

**ADDITIONAL NOTES ON SPECIES OF THE ASIAN GENERA
ENDOCOMIA, HORSFIELDIA, AND KNEMA (MYRISTICACEAE)**

W. J. J. O. DE WILDE

Rijksherbarium / Hortus Botanicus, P. O. Box 9514, 2300 RA Leiden, The Netherlands

SUMMARY

Notes are given on various taxa in the Asian genera *Endocomia*, *Horsfieldia*, and *Knema* of the family Myristicaceae. Newly described taxa are *Horsfieldia penangiana* subsp. *obtusifolia*, *H. perangusta*, and *Knema emmae*, *K. krusemaniana*, *K. kunstleri* subsp. *leptophylla*, *K. longepilosa*, and *K. ridsdaleana*.

INTRODUCTORY NOTE

With the conclusion of the investigations regarding the treatment of the family Myristicaceae for Flora Malesiana, a few additions to the precursory publications on the genera *Endocomia* W. J. de Wilde, *Horsfieldia* Willd., and *Knema* Lour. for the Southeast Asian region are required because of newly collected materials or collections not seen before (De Wilde, 1979, 1984a, b, 1985a, b, 1986, 1987a, b).

I acknowledge the help of Dr. J. F. Veldkamp (L) for providing the translation of the diagnoses of the new taxa into Latin, and Mr. J. H. van Os (L), who made the beautiful drawings.

ENDOCOMIA W. J. de Wilde

Endocomia macrocoma (Miq.) W. J. de Wilde subsp. *macrocoma*; *Blumea* 30 (1984) 184.

A specimen collected in NE Luzon, *Ridsdale*, *Dejan*, *Baquiran ISU 317*, with male inflorescences, keys out in the keys to the species and subspecies (l.c.: 182, 184) at subsp. *macrocoma*, amongst others because of the different states of development of the flowers in one cluster, and the conspicuous tomentum of the inflorescences (and flowers), young (developing) leaves and twig apex. However, subsp. *macrocoma* as defined by me, is known only from the Moluccas and possibly Sulawesi, whereas Philippine specimens of *Endocomia* were all referred to subsp. *prainii* (King) W. J. de Wilde, this latter subspecies characterized by an inconspicuous tomentum. Both subspecies are variable, however.

Ridsdale et al. ISU 317 deviates from typical subsp. *macrocoma* by the synandrium composed of c. 6 anthers (4 in subsp. *macrocoma*). The number of 6 anthers agrees with the New Guinean specimens referred to subsp. *prainii*, but these latter have red-coloured perianths inside; in *Ridsdale et al. ISU 317* the perianths are yellow inside.



The indumentum of subsp. *macrocoma* is very variable, and that of *Ridsdale et al. ISU 317* agrees with that of e.g. *de Vogel 3454*, from Halmahera.

It appears that a possible division into subspecies or other entities of *E. macrocoma* still awaits a closer study, and the true status of the Luzon collection remains doubtful until additional material, including fruit, can be examined.

Note — Erratum. In the key to the species of *Endocomia*, (l.c.: 182), in lead 1b, the number of anthers should be read '3–6' instead of '3 or 4'.

HORSFIELDIA Willd.

Horsfieldia affinis W.J. de Wilde, Gard. Bull. Sing. 38 (1985) 217.

Through a number of collections made after my revision of *Horsfieldia* (De Wilde, 1985) it has become clear that *H. affinis* is a synonym of *H. reticulata* Warb. This latter species is typified by a specimen with rather aberrant, comparatively coriaceous and brittle leaves, but nonetheless links up with all additional material.

Horsfieldia gracilis W.J. de Wilde, Gard. Bull. Sing. 38 (1985) 211.

This delicate Bornean species was described as related to *H. paucinervis* Warb., in the group of other related Bornean species to which also belong the more robust species *H. splendida* W.J. de Wilde, *H. rufo-lanata* Airy Shaw, and *H. reticulata* Warb.

Through some additional collections, viz. *Wong WKM 1494* (male flowers), *Dransfield JD 7242* (immature male flowers), both from Brunei, and *Ilias Paie S 50154* (male flowers) from Sarawak, the distinction between *H. paucinervis*, *H. gracilis* and smaller leaved forms of *H. splendida* and *H. reticulata* seems to get blurred. The vegetative characters of these collections, especially the general shape and size of the leaves, number of lateral veins, and the rather typical shape and composition of the hairs of the indumentum of the lower leaf surface (although differing in the density of hairs), as well as the thickness of the twigs towards the apex, provoke suspicion that the above-mentioned species are connected by intermediates and, hence, that possibly *H. paucinervis* and *H. gracilis* should be united.

However, closer study leads me to keep the species separate provisionally, as accepted by me in 1985, and tentatively to treat the above-mentioned collections as 'deviating' under *H. gracilis*.

Fig. 1. Some taxonomically related *Horsfieldia* species. — *H. paucinervis* Warb. a. Habit of staminate flowering twig, $\times 0.5$; b. longitudinally opened staminate flower, and schematic section of androecium, $\times 10$; c. portion of twig with fruit, $\times 0.5$. — *H. aff. gracilis* W.J. de Wilde. d. Twig with staminate inflorescence, $\times 0.5$; e. staminate flower and section of androecium, $\times 10$. — *H. gracilis* W.J. de Wilde. f. Twig with mature fruit (note persistent perianth), $\times 0.5$. — *H. cf. gracilis* W.J. de Wilde. g. Staminate flower and section of androecium, $\times 10$. — *H. reticulata* Warb. h. Staminate flower and section of androecium, $\times 10$; i. fruit (note persistent perianth), $\times 10$ (a, b: *Purseglove P 4403*; c: *Keßler 319*; d, e: *Ilias Paie S 50154*; f: *Ilias Paie S 16604*, type; g: *K.M. Wong KMW 1494*; h: *BRUN 5654*; i: *Paul Chai S 36018*). — Note: habit of leafy twig, staminate inflorescences, staminate flowers, and fruit of the related *H. splendida* W.J. de Wilde is depicted in De Wilde, Gard. Bull. Sing. 38 (1985) 214, f. 24.

Much more critical material of the *H. paucinervis*–*gracilis*-alliance is needed to elucidate the confusing variation, and to establish the true status of the intermediate specimens.

In brief, evidence discriminating the two species is presented in Figure 1a–g and below:

- *Horsfieldia paucinervis* Warb. — Low tree, 3–8 m tall, known through the collections *Beccari 3279* (type, in FI; female flowers; not seen); *Haviland 1735, 3075* (both K), and *Purseglove P 4403* (K, L). This is a species of coastal low forest on white sand in Sarawak. The Leiden specimen of *Purseglove P 4403* has male inflorescences, much-branched from the base, with small, apparently mature flowers with a very small androecium and few anthers. These possibly do not produce fertile pollen, and the specimen might be of hybrid origin. Fruit small, glabrous, perianth possibly not persisting (*Kessler 319*). Leaves with scattered non-traumatic dots below.
- *Horsfieldia gracilis* W. J. de Wilde — Tree, 5–8 m high. The type collection is in fruit, from lowland forest, G. Lambir, Miri District, Sarawak. The mature fruit is small, glabrous, when dry c. 1.5 cm long, with thin pericarp (1 mm thick or less), seed c. 1.2 cm long, perianth persisting under the fruit. Leaves not dotted beneath.

The following three collections may key out as *H. gracilis* and the first two almost surely belong to *H. gracilis*. They are:

Dransfield JD 7242 is a low tree, 3 m tall, from lowland dipterocarp forest in Brunei, with very immature male inflorescences. Apparently it belongs to *H. gracilis*, but somewhat approaches *H. paucinervis* because of slightly thicker leaves, fewer lateral nerves (10–12 per side), and a slightly more dense tomentum on the lower leaf surface.

K. M. Wong WKM 1494 is also from Brunei and is in many respects similar to the foregoing specimen. It has well-developed male inflorescences, with (nearly) mature flowers (Fig. 1g). The flowers are the first known for *H. gracilis*. The pedicel is quite distinctly articulate at the base; perianth depressed globose, c. 0.6 by 1 mm, glabrous, 4-valved to slightly over the middle; androecium depressed globose, c. 0.5 by 0.9–1 mm, anthers 16–18, central column slightly hollowed out at the apex. The adult leaves measure up to 18 by 6 cm, with 12–15 lateral nerves, and are practically glabrous below, in contrast with the type and the above mentioned Dransfield collection.

The *Ilias Paie S 50154* collection is puzzling. It was named *H. reticulata* at the Sarawak Herbarium. It is a small tree, 4 m tall, from hillside forest at 500 m altitude. The leaves are rather small, the male inflorescences are well developed and have a distinct common peduncle, and there are conspicuous, subsistent, leaf-like bracts; the flowers are obviously mature. The flowers have much larger perianths than those of *Purseglove P 4403* (provisionally under *H. paucinervis*), with a somewhat larger synandrium and few anthers (resembling the synandrium of *H. motleyi*). It looks as if the pollen is abnormally small and sterile. Possibly this specimen, which comes very close to *H. splendida* W. J. de Wilde in characters of tomentum of the leaves and shape and morphology of the flowers, is of hybrid origin (Fig. 1a, b).

For the time being one of the best distinctions between *H. gracilis* and *H. paucinervis* is the absence or presence, respectively, of dark-coloured non-traumatic dots on the lower leaf surface. This character was not correctly used in the key to male flowering specimens (De Wilde, l.c.).

Horsfieldia paucinervis Warb.

See under *H. gracilis*.

Horsfieldia penangiana J. Sinclair; W.J. de Wilde, *Gard. Bull. Sing.* 39 (1986) 52.

In the notes of the treatment of this species (De Wilde, 1986) I already remarked that the specimens enumerated for Borneo deviate by blunt leaves.

A later collection, *S 47061*, from West Sarawak, with male flowers, is strikingly similar to these specimens, so I herewith proceed to the description of a new subspecies.

KEY TO THE SUBSPECIES

- a. Leaf apex acute or acute-acuminate. Malay Peninsula, Sumatra
 subsp. **penangiana**
 b. Leaf apex blunt or rounded. Borneo subsp. **obtusifolia**

subsp. **penangiana**

Leaf blades elliptic-oblong, 6–12 cm long, top acute or acute-acuminate. Male perianth (2- or) 3- or 4-lobed, broadly ellipsoid or (sub)globose, 1.2–1.8 mm long, anthers 5–9(–10). Fruit c. 2 by 1.6 cm.

Distribution — Malay Peninsula, Sumatra.

subsp. **obtusifolia** W. J. de Wilde, *subsp. nov.*

A subspecies typica in laminae apice obtusa vel late rotundata differt. — Typus: *Awa & Ismawi S 47061* (holo L; iso K; SAR, n.v.).

Leaf blade elliptic-oblong or oblong, 6–14(–17) cm long, top blunt or rounded. Male perianth 3-lobed, globose, (1.5–)2 mm diam., anthers 12(–15). Fruit c. 1.5 by 1 cm.

Distribution — Borneo.

Habitat — Forest of ridge tops, hills; (50–)300–800 m.

Specimens examined: BORNEO. Sarawak: 1st Div., *S 47061* (male flowers); 3rd Div., *Jungah ak Kudi S 23689* (fr.); E Kalimantan: *bb 16872, 16878* (both sterile).

Horsfieldia perangusta W. J. de Wilde, *spec. nov.*

Horsfieldiae fulvae similis, sed gemmae terminalis pilis longioribus c. 1 mm longis, costa supra gracilissima lineari, laminae pagina supra non tristiter rugosa in sicco, margine involuto differt. — Typus: *Cockburn Kep. FRI 7934* (holo L; iso K; FRI, n.v.).

Slender treelet, 10–12 m. *Twigs* terete, towards the apex 3(–4) mm diam., at first with sparse, shaggy, dark rusty-red tomentum with hairs c. 1 mm long, ± early gla-

brescent; bark of twigs lower down coarsely striate, not cracking, dark brown, not or but inconspicuously lenticellate. *Leaves* chartaceous or thinly coriaceous; blade elliptic-oblong, almost parallel-sided, 20–25 by 7–10 cm, base cuneate, top acute-acuminate; upper surface drying olivaceous, smooth and nearly glossy (not finely wrinkled and dull), below \pm pale cinnamon, at first with \pm sparse, \pm appressed, shaggy, palish hairs 0.5–1 mm, glabrescent except for mostly on and near the midrib and very base of the blade, blade margin conspicuously rolled-in, dark dots absent; midrib above sunken, very slender and appearing only as a thin line; nerves 10–12 per side, flat and inconspicuous above, lines of interarching only visible below; tertiary veining \pm invisible on both surfaces; petiole drying dark brown (as the twigs), 17–20 by 3–4 mm, glabrescent; sterile terminal leaf bud c. 10 by 3 mm, densely red-rusty pubescent with hairs c. 1 mm long. *Inflorescences* only known from infructescences. *Flowers* not known. *Infructescences* situated on the older twigs, below the leaves (twig diameter 5–8 mm), sparingly branched, glabrous (glabrescent), few (1–3-)fruited, 1–2 cm long. *Fruit* ellipsoid, when dry 25–30 by 18–20 mm, top blunt, base rounded, the (dry) pericarp 2–3(–4) mm thick, \pm glabrous (glabrescent) with possibly remnants of minute, rusty, scurfy tomentum remaining at very base (hence, ovary minutely pubescent); fruiting pedicel at first with sparse very minute tomentum, early glabrescent, c. 2 by 3 mm; seed ellipsoid, c. 20 by 14–15 mm, light brown, the aril complete, not lacinate, completely enveloping the seed.

Distribution — Known only from the type, collected 26-3-1968 in the Malay Peninsula, Pahang, Ulu Endau For. Res., compt. 285.

Habitat & Ecology — Ridge top forest dominated by palms; altitude 400 m. Fr. in March.

Notes — 1. Fieldnotes. Slender tree, height 40 ft, girth 1 ft. Bark dark chocolate brown, smooth, rugose. Slash inner bark red-orange, fibrous, laminated. Slash wood white. Fruits orange, seed with a deep orange-red leathery aril.

2. This new species possibly resembles most *H. fulva*, which differs vegetatively by leaves drying dull, finely wrinkled above. The present species has conspicuously incurved blade margins and a narrow, line-shaped midnerve above. The flowers are unknown. Male perianths in bud of *H. fulva* are conspicuously elongated, a feature uncommon in *Horsfieldia*.

3. Tentatively, the present new species can be inserted in the general key for male specimens, and in the key to the Malayan species [De Wilde, Gard. Bull. Sing. 37 (1984)], beside *H. fulva*, as follows:

- p. 146: 60bis a. Tomentum of sterile terminal leaf bud with hairs 0.1–0.3 mm, leaf-midrib broader, margin flat (*H. tristis*, *H. fulva*)
 b. Hairs on leaf bud c. 1 mm long, leaf-margin (dry) rolled-in; midrib above line-shaped *H. perangusta*
- p. 154: 13bis a. Leaves drying not dull, not finely wrinkled. Midrib above very narrow, line-shaped, sunken; blade margin rolled-in. Tomentum of terminal leaf bud with hairs c. 1 mm long *H. perangusta*
 b. Hairs of leaf bud much shorter . . . (*H. subalpina*, *H. ridleyana*)

Horsfieldia polyspherula (Hook. f. emend. King) J. Sinclair; W. J. de Wilde, Gard. Bull. Sing. 39 (1986) 17.

This species comprises three varieties, distributed in the Malay Peninsula, Singapore, Sumatra, and Borneo; only var. *polyspherula* extends to the Philippines, recorded up to now by a single collection, *Mendoza 61-409* (= *PNH 42247*) from NE Mindanao, Agusan Prov.

Through a second collection, *Ridsdale, Baquiran et al. ISU 406*, in fruit, var. *polyspherula* now also appears to occur in NE Luzon, Palanan area, in streamside forest on ultrabasic soil. The specimen deviates only somewhat from the other by the slightly raised (not distinctly raised) lateral veins of the leaf above. Furthermore, the tomentum of the leaf bud and the apical portion of the twig is comparatively short. The collection means a considerable range extension. It should be noted that complete material, i.e. male flowering specimens, is not yet known from the distribution area.

Horsfieldia reticulata Warb., Mon. Myrist. (1897) 304. — Fig. 1h, i

Synonym: *Horsfieldia affinis* W.J. de Wilde, Gard. Bull. Sing. 38 (1985) 217.

Through various collections acquired after the publication of *H. affinis* W. J. de Wilde (l.c., 1985), it has become clear that this latter name is a synonym of *H. reticulata*. The type of *H. reticulata* is rather scrappy and somewhat deviating as it represents a specimen with unusually coriaceous leaves, rendering the veining rather deeply sunken and the upper leaf surface more or less bullate.

Horsfieldia xanthina Airy Shaw subsp. *macrophylla* W. J. de Wilde, Gard. Bull. Sing. 39 (1986) 47.

The fruit of *H. xanthina* was at the time of my treatment of the species (l.c., 1986) only known in a very immature state.

A later collection, *Dyg. Awa & Bernard Lee S 51106*, from Tama Abu Range, 4th Div., Sarawak, at c. 1550 m altitude, has mature fruit: glabrous, ellipsoid, when dry c. 5 by 3–3.5 cm, pericarp 5(–10) mm thick, somewhat woody towards inside; the inflorescence is one-fruited, only 0.5(–1) cm long; the colour of the fruit was recorded as orange.

When identifying the specimen it became clear that *H. subalpina* J. Sinclair subsp. *kinabaluensis* W. J. de Wilde is very closely related, but differing by usually shorter and more slender fruit. I doubt whether subsp. *macrophylla* should go under *H. xanthina*, or possibly better go under *H. subalpina*.

Horsfieldia xanthina and *H. subalpina* differ, among others, in the shape of the androecium (in male flowers), but adequate male flowering herbarium specimens of both forenamed subspecies are too scarce to draw a conclusion on their systematic position, so tentatively this should remain as it is.

KNEMA Lour.

Knema ashtonii J. Sinclair var. ***ashtonii***; W.J. de Wilde, *Blumea* 25 (1979) 384.

The newly acquired collection *Simpson 2377*, from Brunei, contained the first known male flowers of the type variety. They appeared quite similar to those of var. *cinnamomea*, but generally are smaller. The mature male flowers of *K. ashtonii* var. *ashtonii* can be described as follows: pedicel stoutish, c. 9 mm long, with a coarse scar of the fallen bracteole at the apex, at the transition to the perianth; perianth \pm obovoid, slightly depressed above, c. 5.5 by 4.5–5 mm, deeply cleft by the perianth lobes for c. 4/5, perianth hard-carnose, at sutures c. 1(–1.5) mm thick; androecium c. 2 mm long, staminal disc flat or faintly convex, c. 3 mm diam. including 14 or 15 shortly stalked anthers, the whole flower covered with short minute scale-like hairs much less than 0.1 mm high. The male flowers of var. *cinnamomea* are similar but generally larger: pedicel c. 20 mm long, perianth c. 7 mm long, anthers 22–24.

Knema* aff. *austrosiamensis W.J. de Wilde

This species, from S Thailand, was described in *Blumea* 25 (1979) 441, f. 14, with the following diagnostic characters: 1) twigs with tomentum of hairs more than 0.2 mm long; 2) tomentum of lower leaf surface composed of stellate-dendroid hairs of mixed sizes, sessile and stalked; 3) male inflorescences distinctly peduncled; 4) male perianth in bud subglobose, not pear-shaped, the lobes at anthesis splitting the bud for over 2/3; 5) androecium short, with the column distinctly shorter than the diameter of the staminal disc.

A later acquired collection and some material mixed up by me with *K. austrosiamensis* (*Santisuk 735*) seem close to *K. austrosiamensis*, because the tomentum of the lower leaf surface is similarly composed of stellate-dendroid hairs of mixed sizes, with sessile and stalked hairs mixed, partially late-glabrescent. However, the shape of the male perianths is rather constricted below the lobes, rendering the perianth in bud pear-shaped, and with the staminal column longer than the diameter of the disc. These specimens key out with the general key to male flowering *Knema* (De Wilde, l.c.: 339) via lead 1a to a different group of species, e.g. *K. pierrei*, etc., but they apparently cannot be matched with any of the species there.

Because the material of these deviating collections is considerably divergent in general habit, and the shape of the male perianth in *K. austrosiamensis* partly tends to a more elongated pear-shape, possibly correlated with the age or state of development as also found in related species like *K. bengalensis*, I refrain from officially describing these specimens under new names, and I will file them tentatively under *Knema* aff. *austrosiamensis*.

Notwithstanding the fact that these species superficially look very similar, I suspect that still several distinct species may have to be recognized in this alliance on the basis of the male flower shape and characters of the leaf tomentum, but, at present a final decision should wait for more abundant additional collections.

The specimens which are deviating from typical *K. austrosiamensis*, alluded to above, are:

- *Santisuk 735*: This was mixed up by me with *K. austrosiamensis* (De Wilde, l.c.), and it possibly differs from the type (*Larsen c.s. 32242*). It has pear-shaped male perianths, cleft to about halfway, and the staminal column is slender, glabrous, c. 2.5 mm long, about as long as the diameter of the disc including the anthers. Possibly *van Beusekom & Phengklai 1003* (in fruit) is identical.
- *Kohyama c.s. T-48920*, male fl., in SW Kanchanaburi at 900 m altitude. This specimen looks quite distinct from all others in *K. austrosiamensis* and related species. It has stout, coarse twigs, c. 4 mm diam. at apex, and long, \pm narrow leaves, up to 40 by 7.5 cm, with c. 30 lateral nerves per side. The flowers are elongate, pear-shaped, and the staminal column is long and slender, c. 2.5(–3) mm long, with dense, minute, pale brown tomentum at the base; the staminal disc with 12 or 13 anthers is subtriangular, 2.5–3 mm diam. The inflorescences of this collection are remarkable: they are partly sessile, like normally in *Knema*, but some are shortly peduncled, and one is quite remarkably paniculate, as in *Myristica* spp., with a common peduncle c. 4 mm long, with two opposite \pm wart-like laterals, and the main axis again c. 4 mm continuing, carrying 2 subopposite wart-like clusters of flower buds.

***Knema bengalensis* W.J. de Wilde, Blumea 25 (1979) 413.**

This species was described from a single collection, *Khan 311* (K), from Chittagong; its characters among continental Southeast Asian species are: 1) non-flaking bark of twigs, when young non-striate; 2) the lower surface of leaves with tomentum of hairs of mixed sizes, early glabrescent; 3) the male perianth (with conspicuous tomentum of hairs more than 0.2 mm long) of a depressed pear-shape, tapering in the lower half, but not distinctly longer than broad, splitting by the lobes to slightly over halfway deep; the staminal column c. 2 mm long, slightly shorter than the diameter of the staminal disc; 4) the 9–13 mm long pedicel, with the deciduous bracteole situated at or below the middle.

Re-examination of the material has shown that in the original description the thickness of the twigs in the apical part erroneously was described as 2–2.5 mm diameter; this should be (2.5–)3 mm. Further, it was not mentioned that the staminal column has some very minute stellate tomentum at the very base, a feature sometimes also seen in related species like *K. elegans* and in some specimens discussed, e.g. *Knema* aff. *austrosiamensis*, and *K. tonkinensis*; see there.

With the original description, *K. bengalensis* was compared in the notes with several species from the same region as where the type was collected, but now it has become clear that it is closely related to taxa from Indochina, as discussed under *Knema* aff. *austrosiamensis*.

Knema curtisii* (King) Warb. var. *curtisii

In the precursory treatment of *Knema* [De Wilde, *Blumea* 25 (1979) 418] I commented on the deviating specimen *Amdjah 144*, with male flowers. A more recent collection in fruit, *SAN 119567*, possibly is identical, which led me to reconsider the matter, and to describe the material here as a new species, viz. *Knema emmae* W.J. de Wilde.

Knema emmae* W.J. de Wilde, *spec. nov.

Knema curtisii et *K. linguiformi* affinis, ab eis in disco staminali circulari antheris 14 vel 15 parvis sessilibus differt. — Typus: *Amdjah 144* (holo L; iso BO, K, SING, n.v.).

Treelet, c. 4 m high. *Twigs* terete, towards the apex 1.5–2 mm diam., yellowish brown, smooth or finely striate, at first tomentum with hairs 0.5(–1) mm, glabrescent; bark of twigs lower down similar, smooth, yellowish brown, finely striate, not cracking nor flaking; lenticels minute. *Leaves* thinly chartaceous; the blades elliptic-oblong or oblong-lanceolate, ± parallel-sided or broadest at about the middle, 12–20 (–28) by 3.5–7(–7.5) cm, base short-attenuate, tip bluntish, acute, or acute-acuminate; upper surface drying green-olivaceous; lower surface drying slightly paler, glabrous, not or but little papillose; midrib slender above, nerves 12–15 per side, flat or slightly raised above, lines of interarching faint, tertiary veining a fine network, distinct at both surfaces. Petiole short, glabrescent, drying (dark) brown, c. 10 by 2 mm. Sterile terminal leaf bud c. 10 mm, with densely set rusty hairs c. 0.5 mm long. *Inlorescences* wart-like, 1–2 mm long, pubescent, glabrescent, sessile or to 1.5 mm stalked; in male and female 2–5-flowered; flowers rusty pubescent with hairs (0.2–) 0.5–0.7 mm. *Male flowers*: pedicel 6–7 mm long, slender, bracteole minute, less than 1 mm, subpersistent, situated slightly above the middle; mature male perianth in bud ± depressed globose, c. 3 by 4 mm, lobes 3, c. 0.5 mm thick at sutures, splitting the bud for c. 3/4(–4/5); staminal disc circular, flat, c. 2 mm diam.; anthers 14 or 15, small, c. 0.3 mm, not tightly contiguous, sessile just below the rim of the disc, the column tapering, narrow at base, 0.5–0.8 mm long, glabrous. *Female flowers* (*SAN 119567*): pedicel c. 4 mm, perianth obovoid, c. 3.5 mm long; ovary not examined. *Fruit* (*SAN 119567*) 2–4 per infructescence; fruiting pedicel 7–10 mm long, with the scar of the bracteole about the middle; fruit (slightly immature but probably full-grown) ovoid-oblong, 2.5–3 by 1.5–1.6 cm, base ± truncate or broadly rounded, top narrowly rounded with short style with subpeltate stigma remnant, c. 1 mm, dry pericarp 0.5(–1) mm thick, with persistent rusty mealy pubescence of hairs c. 0.5 mm.

Distribution — NE Borneo: Sabah, Bukit Tawai (*Campbell 564*); Keningau (*SAN 955667*); NE Kalimantan, Gunung Maeru Tagal (*Amdjah 144*).

Habitat & Ecology — Hillside forest; once recorded from ultramafic soil; at low altitude. Fl. and fr. June.

Etymology — Named after Emma E. van Nieuwkoop, desk editor at the Rijks-herbarium, Leiden.

Notes — 1. Fieldnotes: Low tree; bole 2 m, total height 4 m. Sapwood whitish; bark dark brownish, inner bark brownish with red latex. Fruit yellowish.

2. Obviously closely related to *K. curtisii* var. *curtisii* and to *K. linguiformis*. In general habit *K. curtisii* usually looks quite distinct with more slender twigs, towards the apex only 1(–1.5) mm diam., and smaller leaves with more slender lateral nerves and petiole; the fruit is ± similar in size (although variable) but early or late glabrescent. *Knema linguiformis* has leaf blades often ± rounded at base, and fruits glabrous (early glabrescent), ± contracted at base into a shorter fruiting pedicel. *Knema emmae* is distinct especially in the male flowers, with a circular staminal disc below with 14 or 15 not tightly contiguous small anthers; in the other two species mention-

ed there are usually more anthers (although often only 9–18 in Bornean specimens of *K. curtisii* var. *curtisii*), attached to a bluntly trigonous (not circular) staminal disc. The fruit has a persistent tomentum or is late-glabrescent.

In addition to the general key to the species of *Knema*, and the key to Bornean species as presented by me in *Blumea* 25 (1979), the present new species keys out beside *K. curtisii* and *K. linguiformis* and beside *K. glomerata* as follows:

- p. 344: 39bis a. Staminal disc circular, anthers 14 or 15. NE Borneo . *K. emmae*
 b. Staminal disc (blunt-)trigonous. Malaya, Sumatra, Borneo . . 40
 p. 363: 29 c. Distinct from *K. glomerata* (rare in Borneo) by the more slender fruiting pedicel, the fruit with 'mealy' rusty tomentum with hairs to c. 0.5 mm long, the leaves drying green, with very distinct reticulate venation *K. emmae*

Knema krusemaniana* W.J. de Wilde, *spec. nov.

Arbor 3–6 m alta. Ramuli foliaque infra grosse persistentiter tomentosi pilis 1–2 mm longis. Puncta non-traumatica adsunt. Perianthum masculinum globosum c. 2 mm diam. Discus staminalis planus antheris incluso c. 1.5 mm diam. Antherae 7 vel 8 omnes 4-sporangiatæ breviter stipitatae. — Typus: *Mogea & de Wilde 4216* (holo L).

Tree 3–6 m. *Twigs* terete, towards the apex (2–)4–5 mm diam., densely dark brown coarsely tomentose with hairs 1–2 mm long, late glabrescent, bark of twigs lower down blackish brown, finely striate, inconspicuously lenticellate, not cracking nor flaking. *Leaves* chartaceous or thinly chartaceous, drying olivaceous or bright brown; blade oblong, broadest at or slightly above the middle, 15–35 by 4–10 cm, base narrowly rounded or cuneate, top acute or acute-acuminate; lower surface drying pale brown or grey-brown, minutely papillose, with scattered (dark) brown non-traumatic dots (lens!), with sparse but conspicuous tomentum with stellate and stellate-dendroid hairs 0.5–1.5 mm, sometimes late-glabrescent; midrib slender, raised above, nerves 14–18 pairs, at an angle of 60–70° with the midrib, tertiary veining forming a fine network distinct at both surfaces; petiole 6–14 by 2.4–4 mm, late-glabrescent, sterile terminal leaf bud densely pubescent with coarse hairs 1–1.5(–2) mm long. *Inflorescences* wart-like or slenderly worm-like, rusty woolly with stellate hairs 0.5–1 mm, simple or 2- (or 3-)armed, to 12 mm long, late-glabrescent, in *male* with (5–)10–25-clustered flowers. *Male flowers*: densely woolly tomentose with stellate and stellate-dendroid hairs 0.5–1 mm long; pedicel 4–5 mm long, slender or thickish; bracteole 1 mm long or less, situated 1–1.5 mm below the perianth, caducous; perianth in bud (slightly immature) subglobose, c. 2 mm diam., carnose, tightly enclosing the androecium, disc not apparent; lobes (valves) 4, splitting perianth for 3/4–4/5; staminal disc flat or slightly convex, circular, 1–1.5(–1.7) mm diam., anthers 7 or 8, short-stiped, spaced, each 4-sporangiate (with 2 thecae), column slender, glabrous, hardly 0.5 mm long. *Female flowers* not seen. Fruit (*Kohyama c.s. K.4681*): 2.5 by 1.7 cm, with tomentum with hairs 0.5–1 mm.

Distribution — Borneo: West and Central Kalimantan, area of the upper Katingan (Mendawai) and Kahayan Rivers: *Argent c.s. 9458*; *Burley, Tukirin et al. 406*; *Kohyama c.s. K. 4681* (fr., slightly doubtful); *Mogea & de Wilde 4216* (type).

Habitat & Ecology — Old secondary forest and forest with *Agathis* on poor sandy soil with thin peat layer; 50–220 m altitude. Locally common in secondary forest. Fl. March, Dec.

Etymology — Named after Mrs. M.J. van Steenis-Kruseman, on the occasion of her 92th birthday in November this year.

Notes — 1. Fieldnotes: Small slender tree, 4–6 m. Leaves glaucous below. Tomentum of young twigs brown. Flower buds pale yellowish brown; flowers pink.

2. The species belongs, with *K. conferta* and *K. pedicellata*, in the group with non-traumatic dots on the lower leaf surface and might be confounded with these species. *Knema krusemaniana* is distinct by generally thinner leaves, twigs with a longer-haired persistent conspicuous tomentum, and smaller male flowers, with only 8 anthers; see further note 3.

3. Male perianth, staminal disc, anthers: in *K. krusemaniana* the male perianth is smaller than in both *K. conferta* and *K. pedicellata*; in *K. krusemaniana* it is 4-valved, in the other two species it is 3-valved and 4- or 5-valved respectively. The pedicels are exceedingly long in *K. pedicellata*, short in the present species. The staminal disc is conspicuously convex in *K. pedicellata*, ± flat in *K. krusemaniana* and *K. conferta*; in *K. pedicellata* the perianth has a raised disc at the base, lacking in both other species. Finally there are remarkable differences in the almost stalked anthers: there are 8 anthers in *K. krusemaniana*, but they are 4-sporangiate; in *K. conferta* and *K. pedicellata* there are (10–)12–18 bisporangiate anthers. Obviously these conditions have been derived from each other, but I cannot say which state is the original one.

4. In the general key to male flowering specimens, and the key to Bornean specimens [De Wilde, *Blumea* 25 (1979) 352 and 361] *K. krusemaniana* can be keyed out beside 82. *K. conferta* as follows:

- a. Male perianth 4–4.5 mm diam.; anthers (10–)12–17, each 2-sporangiate. Malay Peninsula, Singapore, Sumatra, Borneo ***K. conferta***
- b. Male perianth 2(–2.5) mm diam., anthers 8, each 4-sporangiate. Borneo (Central Kalimantan) ***K. krusemaniana***

***Knema kunstleri* (King) Warb. subsp. *leptophylla* W.J. de Wilde, *subsp. nov.* — Fig. 2**

A *K. kunstleri* subspeciebus aliis in habitu graciliore, foliis angustis, pagina inferiore punctulatiore, fructu fusiformi c. 4.5 cm longo differt. — Typus: *Church, Ismail, Ruskandi 2489* (holo L; iso BO, GH).

Tree 25 m. Twigs slender, at apex 1.5–2 mm diam., early glabrescent (hairs greyish, scale-like, less than 0.1 mm), dark brown, bark of twigs lower down faintly striate, hardly lenticellate. Leaves chartaceous; blades oblong-lanceolate or lanceolate, broadest at about the middle, 8–13 × 1–3 cm, base cuneate, top (narrowly) acute-acuminate; upper surface drying bright dark brown, somewhat glossy, lower surface light brown, appearing glabrous, i.e. with scattered fine dark brown non-traumatic dots intermixed with scattered brown-centered minute scale-like hairs less than 0.1 mm, not papillose; midrib slender, raised above, slender below, nerves 15–17 per side, at an angle of (70–)80° with the midrib, hardly raised, lines of interarching faint, tertiary veining forming a very fine slightly raised network, not very distinct at both surfaces;



Fig. 2. *Knema kunstleri* (King) Warb. subsp. *leptophylla* W.J. de Wilde. Habit, $\times 0.5$, drawn after the type-specimen. Note the remarkably different stages of development of the fruits in one twig.

petiole slender, brown as the twigs, 10–15 × 1–1.5 mm, glabrous; sterile terminal leaf bud slender, acute, 10–15 × 1–1.5 mm, densely covered with (grey-)rusty scales less than 0.1 mm. *Male inflorescences* and *male flowers* not known. *Female inflorescences* (immature) densely scaly, few-flowered, common peduncle 1–1.5 mm, mature *female flowers* not seen, bracteole apical, caducous. *Infructescences* axillary of leaves, 1-fruited, peduncle 1–2 mm; fruiting pedicel 7–9 mm, widening above, with narrow ring-shaped perianth-scar, bracteole-scar about halfway to 2–3 mm below apex; *fruit* ± fusiform, with sharp edge, 3.5–4.5 × 1.5–2 cm, base and top narrowed, subacute; dry pericarp 1(–1.5) mm thick, grey-brown with dense layer of scales less than 0.1 mm. Seeds ellipsoid, c. 25 mm long.

Distribution — Only known from the type collection made 13-10-1995, 5 km SW of Uut Labang, West Kalimantan (Borneo), c. 0° 36' S–112° 39' E.

Habitat & Ecology — In sloping primary hill Dipterocarp-forest, at 750 m altitude, red clay soil, semi-light environment; seldom.

Notes — 1. Fieldnotes. Tree 25 tall, 30 cm dbh. Outer bark reddish brown, flaking in large patches, inner bark salmon. Sap red. Leaves glaucous beneath, dark green above, shiny. Fruit yellowish brown.

2. The slender habit, i.e. slender twigs, narrow chartaceous leaves and elongate fruit, early glabrescent or with very inconspicuous tomentum, at once give it a quite distinctive appearance within the complex entity *K. kunstleri*. Also the dotting on the lower leaf surface (lens!) is finer, and less confined to the smallest veins.

3. The status of the present new taxon is uncertain, but because it is only known of a single fruiting gathering, and because it easily keys out on *K. kunstleri* in the key to Bornean species [De Wilde, *Blumea* 25 (1979) 360] it is provisionally accepted as yet another subspecies of the latter, rendering the number of recognized subspecies of *K. kunstleri* to six. The key to the subspecies (De Wilde, l.c.: 468) should be amended and extended in lead 4b as follows:

- 4a. (unaltered) Lowland peat swamp and kerangas forest; Borneo d. subsp. *coriacea*

 b. Fruit 30–45 mm long. Plant usually from montane area 5
 5a. Reticulation on upper leaf surface usually prominent and distinct; blade thinly or thickly coriaceous, base generally rounded. Fruit 30–40 mm, top (subacute or) rounded. Usually in montane forest at (100–)900–2000 m altitude; Borneo ...
 e. subsp. *alpina*
 b. Reticulation on upper leaf surface very fine and hence indistinct; blade chartaceous (subcoriaceous), base attenuate. Fruit 35–45 mm long, top (sub)acute. Hill forest at 750 m altitude; eastern West Kalimantan ... f. subsp. *leptophylla*

Knema latericia Elmer aff. subsp. *latericia* var. *subtilis* W.J. de Wilde, *Blumea* 32 (1987) 118, f. 1e.

In my precursory publication on *Knema latericia* [De Wilde, *Blumea* 25 (1979) 395–397] I remarked under subsp. *ridleyi* that the collection S 32311, collected in 1972 in Sarawak, is aberrant because of its slender habit, with small, narrow, membranous leaves, small fruit, small female flowers, and deviating by the bark of the older twigs

not or only hardly flaking. Through several more similar collections this delicate variety, previously annotated by me in the herbarium as a delicate form, is now known from the area by the following specimens:

S 32311 (fr.); *Anderson K 10* (male), previously identified by me as subsp. *albifolia*; *S 38065* (fr.), also previously identified by me as subsp. *albifolia*, deviating by non-flaking bark; all from eastern Sarawak (4th & 5th Division).

Wong WKM 1411 (fr.), 'a narrow leaved form of subsp. *ridleyi*'; *Keßler 394* (fr.), 'a delicate form', *398* (male), 'a delicate form'; *Dransfield 6638* (male), 'a tiny form', *6639* (fr.), 'a tiny form', *JD 7071* (male); all from Brunei.

It now appeared that these specimens approach the material enumerated with the publication of subsp. *latericia* var. *subtilis*, from nearby Palawan, Philippines, in general habit as well as in some important morphological features. The Sarawak-Brunei material all comes from tiny trees 2-4(-18) m tall, and shares the slender habit of the twigs and leaves, the non- or hardly flaking bark of the twigs, and the small fruits with var. *subtilis*, but differs by a coarser tomentum with stouter and longer hairs of the sterile terminal leaf bud and the young twig apices, and also the leaves generally have more lateral nerves. One might consider these plants as more or less intermediate between smaller-leaved forms of true subsp. *ridleyi* and subsp. *latericia* var. *subtilis*, and pending a future decision about their status I now prefer to file the collections tentatively under the name *K. latericia* Elmer aff. subsp. *latericia* var. *subtilis* W.J. de Wilde.

***Knema longepilosa* (W.J. de Wilde) W.J. de Wilde, *stat. nov.* — Fig. 3**

Knema percoriacea J. Sinclair forma *longepilosa* W.J. de Wilde, *Blumea* 25 (1979) 394. — Type: *S 22985* (holo L, iso K; A, SAN, SING, n.v.).

Tree 3-10 m. *Twigs* subterete, towards the apex 2-4 mm diameter, looking much thicker, 4-6 mm diameter, because of the dense cloth of yellow-brown or dark rusty tomentum of \pm shaggy hairs 2-3 mm long, late-glabrescent; bark of twigs lower down reddish brown, thinly and finely flaking. *Leaves* chartaceous or thinly coriaceous; blade elliptic-oblong to lanceolate, widest \pm above the middle, 13-25 by 3-6 cm, base narrowly rounded or cuneate, top acute-acuminate, glabrous (early glabrescent), upper surface drying olivaceous or greenish, lower surface greyish, with midrib and nerves brown-yellow, contrasting; midrib above narrow, pale, much raised; lateral nerves 10-15 per side, raised at both surfaces, tertiary veining distinct at both surfaces; petiole late-glabrescent, 10-15 by 1.5-2 mm, reddish brown, transversely wrinkled when dry, at first with conspicuous dense yellow-brown or rusty cloth of hairs 2-4 mm, contrasting with the early glabrescent leaf blades. Sterile terminal leaf bud short, 5(-10) by 4-5 mm, looking bluntish because of the dense cloth of hairs, 2-4 mm, as that of twig-apex and petioles. *Inflorescences* simple or forked scar-covered sessile brachyblasts to 5(-10) mm long, late-glabrescent, in male with clusters of 2-6 densely long-pubescent flowers. *Male flowers* densely roughly yellow-brown or rusty tomentose with hairs (2-)4 mm, appearing as mops 6-8 mm diam.; pedicel 3-4 mm, the bracteole minute, oblong, 0.5-1 mm long, long-pubescent as pedicel and perianth, situated 0.5-1 mm below the perianth; mature perianth in bud

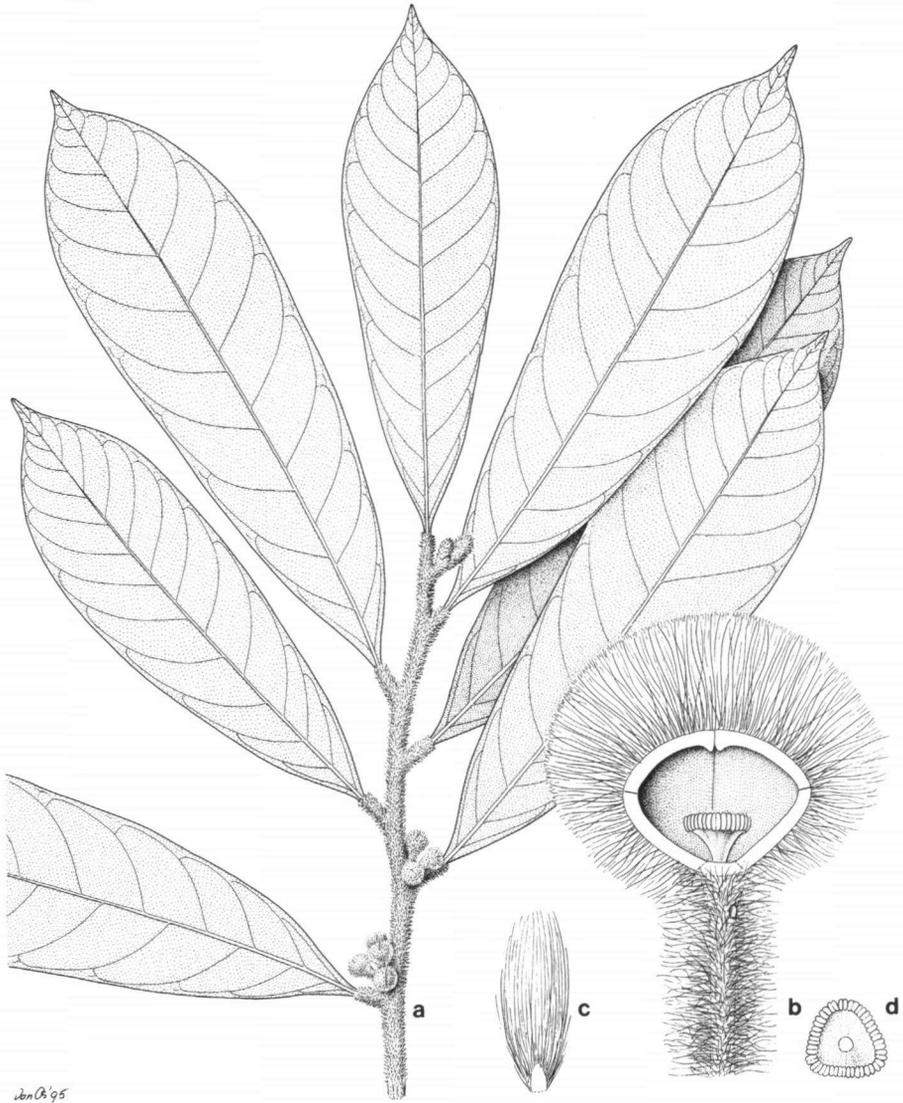


Fig. 3. *Knema longepilosa* (W.J. de Wilde) W.J. de Wilde. a. Leafy twig with male inflorescences, $\times 0.5$; b. lengthwise opened male flower; c. bracteole of male flower; d. androecium, seen from below, all $\times 5$ (a: Church & Mahyar 1613, b–d: Church & Mahyar 1466).

subglobose, 3.5–4 mm diam., valves 3, at sutures c. 0.5 mm thick, splitting the perianth to about halfway; staminal disc flat, blunt-subtriangular, 1.5(–2) mm diam., staminal column short, strongly tapering, c. 1 mm long, glabrous; anthers 15–18 (30–36 thecae), contiguous, sessile, lateral, suberect. *Female flowers* and *fruit* not known.

Distribution — Borneo: Central Sarawak (4th Div.) and West-Central Kalimantan: *Sibat ak Luang S 22985*; *Church & Mahyar 1466, 1613*.

Habitat & Ecology — Hillside forest; occasional, in mixed dipterocarp forest on basaltic soil, clay soil; 100–250 m altitude. Fl. Jan., April.

Notes — 1. Fieldnotes. Small tree, dbh. c. 5 cm. Bark (reddish) brown, latex red; leaves glaucous beneath. Flowers and bud entirely covered by light brown or rusty indumentum.

2. *Church & Mahyar 1466* partly has leaf blades \pm lyrate narrowed, possibly an incidental variation of normal elliptic-oblong entire leaves.

3. The present species was originally recognized as a form of *Knema percoriacea*, on the basis of a single collection, but recent collections by *Church & Mahyar* from W-Central Kalimantan (c. 0.30° S–112° 36' E) with abundant male flowers, made it manifest that a distinct species is concerned. It is readily recognized by the very conspicuous dense and long tomentum of the sterile terminal leaf bud, twig apex, petioles, and flowers, somewhat as those of *Knema hookeriana*. It also resembles the Malayan *Knema plumulosa*, which differs by mammillate staminal disc, and by a disc around the base of the staminal column.

4. *Knema longepilosa* keys out in the general key to the species of *Knema* and the key to the species of Borneo [De Wilde, *Blumea* 25 (1979) 341 and 361, respectively] as follows:

beside 16. *K. hookeriana*:

- p. 341: 19bis a. Twig stout, 5 mm diam. or more; tomentum with hairs to 8 mm. Sumatra, Malay Peninsula *K. hookeriana*
 b. Twigs less than 5 mm diam.; hairs 3–4 mm. Borneo
 *K. longepilosa*

beside 22. *K. percoriacea*:

- p. 361: 10bis a. Tomentum of fruit and flowers with hairs c. 1 mm. Anthers 10–15, shortly stiped *K. percoriacea*
 b. Hairs (2–)3–4 mm. Anthers 15–18, sessile . . . *K. longepilosa*

Knema lunduensis (J. Sinclair) W. J. de Wilde, *Blumea* 25 (1979) 395.

As discussed earlier (De Wilde, l.c.: 395) *K. lunduensis* intergrades with stout forms of the closely related *K. latericia* subsp. *ridleyi*.

A very robust specimen, *Aban Gibot SAN 9957*, from Kota Merudo District, Sabah, clearly belongs to *K. lunduensis*, but markedly differs from the specimens hitherto reckoned to that species by large, extremely coarse-haired male flowers, the perianth measuring 7 by 5.5–6 mm, the (1–)1.5–2 mm long hairs, and the 13 (bi-sporangiate) anthers.

This means that *K. lunduensis* (with Sinclair: *K. latericia* var. *lunduensis*) in itself is considerably variable, also comprising plants with smaller male flowers with a \pm short tomentum of hairs c. 0.5 mm long, anthers 11–14 (e.g. *S 36565*). A specimen with more or less intermediate flowers (male perianth 4–5 mm, hairs c. 1 mm) is, e.g., *S 35911*.

Two collections which I formerly had identified as *K. cf. lunduensis* can, on second thought, better be referred to as stout coriaceous-leaved montane forms of *K. latericia* Elmer subsp. *ridleyi* (Gand.) W.J. de Wilde; they are *Anderson 4552* and *Chew Wee Lek CWL 411*, both from Mulu Mts, E Sarawak, at 1200–1300 m altitude.

***Knema pallens* W.J. de Wilde, Blumea 25 (1979) 391.**

A later acquired collection, *Bernard Lee S 45549*, from Sarawak, has, rather by exception, the hairs of the tomentum (of the sterile terminal leaf bud, the very twig apex, and the fruit) 2–2.5 mm long, as against 1–1.5 mm long in the material studied previously. The fruit of this specimen is somewhat larger than was hitherto known, and is c. 7 cm long.

***Knema percoriacea* J. Sinclair; W.J. de Wilde, Blumea 25 (1979) 392.**

The variable *Knema percoriacea* has been treated by me in 1979 as divided into four forms, of which forma *percoriacea* and forma *sarawakensis* are wide-spread and the most frequently collected. The forma *longepilosa* is now raised to species level (see there). I have the impression that also forma *sarawakensis* may have to be raised to species level, but a number of specimens seem intermediate with the type form. In this case, a special study on more abundant material in the field would be interesting.

The specimen *S 41203* was formerly identified erroneously by me and stored in the herbarium as *Knema pallens*; I now see that it belongs to *K. percoriacea* forma *sarawakensis*; it has fruit to 5.5 cm long, noteworthy because the fruit was recorded as reaching only c. 4.5 cm in length. The indumentum is pale rusty and rather mealy. The fruit of typical forma *percoriacea* is smaller, with possibly a coarser, more dark-brown tomentum.

The collection *SAN 107596*, in fruit, is a somewhat atypical specimen belonging to *K. percoriacea* forma *percoriacea*: it has the bark of the younger and older twigs aberrantly not distinctly cracking and flaking, and the leaves have an exceedingly coarse venation on the upper surface.

***Knema psilantha* W.J. de Wilde, Blumea 25 (1979) 391.**

The collection *Ambri & Arifin W55*, 14-11-1989, from Wanariset area, East Kalimantan, is sterile in L, but agrees very well in vegetative details. This means that *K. psilantha*, hitherto only known from Sarawak and Sabah, also occurs in East Kalimantan.

Knema ridsdaleana* W.J. de Wilde, *spec. nov.

Knema tomentella affinis, in inflorescentiis distincte pedunculatis, floribus conspicue lanato-pubescentibus glabrescentibus differt. — Typus: *Ridsdale c. s. ISU 451* (holo PNH; iso L).

Small tree, 8 m. Twigs subterete, towards the apex 3(–4) mm diam., late-glabrescent, at first with dense rusty tomentum with hairs c. 0.5(–1) mm, coarsely striate,

blackish; bark of twigs lower down coarsely striate, brown-blackish, lenticels not apparent. *Leaves* chartaceous(-coriaceous); blades (ovate-)oblong, broadest at or usually below the middle, 15–25 × 5.5–8(–9) cm, base broadly rounded, top acute-acuminate; upper surface drying olivaceous to dark brown, lower surface drying (ashy-)grey, early glabrescent, but tomentum ± remaining on and near lower portion of midrib, minutely blackish punctate (dots not to be confused with non-traumatic dots, which are much larger), not papillose; midrib slender, raised above, nerves 15–18 per side, at an angle of 50–60° with the midrib, lines of interarching not distinct, tertiary veining forming a fine network distinct at both surfaces; petiole medium, 15(–20) × (2–)2.5 mm, late glabrescent, drying brown-blackish; sterile terminal leaf bud rather slender, c. 15 × 3 mm, acute, densely dark rusty pubescent with hairs c. 0.5(–1) mm. *Male inflorescences* densely pubescent, situated apically in the twigs, axillary of the leaves; common peduncle distinct, 10–15 × 2–2.5 mm, terminally with a simple or usually 2- or 3-forked scar-covered brachyblast, the arms up to 5 mm long ending in subumbels of 1–3 flowers of various size according to age; bracts small, c. 1 mm, densely conspicuously pubescent, caducous. *Female inflorescences* and *female flowers* not seen. *Male flowers* densely dark brown woolly, as a dense mat or blanket-like coating, 0.3(–0.5) mm thick, at anthesis (when dry) largely falling off in large flakes, leaving the perianth completely glabrous; pedicel ± slender, 3–4 (–5) mm long, bracteole oblong, (2–)2.5 mm long, at c. 1 mm below the perianth, at base continuing on the pedicel with low rims; mature perianth in bud depressed (sub-)globose, c. 3 × 4–4.5 mm, lobes 4, splitting the perianth for about 4/5 (9/10), i.e., nearly to the base, at sutures 0.4 mm thick; staminal disc flat, circular, 1.8(–2) mm diam., anthers 11–13, half-stiped, then adnate to the tapering androphore; the anthers 4-sporangiate, thecae nearly 1 mm long, anthers ± contiguous, free part of androphore short, less than 0.5 mm, glabrous, distinctly striate. *Infructescences* and *fruit* not seen.

Distribution — Known only from the type collection, Palanan area, NE Luzon, Philippines.

Habitat & Ecology — Streamside forest on ultrabasic soil; c. 50 m altitude. Fl. April.

Etymology — Named after Colin E. Ridsdale (L), botanist and collector of many interesting specimens (often new species) from the Philippines and India.

Notes — 1. Fieldnotes: Small tree, 8 m; bark dark brown, flaky, inner bark red. Flowers reddish-brown.

2. This species is superficially reminiscent of *Knema glomerata* (especially in the leaves) and *K. tomentella* (as regards the rather conspicuous tomentum, falling off in flakes). It reminds of *K. celebica* because of the peduncled inflorescences, the grey colour of the leaf undersurface, and the tomentum, but that species is quite different by the scattered dots on the leaves, distinct androecium etc. *Knema ridsdaleana* is readily distinct by its grey leaf undersurface with minute dark punctuation (strong lens!), the conspicuous tomentum, the long-stalked (male) inflorescences, the 4-merous perianth, the conspicuous shedding of the tomentum of the perianth, and 11–13 large (long), ± contiguous, subsessile, 4-sporangiate anthers.

In the general key to the male flowering specimens [De Wilde, *Blumea* 25 (1979)] *Knema ridsdaleana* keys out as follows, above lead 42:

- p. 344: 41bis a. (Male) inflorescences conspicuously long peduncled
 *K. ridsdaleana*
 b. Inflorescence (sub)sessile 42

In the regional key for the Philippines (De Wilde, l.c.), above lead 3:

- p. 364: 2bis a. (Male) inflorescences distinctly peduncled. Perianth glabrescent
 *K. ridsdaleana*
 b. Inflorescences (sub)sessile. Perianth with persistent tomentum 3

In most *Knemas* the (male) inflorescences are (sub)sessile; other species with conspicuously long peduncles are, e.g., *K. celebica*, *K. austrosiamensis* from Thailand, or *K. attenuata* from India.

***Knema sericea* W. J. de Wilde, Blumea 25 (1979) 383.**

Since the original description more material of this Central Bornean species has become available: tree to 20 m tall; the mature male perianth in bud is subglobose and may reach a size as large as 10 mm diam.; anthers 10–15, long-stiped (*NGS 751*). The mature fruit is subglobose or broad-ellipsoid, 3.5–5 cm long, with dense minute tomentum; fruiting pedicel 15–20 mm, with the scars of the bracteoles at or somewhat above the middle.

In the key to female or sterile specimens for Borneo (l.c.: 360) this species was keyed out by the blunt leaf apex. A recent collection from Brunei at 350 m altitude, *Simson 2403*, with immature fruits, has an acute-acuminate leaf apex, similar as in the related species. *Knema sericea* remains distinct, however, by its very typical concave staminal disc, and the broad-ellipsoid fruit, c. 4.5 by 3.5 cm. The short tomentum on the lower leaf surface is more fluffy as compared to *K. ashtonii* var. *cinnamomea*, for which it can easily be mistaken.

The collections *Mogea & de Wilde 3515, 4315*, from Central Kalimantan were formerly erroneously named *K. ashtonii* var. *cinnamomea*; it now appeared that they should be referred to *K. sericea*.

***Knema tomentella* (Miq.) Warb.; J. Sinclair, Gard. Bull. Sing. 18 (1961) 277; W. J. de Wilde, Blumea 25 (1979) 438.**

According to Sinclair (l.c.) *Knema tomentella* extends into the Philippines in Luzon and Samar Is., but in my precursory revision of *Knema* (De Wilde, l.c.) I rejected the occurrence there, re-instating *K. stellata* Merr. and *K. alvarezii* Merr. as separate species.

Re-examination of the materials concerned, including some recently acquired collections revealed that:

Knema stellata Merr. superficially resembles *K. tomentella* but should be kept a good separate species.

Knema alvarezii Merr. still more resembles *K. tomentella*, but is provisionally kept separate as an endemic of Luzon.

Knema tomentella (Miq.) Warb., however, does occur in the Philippines, known through a recently made collection, *Soejarto et al. 8030*, from Samar Is. (no flowers in L-duplicate). In this respect I allude to the variability as accepted by me in *K. glomerata*, a species quite frequently collected in the whole of the Philippines. Part of the specimens included by me in that species approach certain forms of *K. korthalsii*, others superficially somewhat incline to *K. tomentella*, especially as regards the dense tomentum of the twig apices, e.g. *Warburg 13644-a*, *Ramos & Deroy BS 22574* or *Elmer 17565*, all from Luzon.

***Knema tonkinensis* (Warb.) W.J. de Wilde, *Blumea* 25 (1979) 381.**

The specimen *Poilane 35658* (L, P), with male flowers, collected in Annam at about 1100 m altitude, appears to approach *K. tonkinensis*: it has a similar tomentum on the lower leaf surface, consisting of almost equally sized, stalked, dendroid hairs, and male perianths narrowed below the lobes, rendering the perianth pear-shaped, somewhat longer than broad. It differs from the material described under *K. tonkinensis* (De Wilde, l.c.) by stouter twigs, c. 4 mm diam. in the apical portion, and by slightly larger flowers, the synandrium with 15 anthers around the staminal disc, contrary to the 9 anthers in the type material. The staminal column is densely minutely hairy towards the base, as in related species like *K. bengalensis* and *K. elegans*. *Knema elegans* particularly is resembling *K. tonkinensis* and seems closely related by its similar, equally sized hairs on the lower leaf surface, but differs by a more globose male perianth, at anthesis deeper cleft by the perianth lobes. See also the discussion under deviating specimens under *Knema* aff. *austrosiamensis*.

I have provisionally named and filed the collection *Poilane 35658* as *Knema* cf. *tonkinensis*.

***Knema tridactyla* Airy Shaw aff. subsp. *sublaevis* W.J. de Wilde, *Blumea* 25 (1979) 434.**

Two collections made since the publication of subsp. *sublaevis*, viz. *Wong WKM 1366* and *Dransfield c.s. JD 7113*, both from Brunei, Temburong, Bukit Belalong, at c. 850 m altitude, come close to *K. tridactyla* subsp. *sublaevis*, but differ by having a more conspicuous tomentum of the sterile terminal leaf bud, young twig apex, and male flowers, the latter (*Dransfield JD 7113*) with 10–12 anthers instead of 5 or 6 as described for subsp. *sublaevis*. Typical *K. tridactyla* has c. 8 anthers (i.e. c. 16 thecae), and a considerably more conspicuous tomentum. The said specimens are in some respects intermediate between the two subspecies, but may represent a new, undescribed, separate taxon. Tentatively the two specimens were named by me as *K. tridactyla* Airy Shaw aff. subsp. *sublaevis*.

It is noted that the whole *Knema tridactyla*-complex obviously is closely related to *K. oblongata* Merr., and especially approaches *K. oblongata* subsp. *parviflora* W.J. de Wilde (De Wilde, l.c.: 404), with only slightly larger male flowers, also with 8 anthers.

REFERENCES

- Wilde, W.J.J.O. de. 1979. New account of the genus *Knema* (Myristicaceae). *Blumea* 25: 321–478.
 Wilde, W.J.J.O. de. 1984a. *Endocomia*, a new genus of Myristicaceae. *Blumea* 30: 173–196.
 Wilde, W.J.J.O. de. 1984b. A new account of the genus *Horsfieldia* (Myristicaceae). Part 1. *Gard. Bull. Sing.* 37: 118–179.
 Wilde, W.J.J.O. de. 1985a. *Ibid.* Part 2. *Gard. Bull. Sing.* 38: 55–144.
 Wilde, W.J.J.O. de. 1985b. *Ibid.* Part 3. *Gard. Bull. Sing.* 38: 185–225.
 Wilde, W.J.J.O. de. 1986. *Ibid.* Part 4. *Gard. Bull. Sing.* 39: 1–65.
 Wilde, W.J.J.O. de. 1987a. Further supplementary data on Malesian *Knema* (Myristicaceae). *Blumea* 32: 115–141.
 Wilde, W.J.J.O. de. 1987b. Additions to *Horsfieldia* (Myristicaceae) including four new species. *Blumea* 32: 459–472.

INDEX

All names are referred to page number. Accepted names are in Roman type; new names and combinations are in bold type; synonyms in italics.

- Endocomia* W.J. de Wilde 375
 macrocoma (Miq.) W.J. de Wilde
 subsp. *macrocoma* 375
Horsfieldia Willd. 377
 affinis W.J. de Wilde 377, 381
 gracilis W.J. de Wilde 377, 378
 paucinervis Warb. 378, 379
 penangiana J. Sinclair 379
 subsp. ***obtusifolia*** W.J. de Wilde 379
 subsp. *penangiana* 379
 perangusta W.J. de Wilde 379
 polyspherula (Hook. f. emend. King)
 J. Sinclair 381
 reticulata Warb. 381
 xanthina Airy Shaw
 subsp. *macrophylla* W.J. de Wilde 381
Knema Lour. 382
 ashtonii J. Sinclair
 var. *ashtonii* 382
 aff. austrosiamensis W.J. de Wilde 382
 bengalensis W.J. de Wilde 383
 curtisii (King) Warb.
 var. *curtisii* 383
 (Knema)
 emmae W.J. de Wilde 384
 krusemaniana W.J. de Wilde 385
 kunstleri (King) Warb.
 subsp. ***leptophylla*** W.J. de Wilde 386
 latericia Elmer
 subsp. *latericia*
 var. *subtilis* W.J. de Wilde 388
 longepilosa (W.J. de Wilde)
 W.J. de Wilde 389
 lunduensis (J. Sinclair) W.J. de Wilde 391
 pallens W.J. de Wilde 392
 percoriacea J. Sinclair 392
 forma *longepilosa* W.J. de Wilde 389, 392
 psilantha W.J. de Wilde 392
 ridsdaleana W.J. de Wilde 392
 sericea W.J. de Wilde 394
 tomentella (Miq.) Warb. 394
 tonkinensis (Warb.) W.J. de Wilde 395
 tridactyla Airy Shaw
 subsp. *sublaevis* W.J. de Wilde 395