outhan), *id. 1140* (P); 49 km from Quiha along road to Asmara, *Seegeler 2156* (ACD, WAG).

Begemdir prov.: Did Quanzela ad Ambra Jesus, *Pichi Sermolli 1727* (FI, W); Pianura ad ovest di Zeghie, *id. 1728* (FI); Nel Mucate di Zeghie, *id. 1729* (FI); Tana, penisola dove e la

chiesa di Kudus Ghiorgis, *id.* 1707 (FI); Tana, pianura di Quami presso Gorgora, *id.* 1708 (FI); Tana, regione di Moreta (Ifag), *id.* 1709 (FI, K); Tana (Isola Deck), *id.* 1710, 1714 (FI); Tana, pianura tra monta Cicia e monte Vuoghelsa (Zeghie), *id.* 1713 (FI); Tana, Birghida Mariam (Isola presso Gorgora), *id.* 1704 (FI); Boscaglia ad ovest del villaggio di Selcien, *id.* 1715 (FI).

Wollo prov.: 43 km along road to Woldeya, *Aweke & Gilbert* 611 (ETH, WAG).

Gojam prov.: Nillo Azzuro, *Pichi Sermolli* 1706 (FI, W); Piana Sud Bahr-Dar, *id.* 1711 (FI, BR); *ibid.*, *id.* 1712 (FI); Tana, *id.* 1705 (P); Rive del lago ad ovest di Bahr-Dar, *id.* 2377 (FI, K).

Wellega prov.: 45 km before Lekemt, *Jansen* 6259 (ACD, WAG); Gai Iargeda, *Milchersich* 128 (FI).

Shoa prov.: 1 km North of Karakore, *Aweke & Gilbert* 609 (ETH, WAG); Meta, Gefersa, *Cufodontis* 349 (FI); Guder, hill at side of waterfall (about 5 km from Ambo), *Jansen, De Wit & Aweke* 4601, 4686 (ACD, WAG); 17 km S. of Addis Ababa, *Meyer* 7447 (K); near Bishoftu (Debre Zeit), *Mooney* 5757 (K); ?Waldia (Woliso probably), *Smeds* 24 (FI); Isola Epiola (Lago Schala), *Vatova* 2270 (FI); 5 km W. of Ambo, *De Wilde & De Wilde-Duyfjes* 6492 (BR, WAG).

Hararge prov.: Alemaya, campus Agric. College, *Bos* 7550 (ACD, WAG); Rock valley, 40 km E.S.E. of Harar road to Djidjiga, *Burger* 854 (K); near Harar town, *Jansen* 5246 (ACD, WAG); 5 km on road to Feddis, *Jansen & De Wit* 7276 (ACD, WAG); Harar, *Robecchi Bricchetti* 156 and 162 (FI; syntype of *U. hararensis*).

Gamu Gofa prov.: Omo, Borodda, *Corradi* 5926 (FI); Omo-Mega, *id.* 5906, 5908 (FI); Omo, *id.* 5882 (FI).

Illubabor prov.: Illubabor, *Chaffey* 270 (K); *ibid.*, *Thomerson* 746 (K).

Kefa prov.: 7 km out of Jimma, Addis road, *Bos* 8603 (ACD, WAG); Bonga, forest and waterfall behind Catholic Mission, *Friis, Aweke, Rasmussen & Vollesen* 2146 (BR); Bonga, Catholic mission, *id.* 2263 (BR, C, ETH, WAG); Jimma Agricultural School compound, *id.* 1396 (BR, WAG); path to Bonga waterfall, *Jansen* 5542 (WAG); Wush-Wush tea plantation area, *id.* 5474 (ACD, WAG); 35 km from Agaro on road to Bedelle, *Seeger* 2601 (ACD, WAG); 3 km from Agaro along road to Jimma, *id.* 2603 (ACD, WAG).

Sidamo prov.: Ghidami, *Benedetto* 642 (FI); Ruscello di El Dire, *Corradi* 5881 (FI); Moyale, *Gillett* 12838 (BR); Lago Margherita, camp di Soddu, *Vatova* 1413 (FI); 2 km from Mega, road to Old Brit. Cons., *J. J. F. E. de Wilde & Gilbert* 395 (ACD, WAG).

Ethiopia: Abyssinia, *Galinier* 196 (MPU; holotype of *F. dahro*); *ibid.*, *Quartin-Dillon* 120 (P).

Other specimens examined: Socotra, *Balf. f.* 283: isotype of *F. socotrana* (K); Kenya, Somalia and Tanzania.

Ficus vogelii (MIQUEL) MIQUEL

Fig. 22

MIQUEL 1867, p. 288; MILDBRAED & BURRET 1911, p. 237; HUTCHINSON 1916, p. 179; CHEVALIER 1920, p. 600; KEAY 1958, p. 609.

Urostigma vogelii MIQUEL 1847, p. 553; *id.* 1849, p. 138 et in HOOKER, Niger Flora, p. 520.

A ca 20 m tall tree, dbh 2 m. Slash light pink. Latex copious, white, milky. Branches red brown, carrying twin, partly hairy, stipular scales, twigs green, bark very uneven, lengthwise wrinkled.

Leaves in spirals. Stipules free, partly intra-, partly extrapetiolar, caducous, long pointed, outside central zone shaggy-hairy, ca 2½ cm long. Petiole 4½–5½ cm long, when young densely soft hairy-scaly, later glabrescent to glabrous, smooth, above flattened or grooved, apex with glandular tissue. Blade elliptic to (broadly elliptic-)obovate, 11–15 cm long, 6–7 cm wide, subcoriaceous, very light green, when dry (dark) rufous-brown, lower surface light cinnamon,

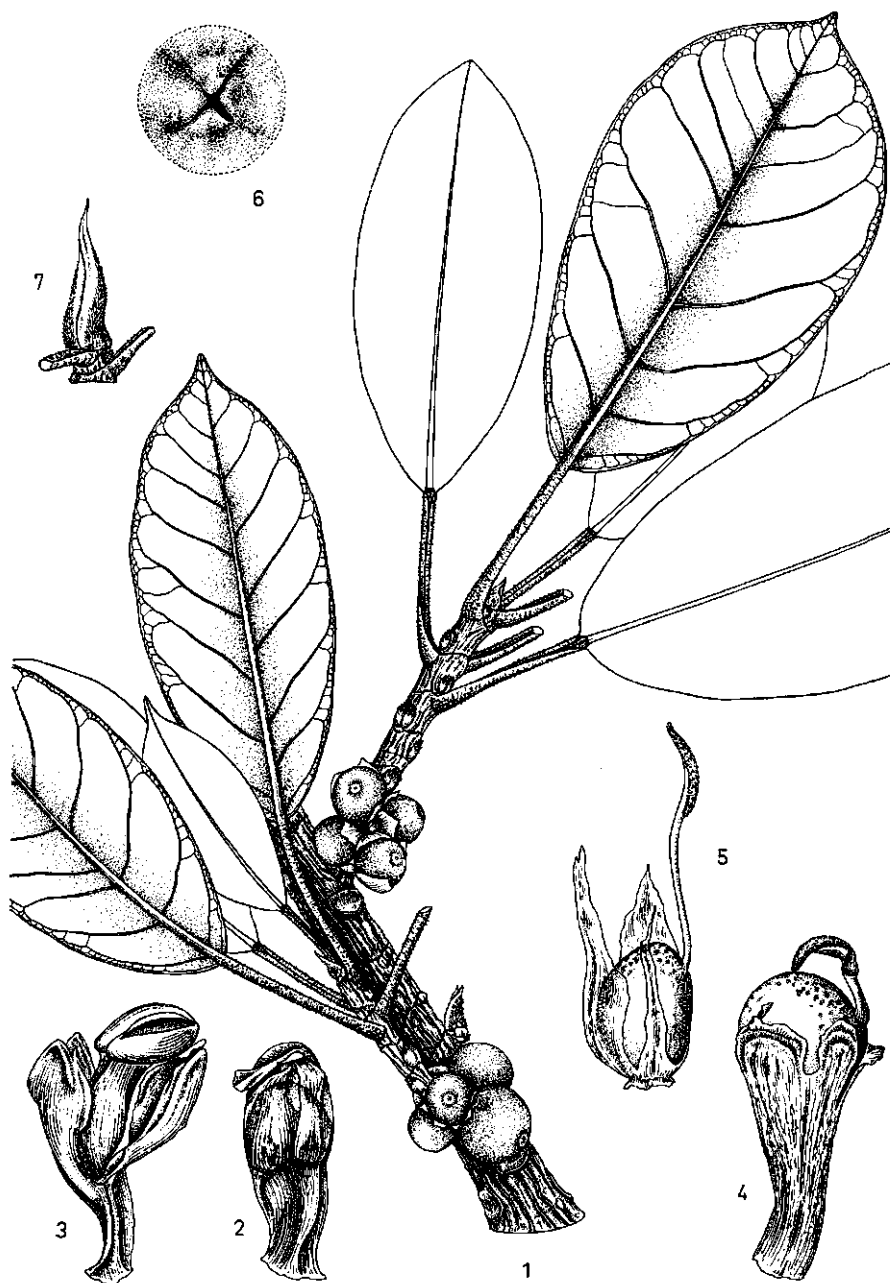


FIG. 22. *Ficus vogelii* (Miq.) Miq. – 1: Branch ($\times \frac{1}{2}$); 2: Male flower, closed ($\times 15$); 3: Male flower, open ($\times 15$); 4: Gall-flower ($\times 15$); 5: Female flower ($\times 15$); 6: Ostiole ($\times 5$); 7: Stipules ($\times \frac{1}{2}$). (1–7: Mr. & Mrs. JANSEN 5763).

delicately but distinctly reticulate, dull, smooth and glabrous on both surfaces, apex broad, gradually but distinctly acuminate, at the base cuneate to narrowly rounded, with little or no glandular tissue in the petiolar region, margin entire, with an evident marginal nerve. Veins almost plane above, distinctly prominent below. Lateral veins on the lower surface 6-8 at either side of the stout, prominent midrib, anastomosing near the leaf-edge. Intercostals slender but distinct.

Figs clustered or solitary, also paired, at or near the base of the lateral outer twigs, (sub)sessile. Bracts large, glabrous, triangular, 3-4, persistent. Receptacle (depressed-)globose, $1\frac{1}{2}$ cm in diam., glabrous, not quite smooth, yellow (? at maturity). Ostiole not prominent, ca 3 mm wide. Orifice without visible bracts, 4-lipped.

Male flowers found scattered over the inner wall of the receptacle, (not concentrated near the ostiole), pedicellate, with a solitary stamen. Filament thick, glabrous, slightly longer than the anther. Perianth-lobes 3-4, spatulate, wrinkly, shorter than the stamen.

Female flowers broadly pedicellate, perianth lobes 3-4, broadly rounded, widely varying in size, shorter than the ovary. Ovary with a lateral style, shorter than the ovary. Stigma lateral-apical, as long as the style.

Gall-flowers sessile, perianth-lobes longer than the ovary, widely varying in width, long pointed. Ovary with an apical-lateral slender style, longer than the ovary. Stigma lateral, almost one third as long as the style.

Taxonomical notes: MIQUEL (1847) described *Urostigma vogelii* as a new species, citing VOGEL no 6 (terra Guineensi, in ripa ad Bassa, m. Julii 1841) and VOGEL no 47 (ad C. Palmas). He referred in the protologue to HOOKER's Niger Flora ('unpublished') and London Journ. Bot. VII, tab. XIV A. This picture represents, according to the legend, *F. vogeliana*, showing leaves. These are, clearly, different from *U. vogelii* MIQ. as described (and from the type materials). MIQUEL redescribed *U. vogelii* in the eventually published Niger Flora (1849). In the protologue the ostiole had been stated to be 'ore angusto fere rimaeformi'. This is omitted in the (otherwise also) changed description of 1849 (Niger Flora), though based on the same specimen(s), the ostiole now not being described at all. HUTCHINSON (1916) described the ostiole as '2-lipped' (in accordance with MIQUEL's protologue), which is incorrect (certainly for the Ethiopian specimen; see the present description and fig. 22). He also mentioned 'basal bracts 2' which is not found in the Ethiopian specimen, where 3 bracts appear to be present (and this agrees with MIQUEL's protologue).

In 1867 MIQUEL reduced *Urostigma* to a subgenus in *Ficus* and published the new combination *Ficus vogelii* (MIQ.) MIQ.

F. vogelii was never recorded for, or supposed to occur in Ethiopia. However, Dr. C. C. BERG (Bot. Lab., Utrecht) kindly drew attention to a specimen collected by Mr. & Mrs. JANSEN (5763). This so far is the only record for Ethiopia which proves that *F. vogelii* has a similar area of distribution as *F. dicranostyla*, *F. exasperata*, *F. glumosa*, ?*F. gnaphalocarpa*, *F. lutea*, *F. mallotocarpa*, *F. ovata*,

F. platyphylla, *F. populifolia*, *F. salicifolia*, *F. sur*, *F. thonningi*, *F. vallis-choudae*.

Ecological notes: JANSEN 5763 was collected along Godjeb River, near Godjeb Farm of the Catholic Mission, road Jimma-Bonga, at an altitude of 1300 m. The leaves were noted to be 'leathery green – very light green, yellow veins at both sides, fruits yellow with yellow protuberances'. Fruits in FAA and a wood-sample are both at Addis and at WAG.

Use: In West Africa *F. vogelii* was planted and tapped for 'red caoutchouc' (CHEVALIER, 1920).

SOME NOTES ON FIGS AND FIG-WASPS IN ETHIOPIA

The symbiosis of fig-wasps and figs is commonly known. There is evidence that a measure of correlation exists between *Ficus*-species and pollinator-species. As a matter of course, when wasps were found to be present in the interior of the receptacles, specimens were conserved in order to have them identified. Prof. dr. J. T. WIEBES, Rijksuniversiteit, Leiden, was willing to cooperate and it was found in some instances possible to identify even fragments of wasps. In addition, Prof. WIEBES discussed the findings and made available a msc. titled 'A short history of fig wasp research', which will be published in the future.

The present chapter contains data taken from this msc., data found in the published literature, and data found on examining the fig specimens from Ethiopia.

After many centuries of customarily having fruiting figs pollinated by wasps produced in wild figs (caprification), LINNAEUS became acquainted with fig insects occurring in *F. carica* and *F. sycomorus*. FORSKÅL (1775) recognized the two sexes in *Sycophaga sycomori*: this is one of the many species parasitic upon the symbiosis of figs and true fig-wasps i.e., Agaonid pollinators.

In 1882 when MAYR summarized the state of knowledge ('Zur Naturgeschichte des Feigeninsecten') 18 species of fig-wasps were known (under 24 names, among them a considerable number originating from African material).

Additional, mainly incidental discoveries were made in the period 1882–1928, and the number of fig-wasp species known was greatly 'augmented'; GRANDI listed a world catalogue of *Agaonidae* (1928, Boll. Lab. Ent. R. Ist. Sup. Agr. Bologna 1, pp. 107–235).

WIEBES described the period 1928–1958 as 'thirty years of miscellaneous reports'; again there were numerous additions to the knowledge of African fig-wasps. After 1958 the work of JOSEPH initiated a closer knowledge of the biology of the tropical fig-wasps and a new classification arose, enabling a comparison of the classification of *Ficus* and the underlying hypothesis with the phylogenetic classification of the wasps. It was found that the surmised strict specificity of the relationships between figs and wasps was correct; cooperation between entomologists and botanists was needed, and implemented. CORNER cooperated with VAN DER VECHT (Java collection) and WIEBES (since 1959), and this was extended by HILL (Hong Kong); RAMIREZ investigated wasps of the Americans. However, African wasps (e.g. *Ceratosolen* etc.) received less attention.

GALIL and EISIKOWITCH studied pollination ecology of *Ficus sycomorus* since 1968 (Ecology 49, pp. 259–269). They found the morphology and biology of pollination far more complicated (and interesting) than was supposed. They, and WIEBES, demonstrated what was confirmed in this present revision: the 'very incomplete knowledge of the situation in many groups'. In fact, if it

is recalled in what way the present state of knowledge of African *Ficus* was evaluated in the introductory part of this revision, it may be said that the study of the Ethiopian *Ficus* has scarcely begun and is in urgent demand of close and intensive field research.

WIEBES already described *Ceratosolen galili* in *Ficus sycomorus* (Ent. Ber., Amst. 24, 1964, pp. 187–191), and GALIL & EISIKOWITCH recognized it as 'a mess mate' or parasite not partaking in pollination activities but placing eggs in gall flowers. It appeared already that parasitic *Agaonidae* occur frequently in Africa e.g. *Sycophaga sycomori* was found to be able to induce the formation of parthenogenetic nourishing tissue for its larva. In the present paper attention is drawn to the pictures of gall-flowers of *F. sycomorus* (fig. 18:6), *F. glumosa* (fig. 6:7), *F. ovata* (fig. 11:5), and *F. salicifolia* (fig. 16:11); they suggest the presence of still undiscovered fig-wasps acting solely as parasites.

WIEBES ends his historical survey with the statement 'the completion of a laborious task is still before us; the inventory of the fig fauna'. This applies to a large degree to the fig flora as well. Cooperation between the botanist and the entomologist is essential.

Finally some remarks are made on pairs of closely related species; *F. palmata* resembles *F. carica* so closely that MIQUEL was led to describe it as '*Ficus pseudo-carica*'. WIEBES in a letter (Feb. 14, 1977) also confirmed the resemblance of the wasps.

The view that *F. palmata* is ancestral to *F. carica* was held by earlier authors e.g. MILDBRAED & BURRET. It was doubted by more recent authors e.g. BLATTER (1923, p. 443) and WERTH (1932, p. 554). WERTH (l.c. p. 541, 546) discussed the origins of *F. caprificus*. His remarks support remarkably well our findings in *F. palmata*. We found that in *F. palmata* specimens occur that bear only figs with gall-flowers and wasps, the wasps being most nearly allied to wasps occurring in the Mediterranean area, and specimens having figs with female flowers only (in which wasps were never seen). We add the observation that the bifid stigma in these female flowers can easily be correlated with the (unequally) bifid stigma found in cultivated *F. carica* (see WERTH l.c. p. 549). Biologically and morphologically, *F. palmata* seems an acceptable ancestor of *F. carica*.

WERTH in his erudite and very readable paper when suggesting the area of origin of the 'fig points to NW India, Afghanistan and Belutsistan, where the fig is known by names very much similar to fig'. This fact certainly may be seen in favour of WERTH's conclusions but the well-known fact that various names may come and go in the course of history (cf. *Cassia*, *Piper*) makes this similarity interesting but of limited value as to defining the country of origin, the area of the ancestry of *F. carica*.

Edible forms of *F. palmata* might have reached NW India and become popular and improved there obtaining a local, vernacular name by which it became wider known. This suggestion is supported, of course by no more proof than WERTH's suggestion. Morphological considerations, both as regards the botanical and entomological data are better evidence, and these can be interpreted as pointing to an African origin of *F. carica*, possibly Ethiopia.

It should be stated, however, that WIEBES, because the entomofauna of *F. carica* seems most diversified in India, suggests an Asian provenance of the species.

INFRAGENERIC CLASSIFICATION OF *FICUS* ACCORDING TO HUTCHINSON, RELATED TO WASP-GENERA

| | | |
|---|-------|--|
| CARICA (<i>carica</i> , <i>palmata</i>) | _____ | <i>Blastophaga</i> |
| SYCOMORUS (<i>sycomorus</i> , <i>mallotocarpa</i> , <i>sur</i> , <i>capensis</i> , <i>vallis-choudae</i> , <i>gnaphalocarpa</i>) | _____ | <i>Ceratosolen</i> |
| SYCIDIUM (<i>capreaefolia</i> , <i>exasperata</i>) | _____ | <i>Liporrhopalum</i> |
| UROSTIGMA (<i>dicranostyla</i> , <i>lutea</i> , <i>salicifolia</i>) | _____ | <i>Platyscapa</i> |
| BIBRACTEATAE (<i>ovata</i>) | _____ | <i>Agaon</i> |
| (<i>glumosa</i> , <i>thonningi</i> , <i>vasta</i> , <i>platyphylla</i>)- | _____ | <i>Elisabethiella</i> |
| (<i>populifolia</i> , <i>abutilifolia</i>) | _____ | <i>Nigeriella</i> |
| (<i>vogelii</i>) | _____ | <i>Allotriozoon</i> , <i>Crossogaster</i> |

It appears that related fig-taxa are in symbiosis with related pollinators.

FIG-WASP SPECIES COLLECTED FROM ETHIOPIAN FIGS (AGAONID ASSOCIATIONS KNOWN FROM EXTRA-LIMITAL SAMPLES ADDED IN PARENTHESES)

| | |
|-------------------------------------|---|
| <i>F. abutilifolia</i> (MIQ.) MIQ. | (<i>Nigeriella fusciceps</i> WIEBES, Nigeria) |
| <i>F. capreaefolia</i> DEL. | |
| AWEKE 696 | <i>Liporrhopalum</i> sp., ♀ and ♂ specimens |
| JANSEN 5760 | — — , ♀ fragments |
| DE WILDE & DE WILDE-DUYFJES 7857 | — — , ♀ fragments |
| <i>F. carica</i> L. | (<i>Blastophaga psenes</i> (L.), widely distributed) |
| <i>F. dicranostyla</i> MILDBR. | |
| JANSEN & AWEKE 5087 | <i>Platyscapa</i> sp., ♀ fragments |
| <i>F. exasperata</i> VAHL | (<i>Liporrhopalum gestroi afrum</i> WIEBES, Ivory Coast) |
| <i>F. glumosa</i> DEL. | |
| O. BECCARI 17 | <i>Elisabethiella</i> sp., 1 ♀, <i>Sycoryctini</i> , 4 ♀ 1 ♂ (parasites) |

| | |
|---|--|
| <i>F. gnaphalocarpa</i> (MIQ.) A. RICH. EBBA 599 | <i>Sycophaga</i> cf. <i>sycomori</i> (L.), 12 ♀, <i>Apocrypta</i> cf. <i>longitarsus</i> MAYR, 5 ♀, <i>Parakoebelea</i> cf. <i>gigas</i> (MAYR), 25 ♀ (all are parasites) |
| <i>F. hochstetteri</i> (MIQ.) A. RICH. | No data |
| <i>F. lutea</i> VAHL AWEKE & GILBERT 701 AWEKE & GILBERT 850 J. J. F. E. DE WILDE 7043 | <i>Platyscapa</i> sp., 8 young ♀ <i>Otitesella</i> (parasites), 1 ♂ and nymphs — sp., 2 ♀ 1 ♂ (parasites) |
| <i>F. mallotocarpa</i> WARB. AWEKE & GILBERT 953 J. J. F. E. DE WILDE 6310 | <i>Ceratosolen</i> sp., 1 ♀ (fragment) — —, 10 ♀ (fragments) |
| <i>F. ovata</i> VAHL JANSEN 5543 | <i>Agaon hamiferum modestum</i> WIEBES, ♀ fragment, <i>Seres armiceps breviceps</i> WIEBES, ♀ fragment (parasites) |
| <i>F. palmata</i> FORSK. DE WILDE & DE WILDE-DUYFJES 6089 | <i>Blastophaga vaidi</i> JOSEPH, 3 ♀, <i>Philotrypesis palmata</i> JOSEPH, 6 ♀ (parasites) |
| <i>F. platyphylla</i> DEL. DE WILDE & DE WILDE-DUYFJES 4896 | (<i>Elisabethiella</i> sp., 3 ♀ 1 ♂, <i>Philocaenus barbatum</i> GRANDI, 15 ♀ (para- sites), Cameroon) |
| <i>F. populifolia</i> VAHL COURBON s.n. (in 1860) | <i>Nigeriella</i> sp., 5 ♀ |
| <i>F. ruspolii</i> WARB. | No data |
| <i>F. salicifolia</i> VAHL AWEKE 1016 JANSEN 4814 | <i>Platyscapa awekei</i> WIEBES, ♀ (fragments) — — —, ♀ (fragments) |

| | |
|--|---|
| <i>F. sur</i> FORSK. | |
| AWEKE & GILBERT 626 | <i>Ceratosolen</i> sp., 15 ♀ (fragments) |
| AWEKE & GILBERT 670 | — cf. <i>occultiventris</i> (MAYR), 1 ♂, <i>Chalcidoidea</i> , 1 ♀ (parasite) |
| WESTPHAL & WESTPHAL-STEVELS 1707 | <i>Ceratosolen</i> cf. <i>occultiventris</i> (MAYR), 3 ♀ |
| DE WILDE & DE WILDE-DUYFJES 6719 | — — — — — , 7 ♀ |
| <i>F. sur</i> FORSK. (<i>capensis</i>) | |
| BOS 949 | (<i>Sycophaga cyclostigma</i> WATERSTON, 7 ♀ (parasites), S. Africa) |
| BOS 1226 | (— — — — — , 2 ♂ (parasites), S. Africa) |
| DRÈGE 2015 | (<i>Ceratosolen capensis</i> GRANDI, 7 ♀, <i>Apocrypta</i> sp., 2 ♂ (parasites), S. Africa) |
| DE WILDE & DE WILDE-DUYFJES 7206 | <i>Ceratosolen capensis</i> GRANDI, 15 ♀ 60 ♂, cf. <i>Eukoebelea</i> sp., 2 ♀ 4 ♂ (parasites), <i>Chalcidoidea</i> , 1 ♀ (parasite) |
| <i>F. sycomorus</i> L. | |
| AWEKE & GILBERT 893 | <i>Ceratosolen arabicus</i> MAYR, 7 ♀, — <i>galili</i> WIEBES, 1 ♂ (cuckoo- wasp), <i>Apocrypta longitarsus</i> MAYR, 9 ♀ 3 ♂ (parasites) <i>Eukoebelea sycomori</i> WIEBES, 5 ♀ (parasite), <i>Sycoryctini</i> sp. 1, 6 ♀ 1 ♂ (parasites), — — — — — 2, 3 ♀ (parasites) |
| AWEKE & GILBERT 935 | <i>Ceratosolen arabicus</i> MAYR, 6 ♀ 3 ♂, <i>Sycophaga sycomori</i> (L.), 17 ♀ 1 ♂ (paras.) <i>Eukoebelea sycomori</i> WIEBES, 5 ♀ (parasites) |
| J. J. F. E. DE WILDE 7372 | <i>Ceratosolen galili</i> WIEBES, 28 ♀ 3 ♂, <i>Sycophaga sycomori</i> (L.), 5 ♀ (parasites) |
| DE WILDE & DE WILDE-DUYFJES 6218 | <i>Ceratosolen galili</i> WIEBES, 3 ♀ |
| <i>F. thonningi</i> BLUME | (<i>Elisabethiella</i> sp., Uganda) |
| <i>F. vallis-choudae</i> DEL. | |
| FRIIS C.S. 568 | <i>Ceratosolen megacephalus</i> GRANDI, 4 ♂ |
| FRIIS C.S. 1928 | — — — — — , 3 ♀, <i>Eukoebelea</i> sp., 5 ♀ (parasites), <i>Sycoryctini</i> , 1 ♀ (parasite) |

F. vasta FORSK.

SCHWEINFURTH & RIVA 1320

FRIIS C.S. 2263

Elisabethiella socotrensis (MAYR), 1 ♀
(fragment)

Elisabethiella socotrensis (MAYR), 2 ♀,
Sycoryctini, 7 ♀ (parasites),
Sycoecini, 8 ♀ (fragments; parasites),
Chalcidoidea, 6 ♀ (parasites).

F. vogelii (MIQ.) MIQ.

JANSEN C.S. 5763

Allotriozone heterandromorphum GRANDI,
4 ♀, 2 ♂

Crossogaster silvestrii GRANDI, 2 ♀
(parasites)

REJECTED NAMES OR TAXA

Ficus acroptera. MOONEY referred to '*Ficus acroptera*' in his Glossary of Ethiopian plant names (1963, p. 39), sub '*Talkus*'. The name is probably an error (cf. *F. vasta* ('*Talak*')). *F. acroptera* was never recorded for Ethiopia.

Ficus huegelii KUNTH et BOUCHÉ (KUNTH 1846, p. 15). KUNTH et BOUCHÉ described *F. huegelii* referring to *F. macrocarpa* HÜGEL, a name which cannot stand because of the earlier *F. macrocarpa* BLUME. The country of origin is unknown; probably no type-material is extant. As the Baron DE HUEGEL collected in the Sudan and Ethiopia the possibility exists that KUNTH et BOUCHÉ described at the time a new species. No decision is warranted now.

Ficus punctata LAM. is represented at P in the Lamarck Herbarium by leaves. LAMARCK's description (Encycl. Méth. Bot. 2, 1786, p. 495-6) may apply to a number of fig species. The protologue contains a doubting reference to RHEEDE, Hort. Malab. and to a collection by COMMERSON on Madagascar. The leaves are not referable with any certainty to any African species and although CUFODONTIS (1953, p. 14) lists it for Ethiopia (nomen indigenum '*Sibaca*' Erythrea) we find no evidence for admitting it as an Ethiopian species. CUFO-DONTIS (l.c.) cited *F. aggregata* VAHL (1805, p. 191) in synonymy to *Ficus punctata*, but *F. aggregata* VAHL is illegitimate, because VAHL cited in synonymy the earlier binomial *F. punctata* LAM. (1786). Sometimes herbarium specimens appear to be identified as *F. punctata* in synonymy with *F. schimperi* and *F. rokko*. Nomenclaturally this is certainly erroneous.

Ficus quibeba WELW. ex FICALHO was entered by DE FICALHO in his study on the useful plants of 'Portuguese Africa' (Pl. Uteis da Africa Portuguesa, Lisboa, 1884, p. 270). He quoted some msc. notes on the habitus of *F. quibeba* by WELWITSCH, who collected it at Golungo Alto, herb. no. 6:399 (Angola).

D. R. CHAFFEY recorded *F. quibeba* for S.W. Ethiopia (Kefa and Illubabor) (see South-West Ethiopia forest inventory project; a glossary of vernacular names etc. Min. Overs. Dev., 1978). DE FICALHO reported nothing about the receptacles. HIERN did (Cat. Welw. Afr. Pl. IV, 1900, p. 1000), but only quoted data he seems to have found among WELWITSCH's notes; the type was without these notes, I presume, because FICALHO did not cite any fact about the figs, nor did HIERN himself, apparently, see them.

It would seem, contrary to HUTCHINSON's admitting *F. quibeba* into his treatment of tropical African *Ficus* (1916, pp. 89, 177-8), preferable to consider *F. quibeba* as a doubtful species described for Angola, and I have no evidence warranting its record for Ethiopia.

Ficus scasellatii PAMPANINI (1915, p. 15) was based on material ascribed to G. SCASSELLATI, reported from Bidi nella Goscia 1912 (SCASSELLATI e MAZZOCCHI, ser. V, n. 31) and Elvalda nella Goscia 1912 (SCASSELLATI e MAZZOCCHI s.n.) by CHIOVENDA (1916, p. 222). CHIOVENDA reported (1932a, p. 410) another specimen (R. TOZZI 340) from Touata del Giuba, ad Alessandra (and suggested affinity to *F. kirkii* HUTCH., and *F. magnoliaefolia* BORZI). All finding localities are outside Ethiopia.

Ficus somalensis (PAMP.) CHIOV. (1929, p. 313). *Ficus somalensis* was not recorded for Ethiopia. It has been repeatedly collected within a distance of 150 km of the Ethiopian frontier in Somalia (Bugda Acable; Hamur) and may appear to occur in the Ogaden area. MILDBRAED et BURRET suggested (1911, p. 210) conspecificity with *F. lutea*.

Ficus spectabilis KUNTH et BOUCHÉ (KUNTH 1846, p. 15). The describing authors referred to '*Ficus africana* Hort. Berol. 1846', and suggested Africa as the country of origin. HUTCHINSON reduced this to *Ficus ovata* (1916, p. 164); this may be the correct disposition.

Ficus zambesiaca HUTCHINSON (1915, p. 341). CUFODONTIS (1953, p. 17) included *F. zambesiaca* for Ethiopia, basing this on 2 specimens studied by CHIOVENDA (R. GUIDOTTI, 1930, no 234; in Flora Somala II, 1932, p. 410, figs 232 and 233). *F. zambesiaca*, however, so far was not seen from Ethiopia (see also GUIDOTTI, La foresta di Mansur, La Lettura XXX, 10, 1930, p. 915, SENNI 1935, p. 257 and HUTCHINSON, FTA VI, 1917, p. 198). When more materials from further north (Ogaden) become available, the identity and distribution of *F. zambesiaca* has to be reconsidered.

SUMMARY

The species of *Ficus* ascribed to Ethiopia are described, pictured and keyed out; the synonymy, taxonomy, ecology, distributional maps, vernacular names and uses are added. No species new to science are recorded and it appears that the number of species believed to occur in Ethiopia must be reduced by nearly one half.

Ficus studies in the field and intensive collecting are indispensable to arrive at solutions for numerous unsolved problems. As *Ficus* trees are among the most important lignescent plants in the Ethiopian plant-cover, and may be used for various purposes (rehabilitation of the vegetation, medicinal, nature protection and management (wild bird food)), further research is much needed.

The problem of the origin of *F. carica* is considered (*F. palmata*); additional data are given as regards plant - insect symbiosis; a morphological peculiarity is pictured for the first time (nourishing, (?ariloid) tissue in *F. glumosa* and some related species). A key to the Ethiopian species could now be made and was especially adapted to quick identification in the field.

This revision of *Ficus* in Ethiopia is the 11th instalment of *Primitiae Africa-nae*, a series of papers, introducing the first results of research-workers in African botanical taxonomy, prepared under supervision of Prof. dr. H. C. D. DE WIT.

Earlier instalments:

1. Acta Bot. Neerl. 5: 171-178. 1956.
2. Blumea 10: 607-624. 1960.
3. Acta Bot. Neerl. 11: 231-265. 1962.
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Present address of the author:

Addis Ababa University, Faculty of Science,
P.O. Box 1176, Addis Ababa, Ethiopia.

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C København (Denmark): Botanical Museum and Herbarium.
E Edinburgh (Great Britain): Royal Botanic Garden.
ETH Addis Ababa (Ethiopia): Addis Ababa University (National Herbarium).
FI Firenze (Italy): Herbarium Universitatis Florentinae, Istituto Botanico.
HBG Hamburg (Germany): Staatsinstitut für allgemeine Botanik und Botanischer Garten.
K Kew (Great Britain): The Herbarium and Library.
L Leiden (Netherlands): Rijksherbarium.
MPU Montpellier (France): Institut de Botanique, Université de Montpellier.
P Paris (France): Muséum National d'Histoire Naturelle, Laboratoire de Phanérogamie.
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INDEX

Scientific names are printed in *italics*. The main entries of the correct taxon-names are indicated by **bold** printed page-numbers. All figures are indicated by an asterisk attached to their indexed number.

Acacia 23, 43, 47, 58, 76, 82, 87, 91
 - *lahai* 40
 - *sieberiana* 32
Adathoda schimperii 76, 91
Afa-kamo 36, 83
Afa-kumo 36
Agaon 99
 - *hamiferum modestum* 100
Agaonidae 97, 98
Agow 65
Albizia 23, 40, 43
Allotriozoon 99
 - *heterandromorphum* 102
Aloe 82
Anogeissus 27, 47
Apocrypta longitarsus 100, 101
 - sp. 101
Arbu 77

Baeles 51
Balas 52
Ballas 15
Bamba 33, 76
Bambelada 88
Bambulede 88
Bambuledeh 88
Beddah 40
Belas 15, 52
Belas 18
Beles 18, 52
Beless 18
Bellass 52
Belles 15
Belless 52
Berd 59
Berde 59
Berdeh 28, 92
Blastophaga 99
 - *psenes* 99
 - *vaidi* 100
Boswellia 47
Bridelia ferruginea 33

Cadia purpurea 64

Calpurnia 40, 64, 82
Capparis 82
Caria 16
Carissa 91
Cassia 82, 98
 - sp. 32
Catha 51
Ceratosolen 97, 99
 - *arabicus* 101
 - *capensis* 101
 - *galili* 98, 101
 - *megacephalus* 101
 - *occultiventris* 101
 - sp. 100, 101
Chabero 47
Chalcidoidea 101, 102
Charo 47
Chekemte 27, 40
Choddo 69
Cioghonte 27
Cokonte 40
Combretum 32, 43, 44, 47, 82, 87
Commiphora 58, 82
Cordia abyssinica 40, 91
Crossogaster 99
 - *silvestrii* 102
Croton 23, 32
 - *macrostachys* 82
Cussonia 47
Cynips 56

Dahro 92
Damba 83
Daro 89
Deer-ad 28, 40
Dekdekena 83
Delb 92
Delonix 58
Dembi 47, 83, 92
Djerande-harmas 40
Djeranta-gihe 40
Dodonaea 47
 - *viscosa* 27, 32, 40
Dracaena 64, 82

- Dscherande* 83
Duruf 40

Elisabethiella socotrens 102
 - sp. 99, 100, 101
Entada abyssinica 32
Eta 47
Etse-beles 18, 52
Euclea 40, 82
Eukoebelea sp. 101
 - *sycomor* 101
Euphorbia 58, 82
 - *tirucalli* 40

Ficus abutilifolia 7, 8, 9, 10*, 58, 99
 - *acrocarpa* 34, 36, 79, 81, 83
 - var. *saligna* 79
 - *acroptera* 103
 - *africana* 104
 - *aggregata* 103
 - *aldabarensis* 82
 - *antithetophylla* 12, 14, 15
 - *baeles* var. α *morifolia* 51
 - *bembicarpa* 20
 - *benghalensis* 75, 89, 91
 - subg. *Bibracteatae* 99
 - *bongoensis* 62
 - *brachypoda* 45, 47, 48
 - var. *scioana* 45, 47, 48
 - *caffra* 37, 38
 - *callabatensis* 89, 91
 - *capensis* 66, 67, 69, 70, 99, 101
 - var. *mallotocarpa* 41
 - var. *pubescens* 66
 - var. *trichoneura* 66
 - *capraeaeifolia* 12
 - *capraefolia* 11
 - *capraefolia* 12
 - *capraeaeifolia* 6, 11, 13*, 99
 - *capreifolia* 11, 12
 - *caprificus* 98
 - subg. *Carica* 99
 - *carica* 3, 4, 5, 6, 15, 17*, 51, 52, 97, 98, 99, 105
 - var. *leucocarpa* 16
 - var. *rupestris* 16
 - *chanas* 72, 75
 - *cyphocarpa* 60
 - *dahro* 88, 91, 93
 - *dekdekana* 62, 78, 81
 - var. *acrocarpa* 78
 - β *hochstetteri* 81
 - var. *pubiceps* 78
 - *typica* 81
 - *dicranostyla* 4, 5, 7, 8, 18, 19*, 95, 99

Ficus discifera 9, 10
 - *dissocarpa* 81
 - *exasperata* 6, 15, 21, 22*, 82, 95, 99
 - *fazokelensis* 25
 - *foliis cordatis subrotundis integerrimis* 73, 75
 - *foliis palmatis* 51
 - *forskalii* 49, 51
 - *glumosa* 8, 25, 26*, 95, 98, 99, 105
 - var. *glaberrima* 25, 27
 - var. *intermedia* 25, 27
 - var. *lanuginosa* 25, 27
 - *gnaphalocarpa* 6, 8, 29, 30*, 95, 99, 100
 - *goetzei* 79, 81
 - *hararensis* 89, 91
 - *hochstetteri* 7, 33, 35*, 100
 - var. *glabrior* 34, 36
 - *huegelii* 103
 - *indica* 62, 64, 89, 91
 - *ingens* 37, 38, 86
 - *ingentoides* 37, 38
 - *intermedia* 56
 - *kirkii* 104
 - *kotschyana* 54
 - *lateralis* 54, 56
 - *lichtensteinii* 66, 69
 - *lutea* 7, 37, 39*, 95, 99, 100, 104
 - *macrocarpa* 103
 - *macrocarpum* 81
 - *magnoliaefolia* 104
 - *mallotocarpa* 6, 41, 42*, 70, 76, 95, 99, 100
 - *microcarpa* 78, 79, 81
 - *morifolia* 49, 51
 - *neriifolia* 62, 64, 65
 - *nymphaeae folio* 75
 - *ovata* 4, 7, 8, 45, 46*, 95, 98, 99, 100, 104
 - *palmata* 3, 5, 6, 16, 18, 48, 50*, 98, 99, 100, 105
 - var. *genuina* 51
 - var. *morifolia* 48, 51
 - β *petittiana* 48
 - γ *pseudocarica* 49
 - var. *pseudo-carica* 51
 - var. *somalensis* 51
 - var. *stipitata* 51
 - var. *tomentosa* 52
 - *panifica* 66, 69
 - *panificus* 66
 - *paolii* 12, 14
 - *persicifolia* 60
 - var. *pubicarpa* 62
 - *petittiana* 49, 53
 - *platyphylla* 7, 8, 54, 55*, 96, 99, 100
 - *populifolia* 7, 56, 57*, 89, 96, 99, 100

- Ficus praetoriae* 62
- *pseudo-carica* 49, 51, 53, 98
 - - var. α *tomentosa* 49, 51, 53
 - *pubicosta* 34
 - *punctata* 103
 - *quibeba* 103
 - *racemosa* var. *elongata* 70
 - *reflexa* 81, 82
 - *religiosa* 56, 58
 - *rhodesiaca* 60
 - *riparia* 66, 70, 71
 - *rivae* 89, 91
 - *rocco* 79, 81
 - *rokko* 79, 81, 103
 - *rubra* 82
 - *ruspolii* 7, 60, 61*, 100
 - *salicifolia* 7, 62, 63*, 96, 98, 99, 100
 - - var. *australis* 62, 64
 - - var. *fructibus sessilibus* 64
 - *saligna* 81
 - *scabra* 21, 23
 - *scassellatii* 4, 104
 - *schimperi* 34, 36, 78, 81, 86, 103
 - - var. *hochstetteri* 34
 - - b. *pubescens* 81
 - *schimperiana* 37, 38, 86
 - *schweinfurthii* 84, 87, 88
 - *sechellarum* 82
 - *serrata* 21, 23
 - *socotrana* 88, 91, 93
 - *somalensis* 4, 104
 - *sonderi* 27
 - *spectabilis* 104
 - *stuhlmannii* var. *glabrifolia* 37
 - *sur* 6, 43, 66, 68*, 76, 96, 99, 101
 - - var. *erythraea* 66, 71
 - subg. *Sycidium* 99
 - subg. *Sycomor* 76, 99
 - *sycomor* 2, 6, 27, 31, 43, 67, 72, 74*, 97, 98, 99, 101
 - - *vera* 72, 75
 - *thonningi* 6, 23, 36, 62, 78, 80*, 96, 99, 101
 - *tjiela* 78, 81
 - *trachyphylla* 29, 31
 - *tridentata* 12, 14
 - *tsjela* 81
 - *tuela* 81
 - *umbellata* 56, 58
 - subg. *Urostigma* 95, 99
 - *vallis-choudae* 6, 84, 85*, 96, 99, 101
 - *vasta* 7, 8, 88, 90*, 99, 102, 103
 - - var. *glabrescens* 88, 91
 - - var. *typica* 91
- Ficus vasta* var. *velutina* 88, 91
- *vogeliana* 95
 - *vogelii* 4, 6, 93, 94*, 99, 102, 106
 - *xanthophylla* 37, 38, 41
 - *zambesiaca* 4, 104
- Giltu 47
- Gnidia glauca* 32
- *lamprantha* 32
- Gotho 69
- Grome 47
- Gromheh 47
- Gymeyz 27, 56
- Hamash 59
- Harbu 24, 44, 71
- Haschref 24
- Hashref 24
- Hypericum* 47
- Jemat 65
- Juniper 51
- Kafanu 40
- Khoddo 71
- Kilti 92
- Koddo 71
- Kondagutu 33
- Lati 24
- Lipporrhopalum* 99
- *gestroi afrum* 99
 - sp. 99
- Loranthus* 76
- Lufu 40
- Lugo 15, 52, 77
- Makkoy-adda 77
- Marua 47
- Maytenus* sp. 51
- Melo 92
- Millettia ferruginea* 23
- Mincho 56
- Mokkoy-ghedud-darreh 77
- Mudah 59
- Muki lubeto 15
- Nidir 59
- Nigeriella* 99
- *fusciceps* 99
 - sp. 100
- Oda 47
- Olea* 40, 82
- Otitella* 100

Parakoebelea gigas 100
Philocaenus barbatum 100
Philotrypesis palmata 100
Phoenix reticulata 40
Piliostigma 43, 47
 – *thonningii* 32, 40
Piper 98
Platyscapa 99
 – *awekei* 100
 – sp. 99, 100
Podocarpus 70
Pterocarpus 58

Qilitu 47

Rhus abyssinicus 40
Rumex nervosus 40, 51

Salix subserrata 14, 51
Sapium 43
Seres armiceps breviceps 100
Shola 47, 65, 71, 76
Sibaca 103
Sibacu 83
Stereospermum 32, 43, 44, 47, 87
 – *kunthianum* 40
Sur 67, 71
Sycoecini 102
Sycomor 31, 75
 – *antiquorum* 72, 75
 – *capensis* 66, 69
 – *gnaphalocarpa* 29, 31
 – *panifica* 66, 69
 – *rigida* 73, 75
 – *riparia* 66, 69, 70
 – *schimperiana* 77, 84, 86
 – *schweinfurthii* 87
 – *sur* 66
 – *trachyphylla* 29, 31
Sycophaga 101
 – *cyclostigma* 101
 – *sycomori* 97, 100, 101
Sycoryctini 99, 101, 102
 – sp. 101
Syzygium 43

Ta-ab 65
Talak 89, 92, 103

Talkus 103
Talqûs 83
Tecomti 27
Tciahamte 27
Tel(o)ukat 65
Terminalia 43, 58, 82
Tschog(h)onte 27, 83

Urostigma 2, 10
 – *abutilifolium* 9, 10
 – *acrocarpa* 34
 – *acrocarpum* 79
 – *caffrum* 37, 38
 – *catalpaefolium* 9, 56, 58, 59
 – *catalpifolium* 56
 – *dekdekana* 79, 81
 – *fazokelense* 27
 – – *forma minor* 25, 27
 – *fazokelensis* 25
 – *glumosum* 25, 27
 – *hararensis* 93
 – *hochstetteri* 34
 – *ingens* 37, 38
 – *kotschyanum* 27, 54, 56
 – *luteum* 37
 – *macrocarpum* 79
 – *platyphyllum* 54
 – *populifolium* 56
 – *salicifolium* 62
 – *schimperi* 79
 – *socotrana* 89
 – *thonningi* 79
 – *vogelii* 93, 95
 – *xanthophyllum* 37, 38

Viscum 76
Vudah 59

Wachia 71
Wachio 71
Wada 77
Wallanti 15
Warka 92
Woda 77
Worka 33, 71, 76, 92

Ziziphus 27