# A REVISION OF HAPLOLOBUS (BURSERACEAE)

P. W. LEENHOUTS

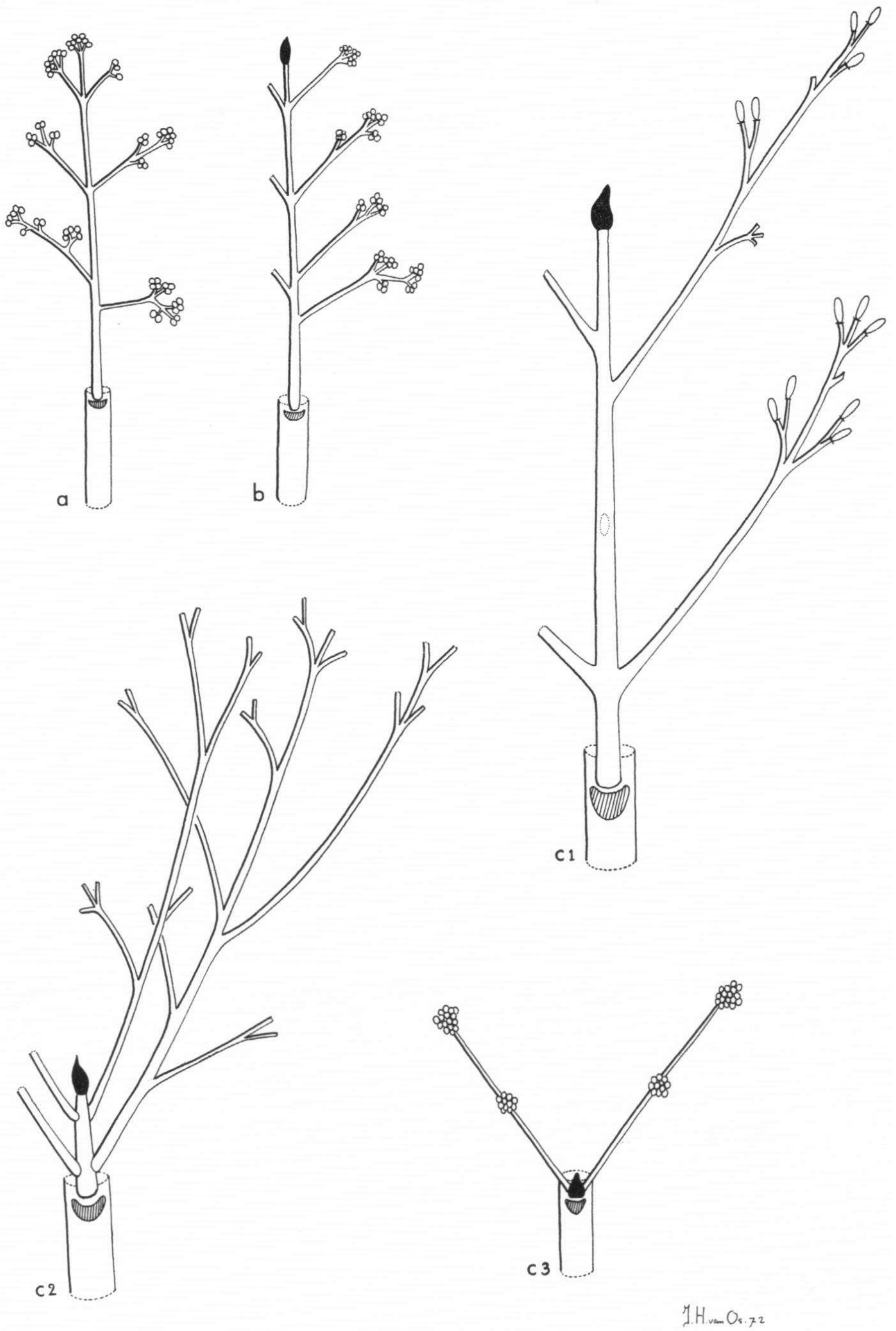
## INTRODUCTION

The written history of *Haplolobus* is still less than one century old. O. Beccari, the great Italian naturalist, was the first to collect a specimen of this genus, June 1866 in Borneo, the only *Haplolobus* ever collected in W. Malesia! He, too, was apparently the first to recognize this genus as separate from *Santiria*, probably in 1872, but he never published it and his annotation became forgotten in his herbarium in FI (see Husson & Lam, Blumea 7, 1953, 456). The first species were described in 1889 by K. Schumann (in K. Sch. & Hollr., Fl. Kais. Wilh. Land) under *Santiria*. Only in 1931 the genus was split off from *Santiria* and formally described by H. J. Lam. The first revision appeared in 1932 (H. J. Lam, Bull. Jard. Bot. Btzg III, 12, pp. 404—419). Later revisions were by Husson & Lam (Blumea 7, 1953, 413—458; the treatment by the present author in Fl. Mal. I, 5, 1956, 238—246, was in no part original but based exclusively upon this revision) and by H. J. Lam (Blumea 9, 1958, 237—272). In 1962, after his retirement as Director of the Rijksherbarium and Professor of Systematic Botany at Leiden University, Prof. Dr. H. J. Lam intended to revise *Haplolobus* anew, but circumstances prevented him from doing so.

The repeated and urgent requests of Prof. Lam, who was my teacher, the availability of rich new collections from New Guinea, and the possibility to study anew the types of several of the older names thought to be completely lost in B but fragments of which turned out to be still extant in the Lauterbach herbarium in WRSL, were the reasons for venturing on a fourth revision in the course of 40 years. Looking back at this 4th revision I cannot but admit that *Haplolobus* is doubtless an extremely difficult genus. Much more good, that is fertile material from all over its area is needed before any reasonably satisfactory and stable revision can be written. The present one is in some points probably a small step forward, notably in the better delimitation from *Santiria* based not only upon fruit characters but also on flower characters, thanks to which more stable geographic conclusions could be drawn. Some other deviations from its forerunners will doubtless turn out to be steps sideways or even backward. The practical difficulties are treated more in detail in the notes under *H. floribundus*. In the present stage of knowledge it is still impossible to say more about the taxonomic position of the genus as a whole, nor on its inner structure, than has been done by Lam (1958 and before). The taxonomic and geographic isolation of *H. beccarii* remains a riddle, the taxonomy of the group around and including *H. floribundus* remains vague, and the resemblance of some species to certain species of *Santiria* or even *Canarium*, suggesting polyphyly, remains puzzling.

## GENERAL NOTES

*1. Medullary vascular bundles in the petiole.* (Husson &) Lam paid a great deal of meticulous attention to this character. In my experience, however, it does not play a great part in the characterization of the taxa. The number of these bundles depends on the one hand on the


a
b
c1
c2
c3
J.H.van Os.72

thickness of the petiole, on the other on the degree to which they are mutually free or confluent. Accordingly, the number may vary considerably even in one and the same collection. I have not included this character in the key, nor in the descriptions.

2. *Inflorescence* (fig. 1). Some attention to the structure of the inflorescence has been paid already in Husson & Lam (1953). However, this character deserves more attention than it has been given up till now. The four main types are:

a. axillary, without any vegetative bud: the normal case in *H. floribundus* ssp. *floribundus* and ssp. *salomonensis* and *H. triphyllus.*
b. axillary, but the rachis terminated by a vegetative bud: occasionally in several species, clearly a link between a and c.
c. laterally inserted on a leafless vegetative short shoot which may be hardly more than an axillary bud (*H. furfuraceus*), may be very short with much longer inflorescences (*H. beccarii, boswezensis, lanceolatus*), or may be rather long and sturdy (*H. robustus*). This kind of inflorescence seems to be rare in *Burseraceae* but I have found it in some species of *Santiria.*
d. a special kind of inflorescence is found in *H. furfuraceus* and *pachypodus* with the flowers in clusters along the subspicate branches.

3. *Domatia.* Husson & Lam (1953) regarded the presence of domatia as a character of some importance and used it in the delimitation of a few species. In the course of the present study it appeared that domatia are restricted to a few species only, but that at least in a few cases there was a clear correlation between presence of domatia and higher altitude. Some series could be made of otherwise reasonably identical material from the lowland without domatia, via middle altitudes with faint domatia, to material from altitudes above *c.* 1000 m with distinct domatia (see under *H. floribundus* ssp. *floribundus* and *moluccanus* and *H. furfuraceus*). However, other collections from altitudes above 1000 m lack domatia, and in *H. floribundus* ssp. *salomonensis* domatia may be absent or present, faint or clear, without any apparent correlation with altitude.

4. *Galls.* It is a well-known fact that galls are often specific to a high degree. However, I know of hardly any systematic-botanical study in which galls have but been used as characters, let alone have played a part in the delimitation of taxa. Especially in the disentangling of difficult groups galls may be of use. In *Haplolobus*, galls on leaves and inflorescences are relatively common. Several species mainly bear one exclusive type of gall, and these may provide as good a character as any. For that reason the galls have been included in the descriptions and several have been depicted.

5. *Typification.* Great care has been given to the typification of all names. (Husson &) Lam selected in several cases lecto- or neotypes, sometimes unnecessarily, and this led in at least one case (*Santiria nubigena*) to a wrong interpretation. Furthermore, they tried to typify every species by a ♂ and a ♀ (flowering or fruiting) specimen, making thus things nomenclaturally less clear and even invalidating two new species (*H. lanceolatus* and *pubescens*).

Fig. 1. Inflorescences, schematic. a. Normal axillary inflorescence (*H. floribundus*: *K. J. White W 1440*). b. Axillary inflorescence terminated by a vegetative bud (*H. pubescens*: *Kostermans & Soegeng 466*). c. Vegetative, but leafless axillary shoots bearing lateral inflorescences (c 1. *H. lanceolatus*: *BW 4040*; c 2. *H. boswezensis*: *Kostermans & Soegeng 34*; c 3. *H. furfuraceus*: *Hartley 12831*). Vegetative buds are black. All × ½.

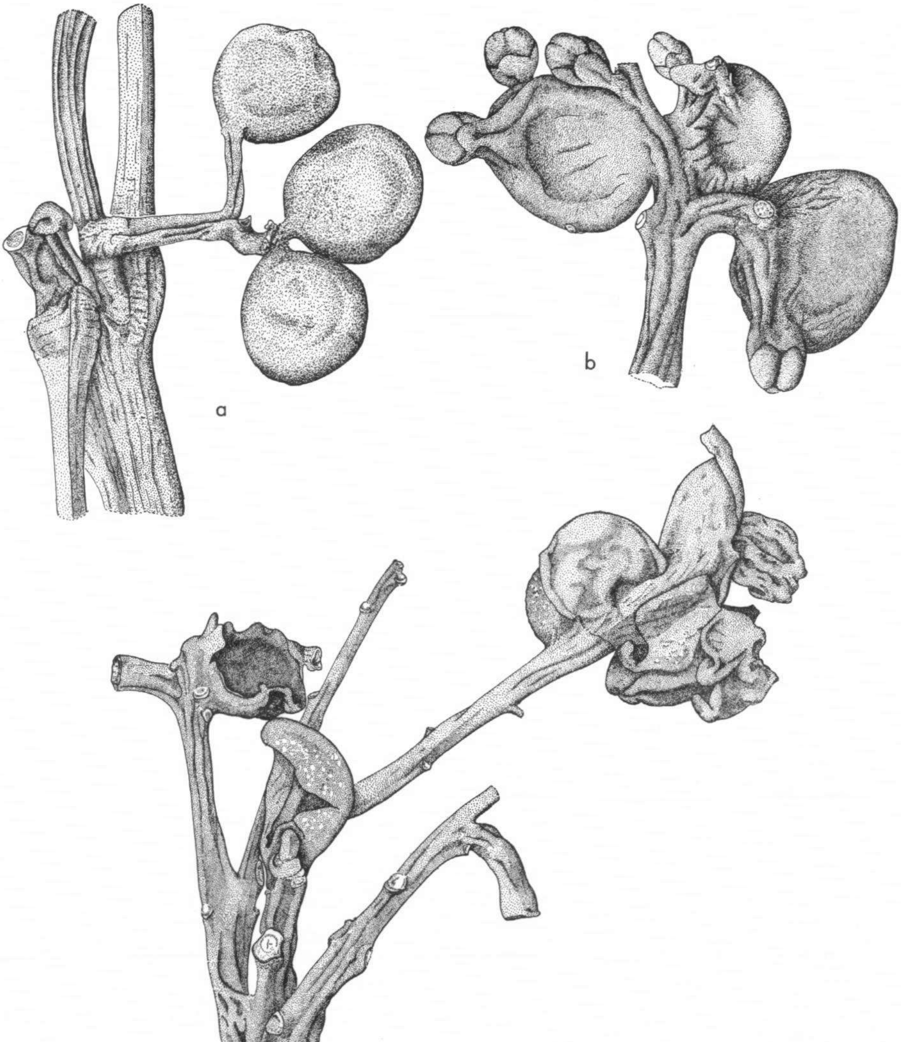



Fig. 2. Galls in inflorescences. a. *Haplolobus floribundus* ssp. *microphyllus* (*BW 1217*; 2 ×). b. ditto (*BW 7601*; 3½ ×). c. *H. floribundus* ssp. *moluccanus* (*BW 11792*; 2 ×).

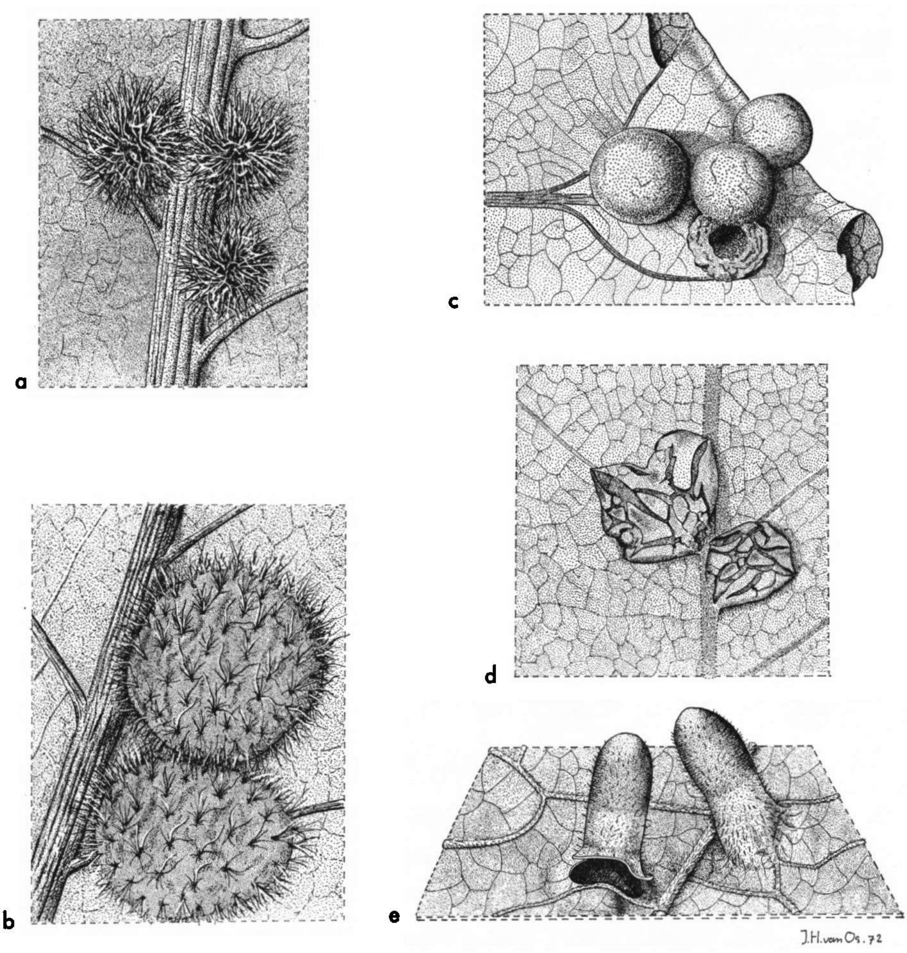



Fig. 3. Leaf galls. a. *Haplolobus ? pachypodus*, young galls on lower side of leaflet (*BW 9171*; 6½ ×). b. the same, older stage (*BW 9169*; 6½ ×). c. *H. floribundus* ssp. *microphyllus*, lower side of leaflet (*BW 6083*; 2 ×). d. *H. furfuraceus* var. *furfuraceus*, upper side of leaflet (*T. G. Hartley 12854*; 3½ ×). e. *H. lanceolatus*, lower side of leaflet (*BW 9009*; 3½ ×).

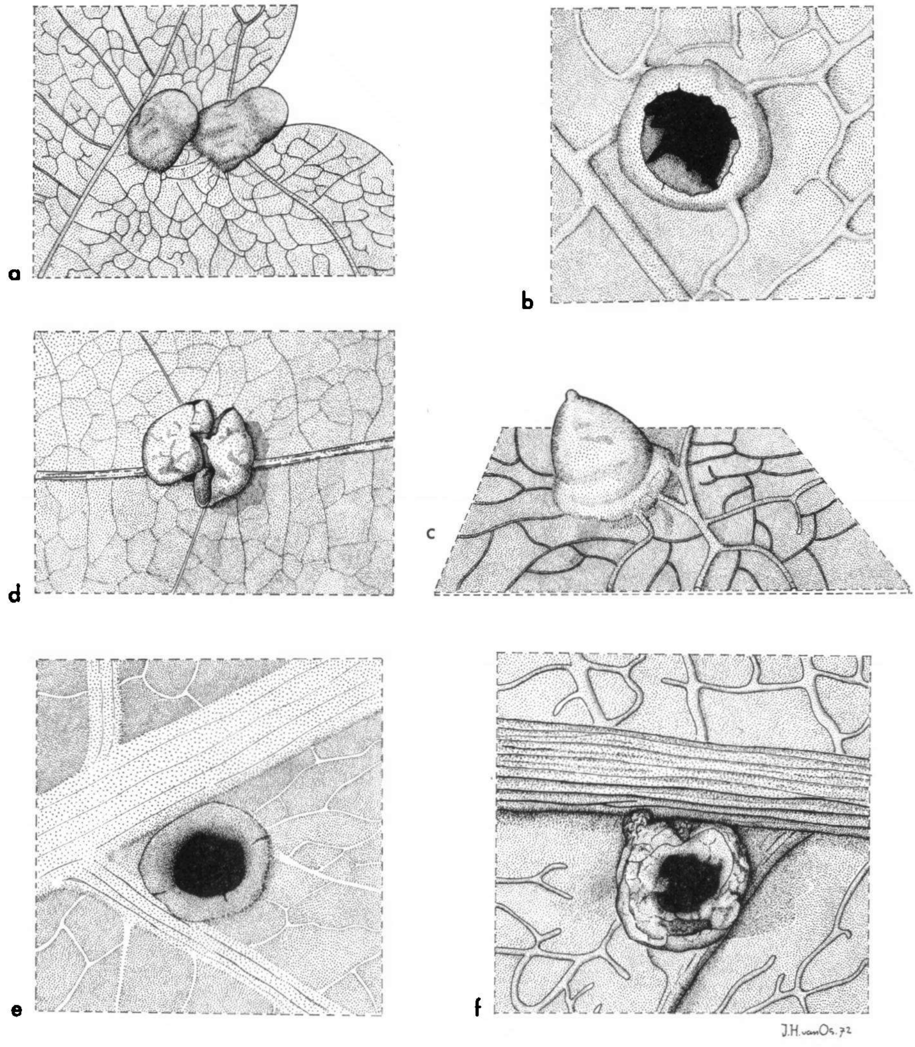



Fig. 4. Leaf galls. a. *Haplolobus floribundus* var. *salomonensis*, lower side of leaflet (*BSIP 11721*; 3½ ×). b. the same, upper side of leaflet (ditto; 13 ×). c. the same, an identical or closely allied kind, lower side of leaflet (*BSIP 1658*; 6½ ×). d. *H. floribundus* ssp. *moluccanus*, lower side of leaflet (*BW 11792*; 2 ×). e. *H. canarioides*, upper side of leaflet (*BSIP 13183*; 6½ ×). f. the same, an other kind of gall, lower side of leaflet (ditto; 6½ ×).

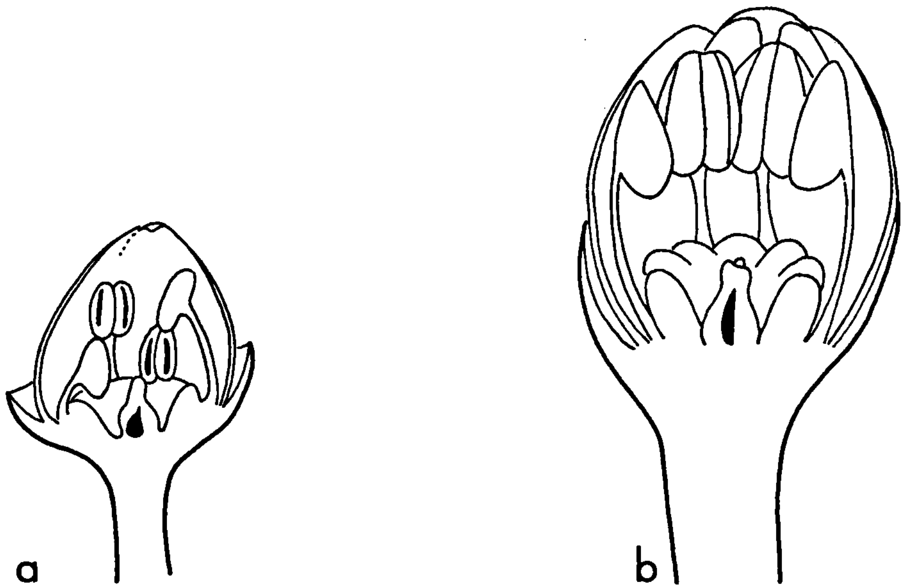



Fig. 5. Slightly schematized longitudinal sections through the ♂ flowers of *Santiria* (a) and *Haplolobus* (b) showing the structural differences. a. based upon *Santiria laevigata* Bl. (U sh. nr. 32900); b. based upon *H. floribundus* (*Ledermann 12506a*).

6. *Descriptions.* The descriptions are restricted to some of the more important points not included in the key; all important characters are included in the latter. Both the key and the descriptions are exclusively based upon undisputable material. Extensive descriptions can be found in the publications by (Husson &) Lam cited which also give good figures of nearly all species.

7. *Citation of specimens.* All specimens seen by the present author are cited. If nothing is mentioned the material was sterile; if no herbarium is mentioned it is represented in L.

## KEY TO THE EAST MALESIAN GENERA OF BURSERACEAE

1 a. Stipules present, either persistent or caducous, in the latter case at least to be found in bud and scars visible . . . . . . . . . . . . . . . . . . **Garuga floribunda** and most species of **Canarium**
b. Stipules absent . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2
2 a. Pith of branchlets with resiniferous vascular bundles, either all appressed to the wood cylinder, or all or partly scattered. . . . . . . **Canarium** div. spp., **Dacryodes rostrata, Santiria laevigata**
b. Pith of branchlets without resiniferous vascular bundles. . . . . . . . . . . . . . . . . . 3
3 a. Pith of petioles without resiniferous vascular bundles.
**Protium macgregorii, Scutinanthe brevisepala**
b. Pith of petioles with resiniferous vascular bundles . . . . . . . . . . . . . . . . . . 4
4 a. Halfway between every two nerves there is an intercalated vein parallel to these, more feeble, but nearly always reaching the marginal arching; nerves all nearly transverse to the midrib.
**Santiria rubiginosa**
b. Intercalated veins usually not or hardly developed, if conspicuous then much nearer to the upper than to the lower nerve and never reaching the marginal archings or the margin; at least most of the nerves not transverse to the midrib or nearly so . . . . . . . . . . . . . . . . . . . . . . 5

5 a. Receptacle of flower rather broad, hence flower buds often conical and calyx saucer-shaped; disc at the outside partly adnate to the receptacle, spreading, low annular (¼—½ mm high), leaving a rather wide central space around the pistil or pistillode. Fruit never erect, at least bulging to one side, usually style rest lateral to next to the base; cotyledons deeply lobed, folded in the seed **Santiria**

b. Receptacle of flower narrow, hence flower buds usually ellipsoid and calyx cup-shaped; disc at the outside free from the receptacle, erect, forming an up to 1 mm high thick-fleshy wall with nearly parallel sides, appressed to the pistil or pistillode (the latter hardly protruding from it and hence not conspicuous). Fruit erect, at most bulging to one side but the style rest always terminal; cotyledons entire, flat in the seed . . . . . . . . . . . . . . . . . . . . . . . . . **Haplolobus**

The most important point in the above key is the differentiation of *Haplolobus* and *Santiria* not only on fruit, but also on flower characters. Actually, up to the present only fruiting material from E. Malesia could with certainty be placed in one genus or the other. Two of the three *Santiria* species known from this part, *S. apiculata* and *laevigata*, are vegetatively indistinguishable from some species of *Haplolobus*, notably from certain forms of *H. floribundus*, even with the help of a synoptic key which makes possible the combined use of several characters. Consequently, material without fruits could not be placed, and especially the eastern limit of the genus *Santiria* was unclear. The detection of differences in the general structure of the flower not only enabled the identification of far more material, but it considerably added to the conclusion that to all probability *Santiria* does not stretch farther east than the Moluccas, and that all material from New Guinea and further east can be included with reasonable certainty in the genus *Haplolobus*.

## SYNOPTIC KEY TO THE SPECIES

The species are represented by numerals, the infraspecific taxa by letters, both corresponding with those used in the main text; taxa cited under one lead of a couplet only are printed in bold type.

1. Indumentum (domatia excluded)
   a. hirsute, mostly forming a fairly dense fur on branchlets, axial parts of leaves, lower side of leaflets, inflorescences, and infructescences, not rarely with an undercoat of short dense tufts: **1. 2.** 5aB. **5d2. 6a.** 7. **8. 10. 11.**
   b. otherwise (scurfy, with scales, minute hair tufts, or puberulous), mostly restricted to the terminal bud and sometimes the youngest parts: **3. 4.** 5a, **b, c, d1. 6b.** 7. **9. 12. 13.**
2. Diameter of branchlets just below the lowermost leaf (mm): 1(4—6). 2(17—22). 3(10). 4(6—12½). 5(2—13). 6(4—9). 7(5—11). 8(11). 9(10). 10(2½—4). 11(8—10). 12.(3—5). 13(7—8).
3. Pith of twigs
   a. compact, persistent: **1. 2. 3. 5. 6. 7. 8. 9. 10. 11. 12. 13.**
   b. fibrous, soon disappearing: **4.**
4. Number of pairs of leaflets: 1(2). 2(6). 3(3—4). 4(2—4). 5a(0—3). 5b(0—5). 5c(2—4). 5d(1—4). 6a(2—4). 6b(1—2). 7(2—5). 8(1—3). 9(1—3). 10(2—4). 11(2—3). 12(0—1). 13(4).
5. Length of petiole (cm): 1(3—5). 2(23). 3(7—10). 4(10—12). 5(1½—14). 6a(3—12). 6b(2—4½). 7(4—21). 8(3½—8). 9(5—14). 10(4—6½). 11(7). 12(1.2—1.7). 13(7½—9).
6. Petiole in cross-section
   a. terete or nearly so: 5a. 5b. 5d2. 7. 10. **13.**
   b. distinctly flattened above, mostly semiterete: **1. 3.** 5. 6. 7. 8. **9.** 10. **11. 12.**
   c. grooved above: **2. 4.** 5. 6a. 8.
7. Length of terminal petiolule (cm): 1(1½—2½). 2(?). 3(4—5). 4(4—5). 5a, c, d(1—5). 5b(4½—6¾). 6(1¼—4). 7(1½—3). 8(5—6). 9(5½). 10(1½—3). 11(2½—3½). 12(1—2). 13(2¼).
8. Thickness of petiolules (mm): 1(1—2). 2(3). 3(2). 4(1—1½). 5(½—2). 6(¾—1½). 7(1½—4). 8(2—2½). 9(2). 10(¾—1½). 11(2—3). 12(1.1—1.4). 13(1½—2).
9. Lower side of dried leaflets (normal mature leaves only, young or sucker leaves always tend to be much darker)
   a. light coloured, greenish to light brown: 3. **4.** 5. **6. 7. 8. 10.** 12.
   b. dark coloured, middle to dark or reddish brown: **1. 2.** 3. 5a, b, d. **9. 11.** 12. **13.**
10. Upper side of leaflets
   a. glabrous: **2. 3. 4. 5.** 6. 7. **12.** 13.
   b. hairy at least on midrib: **1.** 6a. 7. **8. 9. 10. 11.** 13.

11. Lower side of leaflets
    a. glabrous to hairy on midrib and nerves: **3. 4.** 5. **6.** 7. **12. 13.**
    b. hairy also on veins and sometimes veinlets: **1. 2.** 5d2. 7. **8. 9. 10. 11.**
12. Domatia
    a. absent: **1. 2. 3. 4.** 5. **6a. 7. 8. 9. 10. 11. 12. 13.**
    b. present: 5. **6b.**
13. Number of nerves per side in terminal leaflets (mind intercalated veins which are excluded; these may be nearly as well developed as nerves but branch off from the midrib far nearer to the upper than to the lower of the neighbouring nerves, make a wider angle with the midrib, mostly nearly 90°, and hardly ever reach the margin): 1(14—18). 2(25—30). 3(*c.* 12). 4(*c.* 10). 5a(6—18). 5b(8—16). 5c(5—11). 5d(6—14). 6a(10—12). 6b(6—9). 7(*c.* 15). 8(*c.* 15). 9(*c.* 18). 10(8—11). 11(12—16). 12(6—7). 13(12).
14. Distance between nerves along midrib in central part of leaflet (cm): 1(¾—1¼). 2(1—1½). 3(1½—2¾). 4(1¾—3¾). 5a(½—2½). 5b(1½—4). 5c(¾—1½). 5d(¾—2½). 6(¾—2¼). 7(¾—2½). 8(1½—2). 9(*c.* 1¼). 10(1—1½). 11(*c.* 1½). 12(1¼—2). 13(1—2).
15. Inflorescences
    a. at least partly inserted on a leafless axillary short shoot: **1. 2.** 3. 4. 5b, **c.** 6. **7. 8.** 9 ?. 10. **11. 13.**
    b. exclusively axillary, the rachis sometimes terminated by a vegetative bud: 3. 4. **5a,** b, **d.** 6a. 9 ?. 10. **12.**
16. Length of ♂ pedicel (mm): 1(0.6). 2(?). 3(1—2). 4(1½—2½). 5a(0.4—0.8). 5b(1—3). 5c(½—1). 5d1(½—1¾). 5d2(2—3). 6(sessile, clustered). 7(½). 8(?). 9(sessile, clustered). 10(0.6). 11(?). 12(?). 13(?).
17. Height of calyx in old buds or flowers (♂ and ♀ are about the same) (mm): 1(>0.75). 2(?). 3(1.5). 4(1.5). 5a(0.6—1.1). 5b(1.2—1.25). 5c(1—1.3). 5d(1.2—1.8). 6(2.3—2.5). 7(1—1.2). 8(1.3—1.5). 9(>1). 10 (1.2—1.3). 11(?). 12(1.2). 13(?).
18. Calyx
    a. distinctly more than halfway connate: **2** ?. 5a, c. **7.** 9 ?. **10.** 11 ?. **12.** 13 ?.
    b. about halfway connate: **1. 2** ?. 5a, c. **6a. 8.** 9 ?. 11 ?. 13 ?.
    c. distinctly less than halfway connate: 2 ?. **3. 4.** 5a, **b, d. 6b. 10.** 11 ?. 13 ?.
19. Calyx outside
    a. glabrous: 2 ?. **3. 4.** 5. 6. **7. 8. 9.** 13 ?.
    b. puberulous: 2 ?. 5a, c. 6a. **12.** 13 ?.
    c. pilose: **1. 2** ?. **10. 11.** 13 ?.
20. Length of full-grown petals in ♂ flowers (mm): 1(>1.5). 2(?). 3(>2.5). 4(>2). 5a(1.1—2). 5b(1.9—2.3). 5c(2.3). 5d(2.5—3). 6(2.6—2.7). 7(>2.4). 8(?). 9(?). 10(1.0). 11(?). 12(?). 13(?).
21. Petals outside
    a. glabrous: **1.** 2 ?. **3. 5.** 6. **7. 9. 10.** 11 ?. 12 ?. 13 ?.
    b. pubescent, glabrescent: 2 ?. **4.** 6a. **8.** 11 ?. 12 ?. 13 ?.
22. Anther in ♂ flower
    a. elliptic or ovate: **1.** 2 ?. **5b,** d. 6. **9. 10.** 11 ?. 12 ?. 13 ?.
    b. oblong-ovate: 2 ?. **3. 4. 5a, c,** d. 6. **7. 8.** 11 ?. 12 ?. 13 ?.
23. Length of anther (mm): 1(0.5). 2(?). 3(1). 4(1.3). 5a(0.8—0.9). 5b(0.5). 5c(0.9—1). 5d(0.8—1.5). 6(0.7—1). 7(1). 8(?). 9(0.5). 10(0.6). 11(?). 12(?). 13(?).
24. Pistil
    a. glabrous: **1. 2** ?. **3. 4. 5. 6. 7. 8. 9. 10.** 11 ?. 13 ?.
    b. densely puberulous in the upper half: **2** ?. 11 ?. **12.** 13 ?.
25. Length of infructescence (fruits excluded) (cm): 1(?). 2(4—7). 3(18—20). 4(7—15). 5a(2½—7). 5b(4—19). 5c(4—8). 5d(3½—7). 6(3—10). 7(14—22). 8(1—1½). 9(?). 10(4—8). 11(6—16). 12(?). 13(6—7).
26. Thickness of fruiting pedicels (mm): 1(?). 2(1½—2). 3(1½—2). 4(2½—3). 5a(¾—1). 5b(1½—2). 5c(?). 5d(1—1½). 6(2). 7(1¼—1¾). 8(?). 9(?). 10(1). 11(2—3). 12(?). 13(1).
27. Fruiting calyx in diam. (mm): 1(?). 2(3). 3(4). 4(5). 5a(1½—2½). 5b(4—4½). 5c(?). 5d(2½—4). 6(4—4½). 7(2½). 8(?). 9(?). 10(2½—3). 11(4—5). 12(?). 13(4).
28. Fruit, length (cm): 1(?). 2(1.3—1.5). 3(2.2). 4(3¼—3½). 5a(¾—1¾). 5b(1.4—2.2). 5c(?). 5d(2—2.6). 6 (1.7—2). 7(1.6—2). 8(?). 9(?). 10(1.3—1.4). 11(1—1.3). 12(?). 13(>1.2).
29. Fruit in diam. (cm): 1(?). 2(1.2). 3(1.3). 4(2—2½). 5a(0.5—1.3). 5b (1—1.2). 5c(?). 5d(1.2—1.45). 6(1.1—1.4). 7(0.8—1.2). 8(?). 9(?). 10(1.2—1.3). 11(0.9). 12(?). 13(>0.9).
30. Fruit, length/width ratio: 1(?). 2(1.1—1.25). 3(1.7). 4(1.5—1.8). 5a(1.1—1.7). 5b(1.2—2.3). 5c(?). 5d (1.5—1.9). 6(1.2—1.8). 7(1.6—2). 8(?). 9(?). 10(1.1). 11(1.3—1.5). 12(?). 13(?).
31. Fruit (mature) in cross-section
    a. round: 1 ?. **2. 3. 5. 6. 7.** 8 ?. 9 ?. **10. 11.** 12 ?. 13 ?.
    b. triangular: 1 ?. **4.** 8 ?. 9 ?. 12 ?. 13 ?.

1. **Haplolobus acuminatus** (K. Sch.) H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 207; Bull. Jard. Bot. Btzg III, 12 (1932) 410, t. 8 f. 43, *p.p.?*; Husson & Lam, Blumea 7 (1953) 427, f. 5, *p.p.*; H. J. Lam, Blumea 8 (1955) 175, *p.p. et f. glabrior excl.*; Leenh., Fl. Mal. I, 5 (1956) 241, *ditto*; H. J. Lam, Blumea 9 (1958) 247, *p.p.* — *Santiria acuminata* K. Sch. in K. Sch. & Hollr., Fl. Kais. Wilh. Land (1889) 64. — *H. acuminatus* f. *acuminatus* H. J. Lam, Blumea 8 (1955) 175 *p.p.* — Type: *M. Hollrung 737*, NE. New Guinea, Augusta R., 1887, ♂ (B, lost; iso in K *n.v.*, L).

Tree, 15—20 m. *Indumentum* hirsute with dense undercoat of minute ferruginous hair tufts. *Lateral petiolules* 1—1½ cm long. *Leaflets* 4—14 × 3—7 cm, ratio 2, terminal elliptic, laterals subovate, when dry shining brown above, medium to reddish brown beneath; base of laterals equalsided, about truncate or rounded; apex mostly rather abruptly acuminate, acumen short and slender; nerves angle to midrib *c.* 70—80°, slightly curved, nervation open. ♂ *Inflorescences* few to several inserted on a short (—1½ cm) leafless axillary shoot, several times branched but rather compact, rather many-flowered, cymes nearly sessile with several short-stalked flowers; 3—5 cm long. *Fruits* not with certainty known.

Known from the type only.

Dubious specimen.

NEW GUINEA. Northeast. *Ledermann 10390*, Sepik Dist., Malu, alt. below 100 m, y. fr.

*Notes.* The delimitation of *H. acuminatus* remains unclear. It is distinctly allied to both *H. pachypodus* and *H. pubescens*. Originally (1932) Lam kept *H. acuminatus* and *H. pachypodus* separate, though I am not sure that all specimens cited by him under *H. acuminatus* really belong here. In Husson & Lam (1953), however, he combined the two, whereas *H. pubescens* was not split off before 1958. Moreover, in 1958 he described a f. *glabrior* that in my opinion represents a completely different species; I am unable to place it, however.

*H. pubescens* is easily distinguishable on the colour of the dried leaflets (greenish to light brown beneath), the smaller number of more widely spaced nerves, and the calyx which is distinctly more than halfway connate.

The differentiation from *H. pachypodus* remains difficult. A comparison of the types of both species, both with ♂ flowers, gave the following differences: indumentum (*a.* hirsute, partly with an undercoat of minute hair tufts, *p.* puberulous with minute hair tufts), diameter of branchlet (*a.* 4—6 mm, *p.* 10 mm), length of petiole (*a.* 3—5 cm, *p.* 5—14 cm), number of medullary vascular bundles in the petiole (*a.* 9, *p.* 16 or 17), length of terminal petiolule (*a.* 1½—2½ cm, *p. c.* 5½ cm), leaflets (*a.* 4—14 × 3—7 cm, coriaceous, beneath pilose on midrib and veins, *p.* 6½—20 × 3—9 cm, chartaceous, beneath puberulous all over), base of laterals (*a.* truncate or rounded, *p.* distinctly angular), midrib beneath (*a.* rounded, *p.* sharp angular), nervation (*a.* open, *p.* closed), ♂ inflorescence (*a.* hirsute up to the calyx, flowers not glomerulous, *p.* apparently glabrous, at least the calyx, flowers clustered). Apart from these two types I could dispose of 16 specimens, one with young infructescences, all others sterile. Vegetatively, the whole material made a reasonably homogeneous impression, well in accordance with *H. pachypodus*, a little bit less so with *H. acuminatus*. However, this material breaks down all vegetative differences mentioned! The only fertile specimen, *Ledermann 10390*, fitted well in this *pachypodus*-like assemblage but the infructescence is hirsute and the young fruits are solitary and *c.* 5 mm long stalked, so in this to my opinion most important character there is more agreement with *H acuminatus*. Therefore, I placed this specimen provisionally under the present species, whereas all sterile material has been cited as dubious under *H. pachypodus*.

2. **Haplolobus beccarii** Husson in Husson & Lam, Blumea 7 (1953) 431, f. 7; Leenh., Fl.

Males. I, 5 (1956) 243; H. J. Lam, Blumea 9 (1958) 248. — Type: O. *Beccari PB 1803*, Borneo, Sarawak, Mattang, fr. (FI).

Tree. *Indumentum* hirsute, partly with a puberulous undercoat. *Lateral petiolules* 1½—2½ cm long. *Leaflets* 21—36×7½—10 cm, ratio 3—3½, elliptic, when dry olivaceous above, dark brown beneath; base of laterals slightly oblique, acute; apex ± tapering acuminate, acumen up to 1½ cm long, slender; nerves angle to midrib 70—80°, very regular, slightly curved, distinctly looped and joined near the margin. *Infructescences* cauliflorous (?), inserted on up to 1 cm long, rather thick leafless vegetative short shoots, several together, all about equally long, hirsute, sparsely branched, with few fruits solitary or in few-flowered cymes.

Known from the type only.

*Ecol.*: Fr. June.

*Notes*. Husson and Lam already pointed to the relatively isolated position of this species, systematically as well as geographically. I agree with these authors that its nearest ally, if any, may be *H. acuminatus* in their sense (that is including *H. pachypodus* in the sense of the present author).

Not only its geographic and systematic isolation, but also its apparent rarity give something of a mystery to this species. It has been collected only once, in 1866, on G. Mattang near Kuching. It is possible that it has been confused with some other species. Among the *Burseraceae* from the same region there is one, *Santiria tomentosa*, which shows a rather striking resemblance to the present species. As to vegetative parts, *Santiria tomentosa* differs a.o. in its far more dense, ferruginous-velvety indumentum which covers the twigs, leaf axes, midrib and nerves on the upper side of the leaflets, and their whole lower surface (*H. beccarii* is relatively sparsely hirsute, its leaf axes and upper side of leaflets are glabrous), in the reddish brown colour of the upper side of the dried leaflets, and in the base of the leaflets which is mostly rounded to cordate, correlated with a more ovate leaf shape. It is possible that *H. beccarii* is a cauliflorous treelet of the understorey of the forest, escaping the attention of foresters.

3. **Haplolobus boswezensis** Leenh., *nov. sp.* — Type: *A. Kostermans & Soegeng 34*, NW. New Guinea, Hollandia, alt. *c.* 300 m, 26-7-1966, ♂ bud (L). — **Fig. 1 c2.**

Arbor 20 m alta, 20 cm diam., gemmis inflorescentiisque lepidotis excepta glabra. *Ramuli* c. 10 cm crassi; medulla haud fibrosa. *Folia* 3-jugata; petiolus 7—8 cm longus, supra applanatus; petioluli laterales 2—3½ cm longi, 2 mm crassi, ad basin apicemque tumidi; petiolulus terminalis 4—5 cm longus. *Foliola* 15—25 cm longa, 7—8 cm lata, ovato-oblonga, in sicco ferruginea; domatia absentia; basis foliolarum lateralium paullo obliqua, rotundata; apex sensim acuminatus, acumine longo et obtuso; nervi secundarii utrinque c. 12, inter sese 1½—2½ cm distantes, patentes, subrecti, ad marginem abrupte curvati, haud conjuncti. Inflorescentia ramulis brevibus gemma vegetativa terminatis inserta, laxe ramosa, masculina 10—14 cm longa; pedicelli 1—2 mm longi. *Flos* masculinus: calyx 1.5 mm altus, per 0.35 connatus; petala in gemma. 2.5 mm longa, glabra; antherae ovato-oblongae, 1 mm longae; pistillodium glabrum.

Tree up to 20 m×20 cm ⌀. *Indumentum* scurfy, restricted to the young parts and the inflorescences. *Lateral petiolules* 2—3½ cm. *Leaflets* 10—25×4—8 cm, ratio *c.* 2½—3, ovate-oblong, when dry ferruginous; base of laterals slightly oblique, rounded to blunt; apex tapering acuminate, acumen blunt; nerves spreading, nearly straight, bent near the margin, nervation open. *Inflorescences* inserted on a short shoot terminated with a vegetative bud, few, widely branched, ♂ 10—14 cm long.

NEW GUINEA. Northwest. *A. Kostermans & Soegeng 34 & 88*, Hollandia, 100—300 m alt., ♂, resp. fr.

Dubious specimen.
NEW GUINEA. Vogelkop Peninsula. G. *Iwanggin BW 5675*, Warsamson R. c. 25 km E. from Sorong, alt. c. 60 m.

*Ecol.* In valley, alt. 100—300 m. Fl. fr. July.

*Notes.* The present species is doubtless nearest to *H. lanceolatus* from the same region but distinctly different in several characters, though these are mainly quantitative ones: *H. lanceolatus* has much shorter petiolules, leaflets that tend to be obovate rather than ovate, much longer ♂ inflorescences, shorter pedicels, a smaller calyx which is higher up connate, a smaller fruiting calyx, and slightly smaller fruits.

I have named this species in honour of all people working with the '*Boswezen Nederlands Nieuw-Guinea*' (Forestry Division Netherlands New Guinea). In the short time of its existence, from 1950 to 1962, it made a great contribution to our knowledge of the flora and vegetation of the western half of New Guinea; in its BW series about 14000 numbers were collected, mainly in the northern part and on the Vogelkop Peninsula. It were mainly these collections that made a new revision of *Haplolobus* worthwhile.

**4. Haplolobus canarioides** Leenh., *nov. sp.* — Type: *Whitmore's collectors BSIP 3561*, Solomon Is., Santa Ysabel, Allardyce Harbour, 6-1-1964, fr. (L; iso in HONIARA *n.v.*).

Arbor glabra gemmis lepidotis excepta. *Ramuli* c. 10 mm diametiens; medulla fibrosa, abolescens. *Folia* 4-jugata; petiolus 12 cm longus, canaliculatus; petioluli laterales 2½—3 cm longi, c. 1½ mm crassi; petiolulus terminalis 5 cm longus. *Foliola* 19—23 cm longa, 8—10 cm lata, elliptica, in sicco supra cineraceo-virides, subtus alutacea; domatia absentes; basis foliolorum lateralium paulum obliqua, cuneata vel rotundata; apex abrupte acuminatus, acumine longo angusto obtusoque; nervi secundarii utrimque c. 11, inter sese c. 2 cm distantes, paulo curvati, ad marginem indistincte connati, venae venulaeque inconspicuae. *Infructescentia* axillares vel in ramulis brevis gemma vegetativa terminato inserta, ad basem paulo ramosa, 10—15 cm longa; pedicelli 5—10 mm longi, 2½—3 mm crassi; calyces c. 5 mm diametiens. *Fructus* 3¼—3½ ad 2—2½ ad 1¾—2 cm, ellipticis, applanato-triangulares.

Tree up to 21 m × 70 cm ⌀ with steep and thin buttresses up to 1.80 m high. *Indumentum* scurfy, restricted to the buds. *Lateral petiolules* 1½—3½ cm. *Leaflets* 11—23 × 6—12 cm, ratio 1¾—2½, elliptic, lower ones sometimes slightly ovate, when dry above mostly greyish green, sometimes yellowish- to brownish-olivegreen like the lower surface; base of laterals slightly oblique, rounded in lower to blunt in upper leaflets; apex abruptly acuminate, acumen ½—1 cm long, slender, blunt to sometimes slightly emarginate; nerves patent, nearly straight to curved, often looped and joined in the upper half. *Inflorescences* axillary or sometimes few inserted on a rather short, thick, leafless short shoot, ♂ 14—18 cm long, mostly with a few strong branches from near the base, further repeatedly but not very widely cymosely branched, puberulous, ± glabrescent. *Fruits* 3¼—3½ × 2—2½ × 1¾—2 cm. *Galls* on lower leaf surface, ± globular, *c.* 2½ mm ⌀, opening on the upper side with a relatively very wide pore (*c.* 2 mm) (fig. 4 e & f).

SOLOMON ISLANDS. Shortland I. *R. Mauriasi BSIP 13183*, Kupala R. Area, alt. 75 m, y. fr. — Santa Ysabel. *Whitmore BSIP 3561 & 3583*, Allardyce Harbour, fr.; *Beer BSIP 7372*, Moloforu Bay, y. fr.; *Beer BSIP 7846*, Qarangao, ♂.

*Ecol.* Primary forest, mainly on ridges and slopes, at low alt. Fl. Oct.; fr. Jan.

*Notes.* A very distinct species, though doubtless from the *H. floribundus* alliance; vegetatively, it reminds strongly of *H. floribundus* ssp. *moluccanus*. Its most distinctive characters are the fibrous, soon disappearing pith of the twigs, the outside hairy petals, the big flowers, the big fruiting calyces, and the big, relatively thick-walled, and in cross-section triangular fruits. In all these characters it resembles *Canarium*, but the seeds are typical for *Haplolobus*.

**5. Haplolobus floribundus** (K. Sch.) H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 207; Bull. Jard. Bot. Btzg III, 12 (1932) 412, f. 45; Husson & Lam, Blumea 7 (1953) 436 *p.p.*, excl. syn. *Canarium furfuraceum* & *H. furfuraceus*; H. J. Lam, Blumea 8 (1955) 177 *p.p.*, cf. also *sub H. furfuraceus*; Leenh., Fl. Mal. I, 5 (1956) 244, f. 2f, 16e, *p.p.*, excl. syn. *Canarium furfuraceum* & *H. furfuraceus*; H. J. Lam, Blumea 9 (1958) 251 *p.p.*, excl. syn. *Canarium furfuraceum*, *H. acuminatus*, *furfuraceus* & *versteeghii*. · *Santiria floribunda* K. Sch. in K. Sch. & Hollr., Fl. Kais. Wilh. Land (1889) 63. — Type: *Hollrung 543*, NE. New Guinea, Madang Dist., along the coast near Konstantinhafen, -2-1887, ♂ (B, lost; iso in K, MEL, P, none seen). — **Fig. 1a; 5b.**

*Santiria anisandra* Laut., Bot. Jahrb. 56 (1920) 339, f. 4; in E. & P., Nat. Pfl. Fam. ed. 2, 19a (1931) f. 218. — *H. anisander* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 207; Bull. Jard. Bot. Btzg III, 12 (1932) 414, f. 46; Husson & Lam, Blumea 7 (1953) 452 *p.p.*, excl. *specim. Novae Britt.* = *Canarium oleosum*; Leenh., Fl. Males. I, 5 (1956) 246 *p.p.* — *H. leeifolius* (Laut.) H. J. Lam var. *anisander* H. J. Lam, Blumea 9 (1958) 259 *p.p.*, excl. *specim. Novae Britt.* — Lectotype (Husson & Lam, 1953): *Ledermann 7719*, NE. New Guinea, Sepik Dist., Schichtberg, Schultze R., alt. 400 m, 26-6-1912, ♂ (B, lost; iso in K, not seen, WRSL).

*Santiria caudata* Laut., Bot. Jahrb. 56 (1920) 336. — Lectotype (H. J. Lam, 1958): *Ledermann 9877*, NE. New Guinea, Sepik Dist., Lordberg, alt. 1000 m, 29-11-1912, ♀ (B, lost; iso in K, not seen).

*Santiria ledermannii* Laut., Bot. Jahrb. 56 (1920) 334. — *H. ledermannii* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 207; Bull. Jard. Bot. Btzg III, 12 (1932) 408, f. 41; Husson & Lam, Blumea 7 (1953) 427; Leenh., Fl. Males. I, 5 (1956) 241; H. J. Lam, Blumea 9 (1958) 257. — Type: *Ledermann 9013*, NE. New Guinea, Sepik Dist., Etappenberg, alt. 850 m, 4-10-1912, ♀ and fr. (B, lost; iso in K, not seen).

*Santiria leeaefolia* Laut., Bot. Jahrb. 56 (1920) 335. — *H. leeifolius* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 208; Bull. Jard. Bot. Btzg III, 12 (1932) 417, f. 50; Husson & Lam, Blumea 7 (1953) 454, f. 15; Leenh., Fl. Males. I, 5 (1956) 246; H. J. Lam, Blumea 9 (1958) 258. — *H. leeifolius* var. *leeifolius* H. J. Lam, Blumea 9 (1958) 259. — Type: *Ledermann 9760*, NE. New Guinea, Sepik Dist., April R., alt. 200—400 m, 19-11-1912, ♂ (B, lost; iso in L).

*Santiria maluensis* Laut., Bot. Jahrb. 56 (1920) 334. — *H. maluensis* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 208, f. 97; Bull. Jard. Bot. Btzg III, 12 (1932) 416, f. 49; Husson & Lam, Blumea 7 (1953) 436, f. 8; H. J. Lam, Blumea 8 (1955) 177; Leenh., Fl. Males. I, 5 (1956) 244. — Syntypes: of the 9 syntypes cited at least 6 are still extant and have been studied by the present author; these are *Ledermann 6548*, *6605*, *7804*, *8082*, *9691*, and *10708*, all from NE. New Guinea, Sepik Dist., Malu and April R., alt. 50—400 m, -3-1912/-1-1913, fl. and fr. (B, lost; iso in WRSL).

*Santiria nubigena* Laut., Bot. Jahrb. 56 (1920) 335. — *H. nubigenus* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 208, f. 61, excl. syn. *Santiria triphylla*=*H. triphyllus*; Bull. Jard. Bot. Btzg III, 12 (1932) 415, f. 47, *p.p.*, excl. f. 47 a and c and syn. *Santiria triphylla*=*H. triphyllus*; Husson & Lam, Blumea 7 (1953) 447 *p.p.*, excl. syn. *Santiria triphyllus*, see also under *H. furfuraceus* var. *glandulosus*; Leenh., Fl. Males. I, 5 (1956) 245 *p.p.* excl. syn. *Santiria triphyllus*, see also *H. furfuraceus* var. *glandulosus*; H. J. Lam, Blumea 9 (1958) 264, f. 4. — Type: *Ledermann 10323*, NE. New Guinea, Sepik Dist., Lordberg, Sepik R., alt. 1000 m, 11-12-1912, bud (B, lost; iso in WRSL).

*Santiria sepikensis* Laut., Bot. Jahrb. 56 (1920) 333. — *H. sepikensis* H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 208, f. 62; Bull. Jard. Bot. Btzg III, 12 (1932) 416, f. 48. — Neotype (H. J. Lam, 1958): *Ledermann 10455*, NE. New Guinea, Sepik Dist., Malu, alt. 50—100 m, 6-1-1913, y. fr. (B, lost; iso in L).

*H. moluccanus* H. J. Lam, Ann. Jard. Bot. Btzg 42 [(1931) f. 45] (1932) 207, f. 60; Bull. Jard. Bot. Btzg III, 12 (1932) 407, f. 40; Husson & Lam, Blumea 7 (1953) 433; Leenh., Fl. Males. I, 5 (1956) 243; H. J. Lam, Blumea 9 (1958) 263. — Lectotype (Husson & Lam, 1953): *Beguin 2225*, Moluccas, Halmahera, W. Pitu, alt. *c.* 40 m, 21-10-1922, ♂ (L; iso in BO, not seen).

*Canarium aneityense* Guill., J. Arn. Arb. 14 (1933) 54. — *H. aneityensis* Husson in Husson & Lam, Blumea 7 (1953) 449, f. 14; H. J. Lam, Blumea 8 (1955) 179. — Type: *S. F. Kajewski 943*, New Hebrides, Aneityum, Anelgauhat Bay, alt. 150 m, 19-3-1929, ♂ (A; iso in P, none seen).

*H. celebicus* H. J. Lam, Blumea 3 (1938) 111, fig.; Husson & Lam, Blumea 7 (1953) 435; ? H. J. Lam, Blumea 8 (1955) 177; Leenh., Fl. Males. I, 5 (1956) 243; H. J. Lam, Blumea 9 (1958) 248. — Type: *NIFS Cel/V-208*, Celebes, Malili, near Tole Tole, alt. 250 m, 9-11-1932, ♂ (L; iso in BO, not seen).

*H. salomonensis* C. T. White, J. Arn. Arb. 31 (1950) 92. — Type: *F. S. Walker BSIP 242*, Solomon Is., Guadalcanal, Beaufort Bay, Kimbau R., alt. 180 m, 26-2-1946, ♂ (BRI, not seen; iso in A and K, not seen, L).

*H. clementium* Husson in Husson & Lam, Blumea 7 (1953) 449, f. 13; H. J. Lam, Blumea 8 (1955) 179; Leenh., Fl. Males. I, 5 (1956) 245. — Type: *J. & M. S. Clemens 1768*, NE. New Guinea, Morobe Dist., Wareo, alt. 750 m, 5-2-1936, ♀ (B, not seen; iso in A, not seen, L, Z).

*H. hussonii* H. J. Lam in Husson & Lam, Blumea 7 (1953) 443, f. 10; Leenh., Fl. Males. I, 5 (1956) 245. — Type: O. *Beccari herb. 2224A*, W. New Guinea, Japen I., Ansus, -4-1875, fr. (FI).

*? H. megacarpus* H. J. Lam in Husson & Lam, Blumea 7 (1953) 443, f. 11; Blumea 8 (1955) 178, f. 2; Leenh., Fl. Males. I, 5 (1956) 245. — Type: O. *Beccari herb. 2225*, W. New Guinea, Japen I., Ansus, -4-1875, fr. (FI).

*H. microphyllus* Husson in Husson & Lam, Blumea 7 (1953) 423, f. 2; Leenh., Fl. Males. I, 5 (1956) 240; H. J. Lam, Blumea 9 (1958) 262. — Type: *L. J. Brass & C. Versteegh 11198*, NW. New Guinea, Idenburg R., 15 km southwest of Bernhard Camp, alt. 1780 m, –1–1939, ♀ (L; iso in A, not seen).

*H. monophyllus* H. J. Lam in Husson & Lam, Blumea 7 (1953) 445, f. 12; Leenh., Fl. Males. I, 5 (1956) 245; H. J. Lam, Blumea 9 (1958) 263. — Type: *Main & Aden 1316*, Moluccas, Morotai, Mt. Pare Pare, alt. 1000 m, 28-5-1949, ♂ (L; iso in A, BISH, BO, BRI, CAL, K, LAE, P, PNH, none seen).

*H. monticola* Husson in Husson & Lam, Blumea 7 (1953) 425, f. 4, *p.p.*, excl. f. 4c and specim. *Brass 13152=H. ? furfuraceus*; Leenh., Fl. Males. I, 5 (1956) 241 *p.p.*, see also under *H. furfuraceus*. — *H. glandulosus* Husson var. *monticola* H. J. Lam, Blumea 9 (1958) 254, *p.p.*, see also under *H. furfuraceus*. — Type: *J. & M. S. Clemens 1924*, NE. New Guinea, Morobe Dist., Sattelberg, alt. 1000 m, 3-3-1936, ♀ (B, not seen; iso in A, not seen, L, Z).

*H. ? decipiens* H. J. Lam, Blumea 9 (1958) 249, f. 1. — Type: *J. & M. S. Clemens 1752*, NE. New Guinea, Morobe Dist., Sattelberg, Heldsbach, alt. 600—900 m, 30-1-1936, ♂ (L; iso in Z).

*Santiria apiculata* Benn. var. *pilosa auct. non* (Engl.) Kalkm.: H. J. Lam, Blumea 9 (1958) 267.

Tree up to 33(—45) m × 75 cm, mostly with buttresses up to 3 m high, up to 2 m spreading, and 4—15 cm thick, exceptionally a shrub. *Indumentum* mostly scurfy or puberulous, sometimes hirsute. *Lateral petiolules* ½—3 cm. *Leaflets* 1.6—37 × 0.4—16 cm, ratio 1½—4, elliptic to ovate, the terminal to obovate, when dry above greyish green to olive- or reddish brown, beneath light green, olive yellow, or light to dark or reddish brown, sometimes with domatia; base of laterals equalsided to strongly oblique, subcordate to acute; apex tapering to rather abruptly acuminate, acumen short to long and broad to slender, blunt or sometimes emarginate or acutish; nerves patent to transverse to the midrib, nearly straight to rather strongly curved, nervation open to closed. *Inflorescences* axillary, sometimes partly together pseudoterminal, without or with a vegetative terminal bud, or inserted on a leafless short shoot of variable length, variably branched, lax or dense, ♂ 2—25 cm long. *Galls* of several different kinds are found in the different populations.

**a.** ssp. **floribundus.** — *Santiria floribunda* K. Sch. — *Santiria anisandra* Laut. — *Santiria caudata* Laut. — *Santiria ledermannii* Laut. — *Santiria leeaefolia* Laut. — *Santiria maluensis* Laut. — *Santiria nubigena* Laut. — *Santiria sepikensis* Laut. — *H. clementium* Husson — *H. hussonii* H. J. Lam — *H. monticola* Husson — *H. ? decipiens* H. J. Lam.

*Terminal petiolule* 1—5 cm. *Leaflets* 1.6—20 × 0.4—10 cm, elliptic or rarely ovate; base of laterals (truncate or) rounded to acute; nerves ½—2½ cm distant. *Inflorescences* axillary with 2 or 4 (exceptionally 6) erecto-patent branches from just above the base, the rachis sometimes short and terminated by a vegetative bud, branches sparsely, widely, and laxly branched to racemoid. *Flowers*: calyx 0.6—1 mm high, less to more than halfway connate; petals in ♂ flowers 1.5—2 mm long; anthers oblong-ovate, 0.8—0.9 mm long. *Fruiting calyx* 1½—2 mm ∅. *Fruit* ¾—1¾ × ½—1.3 cm, ratio 1.1—1.5. *Galls* of different kinds: 1. rather thick- and hard-walled bladders 6—7 mm ∅, on twigs, leaf axes, or on the leaflet near the midrib; 2. globules *c.* 4 mm ∅ on the lower side of the leaflets; the latter is by far the more common kind.

*Distr.* Throughout New Guinea.

*Note.* A further division of this subspecies into four groups (A, B, C, D) and some more deviating populations has been given in the notes at the end of the present species.

**b.** ssp. **moluccanus** (H. J. Lam) Leenh., *nov. stat.* — *H. moluccanus* H. J. Lam — *H. celebicus* H. J. Lam — *H. monophyllus* H. J. Lam — *? H. megacarpus* H. J. Lam.

*Indumentum* scurfy (terminal bud) and puberulous (leaves, inflorescences) either with solitary or with tufted hairs. *Terminal petiolule* 4½—6¾ cm. *Leaflets* 6½—37 × 2½—16 cm, elliptic to (lower) sometimes ovate; acumen mostly short and broad, blunt to emarginate; nerves 1½—4 cm distant, obliquely erect to spreading, straight to (mostly slightly) curved, leaf surface between the nerves mostly very smooth. *Inflorescences* either axillary, sometimes partly together pseudoterminal, the 'rachis' sometimes terminated by a vegetative bud, to abbreviated, or some inflorescences inserted on a rather long to short leafless short shoot (one and the same specimen may show a great variation on this point), ♂ (3—)15—20 (—25) cm long, widely and typically very laxly branched. *Flowers*: calyx 1.2—1.25 mm high, connate for 25—40%; petals in ♂ flowers 1.9—2.25 mm long; anthers elliptic, 0.5 mm long. *Fruiting calyx* 2½—4½ mm ∅. *Fruits* 1.4—2.2 × 1—1.2 cm, ratio 1.2—2.3. *Galls* globular, up to *c.* 1 cm ∅, rather thick-walled, mostly on and along the leaflets or in the inflorescences (buds or pedicels), more rarely on petioles or petiolules (fig. 2c; 4d).

*Distr.* Celebes, Moluccas, and the western half of New Guinea.

**c.** ssp. **microphyllus** (Husson) Leenh., *nov. stat.* — *H. microphyllus* Husson.

*Indumentum* scurfy to puberulous with tufted hairs, mostly restricted to the buds and the inflorescences. *Terminal petiolule* 1½—4½ cm. *Leaflets* 4—15 × 1½—6 cm, ratio 2—3, when dry above greyish green; base of laterals equalsided to slightly oblique; nerves ¾—1½ cm distant, spreading, mostly rather strongly curved. *Inflorescences* few to many inserted on an up to 8 cm long leafless short shoot, rarely some axillary apparently without vegetative terminal bud, repeatedly branched, ♂ 2—10 cm long. *Flowers*: calyx 1—1.3 mm high, *c.* 50—70% connate; petals in ♂ flowers 2.25 mm long; anthers oblong-ovate, 0.9—1 mm long. *Fruits* unknown. *Galls* globular, *c.* ¾ cm ∅, rather thick-walled, on and along the leaflets, on the pedicels, and in the flowers (fig. 2a, b; 3c).

*Distr.* Throughout New Guinea.

**d.** ssp. **salomonensis** (C. T. White) Leenh., *nov. stat.* — *Canarium aneityense* Guill. — *H. salomonensis* C. T. White.

*Terminal petiolule* 2—5 cm. *Leaflets* 7—17 × 3½—9 cm, ratio 1½—3, elliptic to ovate; base of laterals subcordate to blunt; nerves ¾—2½ cm distant, oblique-erect to patent. *Inflorescences* axillary, exceptionally the rachis terminated by a vegetative bud, ♂ 6—18 cm long, sparsely to rather widely laxly branched. *Flowers*: calyx 1.2—1.8 mm high, mostly less than 33%, rarely up to halfway connate; petals in ♂ flowers 2.5—3 mm long; anthers oblong-ovate to ovate, 0.8—1.5 mm long. *Fruiting calyx* 2½—4 mm ∅. *Fruits* 2—2.6 × 1.2 × 1.45 cm, ratio 1.5—1.9. *Galls* scattered over the lower leaf surface between the nerves, conical and 2½ × 2½ mm to cylindrical, mostly rounded at the top and 3 × 2 mm, on the upper surface rather flat dome-shaped, finally opening above with a rather wide pore (fig. 4a—c).

This subspecies can be subdivided into two varieties, as follows:

**1.** var. **salomonensis.**

Indumentum puberulous, restricted to young parts. Leaflets shortly and broadly acuminate. ♂ pedicels 0.5—1.8 mm. Petals 2.5—2.6 mm.

*Distr.* New Britain, Solomon Is., Santa Cruz Is., New Hebrides, Fiji Is., and Samoa.

**2.** var. **hirsutus** Leenh., *nov. var.* — Type: *Cowmeadow BSIP 3232*, Solomon Is., NW. New Georgia, Kimbukimbu R., alt. 65 m, 30-10-1964, ♂ (L).

Ramuli, foliorum partes axis, foliolorum partes inferiores, inflorescentiaque hirsuti. Foliola longe acuminata. Pedicelli florum masculorum 2—3 mm longi. Petala 3 mm longa.

*Distr.* Solomon Is. (New Georgia).

CELEBES. N o r t h. *NIFS bb 31850*, Manado, Poso, Bailo, alt. *c.* 30 m (aff. b)[1]); *NIFS bb 31901*, Manado, Poso, Dondo, alt. 35 m (b). — C e n t r a l. *NIFS Cel/V-208, 312*, Malili, near Tole Tole, alt. 250 m, ♂ and fr. resp. (b).

MOLUCCAS. M o r o t a i. *Lam 3583* (b); *3653*, Marilako, alt. *c.* 20 m (b); *Main & Aden 1253, 1316*, G. Pare Pare, alt. 1000 m, ♂ (b); *1417*, Sangawo R., alt. 150 m (b); *Tangkilisan 88 = NIFS bb 33782*, Tobelo Subdist., alt. *c.* 30 m (b). — H a l m a h e i r a. *Beguin 2225*, W. Pitu, alt. *c.* 40 m, ♂ (b); *2301*, W. Tobelo, alt. *c.* 30 m, y. fr. (b); *NIFS bb 24847, 24882*, Weda, Tiloppe, alt. *c.* 25 m, ♂ (b); *bb 24852*, ditto, ♂ (aff. b); *bb 24939*, Weda, Luku Lamo, Ake Kobe, alt. *c.* 10 m (b). — B a t j a n. *De Haan 33 = NIFS bb 23153*, Masurung, alt. *c.* 500 m (b); *62 = bb 23182*, Saoran Domut, alt. *c.* 50 m (b); *NIFS bb 16456*, alt. *c.* 15 m (b). — S u l a I s. *NIFS bb 28840*, Sanana, Fowata, Waj Bussa, alt. 260 m (b); *bb 28871*, Sanana, Kabauw, alt. 150 m (b). — B u r u. *NIFS bb 22832*, Kak Tua For. (b). — C e r a m. *NIFS bb 25841, 25878*, East, Kiandarat, alt. *c.* 60 m (b).

NEW GUINEA. V o g e l k o p P e n i n s u l a. *O. Beccari PP 862*, Arfak Mts., Putat, fr. (aB) (FI); *K. Bouwer BW 444*, Prafi, alt. 150 m (aff. b); *A. Brouwer BW 2602*, Oransbari (b); *G. Iwanggin BW 5756*, Sidei, alt. 5 m (aff. b); *BW 5807*, Wariki, alt. 3 m (aff. b); *BW 5853*, Sidei, alt. 5 m (aB); *C. Kalkman BW 3695*, Tafelberg near Manokwari, alt. 135 m (aB); *M. C. Kokkelink BW 15634, 15639*, Warmare Valley, alt. 120 m (aB); *C. Koster BW 1131*, Oransbari (aB); *BW 6704*, Sidai, alt. 7 m (aB); *BW 6715*, Sidai, alt. 5—20 m, ♀ (aB); *BW 6843*, Sidai, alt. 5—20 m, ♂ (c); *BW 6918*, Sidei, alt. 10 m (aB); *BW 7192*, Kebar Valley, alt. 450 m, old ♀ (b); *BW 7221*, ditto, old ♀ (c); *BW 10960*, Masni Plain, alt. 8 m, y. fr. (c); *BW 11774*, Oemboei

[1]) The letters and figures in brackets refer to the infraspecific taxa.

(near Andai), alt. 30 m (b); *BW 13793*, Wandammen Peninsula, Wondiwoi Mts., alt. 340 m (b, simple-leaved); *A. Kostermans 232 = bb 33437*, *272 = bb 33468*, Momi, alt. 10 m (aff. aD); *J. A. Lasschuit BW 4507*, Oransbari (aB); *O. Moll BW 2461*, Warmare Valley, alt. 120 m (b); *V. W. Moll BW 9832*, Kaimana Dist., Adi I., alt. 15 m (aff. b); *BW 11722*, Warsamson Valley, alt. 30 m (c); *BW 12980*, *12981*, *13039*, Bomberai Peninsula, Sjuga-Wagura area, Armina (aC); *P. van Royen & H. Sleumer 7780*, Central Tamrau Ra., south slope path from Sudjak village to Mt. Kusemun, near Aiwa R., alt. 840 m, bud (aff. c); *F. A. W. Schram BW 1556*, Oransbari (between b and c); *BW 1874*, ditto (aB); *BW 1890*, *1892*, ditto (aff. b); *BW 1894*, ditto (aB); *BW 1903*, ditto (b); *BW 2981*, *2985*, Warsamson, alt. 60 m (between aC and c); *BW 5991*, For. Res. Tafelberg, alt. 120 m, fr. (aB); *BW 5994*, ditto, fr. (b); *BW 6096*, Ajamaroe, y. fr. (aC); *BW 7601*, Sidei, alt. 5 m, ♀ (c); *BW 7611*, Sidei, alt. 5 m (aB); *BW 7792*, Kebar Valley, alt. 630 m (b); *BW 7822*, ditto, Anisandau, alt. 630 m (c); *BW 12264*, Warsamson Valley, Asbakin, alt. 50 m (b); *BW 13387*, Wandammen Peninsula, Wondiwoi Mts., alt. 800 m (aC); *C. Versteegh BW 3948*, Sansapor, alt. 15 m, ♂ (between b and c); *BW 4931*, Beriat, alt. 10 m, ♂ (aA); *BW 7418*, Aitinjoe, alt. 250—300 m, y. fr. (aC); *BW 10336*, Kebar Valley, Watjetoni Mt., alt. 1200 m (a, mountain form); *W. Vink BW 11359*, *11363*, Kebar Valley, Asiti, alt. 445 m, latter y. fr. (b). — S c h o u t e n I s. Biak: *V. W. Moll BW 9719*, *9720*, near Soendei, alt. 32 m (aC); *NIFS bb 30692*, *30694*, *30722*, *30764*, *30777*, *30824*, *30840*, alt. 50—80 m (aC). — J a p e n I. *O. Beccari herb. 2224*, Ansus, fr. (aA); *herb. 2225*, Ansus, fr. (aff. b); *C. Koster BW 11129*, Soemberbaba, alt. 8 m (b); *NIFS bb 30306*, Sameimi, alt. 700 m (aA); *bb 30515*, alt. 350 m (b); *F. A. W. Schram BW 10508*, Aisao, alt. 250 m, ♀ bud (aC). — N o e m f o o r I. *M. Jarissetouw BW 610*, Namber, alt. 50 m (aff. b); *C. Koster BW 1004*, *1014*, *1015*, ditto, alt. 3—7 m, the last in bud, prob. ♀ (aff. b). — M i o s N o e m I. *NIFS bb 30973*, alt. 200 m, ♂ (aA); *F. A. W. Schram BW 15040*, alt. 10 m (aC). — M i o s W a a r I. *C. Koster BW 1217*, alt. 7 m (c). — N o r t h w e s t. *L. J. Brass & C. Versteegh 11198*, Idenburg R., Bernhard Camp, alt. 1780 m (c, mountain form); *A. Brouwer BW 2660*, Cycloop Mts., alt. 500 m, ♀ bud (aA); *W. M. Docters van Leeuwen 10800*, Nassau Mts., Explorers Bivouac, alt. 1000 m, fr. (aA); *G. Iwanggin BW 9006*, Bodem R. 60 km SE. from Sarmi, alt. 75 m (aA); *BW 9010*, ditto (aC); *C. Koster BW 4317*, Cycloop Mts., alt. 380 m (aA); *BW 8056*, Bodem R. 60 km SE. from Sarmi, alt. 70 m (aff. b); *BW 8063*, ditto (aC); *BW 8108*, ditto (aA); *A. Kostermans & Soegeng 35*, *358*, *479*, *497*, around Hollandia, alt. 50—300 m, 1st and 3rd one in bud, 2nd and last with old ♀ (aA); *O. Moll BW 6685*, Sarmi Dist., Foein R., alt. 50 m (c); *NIFS bb 25015*, Cycloop Mts., alt. 900 m, old ♀ (c); *bb 25095*, hill N. of Hollandia, alt. 40 m (aA); *bb 28970*, Berap (c); *bb 31079*, Pionierbivak, alt. 35 m (aA); *bb 31471*, ditto (b); *P. van Royen 3782*, Cycloop Mts., path from Ifar to Ormoe, alt. 600 m, ♀ (aB); *P. van Royen & H. Sleumer 6223*, Cycloop Mts., southern slope of Makanoi Ra., N. of Kotanica, alt. 600 m (aA); *F. A. W Schram BW 1630*, *1634*, Tami, alt. 2 m (c); *BW 2707*, mouth of Tami R., alt. 15 m (aA); *BW 7989*, Sidoarsi Mts., alt. 430 m (aff. b); *BW 9403*, *9433*, *9475*, Sekoli Plain, alt. 75 m (c); *C. Versteegh BW 935*, Cycloop Mts. between Ifar and Ormoe, alt. 700 m, y. fr. (aB); *W. Vink BW 8429*, Sidoarsi Mts., alt. 200 m (aC); *BW 8463*, ditto, alt. 425 m (aA). — S o u t h w e s t. *B. Nautje BW 6513*, *6515*, Asmat Region, Erma, sealevel (c); *NIFS bb 14536*, Upper Digul R., alt. 15 m (c). — S o u t h e a s t. Central Dist.: *R. Schodde 2914*, Sirinumu area, *c.* 7 miles S. of Sogeri, alt. 450 m, ♂ (c). Northern Div.: *R. D. Hoogland 3723*, Divinikoari Hill, alt. 50 m, y. fr. (aA). — N o r t h e a s t. Sepik Dist.: *Ledermann 6548*, *6605*, Sepik R., Malu, alt. 60—80 m, fr. (aA) (WRSL); *7719*, Leonhard Schultzefluss, Schichtberg, alt. 400 m, ♂ (aB) (WRSL); *7804*, *8082*, Malu, alt. 50—100 m, ♀ (aA) (WRSL); *9691*, April R., alt. 200—400 m, ♂ (c) (WRSL); *9760*, ditto, ♂ (aA); *9915*, Lordberg, alt. 1000—1400 m, ♀ (a, '*caudata*'); *9989*, alt. 1000 m, ♂ (c); *10323*, Lordberg, alt. 1000 m, ♀ (aD) (WRSL); *10455*, *10708*, Malu, alt. 50—200 m, ♀ (aA) (latter WRSL); *R. Pullen 1569*, Wewak-Angoram Area, Prince Alexander Ra., SE. side of Mt. Turu above Ambakanja village, alt. 780 m, y. fr. (aD). Western Highlands Dist.: *J. R. Flenley ANU 2870*, Wabag Subdist., Pokaris near Kompiam, alt. 2000 m (aff. c). Madang Dist.: *P. Katik NGF 46541*, Madang Subdist., Gogol R., alt. 30 m, bud (aC); *J. C. Saunders 226*, Madang Subdist., Ramy Valley near Faita Airstrip, alt. 180 m (aB); *K. J. White NGF 10275*, Josephstaal, alt. 75 m, y. fr. (aff. d). Morobe Dist.: *L. J. Brass 29262*, Oomsis, alt. 200 m, y. fr. (aA); *J. & M. S. Clemens 846*, Heldsbach, alt. 450—600 m, ♂ (aD) (Paratype of *H. decipiens* H. J. Lam); *1752*, Sattelberg to Heldsbach, alt. 600—900 m, ♂ (aD); *1768*, Wareo, ♀ (aA); *1924*, Sattelberg, alt. 1000 m, ♀ (a, '*monticola*'); *A. G. Floyd NGF 7259*, on main Buang Track, along ridge above Gabensis, alt. 570 m, fr. (aA); *T. G. Hartley 11052*, Burep R. *c.* 15 miles NE. of Lae, alt. 15 m, ♂ (aA); *11061*, S. of the Busu R. *c.* 10 miles N. of Lae, alt. 120 m, ♂? (aA); *11356*, *c.* 3 miles S. of Garagos R. along Lae-Bulolo Rd., alt. 450 m, fr. (aA); *11387*, Tymne-Wago Track, alt. 600 m, old bud (aff. aA); *E. E. Henty NGF 10532*, Markham R., alt. 90 m, ♀ and fr. (aD); *NGF 13688*, Oomsis Logging Area, alt. 450 m, fr. (aA); *NGF 16734*, ditto, alt. 90 m, bud (aD); *NGF 29384*, ridge above Markham Point, alt. 100 m, fr. (aA); *C. K. Ingram NGF 925*, Lae (aD); *A. N. Millar NGF 13857*, *18862*, Lae Bot. Gard., alt. 15 m, ♂ (between aD and c); *P. v. Royen NGF 20145*, Markham Pt., alt. 270 m, bud (aA); *C. D. Sayers NGF 21667*, ditto, alt. 150 m, ♂ (between aD and c); *C. T. White, H. E. Dadswell & L. S. Smith NGF 1564*, Lae, alt. 7 m, old ♀ (aD); *K. J. White W 1440*, Lae Bot. Gard., alt. 30 m, ♂ (between aD and c); *J. S. Womersley NGF 19207*, Oomsis, alt. 150 m, fr. (aA); *J. S. Womersley, A. N. Millar & N. R. Lowe NGF 19480*, ditto, alt. 360 m, y. fr. (aA). — N e w B r i t a i n. *K. J. White NGF 10822*, Talasea Subdist., near Rikau, ♂ (d1).

SOLOMON ISLANDS. Gizo I. *R. Mauriasi BSIP 11721*, alt. 40 m, ♂ (d1). — Kolombangara. *R. Mauriasi BSIP 11477*, Shoulder Hill Area, alt. 300 m, bud (d1); *11640*, Rei Area, alt. 180 m, ♂ (d1). — New Georgia. *N. Burn-Murdoch BSIP 6912*, Lolofa, ♂ bud (d1); *7452*, Wilson Harbour, y. fr. (d2); *Cowmeadow BSIP 3232*, Kimbukimbu R., alt. 65 m, ♂ (d2). — Santa Ysabel. *W. Beer BSIP 7317*, Nahao Bay, alt. 75 m, bud (a?; small-leaved form resembling *H. triphyllus*). — Small Malaita. *I. Gafui BSIP 16474*, SW. Tarapaina, alt. 90 m, bud (d1). — Guadalcanal. *J. Boraule BSIP 9335*, Marau, Makina R., alt. 140 m, ♂ (d1); *I. H. Gafui BSIP 10104*, West coast, Kambi Hill, Duidui, alt. 340 m, ♂ (d1); *R. Mauriasi BSIP 11799*, Southwest, Duidui Area, alt. 18 m, fr. (d1); *12207*, Southwest, Wanderer Bay Area, alt. 190 m, fr. (d1); *P. Runikera BSIP 9712*, Southeast, Betebete, Avu Avu, alt. 210 m, ♂ (d1); *F. S. Walker BSIP 242*, Beaufort Bay, Kimbau R., alt. 180 m, ♂ (d1). — Three Sisters Is. *R. Mauriasi BSIP 17980*, Malaupaina I., alt. 15 m, y. fr. (d1); *18040*, Malaulalo I., alt. 25 m, y. fr. (d1). — San Cristobal. cf. H. J. Lam, 1955. — Sta Ana I. *R. Mauriasi BSIP 17871*, East end, alt. 30 m, y. fr. (d1). — Sta Catalina I. *R. Mauriasi BSIP 17811*, West, alt. 25 m, y. fr. (d1). — Rennell I. *I. H. Gafui BSIP 14927*, Lavangu Area, alt. 45 m, bud (d1); *14991*, Niupani Area, alt. 45 m, ♂ bud (d1); *B. Sirute'e BSIP 9634*, Matagava Area, Kangava Bay, alt. 20 m, ♀ (d1).

SANTA CRUZ IS. Vanikoro I. *W. Piaito BSIP 7037*, ♂ (d1); *T. C. Whitmore BSIP 1631*, Middle Ridge, Sundi Valley, alt. c 300 m, fr. (d1); *1658*, Saboe Bay, alt. c. 60 m, fr. (d1); *1758*, Middle Ridge, alt. c. 360 m, fr. (d1).

NEW HEBRIDES. Aneityum. cf. Guillaumin, 1933.

FIJI IS. Viti Levu. *A. C. Smith 5858*, Mba, hills between Nggaliwana and Tumbeindreketi Creeks, alt. 725—800 m, fr. (d1); *6160*, Mba, hills between Nandala and Nukunuku Creeks, along trail from Nandarivatu to Lewa, alt. 750—850 m, fr. (d1).

SAMOA. Savai'i. *M. L. Bristol 2321*, above Patamea, alt. 375 m, bud (d1).

PALAU GROUP. cf. H. J. Lam, 1955.

*Ecol.* Primary, rarely secondary forests, on plains as well as on slopes and ridges, mostly on rather compact alluvial soils, mostly dry, rarely swampy; alt. 0—500(—2000) m. Fl. throughout the year, fr. Febr.-May, Sept.-Oct.

*Notes.* As may be clear already from the great number of synonyms, *H. floribundus* is a complex species, far more variable and more widespread than any of the other ones. And, like in most complex species, taxonomic problems concern not only the inner structure, but also the outer demarcation.

Present knowledge of *H. floribundus* in the delimitation accepted here is based upon just about 200 collections. This material represents an area stretching from Celebes to Samoa, some 70 degrees of longitude in all. The sampling of this enormous area is not only extremely meagre, it is, moreover, very uneven. A glance at the localities cited will suffice to show that the number of specimens known from Celebes and the Moluccas at the one end and from the islands east of the Solomons at the other is very low indeed. The number of collections from the Solomons is a little bit greater, but still of most of the islands only one or two collections are known. The island of New Guinea is not only the great central land mass in the area of *H. floribundus*, it takes also the central position as to variability. Scanning more carefully the localities of the about 150 collections from this island will show that these are mainly concentrated in some parts, and that within these parts many collections are even from some very restricted localities. Some 90% of the New Guinea collections came from the Vogelkop Peninsula (52), from some of the islands in the Geelvink Bay (22), from the region around Hollandia (*c.* 25), and from the Madang and Morobe Districts (26). There are still wide gaps in the western half of the North-west and in the Sepik District (most of the very important Ledermann collections from this part are at most still existent in small fragments; these, the original descriptions, the excellent and very complete descriptions published by Lam, Bull., 1932, and the drawings made under his supervision which are now at L, are at present the main sources for our knowledge of this part), whereas from the southern half and the central mountain range there are only very few specimens.

The still too few collections from too few localities is not the only problem met with in trying and systematize the *floribundus* complex. A 2nd problem is that too few of these collections are fertile: out of the about 200 specimens less than 50 bear well-developed flowers and *c.* 20 (nearly) mature fruits.

A 3rd and last problem is the great variability alluded to above already. Particularly New Guinea and neighbouring islands show a mosaic of at least some 25 races, some very restricted, others rather widespread. Of some localities all collections are uniform, of others some distinctly different races are known which seem to grow side by side. Some races are known by 10 or more specimens, including ♂ and ♀ flowering and fruiting ones, others are represented by a single specimen only, sometimes even sterile.

From all this it may be clear that growing knowledge may still greatly affect any taxonomy of this complex, either by fading away what still seem to be definable limits between races, or by enabling the delimitation of even some good species. If I have ventured at a division into 4 subspecies and a further subdivision of some of these this should not be taken as more than a trial towards some schematization along more or less natural lines (it is hoped) of what otherwise would remain an unmanageable mass. These subspecies — and this holds still more for the further subdivisions — represent tendencies rather than stabilized taxa, and many a collection has been included with much hesitation in one subspecies rather than in some other.

**Ssp. floribundus** (a) is the central and most variable group. It is restricted to New Guinea with the exception of one specimen in the Solomon Is. (Sta Ysabel). The many local races can mainly be arranged into 4 groups indicated by capitals in the citation of specimens. The following short diagnoses of these four groups are based upon rather extreme races; a great part of the material falls more or less in between some of these groups, tending more to one or to the other.

**A.** Twigs glabrous or scurfy-puberulous. Leaflets thin- to stiff-chartaceous, glabrous, without or with faint domatia; base acute to rounded; apex tapering to sometimes rather abruptly acuminate; midrib above often rather broad, near base ¾—1½ mm; nerves in terminal leaflet 11—18/side, straight to slightly curved, above mostly light to purplish brown. Typically developed in the Morobe Dist.

**B.** Twigs mostly puberulous or pilose, sometimes glabrous. Leaflets mostly rather thin-, exceptionally stiff-chartaceous, beneath pilose or puberulous, sometimes glabrous, mostly with hairy or (sometimes faint) glabrous domatia; base of laterals acute to blunt, sometimes rounded; apex more or less abruptly rather long and slender acuminate; midrib mostly slender; nerves in terminal leaflet 8—13/side, straight to slightly, sometimes moderately or strongly curved, above mostly concolorous. Typically developed in the Vogelkop Peninsula and the Cycloop Mts.

**C.** Twigs glabrous or sometimes scurfy-puberulous. Leaflets stiff-chartaceous to coriaceous, glabrous, without domatia; base variable; apex tapering or sometimes abruptly acuminate; midrib above slender; nerves in terminal leaflet 8—16/side, nearly straight to strongly curved, above mostly yellowish. Typically developed in the Vogelkop Peninsula, the Islands of Biak and Japen, and near Hollandia.

**D.** Twigs glabrous or puberulous. Leaflets thin-chartaceous, glabrous, without domatia; base in laterals very blunt to rounded; apex tapering acuminate; midrib slender; nerves in terminal leaflet 7—15/side, (straight to) strongly curved, above yellowish. Typically developed in the Morobe Dist.

Apart from these four groups there are a few rather deviating populations which deserve to be mentioned.

'*ledermannii*' and '*caudata*', a mountain form from the Sepik Dist., from 850—1000 m alt., small in all dimensions and with the leaflets rather caudate-acuminate.

'*monticola*', another mountain form from the Morobe Dist. at 1000 m alt. Probably near group D but characterized by the presence of clear pit domatia.

*C. Versteegh BW 10336* from the Kebar Valley, Vogelkop Peninsula, at 1200 m alt., represents an other mountain form with *c.* 5 cm long, rather broad, coriaceous leaflets and inflorescences up to 2 cm long. This comes near group C.

*W. Beer BSIP 7317* from Sta Ysabel, at 75 m alt., seems nearest to group D. It has also rather small leaflets (terminal $5\frac{1}{2}$—7 cm) that are stiff-chartaceous, greyish green with light yellowish nerves above, yellowish green beneath, with a minute reticulation prominulous at both sides. The inflorescences are up to $1\frac{1}{2}$ cm long only with up to 5 or 6 flowers. This form resembles also *H. triphyllus.*

**Ssp. moluccanus** (b) is the western form, typically developed in Celebes and the Moluccas, in New Guinea restricted to the Vogelkop Peninsula and some islands in the Geelvink Bay and merging here with ssp. *floribundus* and possibly even to some degree with ssp. *microphyllus*. Furthermore, vegetatively it shows a great resemblance to *H. canarioides*. Ssp. *moluccanus* forms a rather coherent entity varying between typical *H. moluccanus* with thick branchlets, large thin leaflets with widely spaced, strongly curved nerves and the space between the nerves rather smooth, and big inflorescences on the one hand, and *H. celebicus* with thinner twigs, smaller and mostly thicker leaflets with the nerves nearer to each other and often less strongly curved and the venation often more clear, and with smaller inflorescences on the other.

An unusual form is represented by *H. monophyllus* from the island of Morotai. The type, from 1000 m alt., is characterized by simple or 3-foliolate leaves with hairy domatia and by very small inflorescences. Apart from these characters it comes very close to *H. celebicus*. A second collection from the same locality and height, *Main & Aden 1253*, agrees very well with the type but has 2- or 3-jugate leaves. A third collection, *Main & Aden 1417*, also from Morotai, has been collected at 150 m alt. This too resembles the type very much but the leaves are 2-jugate and the domatia are less clear. This is one of those series from lowland material without or with faint domatia to material from greater altitude with well-developed domatia. Simple leaves are further known from *Koster BW 13793*, West New Guinea, Wandammen Peninsula, Wondiwoi Mts., at 340 m alt., a collection that comes near to typical *H. moluccanus.*

As far as can be judged from the very few ♂ specimens available, the extremely small anthers are restricted to Celebes and the Moluccas; in W. New Guinea they may be up to 1.5 mm in furthermore typical material.

**Ssp. microphyllus** (c), like ssp. *floribundus*, is scattered all over New Guinea, but it is by far less variable. Vegetatively, it is not always clearly separated from some forms of ssp. *floribundus*, but the insertion of the inflorescences on a short shoot and the relatively big flowers are good characters. Some specimens in the westernmost part of New Guinea may come near to ssp. *moluccanus* and in the east the delimitation against ssp. *salomonensis* is not always sharp. As a whole it strongly resembles *H. furfuraceus* which differs, however, by the clustered flowers. The variability is at least partly correlated with the wide altitudinal range: most of the material, if arranged according to altitude, forms a coherent series. There are some rather wide gaps in altitude, however, especially towards the type which is among the undisputable specimens the one collected highest. Furthermore, specimens from about the same altitude but collected in different localities may look rather different.

This is one of those cases where domatia have developed at higher altitudes only. *Ledermann 9989* (1000 m) shows what seem to be pit domatia scattered all over the lower surface; *Brass & Versteegh 11198* (1780 m) and *Flenley ANU 2870* (2000 m) have dome domatia in the nerve axils. Domatia are absent from all material collected below 1000 m.

**Ssp. salomonensis** (d) represents the present species on the islands east of New Guinea. A few collections from E. New Guinea (*Millar NGF 13857, White NGF 10275*) and the only one from New Britain (*White NGF 10822*) seem to connect it with ssp. *microphyllus*. As a whole it is rather uniform: apart from the two hairy collections from New Georgia provisionally named as a separate variety, the two collections from Fiji are the ones most deviating. These are hardly comparable with the others, however, as they are from much higher altitude; the only collection from Samoa agrees completely with those from the Solomons. The Fiji specimens show in their leaves a surprising resemblance to the Fiji form of *Canarium vitiense*.

In ssp. *salomonensis*, domatia are rather common, but mostly feebly developed; they are either naked glands or hair tufts. I looked in vain for any correlation either with geography or with altitude.

*H. floribundus* seems fairly closely allied to all further species of the genus, with the possible exception of *H. beccarii*. Most species are clearly separated by one or a few characters. The delimitation from *H. boswezensis, H. lanceolatus*, and *H. versteeghii* is rather vague, however. The differences between on the one hand *H. floribundus*, on the other *H. boswezensis* and *H. lanceolatus* can hardly be defined, but the latter two differ markedly from any of the races included in the present species, far more so than do those races mutually. Therefore, I prefer to keep them separate. *H. versteeghii* is too incompletely known to draw any conclusion; it may be something quite different from *H. floribundus*. The same may hold for *H. megacarpus* but the type of that name resembles ssp. *moluccanus* to such degree that I have included it provisionally in the present species.

**6. Haplolobus furfuraceus** (Laut.) H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 207; Bull. Jard. Bot. Btzg III, 12 (1932) 409, f. 42, *p.p. excl. specim. FRI bb 14536* (=*H. microphyllus*). — *Canarium furfuraceum* Laut., Bot. Jahrb. 56 (1920) 325. — Lectotype (H. J. Lam, Blumea 9, 1958, 251): *Ledermann 9796*, NE. New Guinea, Sepik region, April R., alt. 200—400 m, 21-11-1912, ♂ bud (B, lost; iso in L). — **Fig. 1 c3.**

*H. glandulosus* Husson in Husson & Lam, Blumea 7 (1953) 423, f. 3; Leenh., Fl. Males. I, 5 (1956) 241; H. J. Lam, Blumea 9 (1958) 253 *pro var. glandulosus*. — Type: *J. & M. S. Clemens 4988*, NE. New Guinea, Morobe Dist., Ogeramnang, *c.* 1750 m alt., 15-1-1937, bud (B, not seen; iso in A, not seen, L, Z).

Tree up to 42 m × 80 cm ∅, without buttresses. *Indumentum* variable. *Lateral petiolules* ½—2 cm. *Leaflets* 5—17 × 2¼—7¼ cm, ratio 1¾—2¾, elliptic to ovate, when dry above greyish- to olive green, beneath greenish to light brown; base of laterals equalsided to slightly, sometimes strongly oblique, rounded to blunt; apex tapering to abruptly acuminate, acumen short and blunt; nerves spreading, variably curved, nervation open or nerves sometimes ± looped and joined near the margin. *Inflorescences* mostly few inserted on a vegetative shoot which may vary from hardly more than a sessile vegetative bud to a 10—15 cm long pseudo-rachis terminated by a vegetative bud, rarely no vegetative bud could be found, ♂ up to 20 cm long, with few erect branches, bearing scattered many-flowered clusters. *Galls* on the upper or lower surface of the leaflets, ± semiglobular, *c.* 3 mm ∅, the surface cracked; ovary sometimes developing into a globular gall *c.* 6 mm ∅, surface cracked in the same way as in the leaf galls (fig. 3d).

**a.** var. **furfuraceus.** — *Canarium furfuraceum* Laut.

*H. floribundus* (K. Sch.) H. J. Lam: Husson & Lam, Blumea 7 (1953) 436 *pro syn. Canarium furfuraceum et H. furfuraceus*; Leenh., Fl. Males. I, 5 (1956) *ditto*; H. J. Lam, Blumea 9 (1958) 251, *ditto*.

Big tree. *Indumentum* hirsute with an underlayer of short tufts. *Lateral petiolules* ¾—2 cm. *Leaflets* as above; no domatia. *Calyx* about halfway connate, nearly always puberulous.

New Guinea. Northeast. *M. S. Clemens 1837*, Morobe Dist., Wareo, 750 m alt., bud (L, Z); *L. Clifford & A. Kairo NGF 17106*, Morobe Dist., Bulolo, Taun Creek Logging Area, alt. 1200 m, old fl.; *T. G. Hartley 12831* & *12854*, Morobe Dist., above Bakaia, *c.* 15 miles SE. from Garaina, alt. 900 m, ♂; *R. D. Hoogland 8955*, Morobe Dist., Huon Peninsula, Masba Creek Area, *c.* 3 miles S. from Pindiu, alt. 750 m, fr.; *Ledermann 9796*, Type.

*Ecol.*: In dense to open forest or even open grassland, on slopes or on the valley floor, dry or wet; alt. 50—1200 m. Fl. Jan., June; fr. May.

**b.** var. **glandulosus** (Husson) Leenh., *nov. stat.* — *H. glandulosus* Husson.

*H. nubigenus* (Laut.) H. J. Lam: Husson & Lam, Blumea 7 (1953) 447 *pro specim. Carr 13338*; Leenh., Fl. Males. I, 5 (1956) 245 *p.p.*

Tree 18 m × 25 cm ∅. *Indumentum* scurfy, restricted to young parts. *Lateral petiolules* ½—1½ cm. *Leaflets* 5—10½ × 3—5½ cm; base of laterals hardly oblique, mostly rounded; naked glands or pit domatia present. *Calyx* connate for *c.* ¼.

New Guinea. Southeast. *C. E. Carr 13338*, Boridi, alt. 1500 m, ♂. — Northeast. *M. S. Clemens 4988*, Type; *T. G. Hartley 12868*, Morobe Dist., above Bakaia, *c.* 15 miles SE. from Garaina, alt. 1950 m, bud.

*Ecol.*: Rain forest; alt. 1500—1950 m. Fl. Febr., Sept.

Dubious specimens.

New Guinea. Vogelkop Peninsula. *C. Versteegh BW 10425*, Tafelberg near Manokwari, alt. *c.* 130 m, y. fr.; *W. Vink BW 11328*, Kebar, Asiti, alt. 470 m, y. fr. — Northwest. *L. J. Brass 13152*, Idenburg R., 4 km SW. from Bernhard Camp, alt. 1000 m, Paratype of *H. monticola* Husson. — Southeast. *L. J. Brass 24328*, Milne Bay Dist., Peria Creek, Kwagira R., alt. 50 m, y. fr.; *25432*, Normanby I., Waikaiuna, alt. 20 m, ♂; *C. E. Carr 12247*, Koitaki, alt. 450 m, fr.; *A. Gillison NGF 22342*, Northern Dist., near Mt. Victory, 12 miles NW. from Wanigela, alt. 90 m, y. fr.; *R. D. Hoogland & J. S. Womersley 3238*, Northern Div., *c.* 10 kmW. from Popondetta, alt. *c.* 200 m, ♀; *J. C. Saunders 1074*, Southern Highlands Dist., *c.* ½ mile NW. from Lake Kutubu Patrol Post, alt. *c.* 630 m; *L. S. Smith NGF 1312*, Milne Bay Dist., *c.* ½ mile S. of Waigani Plantation, alt. 10 m, fr.

*Notes.* The present species is well characterized by the inflorescences with the flowers clustered, a character it only shares with *H. pachypodus*. Already Lauterbach (1920) pointed to this relationship.

The dubious specimens, more than in most other species, can clearly be arranged in some groups.

*Brass 13152* and *Saunders 1074* probably represent the present species. The former strongly resembles *Clemens 1837* which has been included in *H. furfuraceus* because of its galls and falls well in the range of var. *furfuraceus*. Both dubious specimens are collected outside the area from which var. *furfuraceus* is known.

*NGF 1312* may also represent var. *furfuraceus* but has been collected outside its area and has nearly globular fruits *c.* 1½ cm ∅.

Both collections from the Vogelkop Peninsula are doubtless conspecific; they are allied with *H. furfuraceus* but may represent a different species. Possibly, *Brass 24328* and *25432*, *Hoogland & Womersley 3238*, and *NGF 22342*, all from the southeastern part, are identical. They are all characterized by 3- or 4-jugate leaves with rather big leaflets, a typical greyish green colour of the leaflets, and a very minute, prominulous venation. The fruits of both BW collections may be well in accordance with those of *H. furfuraceus*, those of *Brass 24328* and *NGF 22342* are nearly globular, whereas *Hoogland & Womersley 3238* shows relatively big ♀ flowers (*c.* 4 mm long).

**7. Haplolobus lanceolatus** H. J. Lam [Blumea 9 (1958) 255, f. 2, *nom. inval.*] *ex* Leenh., *nov. sp.* — *H. floribundus* (K. Sch.) H. J. Lam: Husson & Lam, Blumea 7 (1953) 436 *pro spec. NIFS bb 25088.* — Type: *A. Brouwer BW 2659*, NW. New Guinea, Cycloop Mts., alt. *c.* 500 m, ♂ (L). — **Fig. 1 c 1.**

Tree up to 25 m × 40 cm ⌀. *Indumentum* either scurfy and restricted to the young parts, or moreover puberulous up to and including the midrib above and the nerves beneath, or the same with interspersed longer patent hairs, or velvety. *Lateral petiolules* ½—1½ cm. *Leaflets* 9—34 × 3½—10 cm, ratio 2—4, elliptic to (upper ones) slightly obovate, when dry shining greyish green above, the same to sometimes light brown beneath; base of laterals mostly slightly oblique, sometimes equalsided, mostly rounded, sometimes blunt; apex variably, mostly rather abruptly acuminate, acumen up to 2 cm long, mostly slender; nerves angle to midrib rather wide, fairly strongly bent, nervation regular, as a whole open. *Inflorescences* inserted on a short shoot, few together, widely branched, many-flowered, puberulous to glabrous. *Galls* sometimes frequent, on lower side of leaflets, patent, ellipsoid, up to 7 × 2 mm, smooth, thin-puberulous (fig. 3e).

NEW GUINEA. N o r t h w e s t. *A. Brouwer BW 2656*, st., *2659* (Type), Cycloop Mts., alt. *c.* 500 m; *G. Iwanggin BW 9009*, Bodem R., 60 km SE. from Sarmi, alt. *c.* 75 m; *G. Iwanggin BW 9081*, Sidoarsi Mts., near Oereb bivouac, alt. *c.* 50 m; *A. Kostermans & Soegeng 158*, near Hollandia, alt. *c.* 150 m, ♂; *465*, Dozai (E. of Hollandia), alt. 50 m, ♂; *NIFS bb 25088*, hill north of Hollandia, alt. *c.* 50 m, y. fr.; *H. A. v. d. Sijde BW 4040, 4092*, between Hollandia and Hollandia Binnen, alt. *c.* 10 m, old ♀ and fr. resp. — J a p e n I. *G. Iwanggin BW 10017*, Aisaoe, Sebosiari, alt. *c.* 250 m.

*Ecol.*: Mainly in primary, exceptionally in secondary forests, mostly on dry land, often on steep slopes, alt. up to 500 m. Fl. June-Aug., Nov.; fr. Oct.

*Notes.* As a whole *H. lanceolatus* is fairly uniform and well recognizable. It is best characterized by the fairly large and relatively long leaflets, the big inflorescences inserted on short and thick, leafless, axillary shoots which are terminated by a vegetative bud, and the calyx which is for 60—65 % connate. It most resembles *H. boswezensis*, from the same area, which is distinctly different in several characters, however.

The indumentum is usually puberulous, only the collections *BW 9081* and *10017* are densely ferruginous-velvety.

Lam (1958) indicated two types, a ♂ and a ♀ one, which was contrary to Art. 37 of the Code and invalidated his name. I have validated it here by choosing one of these two, further referring to his Latin diagnosis.

**8. Haplolobus mollis** H. J. Lam, Blumea 8 (1955) 177, f. 1; Leenh., Fl. Males. I, 5 (1956) 242; H. J. Lam, Blumea 9 (1958) 262. — Type: *D. R. Pleyte 345*, Moluccas, Halmahera, G. Sembilan, alt. 600 m, 29-9-1951, ♀ (L; iso in BO *n.v.*).

Tree 20 m. *Indumentum* hirsute with a puberulous lower layer, the former dominating on the lower side of the leaflets, the latter on twigs and inflorescences. *Lateral petiolules* 1—2.2 cm long. *Leaflets* 7—19 × 5—11.5 cm, ratio 1¾—2, elliptic, when dry above shining greenish olive, beneath brownish green; base of laterals equalsided or (lowermost) slightly oblique, blunt to subcordate; apex abruptly acuminate, acumen short, slender, blunt; nerves spreading, slightly curved, ± distinctly looped and joined close to the margin. *Inflorescences* (♀ only) inserted on a short shoot *c.* ½ cm long, few together, 1—1½ cm long, with few flowers, pedicels *c.* 5 mm long.

Known from the type only

Dubious specimen.

NEW GUINEA. V o g e l k o p P e n i n s u l a. *C. Koster BW 13725*, Wandammen Peninsula, Wondiwoi Mts., alt. 920 m.

*Ecol.* Forest; 600 m alt. Fl. Sept.

*Note. H. mollis* seems nearest to *H. pubescens*; further possible allies are *H. acuminatus* and *pachypodus*. It is clearly different from all these species in several characters, however.

**9. Haplolobus pachypodus** (Laut.) H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 207; Bull. Jard. Bot. Btzg III, 12 (1932) 411, t. 8 f. 44. — *Canarium pachypodum* Laut., Bot. Jahrb. 56 (1920) 324. — Type: *Ledermann 9724*, New Guinea, Sepik Dist., April R., alt. 200—400 m, 16-11-1912, ♂ bud (B, lost; iso in K *n.v.*, L).

*H. acuminatus* H. J. Lam *p.p., typo excl.*: Husson & Lam, Blumea 7 (1953) 427; H. J. Lam, Blumea 8 (1955) 175, *pro spec. BW 1773*; Leenh., Fl. Mal. I, 5 (1956) 241; H. J. Lam, Blumea 9 (1958) 247.

*Indumentum* consisting of minute ferruginous hair tufts. *Lateral petiolules* (0.7—)1—2 cm long. *Leaflets* (6½—)13—20×(3—)5—9 cm, ratio 2½—2¾, terminal elliptic, laterals subovate, when dry olive brown above, redbrown beneath; base of laterals slightly oblique, very blunt to about rounded; apex abruptly acuminate, acumen rather short and slender; nerves angle to midrib 60—80°, nearly straight, distinctly looped and joined quite near the margin. ♂ *inflorescence* branched from the base (inserted on leafless axillary shoot?), 4—12 cm long, flowers clustered.

Known from the type only.

Dubious specimens.

NEW GUINEA. Vogelkop Peninsula. *G. Iwanggin BW 5769*, Sidei (*c.* 50 km west of Manokwari), alt. 5 m; *C. Kalkman BW 6241*, Beriat (*c.* 12 km south of Teminabuan), alt. 10 m; *M. C. Kokkelink BW 15618*, Warmare Valley (*c.* 20 km southwest of Manokwari), alt. 120 m; *C. Koster BW 6967*, Sidei, alt. 10 m; *F. A. W. Schram BW 1773*, Sidai; *Schram BW 7793*, Kebar Valley, alt. 630 m; *Schram BW 12321*, Warsamson Valley, alt. 50 m. — Northwest. *G. T. Iwanggin BW 9169, 9171, F. A. W. Schram BW 9412*, all Sekoli Plain (south of Hollandia), alt. 90—100 m; *H. J. Lam 705*, Pionierbivak on Mamberamo R., alt. 60 m, ♀ fl. — Southwest. *C. Kalkman BW 6470*, Subdiv. Muju, Opka (*c.* 10 km northeast from Ninati), alt. 50 m. — Northeast. *J. S. Womersley NGF 3754*, Sepik Dist., Garamambu. — Japen I. *NIFS bb 30371, 30462*, alt. 370 m (Paratypes of *H. hussonii* H. J. Lam).

*Notes.* The four elements on which the present interpretation of *H. pachypodus* has been based are: 1. Lauterbach's original description; 2. Lam's excellent description of the type in the Bull. (1932); 3. the drawing he had made from the type and which is now kept in L; and 4. the rather poor isotype in L.

Whereas Lam originally (1932) kept this species separate, he later (from 1953 onwards) merged it with *H. acuminatus* (see there). Actually, *H. pachypodus* seems nearest to *H. furfuraceus* with which it shares the peculiar character of an inflorescence with flowers in sessile clusters. However, as long as not more and especially better material is available the delimitation of the present species, and hence the identification of material, will remain uncertain.

The specimens cited as dubious, all sterile, form a reasonably uniform entity. In their leaf-characters, especially in the rather dense nervation and the dark, often reddish brown colour of the lower side of the leaflets, they agree very well with the type. The indumentum is rather variable, in several specimens hirsute with or without a lower coat of tufts; a few are glabrous. For the very characteristic gall see fig. 3a & b.

Lam (Bull. 1932) mentioned and figured the presence of a few small and scattered medullary vascular bundles in the twig. This observation could not be checked on the available material. To some degree it would break down the delimitation on vegetative characters given in the introductory key and would be unique in the genus. The dubious specimens all lack vascular strands in the pith of the twig. Another character mentioned by Lam (l.c.) is the presence of concentric instead of collateral vascular strands in the pith of the petioles. The value of this character is not clear.

**10. Haplolobus pubescens** H. J. Lam [Blumea 9 (1958) 265, f. 5, *nom. inval.*] *ex* Leenh., *nov. sp.* — Type: *C. Versteegh BW 927*, NW. New Guinea, Cycloop Mts. between Ifar and Ormu, alt. 680 m, 4-11-1954, ♂ bud (L). — **Fig. 1b.**

*H. acuminatus* (K. Sch.) H. J. Lam: Husson & Lam, Blumea 7 (1953) 427 *pro specim. Beccari PP 542* & *NIFS bb 30470*; H. J. Lam, Blumea 8 (1955) 175 *pro specim. BW 927*; Leenh., Fl. Mal. I, 5 (1956) 241 *p.p.*

Tree up to 30 m × 60 cm ∅, with buttresses up to 1½ m high, up to 1½ m spreading, and *c.* 4 cm thick. *Indumentum* hirsute, sometimes with an underlayer of small tufts. *Lateral petiolules* 0.4—1 cm. *Leaflets* 3½—14 × 2—5¾ cm, ratio 2—3, elliptic, lowermost sometimes slightly ovate, when dry above dull greyish green, beneath the same to light brown; base of laterals equalsided to oblique, blunt to subcordate; apex tapering to mostly rather abruptly narrowed into a usually fairly long, slender, blunt acumen; nerves 1—1½ cm distant, obliquely erect, gradually, mostly strongly curved, nervation regular, open. *Inflorescences* axillary or attached on a long to short leafless shoot terminated by a vegetative bud, ♂ 6—16 cm long, sparsely but widely branched. *Galls* globular bladders up to ¾ cm in diam. in the leaflets not far from the margin.

NEW GUINEA. Vogelkop Peninsula. *C. Koster BW 6770*, Sidai (*c.* 65 km west from Manokwari), alt. 5—20 m, ♂. — Northwest. *A. Kostermans & Soegeng 466 & 481*, Dozai (east of Hollandia), alt. 50 m, ♀ and ♂ resp.; *C. Versteegh BW 927*, Type. — Southeast. *R. Pullen 6427*, Gulf Dist., *c.* 6 miles north from Kerema up the Matupe R., alt. 60 m, ♀. — Japen I. *C. Koster BW 11183*, Sumberbaba, alt. 10 m; *NIFS bb 30470*, Mariattu, alt. *c.* 370 m.

*Ecol.* Primary forest on flat to slightly sloping country on rather wet clayey soil; alt. 0—*c.* 700 m. Fl. Jan., Aug., Oct.

*Notes.* Doubtless, the present species is nearest to *H. acuminatus* and *pachypodus*. The differences mentioned under the notes to the former hold also true for the latter. Moreover, *H. pachypodus* is distinctly different in its peculiar inflorescence.

Locally, *H. pubescens* is mostly rather common to common, according to the labels; as a whole, however, it seems to be rare, and the localities are very scattered.

Lam originally (1958) cited two different types, hence invalidating the name. By choosing one of these two as the actual type I have validated it here. The other syntype, *Beccari PP 542* from Andai, Vogelkop Peninsula (FI), was not available to me.

**11. Haplolobus robustus** H. J. Lam in Husson & Lam, Blumea 7 (1953) 429, f. 6; *non* H. J. Lam, Blumea 8 (1955) 176 (=*Canarium vitiense*); Leenh., Fl. Males. I, 5 (1956) 243 *p.p. excl. specim. Numfoor I.*; H. J. Lam, Blumea 9 (1958) 267 *p.p.*, *excl. specim. BW 1060* (=*Canarium vitiense*). — Type: *L. J. Brass & C. Versteegh 13111*, NW. New Guinea, Idenburg R., 4 km southwest from Bernhard Camp, alt. 850 m, -3-1939, fr. (L; iso in A *n.v.*).

Tree 19 m × 41 cm ∅. *Indumentum* hirsute, dense, gradually glabrescent. *Lateral petiolules* 0.8—1 cm. *Leaflets* 12½—21 × 6—9 cm, ratio 2—3, elliptic to (lower ones) ovate, when dry above greyish green, beneath dark brown; base of laterals slightly oblique, rounded to subtruncate; apex abruptly acuminate, acumen short, slender, blunt to acutish; nerves obliquely erect, nearly straight, nervation regular, open except in upper part. *Infructescences* either axillary or inserted on a sturdy leafless shoot up to 7 cm long and *c.* ¾ cm ∅, sparsely but widely branched.

Only known from the type.
*Ecol.* Primary rain forest, flat country, at 850 m alt. Fr. March.
*Note.* A very distinct species; probably nearest to *H. pachypodus.*

**12. Haplolobus triphyllus** (Laut.) H. J. Lam, Blumea 9 (1958) 268, f. 6. — *Santiria triphylla* Laut., Bot. Jahrb. 56 (1920) 336. — Lectotype (Husson & Lam, 1953): *Ledermann 9703*, NE. New Guinea, Sepik region, April R., alt. 200—400 m, 15-11-1912, ♀ (B, lost; iso in L).

*H. nubigenus* (Laut.) H. J. Lam, Ann. Jard. Bot. Btzg 42 (1932) 208 *pro syn. Santiria triphylla*; Bull. Jard. Bot. Btzg III, 12 (1932) 415, ditto *et* fig. 47a & c; Husson & Lam, Blumea 7 (1953) 447, ditto; Leenh., Fl. Males. I, 5 (1956) 245, ditto.

Tree up to 20 m. *Indumentum* scurfy, early glabrescent. *Lateral petiolules* 0.5—2 cm. *Leaflets* $3\frac{1}{2}$—$9 \times 1\frac{1}{2}$—$4\frac{1}{2}$ cm, ratio *c.* 2, elliptic, when dry above greyish green to olive brown, beneath light to middle brown; base of laterals equalsided, acute; apex abruptly acuminate, acumen variable in length, slender, blunt; nerves obliquely erect, strongly curved, only the upper ones looped and joined near the margin. *Inflorescences* axillary, ♀ 1—3 cm long, sparsely branched from just above the base.

NEW GUINEA. Northeast. *Ledermann 9565*, Sepik region, Etappenberg, alt. 850 m, bud; *9703*, type.

*Ecol.* Rain forest at 200—850 m alt. Fl. Nov.
*Note.* The present species is doubtless nearest allied with *H. floribundus.* It is distinguished, however, by a character which seems to be unique in the genus: the upper half of the pistil is densely, though minutely, ferruginous tomentose.

**13. Haplolobus versteeghii** H. J. Lam in Husson & Lam, Blumea 7 (1953) 440, f. 9; Leenh., Fl. Males. I, 5 (1956) 244. — *H. floribundus* (K. Sch.) H. J. Lam: H. J. Lam, Blumea 9 (1958) 251 *p. min. p. typo excl.* — Type: *L. J. Brass & C. Versteegh 12546*, NW. New Guinea, Idenburg R., near Bernhard Camp, alt. 1150 m, y. fr. (L; iso in A *n.v.*).

Tree up to 26 m × 55 cm ∅. *Indumentum* ferruginous-scurfy on terminal bud and infructescence; midrib above puberulous, the basal part of the midrib beneath with scattered, minute, ferruginous hair tufts. *Lateral petiolules* $\frac{3}{4}$—$1\frac{1}{2}$ cm long. *Leaflets* 10—19 × 5—$7\frac{1}{2}$ cm, ratio 2—3, elliptic, lowermost ovate, when dry greyish green above, medium brown beneath; base of laterals oblique, blunt to rounded, in lowermost subcordate; apex variably acuminate, acumen short; nerves angle to midrib *c.* 60°, ± straight to rather strongly curved, hardly to all clearly looped and joined near the margin. *Infructescences* probably few inserted on a leafless short shoot, sparsely branched, with few fruits. Unripe *fruits* 1.2 × 0.9 cm.

NEW GUINEA. Northwest. *L. J. Brass & C. Versteegh 12544* (Paratype), *12546* (Type), Idenburg R. near Bernhard Camp.

*Ecol.* Primary forest at 1150—1200 m alt. Young fruits in Febr.
*Note.* The present species seems nearest allied to *H. floribundus* ssp. *moluccanus* and may even be identical with it. The comparison is very difficult, however, as the present species is very incompletely known. That is why, though hesitatingly, I keep it separate.

## INDEX TO COLLECTIONS STUDIED

The numbers in brackets refer to the species.



## INDEX TO ACCEPTED NAMES AND SYNONYMS

New names are in bold type, further accepted names are in plain type, synonyms are in italics.

**boswezensis** Leenh.
**canarioides** Leenh.
*celebicus* H. J. Lam = H. floribundus ssp. moluccanus
*clementium* Husson = H. floribundus ssp. floribundus
*decipiens* H. J. Lam = H. floribundus ssp. floribundus
floribundus (K. Sch.) H. J. Lam
ssp. floribundus
var. **hirsutus** Leenh.
ssp. **microphyllus** (Husson) Leenh.
ssp. **moluccanus** (H. J. Lam) Leenh.
ssp. **salomonensis** (C. T. White) Leenh.
var. salomonensis
furfuraceus (Laut.) H. J. Lam
var. furfuraceus
var. **glandulosus** (Husson) Leenh.
*glandulosus* Husson = H. furfuraceus var. glandulosus
var. *glandulosus* = H. furfuraceus var. glandulosus
var. *monticola* (Husson) H. J. Lam = H. floribundus ssp. floribundus
*hussonii* H. J. Lam = H. floribundus ssp. floribundus
**lanceolatus** Leenh.
*ledermannii* (Laut.) H. J. Lam = H. floribundus ssp. floribundus
*leeifolius* (Laut.) H. J. Lam = H. floribundus ssp. floribundus
var. *anisander* (Laut.) H. J. Lam = H. floribundus ssp. floribundus
var. *leeifolius* = H. floribundus ssp. floribundus
*maluensis* (Laut.) H. J. Lam = H. floribundus ssp. floribundus
*megacarpus* H. J. Lam = H. ? floribundus ssp. moluccanus
*microphyllus* Husson = H. floribundus ssp. microphyllus
mollis H. J. Lam
*moluccanus* H. J. Lam = H. floribundus ssp. moluccanus
*monophyllus* H. J. Lam = H. floribundus ssp. moluccanus
*monticola* Husson = H. floribundus ssp. floribundus
*nubigenus* (Laut.) H. J. Lam = H. floribundus ssp. floribundus
pachypodus (Laut.) H. J. Lam
**pubescens** Leenh.
robustus H. J. Lam
*salomonensis* C. T. White = H. floribundus var. salomonensis
*sepikensis* (Laut.) H. J. Lam = H. floribundus ssp. floribundus
triphyllus (Laut.) H. J. Lam
versteeghii H. J. Lam

Santiria
*acuminata* K. Sch. = H. acuminatus
*anisandra* Laut. = H. floribundus ssp. floribundus
*caudata* Laut. = H. floribundus ssp. floribundus
*floribunda* K. Sch. = H. floribundus ssp. floribundus
*ledermannii* Laut. = H. floribundus ssp. floribundus
*leeaefolia* Laut. = H. floribundus ssp. floribundus
*maluensis* Laut. = H. floribundus ssp. floribundus
*nubigena* Laut. = H. floribundus ssp. floribundus
*sepikensis* Laut. = H. floribundus ssp. floribundus
*triphylla* Laut. = H. triphyllus