

**REVISION OF MAGODENDRON (SAPOTACEAE) WITH
OBSERVATIONS ON FLORAL DEVELOPMENT AND MORPHOLOGY**

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SUMMARY

The genus *Magodendron* Vink is revised. A second species, *M. mennyae*, is described. In the developing flower the staminodes are initiated when the stamens are already distinctly differentiated into filament and anther. The probability of movements of the staminodes during anthesis is discussed. In the youngest stages observed the pistil is a single, apically open locule; the sept primordia on its wall are free from the pistil base. The septs grow towards the centre of the pistil. The concrescence of the septs is imperfect, resulting in open connections between the ovarial locules and towards the stigma.

INTRODUCTION

Since the description of *Magodendron* in 1957 the number of collections of this then monospecific genus has quadrupled. These collections enlarged the small distributional area and they contained good fruiting material. Therefore, a revision seemed merited. It turned out that two vicarying taxa are present, differing in leaves and flowers, but remarkably similar in ecology.

NOTES ON FLORAL DEVELOPMENT AND MORPHOLOGY

From some collections dried flowerbuds were available, together with a few buds preserved in alcohol. Very young stages could not be studied as upon drying the buds become very hard by their latex contents. Some observations are worthwhile to be reported.

Mature stages have been figured in Vink (1957) and these are not reproduced here.

Calyx

Of the five quincuncial, free sepals the inner ones are eared at their base and they become so at a rather early stage. The third sepal is straight at its outer base, eared at the inner one.

A dorsal crest, if present, only develops on the inner sepals.

In very young buds the exposed parts of the calyx are all completely hairy, but soon this indumentum disappears almost entirely and only the base of the calyx remains hairy (Fig. 38, 39). The inner sepals are on their dorsal surface either (almost) glabrous, or sericeous. All sepals are glabrous inside.

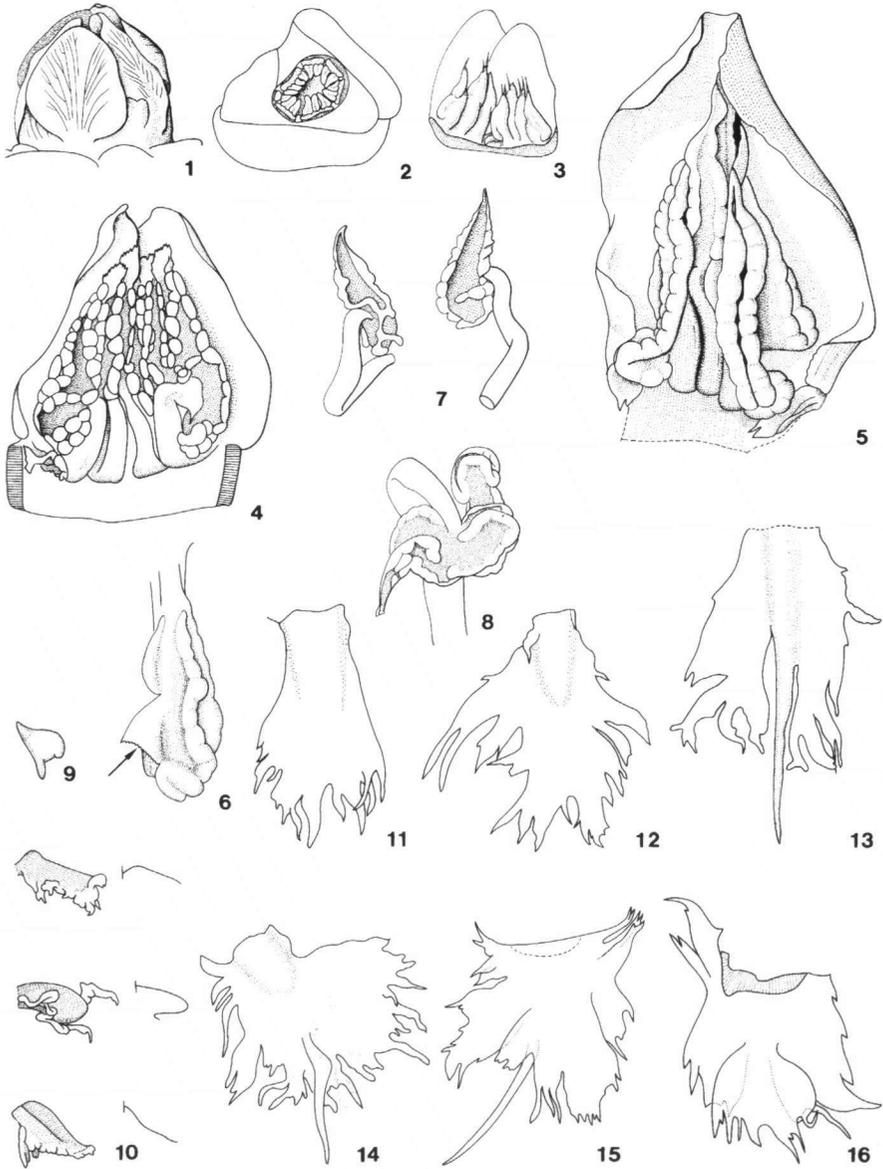


Fig. 1–16. *Magodendron*. — 1. Young corolla, $\times 12.5$; 2. bud, calyx and corolla removed, $\times 12.5$. — 3, 4, & 5. Petals with stamens and staminodes from buds of different age, hairs omitted in 4 & 5, $\times 12.5$. — 6. Young stamen laterally (arrow: scar), $\times 25$. — 7. Two mature stamens with open thecae, $\times 6$. — 8. Mature anther, recurved, $\times 6$. — 9. Young staminode, $\times 25$. — 10. Three young staminodes, with generalised form, $\times 25$. — 11–16. Mature staminodes, $\times 12.5$. — *M. mennyae*: NGF 29967: 8, 15, 16; NGF 43669: 3, 6, 9; LAE 68599: 5. — *M. venefici*: Hoogland 4625: 13; Kanis 1304: 11; LAE 61719: 1, 2; NGF 1318: 4, 7, 10, 12, 14.

Corolla

The corolla lobes outsize the tube for a long time during the growth of the flower-bud (Fig. 1). The tube starts to elongate at a rather late bud stage and this elongation continues till full anthesis is reached. Finally, it is 1–2.2 times as long as the lobes.

During their enlargement, the lobes become eared at their base. At anthesis the lobes spread out and their tips are rolled backwards.

All parts of the corolla are glabrous.

Androecium

The relation between stamens and staminodes is of interest. A distinct discrepancy in the development of these appendages of the corolla throat is found.

In the youngest buds available the stamens are already present. At the transition of the corolla tube and the lobes they are inserted in a single row, 2–4 opposite each lobe (Fig. 17). Even in young stages the filament is strongly curved (Fig. 4) and difficult to define; therefore, the length of the anthers was used for a comparison with the length of the staminodes.

When the anthers are already 0.22 mm long and the corolla lobes 0.37 mm, the staminodes are still invisible at $\times 50$. Soon after that stage, staminode primordia become visible in the sinuses of the corolla lobes (Fig. 2, 28'), slanting towards the adaxial side. The staminodes thus are distinctly later initiated at a more abaxial location when compared with the stamens.

When the anthers have reached a length of 0.5 mm, the staminode primordia are 0.1 mm. From there on, the anthers elongate at a faster rate than the staminodes until the anthers are about 3 mm and the staminodes about 1 mm. After this stage the staminodes increase faster in length than the anthers, especially by developing the incised/fringed part of their blade. Finally, in open flowers the staminodes and anthers are about equal in length.

The ontogeny of the staminodes in *Magodendron* does not directly reveal their homology. They arise in the sinus between two petal lobes, that is, in a location similar to that of petal lobes. On the other hand, they are initiated much later. As they are single, they cannot straightforwardly be compared with lateral divisions of adjoining lobes. Such lateral divisions are found in the *Mimusopeae* and *Sideroxyloae* (Pennington, 1991: 79), but there staminodes are present as well. If staminodes are considered to be much transformed stamens, then the additional supposition of retardation of the outer whorl of stamens is also needed.

Lam (1938) discussed at some length the relation of staminodes with petals and stamens on the basis of observations on mature flowers of *Nesoluma* and other *Sapotaceae*. He suggested the provisional interpretation of all structures in the corolla-androecium region as potential petals as well as potential stamens. Aubréville (1964) considered the staminodes of *Sapotaceae* to be abortive stamens.

In view of the wide range of forms of staminodes in the *Sapotaceae*, the present case of *Magodendron* cannot be exemplary; comparative studies are needed. Lam (1939) already advocated investigations into the 'morphological nature' of the 'staminodes'.

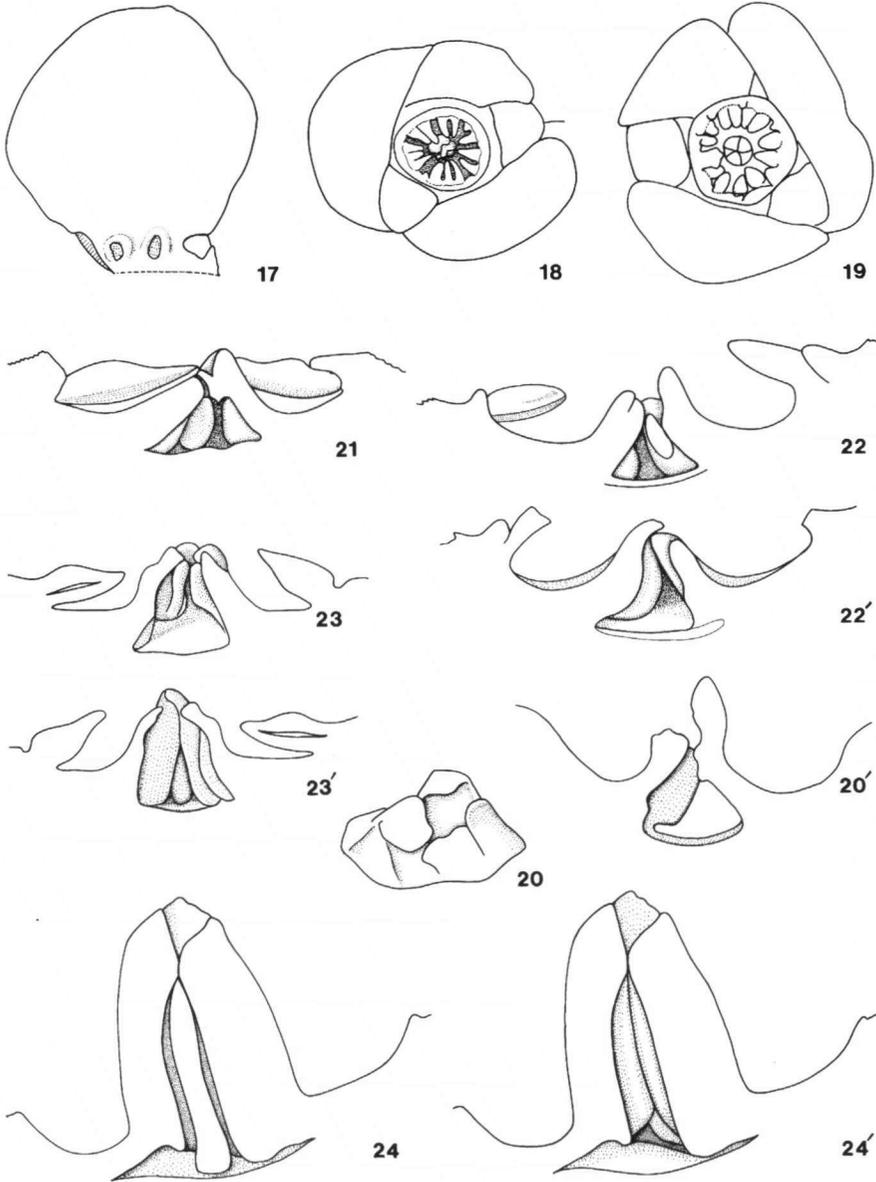


Fig. 17-24'. *Magodendron*. - 17. Young petal with two filament insertions and one young staminode, $\times 25$. - 18, 19. Buds, calyx and corolla removed, showing androecium and lobed pistil, $\times 25$. - 20-24'. Young pistils, $\times 100$. - 20. Oblique view. - 20'. Slice of the same with one free sept. - 21-24'. Longisections; bottom of general locule below bottom of flowerbud; septa attached to locule wall, otherwise free. - 22' & 23'. Opposite sides of sections. - 24'. Free margin of central sept removed. — *M. mennyae*: LAE 61719: 17-24'.

Stamens

The anthers are locellate, that is, the thecae are divided into separate to confluent compartments, a unique character in the Sapotaceae (Pennington, 1991). However, the thecae open with a single, longitudinal slit.

The young stamens often have stiff, yellowish brown hairs at their anther tips (Fig. 3, 6) and soft, colourless hairs on filaments and anthers.

In some specimens one of the flowers is just opening. In these flowers the corolla lobes are erect, not yet spreading, but the anthers are already shedding pollen. This can have been caused by the drying and subsequent boiling of the material, but it could also point to protandry.

Staminodes

The margin of the staminode blade is at least irregularly sharply dentate (Fig. 11), but mostly it is incised to some degree with the resulting lobes dentate to incised. In some specimens (e.g. *Hoogland 4625*, *M. venefici*) almost all staminodes possess a subulate central lobe, better described as a soft spine (Fig. 13). In some cases this spine or a short central lobe is inserted *on* the morphologically abaxial side of the blade (Fig. 14–16). However, mostly such a central lobe is absent.

Very rarely the staminodes bear some soft, colourless hairs on their abaxial surface.

It is not clear whether the staminodes have a function in pollination. In bud and in just open flowers the filaments of the stamens are bent downwards from their insertion, so deeply that the hirsute indumentum of the disk is flattened by their presence c. q. pressure. The staminodes are then hanging more or less flat against the corolla tube and are covered by the curved parts of the filaments. When the filaments stretch upon full anthesis, the staminodes have been seen to be more or less ‘horizontal’ (perpendicular to the tube), closing the corolla throat (*Coode & Katik NGF 29967*, *M. mennyae*, described on the label; *Hoogland 4625*, *M. venefici*, observed in herbarium material). If this is the normal situation, the staminodes must later flip back into their original ‘hanging’ position (by desiccation?) as in corollas collected from beneath the tree patent staminodes were never observed. In the colour slide belonging to *NGF 29967* the closure of the throat is distinct, the filaments are fully stretched, and the anthers are open and apparently have shed (most of) their pollen.

In other Sapotaceae the situation is also not very clear. In his revision of the Sapotaceae, Pennington (1991) described the disk as a nectary. He also described the incurved staminodes of *Mimusops* as forming a closed receptacle around the ovary, acting as a nectar receptacle in the newly opened flower; as a disk is not mentioned this is apparently absent (p. 80).

From Pennington’s work can be extracted that a staminodial receptacle is found in:

- Mimosopeae (disk apparently absent): *Vitellariopsis*, *Vitellaria*, *Neolemonniera*, and *Gluema* (but explicitly not in *Manilkara*);
- Sideroxyloae (disk apparently absent): *Sideroxylon*;
- Chrysophylleae (disk absent): *Sarcaulus*, *Capurodendron*.

The genus *Magodendron* is inserted in the Omphalocarpeae. The other genera of this tribe show a wide variation:

- *Tsebona*: the staminodes are pressed against the style, the disk is minute and free;
- *Omphalocarpon*: the staminodes are often inflexed and covering the ovary, a disk is absent;
- *Tridesmostemon*: no inflexion of the staminodes is mentioned and a disk is absent.

A combination of a 'nectary receptacle' and a 'nectary disk' is thus only found in *Tsebona* and probably in *Magodendron*.

In conclusion, it is clear that the relation between the closure of the corolla throat by the staminodes and the production of nectar by a disk or in some other way needs further clarification.

Disk

The disk arises rather late during flower development (absent in Fig. 25) on the bottom of the flowerbud, around the pistil (Fig. 28). It is free (Fig. 31, 33, 34), ring-shaped, erect or slightly slanting outwards. The disk is covered with long, rather stiff, yellowish brown hairs, but inside it is glabrous along the base. The hairs develop before the disk wall becomes visible. The incurved stamen filaments flatten the hairs locally, giving the impression that the hairs are arranged in groups.

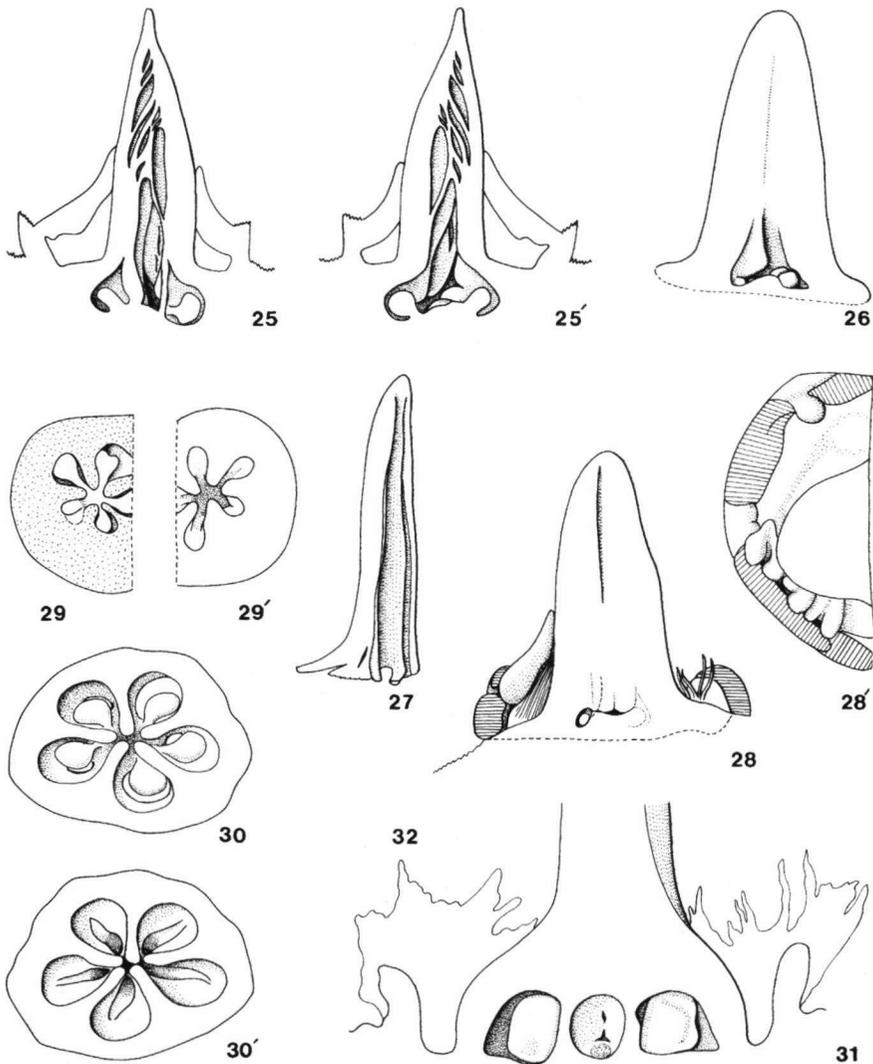
No reports on nectar production by the disk are available and insects were never found in dissected flowers. Movements of the staminodes as described above suggest that field observations are necessary.

The absence or presence of a disk in Sapotaceae is not unequivocal. If a disk is reported to occur, usually an annular, free disk, however small, is indicated or implied. The indumentum of such a disk and of the appertaining ovary can be similar, but often they are different; e.g. hairs of the disk longer than those of the ovary, or disk hairy and the ovary glabrous.

The disk can also be adnate to the ovary. According to Lam (1941) species of *Manilkara* can have a glabrous disk adnate to the hairy ovary. For his *Planchonella paludosa* (*Pouteria torricellensis*) he described a hairy disk adnate to a glabrous ovary

Fig. 25–32. *Magodendron*. Pistils from buds. – 25. Longisection; margins of septa free (in upper stylar part torqued by sectioning), bases united with locule base. – 25'. Opposite side, bases of septa at left free, at right partly so, $\times 50$. – 26. At right sept removed, sept at left with small counterpart from base of locule, $\times 25$. – 27. Halved pistil from top of ovarial locules upwards, septa free till stigma, $\times 25$. – 28. Dotted line: deeper level; broken line: still deeper level; long hairs on emerging disk, $\times 25$. – 28'. Apical view (hairs omitted); hatched: petal scars; three anthers in situ, two staminode primordia between petals, $\times 25$. – 29. Cross-section, view towards pedicel, compitum distinct. – 29'. Opposite side, view towards style, grooves in ceiling of ovarial locules still confluent with central free space, $\times 25$. – 30. As 29. – 30'. As 29', but with grooves leading to stylar canals formed by lateral fusion of sept margins, central stylar canal still open, $\times 25$. – 31. From large bud (pedicel 15 mm), one ovule removed, its locule with two pores to compitum (in style all canals already closed; disk hairs indicated), $\times 25$ – 32. Ovule, $\times 33$. — *M. mennyae*: NGF 43699: 26, 28; LAE 68599: 30, 30'. — *M. venefici*: Hoogland 4625: 25, 25'; Kanis 1304: 27, 29, 29', 31, 32.

(Lam, 1927: 469, fig. 28). In the latter case the disk is apically still free from the ovary and thereby a distinct structure. When the disk as a whole is adnate, it is less easily recognised and its presence or absence is called *subjectif* by Aubréville (1964: 33). For some species Van Royen described the adnate disk even as represented by bundles of hairs, e. g. for *Planchonella (Pouteria) cycloensis* (Van Royen, 1957: 335, fig. 29). Such a statement is understandable in the light of the occurrence of lobed disks as in *Planchonella queenslandica* (Van Royen, 1957: 341, fig. 32). Many cases of small adnate disks will have passed unnoticed in drawing up specific descrip-



tions, especially if there are no differences in indumentum. Descriptions of differences between indumentum of the base and of the body of the ovary, in absence of a disk, should be regarded with suspicion.

Pistil

According to Ng in Pennington (1991) all Sapotaceae – in fact, all Ebenales – possess a compitum, a connection between the locules. Such a connection was already reported for *Magodendron* (Vink, 1957). Here some observations regarding its development are added. It will be shown that the origin of this compitum is connected with the development of the 5–8-locular pistil from a young stage with only one locule.

The youngest buds in which the pistil is observed are 2.5 mm long including the pedicel; they are taken from herbarium material. All observations are made at $\times 50$.

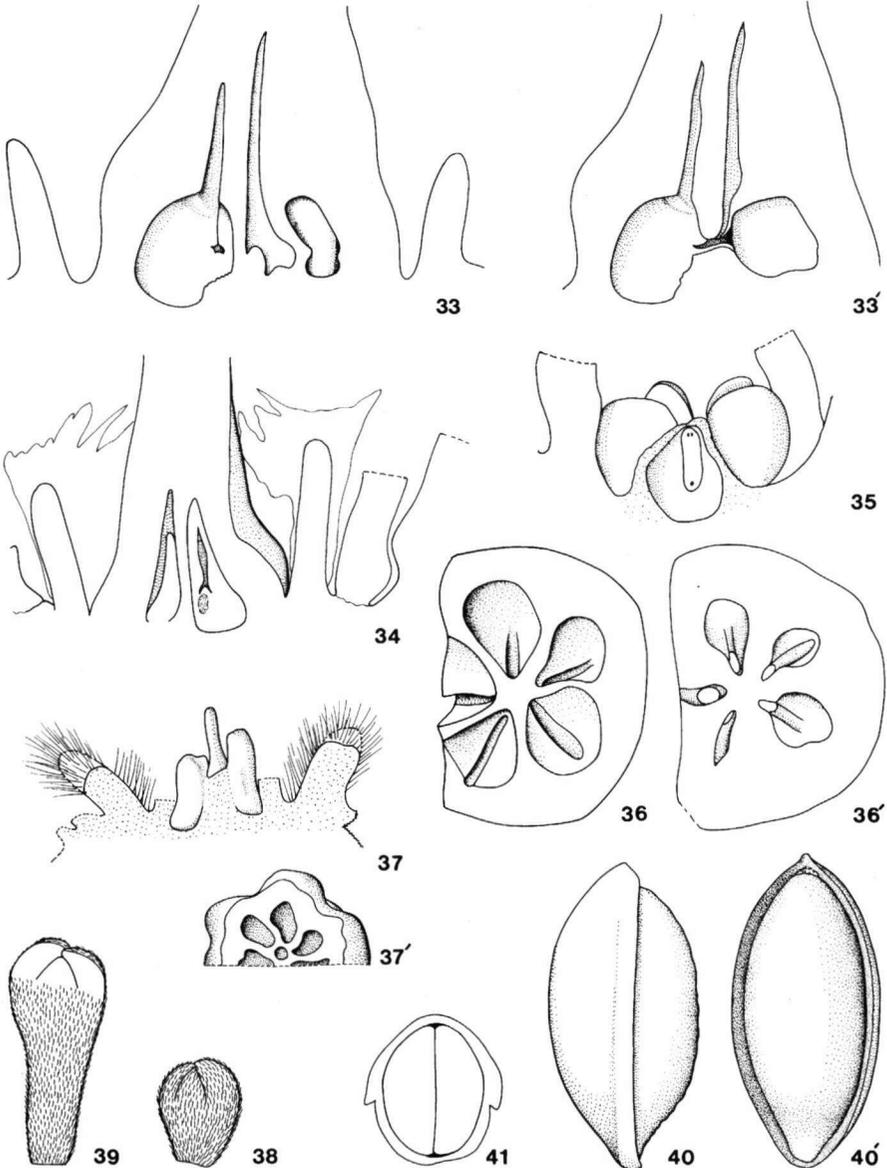
The young pistil occupies the centre of the glabrous bottom of the bud on which the disk is not yet initiated. This pistil is an apically flattened cone. Approximately the upper half of the cone consists of five or more unequal, imbricate lobes (Fig. 18, 19, 23). Internally, the pistil contains a single conical locule with a flat to slightly concave or convex bottom. At its top this locule is not always closed by the imbricately folded lobes.

At first sight the ovarial part of the pistil is inferior, as the locule extends below the general surface of the bottom of the bud (Fig. 21–24). However, later stages of development show that of the flowerbud bottom the outer regions will give rise to the disk, whereas the inner regions consist of the walls of the ovarial part of the superior pistil (Fig. 31). Therefore, the young pistil is better described as superior on a concave floral apex.

Throughout the height of the locule the septa extend inwardly until they meet at the centre (Fig. 24, 24'). Through differential growth the young locule is divided into a styler and an – still seemingly inferior – ovarial part. In the styler part the septa are contiguous, but the ovarial part enlarges faster and there free spaces are left between the septa, near the locule wall. These spaces develop into ovular locules, with a narrow opening between the septa towards the centre of the pistil. Basally in each of these openings an ovule is initiated, on the side of a very low central bulge of the bottom of the general locule. In this way the ovules are initially almost basally inserted (Fig. 26, 29).

Fig. 33–41. *Magodendron*. – 33. Pistil from open flower (disk hairs omitted); at left pore to compitum connected with pore to styler canal. – 33'. The same, frontal sept removed, showing compitum, $\times 25$. – 34. Pistil from open flower (disk hairs indicated), ovule insertion dotted, $\times 25$. – 35. Ovules of old flower, sept broken away, no compitum; frontal ovule removed showing oblong insertion, $\times 25$. – 36. Pistil of old flower, view towards style; ceiling of locules with grooves, septa connate. – 36'. Ibidem, more distally; transition from grooves to styler canals; in centre septa completely united, $\times 25$. – 37. Base of pistil from old flower; extreme case with central axis apically elongated, free in proximal part of styler canal (37'); ovule insertions lateral, $\times 12.5$. – 38 & 39. Buds, $\times 6$. – 40. Seed, lateral. – 40'. The same, adaxial, $\times 0.5$. – 41. Cross-section of seed, rim between testa and scar; thin albumen layer, $\times 0.5$. — *M. mennyae*: NGF 43669: 40, 41. — *M. venefici*: LAE 67179: 37–39; Kanis 1304: 33, 34; NGF 1318: 35–36'.

In the meantime the septa become connate with the bottom of the general locule and with the lateral sides of the central bulge. If this happens at a somewhat later stage, low counterparts to the septa formed by the locule bottom can be observed (Fig. 25', 26). In the styler part of the pistil the interseptal spaces remain very narrow, the septa often touching laterally, but these spaces remain existent up to the apical opening of the style between its tiny lobes (Fig. 27). Free space within the pistil is still continuous.



In a later stage the basal central bulge enlarges to form a low central axis (Fig. 28). The internal margins of the septa unite with their lateral sides, leaving open a central stylar canal; the apex of the central axis remains free (Fig. 30', 33'). Now there is a compitum over the top of the central axis, with open connections with the ovarial locules and, through the stylar canal, with the stigma. The remaining interseptal spaces form additional stylar canals. The ovarial locules thus have two exits, one as a slit in a groove in their ceiling towards an additional stylar canal, one as a small pore over the insertion of the ovule towards the compitum (Fig. 33, 33').

The stylar canals become closed from the stigma downwards, the central one first. Also the exits of the locules close, usually that to the stylar canal first (Fig. 36'). All these closures can take place at various stages of flower development. In large buds the exits of the ovarial locules can be closed; on the other hand, both these exits can still be open when the flower is at anthesis. After anthesis the exits are always sealed.

An aberrant case was found in *LAE 67179 (M. venefici)*. In an old flower the lower part of the central stylar canal was still open and filled by a free sterile elongation of the central axis (Fig. 37, 37').

After anthesis the complete union of the septa with each other and with the central axis leaves no free space in the pistil outside the ovarial locules. The stigma has five to seven minute triangular lobes, curved towards the centre; no distinct stigmatal tissue was observed at $\times 50$.

As described above, the central axis elongates somewhat during the development of the pistil. Thereby the position of the ovules is changed from almost basal to distinctly lateral. At the same time the attachments of the ovules are stretched from circular to oblong (Fig. 35), showing the first indication of the long 'scar' (attachment surface) of the seed (Fig. 40, 40').

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MAGODENDRON

Magodendron Vink, Nova Guinea, n. s., 8 (1957) 124; Aubréville, *Adansonia*, Mém. 1 (1964) 115; Baehni, *Boissiera* 11 (1965) 116, f. 191; Pennington, *Gen. Sapot.* (1991) 259. — Type species: *M. venefici* (White & Francis) Vink.

Trees. Leaves entire, spirally arranged, exstipulate. Cauliflorous. Flowers fasciculate, pedicellate. Sepals 5, quincuncial (or 6, in one series), free. Corolla exsert; tube as long as to longer than lobes; lobes 5–8, spreading. Stamens 10–19, 2–4 opposite each corolla lobe, exsert; anthers locellate. Staminodes 5–8, fringed to lacerate, recurved. Disk free, ring-shaped. Ovary 5–8-locular, cells imperfect; style protruding slightly beyond corolla throat; stigma minute. Fruit 1(–3)-seeded. Seed boat-shaped; scar as long as the seed, covering half the seed surface; albumen membranous to absent; cotyledons thick; radicle double-conical, slightly exsert.

Distribution – Eastern Papua New Guinea.

Ecology – Lane-Poole (1925: 22) mentions “a rather rare second story tree.” Otherwise none of the labels indicates the frequency of local occurrence. J. S. Womersley (in litt. 16.10.1970) proudly announced to have located a single tree. As cauliflorous trees with long-persistent fruits (and probably likewise flowerbuds) are far more easily spotted in the forest than other types of trees, the number of collections would indicate a low frequency.

The variation in ecology of both species is remarkably similar, although the single report from swamp forest falls out of line.

KEY TO THE SPECIES

- a. Secondary nerves 7–15. Outer sepals 5–6.5 × 5.5–8 mm; inner sepals glabrous or with a few scattered hairs on median crest outside. Corolla 7–13 mm long. — Stamens 10–17, 2–4 opposite each corolla lobe. Leaf blades 7.5–28 × 4–12 cm 1. *M. venefici*
- b. Secondary nerves 16–26. Outer sepals 7–10 × 9–11 mm; inner sepals sericeous without, but with broad glabrous zones along margins. Corolla 15–18 mm long. — Stamens 14–19, 3 or 4 opposite each corolla lobe. Leaf blades 17–52 × 5.5–17 cm 2. *M. mennyae*

1. *Magodendron venefici* (White & Francis) Vink

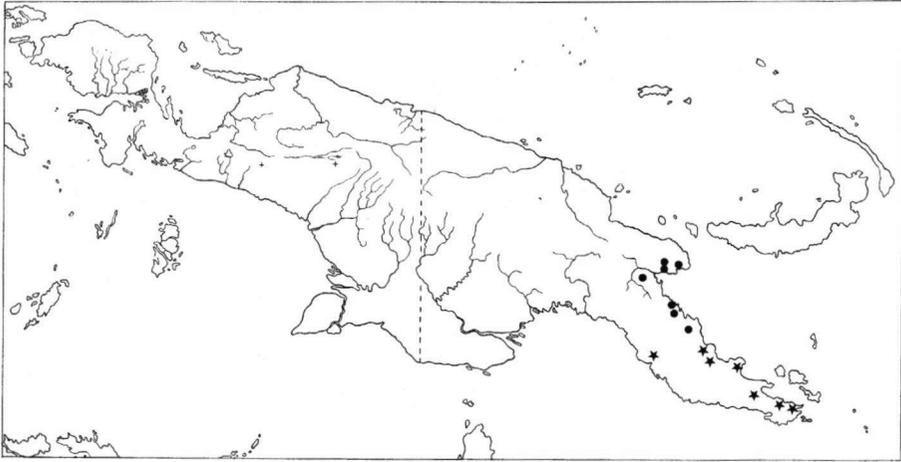
Magodendron venefici (White & Francis) Vink, Nova Guinea, n. s., 8 (1957) 125, f. 20 (orthographic correction, see l.c. 127); Aubréville, *Adansonia*, Mém. 1 (1964) 11, f. 1-1. — *Achradotypus benefici* White & Francis, *Proc. Roy. Soc. Queensl.* 38, 15 (1927) 254, f. 16; H. J. Lam, *Nova Guinea* 14, Bot. (1932) 558, t. CVI. — *Achradotypus spec.*, Lane-Poole, *Forest Resources Terr. Papua & New Guinea* (1925) 22, 132. — Type: Lane-Poole 227 (BRI holo; P).

Tree 15–33 m high; bole 9–18 m, straight, buttressed or fluted up till 1 m high, d. b. h. 18–40 cm. *Bark* light (grey-, red-) brown to dark grey, smooth to finely vertically cracked, craterous to pustular, lenticels in vertical rows; inner bark straw or yellowish or pinkish brown with brown streaks. *Sapwood* white to pinkish straw; heartwood pinkish or reddish brown to brown, hard. *Branchlets* subterete, 3–6 mm in

diam. *Innovations* and tips of branchlets with dense, appressed, (dark) ferruginous indumentum, branchlets soon glabrescent. *Leaves* confined to tips of branchlets; young leaves bright red. *Blade* elliptic to oblong to obovate, 7.5–28 × 4–12 cm, apex (acute to) obtuse (to rounded), 0–2 cm broadly acuminate, base cuneate to obtuse, often slightly attenuate and slightly oblique; thin-coriaceous; above nitidous to dull, glabrous; below dull, glabrous or with remnants of indumentum on midrib; midrib flat or slightly raised above, prominent and triangular below; secondary nerves 7–15, ascending at an angle of 60°–75°, straight or somewhat curved (*Pullen* 5879), near margin curved and diminishing until inconspicuous, sometimes connected by stronger tertiary nerves, distinct and flat above, prominent below; tertiary nerves transversely reticulate with (a) stronger one(s) descending to midrib, faint to inconspicuous above, prominulous to faint below. *Petiole* 2–5(–6) cm long, triangular in cross-section, flat above, with a sharp ridge below, basal 0.5–1 cm thickened, glabrous or with remnants of appressed indumentum.

Inflorescences (burls) on lower part of bole. Bracteoles at base of pedicel broadly ovate, 1–2 × 1–3 mm, broadly rounded, thin, (thinly) appressed hairy on median line outside. *Pedicels* 10–20 × 1.3–2.5 mm, distally thickened, with a few scattered hairs to thinly sericeous. *Sepals* 5 (or 6), coriaceous; outer sepals ovate, 5–6.5 × 5.5–8 mm, apex obtuse to broadly rounded, in bud sericeous outside, later outside glabrous, with a few scattered hairs, or basally thinly sericeous, apex with some dark hairs, inside glabrous; inner sepals ovate to orbicular, 5–6 × 5.5–8 mm, apex truncate to broadly rounded, base eared, margins membranous, outside with or without a median crest, crest sometimes with a few scattered hairs, otherwise glabrous. *Corolla* 5(–8)-lobed, 7–13 mm long, glabrous; tube cylindrical, rather thick, 3–9 mm long; lobes ovate to ovate-orbicular, 3–4.5 × 3.5–4.5 mm, apex narrowly to broadly rounded, base eared. Stamens 10(–17), 2(–4) opposite each corolla lobe, inserted in or slightly below corolla throat, exsert; filaments subulate, curved inwardly when young, straight or bent at the middle, 4.5–7 mm long, glabrous or with scattered, soft, colourless hairs; anthers basi-ventrifix, (ellipsoid or) narrowly ovoid, 3–3.5 × 1–1.5 mm, apex up to 0.5 mm apiculate, base cordate, lobes straight or curved towards filament, apex glabrous to shortly hirsute, otherwise glabrous or with scattered, soft, colourless hairs; thecae locellate but opening with one longitudinal slit each. *Staminodes* 5(–8), inserted in sinuses of corolla lobes, curved inwards or downwards, obovate, 2–4 × 1.5–4 mm, irregularly shallowly to deeply incised and/or margin fringed, thin, glabrous, rarely with some soft, colourless hairs on apical lobes. *Disk* 0.6–1 mm high, 0.2–0.5 mm thick, straw to yellowish brown hirsute, hairs flattened under bent filaments, usually glabrous along base inside. *Pistil* glabrous; ovary 5(–8)-celled, ovoid to conical, 1–1.5 × 1.5–2 mm; style slightly tapering, 5–8.5 mm, apically with 5 minute deltoid lobes curved towards centre.

Fruits more or less patent to the bole, 1–3-seeded, ovoid to obovoid-oblong, 9–12.5 × 5–5.5 cm, apex broadly rounded, with style remnant, base truncate, from green to bluish green to almost black, general surface smooth, drying with mostly longitudinal folds, glabrous, at base with a ring of hairs (disk) which disappears. *Seeds* 5.5–8 × 3.1–3.2 × 2.8 cm; testa nitidous, *in vivo* fleshy red or dark pink, *in sicco* grey and speckled with brown, 2–4 mm thick, along scar with a free sharp rim; scar obovate; cotyledons fleshy, bright pink; radicle 7 mm long.



Distribution of *Magodendron venefici* (White & Francis) Vink (★) and *M. mennyae* Vink (●).

Distribution – Papua New Guinea: Northern, Central, and Milne Bay Provinces (7 collections seen).

Habitat & Ecology – From lowland rain forest to submontane ridge forest, at altitudes of 45 to 800 m; at 580 m in *Lithocarpus-Anisoptera-Hopea*-forest, at 800 m in *Araucaria-Anisoptera*-forest; canopy or subcanopy tree. Flowering reported from March, July and Aug.; fruiting from Aug. and Sept.

Vernacular names – Saruka (Embi), Jaruka (Buna); Gaigai-susu (Kaporika); Woli-gigina (Dawa Dawa), Imasusu (upper Waria).

Ethnobotany – Lane-Poole (1925: 132) stated that *Magodendron* is the most feared sorcerer's tree in the area (Embi, Hydrographer's Range). This conception is apparently very local, as Roy Pullen (in litt. 21.12.1965) reported that his local helpers from the Managalase area (to the S from Hydrographer's Range) seemed to attach no significance to this tree at all.

Notes – Only LAE 67179, from the SE end of the species' distributional area, deviates from the otherwise constant 5-merous floral arrangement with doubled stamens by: sepals 5 (or 6), corolla lobes 5–8, stamens 12–17, staminodes 5–8, locules 5–7 (–8?). However, the size of the leaves and the size of the indumentum of the sepals are in agreement with the present species. This collection has no mature flowers.

The Pullen collection is aberrant in its curved secondary nerves and larger glabrous bracteoles.

The description of the fruit is taken from literature and from notes on labels.

The figures of the flowers in Lam (1932, tab. CVI d, e) are incomprehensible: the disk and the staminodes are completely lacking and the anthers are not locellate. Probably, details from another drawing have erroneously been mounted with the otherwise correct illustrations of *Achradotypus benefici*.

Material seen: PAPUA NEW GUINEA. Northern Province: Hydrographer's Ra., Embi, Lane-Poole 227 (BRI, P), fl., fr.; Bariji-Managalase area, S of Toma, N side of Sibium Ra., alt. 795 m, Pullen 5879 (L), y.fl.; Tufi Subprov., near Budi barracks, alt. 75 m, Hoogland 4625 (L), fl. —

Milne Bay Province: Baniara Subprov., W of Opanabu village, alt. 600 m, *Kanis 1304* (L), fl.; Alotau Subprov., SE ridges of Mt Dalaia, Kaporika village, alt. 578 m, *Larivita & Katik LAE 67179* (L), y. fl.; 6 miles up Dawa Dawa R., alt. 45 m, *L.S. Smith NGF 1318* (L), fl. — Central Province: Port Moresby Subprov., Manumu village, alt. 500 m, *Isles & Vinas NGF 32476* (L), fr.

2. *Magodendron mennyae* Vink, *spec. nov.*

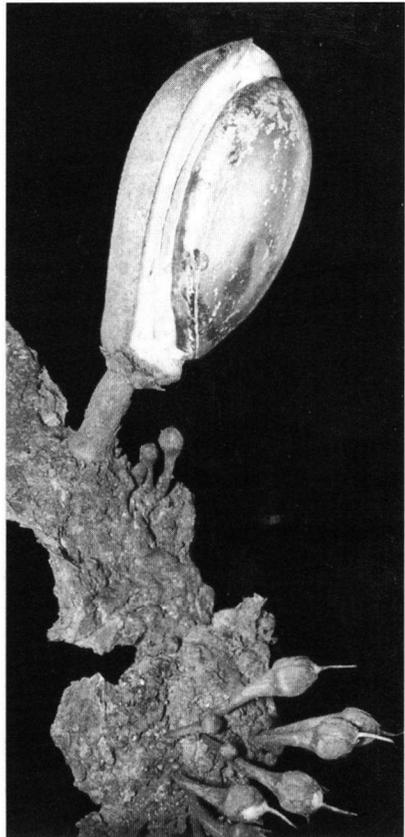
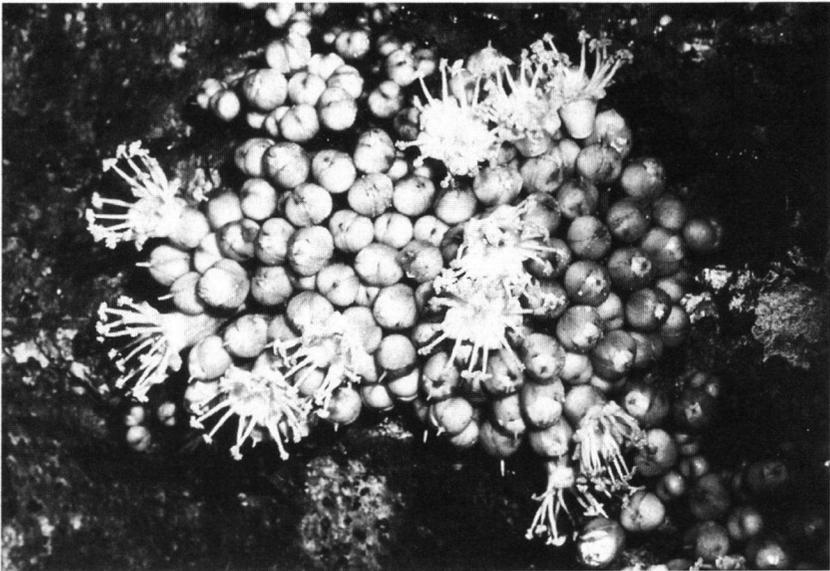
Magodendron venefici auct. non (White & Francis) Vink: Pennington, Gen. Sapot. (1991) f. 31g, h.

Differt a *M. venefici* in nervi secundarii 16–26, sepala 7–10 mm longi, sepala interiora ex-tus pro parte sericea, stamina 3 vel 4 corollae lobi oppositae. — Typus: *Coode & Katik NGF 29967* (L holotype; LAE, n.v.).

Tree 10–40 m high; bole 9–15 m, straight, d.b.h. 30–50 cm. *Bark* light (grey-, yellow-, red-) brown to dark grey, smooth to finely vertically cracked, pustular, lenticels in vertical rows; inner bark straw, or fleshy, or reddish brown, with brown flecks and streaks, red on the back. *Sapwood* cream to straw-brown; heartwood pale brown to reddish brown, hard. *Branchlets* terete to angular, 4–10 mm in diam. *Innovations* and tips of branchlets with dense, appressed, dark brown (or ferruginous) indumentum, branchlets glabrescent. *Leaves* confined to tips of branchlets. *Blade* elliptic to oblong (to obovate-oblong), 17–52 × 5.5–17 cm, apex acute to obtuse, often abruptly up to 1 cm acuminate, base cuneate to obtuse, often slightly attenuate and slightly oblique; thin-coriaceous; above nitidulous to dull, glabrous or with remnants of indumentum on midrib; below dull, glabrous but often with indumentum remnants on midrib and secondary nerves, sometimes also with scattered hairs on entire surface; midrib flat or slightly crested above, strongly prominent and triangular below; secondary nerves 16–26, ascending at an angle of 60°–80°, straight, near margin curved and diminishing until inconspicuous, sometimes connected by stronger tertiary nerves and more or less distinctly arched, distinct and flat or minutely impressed above, prominent below; tertiary nerves reticulate, stronger ones irregularly transverse, often near midrib becoming more or less parallel, faint to inconspicuous above, prominent to faint below. *Petiole* 2–11 cm long, triangular in cross-section, flat (to broadly canaliculate with central crest) above, with a sharp ridge below, basal 0.5–2 cm thickened, appressedly dark ferruginously hairy, more or less glabrescent.

Inflorescences (burls) up to 8 cm high and 20 cm in diam., from ground level up to 10 m high on bole. Flowers c.q. fruits on each burl in the same stage, or buds developing between ripe fruits. Burls on each tree all in the same stage (fruits mixed with buds and young fruits in *NGF 43669*), or in different stages (burls with fruits, with buds, and with flowers in *NGF 29967*). Bracteoles at base of pedicel broadly ovate, 2–2.5 × 3–3.5 mm, broadly rounded, thin, with some appressed hairs on median line on outside. *Pedicels* 20 × 1.5 mm, thinly sericeous. *Sepals* 5, coriaceous;

Fig. 42. *Magodendron mennyae* Vink. Reproductions from colour slides. Top: inflorescences with mature buds and open flowers; at top right two loose corollas (photo M.J. Coode, 1 June 1967, *NGF 29967*, type); bottom left: bole 40 cm in diam. with very young and mature fruits; bottom right: burl from the same tree with young buds, old flowers, and a fruit of which part of the pericarp is removed, showing seed, × 0.25 (photo J.S. Womersley, 29 Sept. 1970, *NGF 43669*).



outer sepals ovate or triangular-ovate to orbicular, 7–10 × 9–11 mm, apex obtuse to broadly rounded (to acuminate), outside glabrous or with a few scattered hairs (also in bud, but sometimes in bud with dense, short, rough, appressed, easily detached hairs), or apex blackish brown sericeous, inside glabrous; inner sepals broadly ovate to broad-orbicular, 7–9 × 8–11 mm, apex broadly rounded to mucronate, or truncate, base eared, outside with a median crest and sericeous, but broad zones along the margins glabrous, inside glabrous. *Corolla* 5-lobed, 15–18 mm long, glabrous; tube somewhat widening towards apex, rather thick, 9–11 mm long; lobes spreading, broadly ovate, 6–7 × 5–8 mm, apex broadly rounded, base eared. *Stamens* 14–19, 3 or 4 opposite each corolla lobe, inserted in or slightly below corolla throat, exsert; filaments subulate, curved inwardly when young, straight, 7.5–13 mm long, glabrous; anthers basi-ventrifix, narrowly ovoid, 3–5 × 1–2 mm, apex acute to rostrate, base cordate, lobes curved towards filament, apex with some hairs, otherwise glabrous; thecae locellate but opening with one longitudinal slit each. *Staminodes* 5, inserted in sinuses of corolla lobes, curved downwards or inwards and more or less closing throat, obovate to rectangular, 3–4.5 × 2–5 mm, irregularly shallowly to deeply incised and/or margin fringed, thin, glabrous or with some soft, colourless hairs. *Disk* 0.5–0.8 mm high, 0.2–0.5 mm thick, yellowish ferruginous hirsute, hairs flattened under bent filaments, glabrous along base on inside. *Pistil* glabrous; ovary 5-celled, conical, 1.5 × 2.5 mm; style slightly tapering, 8 mm long, apically with 5 minute deltoid lobes curved towards centre.

Fruits more or less patent to bole, 1-seeded, (ellipsoid to) obovoid or obovoid-oblong, 7–9.5 × 3.5–5.5 cm, apex broadly rounded and with a style remnant, base broadly rounded to truncate, brown to almost black, general surface smooth, drying with mostly longitudinal folds, glabrous, soon becoming scurfy as epidermis lags behind in expansion, at base with a ring of hairs (disk) which soon becomes floccose and later disappears; walls hard, with much exudate, *in vivo* 3–9 mm thick and in the thicker areas containing 4 flattened locules 9–14 × 0.3–1 mm, *in sicco* 1–2 mm thick. Pedicel 15–35 × 6–10 mm, withered sericeous to glabrous, outer layers breaking up by fissures and small flakes. Sepals 4–11 × 8–13 mm, firmly coriaceous, appressed to base of fruit, apices often eroded and ruptured; outer sepals at base horizontally ribbed, in inner sepals central crest becoming inconspicuous and indumentum withering. *Seed* 6.4–8.2 × 2.7–3.8 × 2.8–4.0 cm, apex and base acute; testa nitidous, *in vivo* grey to dark pink or red, speckled with brown, *in sicco* (dark) brown and speckled with light greyish or yellowish brown, 1–4 mm thick, along the scar with a c. 2 mm wide, free, sharp rim; scar obovate, 6.4–8.2 × 2.7–3.7 mm, dull, low-pusticular, greyish brown, 1–3 mm thick; cotyledons fleshy, bright red-brown, *in sicco* almost black; radicle 6 mm long.

Distribution – Papua New Guinea: Morobe and Northern Provinces (9 collections seen).

Habitat & Ecology – From lowland rain forest to submontane ridge forest, once reported from lowland swamp forest (*NGF 31740*), at altitudes of 30–800 m; at 60 m altitude in *Anisoptera*-forest, at 600 m in forest with *Castanopsis* and *Anisoptera*; canopy and understory tree. Flowering reported from May, fruiting throughout the year (I, III–VI, VIII, IX, XI).

Vernacular names – None noted.

Etymology – This species is named after my wife Menny Vink née Van Leeuwen (11.03.1936, Enkhuizen, The Netherlands), who for so many years supported me fully under all circumstances.

Notes – With *Jacobs 9537* is a seedling, damaged before the unfolding of the first pair of leaves, and developing secondary axes.

Seedling apparently epigeal, phanerocotylar, *Sloanea*-type, *Sloanea*-subtype (De Vogel, Seedlings of Dicotyledons, Pudoc, Wageningen, 1980). *Taproot* long, sturdy, not branched, with rather many sideroots. *Hypocotyl* apparently epigeal, \pm quadrangular, 6 cm long, 0.5 cm in diam., dark reddish brown, thinly minutely warty, glabrous. *Cotyledons* 2, opposite, hard, sessile, $4 \times 2 \times 0.5$ cm, entire, apex rounded, base broad-cuneate, smooth, glabrous. *First internode* angular, 2 cm long, 0.4 cm in diam., dark reddish brown, warty as the hypocotyl but denser so near apex, glabrous. *First two leaves* opposite, 4 cm long, not unfolded, with longitudinal lines of damaged epidermis, undamaged parts warty and glabrous as first internode. *Second internode* replaced by secondary axes, these slender, ferruginously shortly appressed-tomentose; leaves not unfolded, spirally arranged, abaxially densely ferruginously shortly appressed-tomentose.

Material seen: PAPUA NEW GUINEA. Morobe Province: Finschhafen Subprov., 25 km E of Finschhafen, track from Tgedu to Sambiāng, alt. 800 m, *Croft & Katik LAE 68599* (L), fr., y. fl.; Lae Subprov., Mt Kawea, alt. 800 m, *Streimann & Foreman NGF 24436* (L), fr.; Buso valley, alt. 90 m, *Streimann NGF 45146* (L), y. fr.; Lae-Bulolo Rd, Gurakor, alt. 600 m, *Womersley NGF 43669* (L), fr., *Katik LAE 74799* (L), fr.; opposite Lasanga I., alt. 50–150 m, *Jacobs 9537* (L), fr.; helicopter site 2, alt. 100 m, *Ridsdale NGF 31663* (L), fr. — Northern Province: Popondetta Subprov., near Nindewari village, alt. 30 m, *Ridsdale NGF 31740* (L), fl., fr.; N of Ioma, track to Nindewari, alt. 60 m, *Coode & Katik NGF 29967* (L), fl., fr.