

MORE NOTES ON KNEMA AND MYRISTICA (MYRISTICACEAE)

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SUMMARY

New material of *Knema* and *Myristica* necessitated the description of some new species, subspecies and forms, viz. *Knema korthalsii* subsp. *rimosa*, *K. kunstleri* subsp. *pseudostellata*, *K. latericia* subsp. *ridleyi* forma *nana* and forma *olivacea*, *K. minima*, *K. tridactyla* subsp. *pachydactyla* and subsp. *salicifolia*, and *Myristica inaequalis* and *M. rosselensis* subsp. *minutiflora*. Additional comments to other taxa are given and, where appropriate, insertion in (earlier published) general and regional keys are proposed.

INTRODUCTION

During the final stages of preparing the treatment of the family Myristicaceae for Flora Malesiana it appeared that a few additions in *Knema* and *Myristica* remained to be made.

In the still insufficiently collected Myristicaceae repeated supplementary notes appear necessary due to inaccuracies found in previous publications and also because continually new areas are explored disclosing new forms not covered by the existing revisions. Especially in under-collected New Guinea the rich genus *Myristica* is likely to produce still more new taxa of local provenance. Also, additional collections may elucidate the true status of previously studied problematic and incomplete material, as testified by several recent publications.

At present one new species and seven new subspecific taxa in *Knema*, and one new species and one new subspecies in *Myristica* are described.

KNEMA Lour.

Recently acquired specimens of *Knema* from Brunei, obviously identical with specimens formerly (De Wilde, 1996) treated under *K. latericia* var. *subtilis*, induced me to reconsider the whole variable complex of *K. latericia* sensu lato in Borneo, as accepted by me previously. This resulted in the redefining of the subspecific taxa, and the acceptance of a new subspecies under *K. korthalsii* (subsp. *rimosa*), new forms under *K. latericia* subsp. *ridleyi* (forma *nana* and forma *olivacea*). Under *K. kunstleri* a new subspecies is described (subsp. *pseudostellata*), and also one new species, *K. minima*, is added. The taxa concerned, with brief descriptions, notes, and partial keys for discrimination against related or resembling species with reference to previously published keys, are enumerated below:

Knema korthalsii Warb., Mon. Myrist. (1897) 557; W. J. de Wilde, Blumea 25 (1979) 428 (p. 345: key).

KEY TO THE SUBSPECIES

- 1a. Twigs towards apex 3–5 mm diam., older bark not flaking. Lateral nerves to 40 per side, usually clearly interarching. Fruit 2–4 cm long, pedicel 2–6 mm long; persistent style and stigma to c. 1 mm long **a. subsp. korthalsii**
 b. Twigs towards apex 2–3 mm diam., older bark thinly flaking. Lateral nerves 12–22 per side, lines of interarching more faint. Fruit c. 2 cm long, pedicel 1–2 mm long; persistent stigma sessile (as in *K. latericia*) **b. subsp. rimosa**

b. subsp. rimosa W. J. de Wilde, *subsp. nov.*

Arbores 2–15 m altae. A subspecies typica ramulis gracilioribus distaliter 2–3(–5) mm diam., deorsum cortice rimuloso squamuloso differt. — Typus: *SAN A 1996* (Wood), male fl. (L), Sabah.

Tree 2–10(–15) m. *Twigs* towards apex 2–3(–5) mm diam., ± flattened or bluntly 3-angular, faintly ridged from the basis of the petiole, with dense indumentum of hairs of mixed size, to c. 0.5 mm long, glabrescent; bark of twigs lower down grey-brown, thinly flaking. *Leaves* (thinly) chartaceous, elliptic- or obovate-oblong, 15–30 by 3.5–8.5 cm, base acute or rounded, top acute-acuminate, above drying (olivaceous-)brown, grey(-brown) below, glabrous (early glabrescent), midrib raised above; nerves 12–22 per side, raised above; petiole 8–12 by 2–4 mm, tomentose or late glabrescent; terminal leaf bud c. 10 by 3 mm, with hairs c. 0.5 mm long. *Inflorescences* without peduncle, in male simple or 2 or 3 tuberculate, to c. 5 mm diam., with subumbels of 10–20 flowers; female inflorescences few-flowered. *Male flowers* with tomentum of hairs 0.2–0.5 mm long; pedicel (4–)5–10 mm long, bracteole subpersistent, 0.5–1 mm long, at about the middle of the pedicel, mature perianth in bud depressed-globose, as seen from above somewhat triangular, at base broadly rounded or ± flattened (short-attenuate when immature), 3–4 by 4–6 mm, cleft into lobes for c. 4/5, at sutures c. 0.5 mm thick, at base to c. 1 mm thick and forming a cushion-like disc clasping the staminal column. Androecium 1(–1.5) by 2–2.5 mm; column slender, c. 1 mm long, staminal disc including anthers circular, 2–2.5 mm diam., closely spread over the perianth disc; anthers 10–12, horizontal, stiped, slender, c. 0.5 mm long, opening to beneath; staminal disc convex or low-mammillate. *Female flowers* and fruits resembling those of *K. latericia* subsp. *ridleyi*. *Fruit* ellipsoid or obovoid, 2–2.3 cm long, with rough, dark rusty indumentum of hairs 0.5–1 mm long, with persistent sessile, lobed stigma; fruiting pedicel (1–)2–3 mm long.

Distribution — Borneo: endemic in SE Sarawak and E Sabah.

Habitat & Ecology — In lowland forest up to 900 m; in primary dipterocarp forest; on brown sandy soil, leached loam over sandstone; undulating well-drained ground. Fl. Mar.–Apr.; fr. Apr.–June.

Notes — 1. Field-notes. Bark smooth, blackish, scaling irregularly, scales to 3 inch diam., to reveal orange-brown patches below. No buttresses. Outer bark 0.03 inch wide, pale brown, soft, flaky; phellogen pink; inner bark 0.03 inch, fibrous, pink, rapidly exuding a copious red exudate; sapwood off-white, no smell. Male tree [*SAN A 1996* (Wood)] flowering abundantly throughout the crown, for several feet back

from the ends of the smaller branches. Perianth brown, tomentose, inside red. Anthers yellow, disc swollen, pink. Leaves glaucous below.

2. The specimens belonging to this new subspecies of *K. korthalsii* were previously included by me in *K. latericia* subsp. *ridleyi*, which it resembles deceptively in the vegetative state and also the female flowers or fruit. In fact, I cannot tell such specimens apart for sure, and also Sinclair (l. c.) kept the then known specimens under *K. latericia*. However, it now appears that the male flowers are quite distinct, and in the general key the male flowering specimens (De Wilde, 1996: 343), the present subsp. *rimosa* keys out in the emended lead 26 as follows:

- 26a. Mature male flower buds 5–8 mm diam., early glabrescent; pedicels 6–9 mm long. Twigs at apex early glabrescent, often yellowish **K. membranifolia**
 b. Mature male flower buds 3–6 mm diam., with persistent tomentum; pedicels (1–) 2–10 mm long. Twigs at apex late glabrescent, brown 26-bis
 26-bis a. Mature male flower buds globose, 3–4.5 mm diam., pedicel (1–)2–3 mm long, bracteole situated towards the top. Staminal disc flat or faintly convex; anthers ± obtuse, opening somewhat towards the outside **K. latericia**
 b. Mature male flower buds depressed globose, 4–6 mm wide; pedicel (4–)5–10 mm long, bracteole at about the middle. Staminal disc mammillate; anthers ± acute, opening ± downwards **K. korthalsii** subsp. *rimosa*

Knema korthalsii subsp. *rimosa* as described here and *K. latericia* subsp. *ridleyi* share the flaking bark of the older twigs, a character regarded as important for the distinction of taxa, and used in the general key to the species. By removing the longer-pedicelled male flowering specimens with a distinct mammillate staminal disc, the wide-spread and still variable *K. latericia* subsp. *ridleyi* has become more homogeneous. For a proper distinction one should examine fully mature male flowers still in bud, or just opened. Apart from the characters as given in the key, the staminal disc in *K. latericia* is not tightly appressed to the inside of the lower portion of the perianth, which is also not distinctly thickened into a cushion-shaped disc-like structure.

3. The taxonomic status of the present subsp. *rimosa* under *K. korthalsii* is tentative. Possibly the taxon has originated by hybridization with *K. latericia*.

4. The collection *Sauveur 917* from SE Kalimantan (along river, at 10 m altitude) has flaking bark, but is kept out of subsp. *rimosa*; as mentioned previously (De Wilde, 1979: 429) it is treated under subsp. *korthalsii* as deviating.

Collections — BORNEO. Sarawak: *S 56938*. Sabah (collections with male flowers, an asterisk denoting female flowers or fruit): *BNB For. Dept. 1737, 7250**; *Elmer 20809*; *Fabia A 4003*; *SAN A 1996, A 2917*, 16515*, 24488, 34007, 35336*, 37506 (NT 655)*, 78675, 94914, 108293, 108696*. — Sterile collections likely belonging to subsp. *rimosa* are: *SAN 34172*; *BNB For. Dept. 4503*; *Villamil 241*.

***Knema kunstleri* (King) Warb., Mon. Myrist. (1897) 568, t. 25; W. J. de Wilde, Blumea 25 (1979) 468; 41 (1996) 386.**

Again a recent collection from Kalimantan, keying out to *K. kunstleri*, appeared as not identical with any of its six subspecies. It is described here as a new, seventh, subspecies. For convenience, an overview of all seven subspecies is presented below in the form of an abbreviated key.

KEY TO THE SUBSPECIES

- 1a. Leaves large, to 28 by 10 cm. Twigs stout, at apex c. 4 mm diam. Swamp forest.
— Sumatra **e. subsp. macrophylla**
- b. Leaves smaller. Twigs at apex 1.5–3 mm diam. 2
- 2a. Twigs at apex 1.5–2 mm diam., striate. Leaf base usually attenuate. Anthers 8–11.
— Lowland, not in peat swamp forest 3
- b. Twigs at apex 1.5–3 mm diam., not or faintly striate. Leaf base attenuate or rounded. Anthers 7–14. (Male flowers not known in subsp. *leptophylla* and subsp. *pseudostellata*.) — Lowland peat swamp forest, or mountains. Borneo 4
- 3a. Leaves usually drying greenish. — Peninsular Malaysia ... **c. subsp. kunstleri**
- b. Leaves drying brownish. — Philippines **f. subsp. parviflora**
- 4a. Fruit c. 2 cm long 5
- b. Fruit 3–4 cm long. — Plant usually of montane area 6
- 5a. Tomentum of lower leaf surface consisting of scattered scale-like hairs c. 0.1 mm.
— Plant from lowland peat swamp forest **b. subsp. coriacea**
- b. Tomentum of leaves below consisting of mixed sessile hairs, c. 0.1 mm, and few elongate hairs, to c. 0.3 mm. — Plant from montane area
..... **g. subsp. pseudostellata**
- 6a. Leaves generally coriaceous, venation distinctly reticulate, base rounded
..... **a. subsp. alpina**
- b. Leaves chartaceous, venation faintly reticulate, base attenuate
..... **d. subsp. leptophylla**

a. subsp. alpina (J. Sinclair) W. J. de Wilde, *Blumea* 25 (1979) 471.
Distribution — Borneo.

b. subsp. coriacea (Warb.) W. J. de Wilde, *Blumea* 25 (1979) 470.
Distribution — Borneo: Sarawak, Sabah, Brunei.

c. subsp. kunstleri; W. J. de Wilde, *Blumea* 25 (1979) 469.
Distribution — Peninsular Malaysia.

d. subsp. leptophylla W. J. de Wilde, *Blumea* 41 (1996) 386, f. 2.
Distribution — Central Borneo.

e. subsp. macrophylla W. J. de Wilde, *Blumea* 25 (1979) 469.
Distribution — Sumatra.

f. subsp. parviflora (Merr.) W. J. de Wilde, *Blumea* 25 (1979) 470.
Distribution — Philippines: Luzon, Samar.

g. subsp. pseudostellata W. J. de Wilde, *subsp. nov*

A subspecies ceteris folii paginae inferioris tomento pilis 0.1–0.3 mm longis differt. Fructus ellipsoideus c. 2 cm longus. — Typus: *Church c. s. 2560* (L), Kalimantan.

Tree 9 m. Twigs towards apex 2 mm diam., at first with indumentum of hairs 0.1–0.2 mm long, glabrescent, older twigs finely striate. *Leaves* coriaceous, oblong, 10–15 by 2.5–4.5 cm, base subcuneate to broadly rounded; upper surface drying olivaceous-brown, lateral nerves c. 15 per side, flat and indistinct above, reticulation hardly visible; lower surface with persistent open indumentum of minute stellate hairs, c. 0.1 mm long, mixed with longer dendroid hairs c. 0.3 mm long; dark brown non-traumatic dots (cork warts) present, wart-like, much raised. *Male inflorescence* and *male flowers* not known. *Female inflorescences* axillary of leaves, sessile, wart-like, c. 2 mm diam., with 1 (or 2) flowers. *Female flowers*: indumentum of hairs c. 0.1 mm long; pedicel c. 3 mm long, bracteole small, caducous, leaving its scar subapical; perianth obovoid, c. 3 mm long; pistil not investigated. *Fruit* solitary, long-ellipsoid, 19–20 by 9–10 mm, tomentum with rusty hairs 0.1(–0.2) mm long; dry pericarp 0.5(–1) mm thick, seed ellipsoid-oblong, c. 15 mm long.

Distribution — Only known from one collection, eastern West Kalimantan, Serawai, 1.5 km S of Uut Labang, 0° 36' 6" S, 112° 38' 56" E.

Habitat & Ecology — Primary forest; fagaceous and hill dipterocarp forest, major associates include *Shorea*, *Dipterocarpus*, *Quercus*, *Lithocarpus*. Ridge and surrounding sloped hills at 1200 m altitude. Red clay soil. Occasional. Fl. & fr. Oct.

Notes — 1. Field-notes. Tree 9 m tall, 10 cm dbh. Inner bark light orange. Sap red. Leaves fleshy, glaucous beneath, dark green above. Fruit covered by rusty indumentum.

2. The only known specimen of the present subspecies was found in almost the same locality as another recently described subspecies of *K. kunstleri* (i.e., subsp. *leptophylla*, De Wilde, 1996: 386), the latter at c. 750 m, the present one at 1200 m altitude.

The present subsp. *pseudostellata* clearly represents a new taxon, but its definite status can only be determined when more (male flowering) material becomes available. It superficially reminds of *K. stellata* from the Philippines.

Knema latericia Elmer, *Leafl. Philipp. Bot.* 5 (1913) 1815; J. Sinclair, *Gard. Bull. Sing.* 16 (1958) 278, f. 3, pl. II A; 18 (1961) 238; W.J. de Wilde, *Blumea* 25 (1979) 395; 32 (1987) 115, f. 1; 41 (1996) 388.

Delicate specimens with very small male flowers, previously discussed (De Wilde, 1996: 375) under *K. latericia*, now been described as a separate species, *K. minima*, see below. Within *K. latericia* subsp. *ridleyi* two new forms have been recognized, in order to bring some more structure in this variable taxon. However, the true status of these forms, f. *olivacea* (comprising stout plants drying greenish) and f. *nana* (a small, narrow-leaved form with bark and twigs non-flaking) is obscure and provisional.

REVISED KEY TO THE INFRASPECIFIC TAXA OF KNEMA LATERICIA

- 1a. Bark of older twigs thinly flaking 4
- b. Bark not flaking 2
- 2a. Mature male perianth in bud subglobose, c. 4 mm diam. Leaves small, lanceolate.
— E Sarawak, Brunei c1. subsp. *ridleyi* forma **nana**
- b. Mature perianth in bud more or less obconical, c. 3.5 mm wide (not known in var. *subtilis*) 3

- 3a. Twigs 2–4 mm diam. at apex. Leaves 7–25 by 2.5–6 cm, lateral nerves 11–18 pairs **b1. subsp. latericia var. latericia**
- b. Twigs at apex 1–1.5 mm diam. Leaves 5–13.5 by 1–4.5 cm, lateral nerves 8–12 pairs **b2. subsp. latericia var. subtilis**
- 4a. Whole plant pale; twigs, leaves, and flowers when young with yellowish or grey-brown tomentum. Leaves chartaceous, whitish below. Male perianth obconical. — Borneo **a. subsp. albifolia**
- b. Plant not pale; twigs, leaves, and flowers when young with dark rusty indumentum. Leaves chartaceous or subcoriaceous, grey-brown below. Male perianth subglobose or shortly obconical 5
- 5a. Plant stoutish. Leaves drying olivaceous. — E Borneo **c2. subsp. ridleyi forma olivacea**
- b. Plant of various habit. Leaves drying (dark) brown. — S Thailand, Peninsular Malaysia, Sumatra, Borneo **c3. subsp. ridleyi forma ridleyi**

a. subsp. albifolia (J. Sinclair) W.J. de Wilde, *Blumea* 25 (1979) 397; 32 (1987) 117.
— Fig. 1a.
Distribution — Borneo.

b. subsp. latericia; W.J. de Wilde, *Blumea* 25 (1979) 369.

b1. var. latericia; W.J. de Wilde, *Blumea* 32 (1987) 115, f. 1a–d.

Erratum — In De Wilde, l.c.: 117, line 5 from top, for subsp. *albifolia* read subsp. *latericia*.

Distribution — Philippines: Palawan.

b2. var. subtilis W.J. de Wilde, *Blumea* 32 (1987) 118, f. 1e; 41 (1996) 388.

Distribution — Philippines: Palawan.

Note — The specimens from Borneo discussed as approaching var. *subtilis* are at present described as two new taxa, viz. *K. latericia* subsp. *ridleyi* f. *nana* and *K. minima*; see below.

c. subsp. ridleyi (Gand.) W.J. de Wilde, *Blumea* 25 (1979) 396; 27 (1981) 223.

c1. forma nana W.J. de Wilde, *forma nov.* — Fig. 1b

Forma typica habitu minuto ramulis gracilibus foliis minutis angustis, ramulorum cortice laevi non squamuloso differt. — Typus: *Anderson K 10* (L), Sarawak.

Tree 7–18 m. Twigs towards apex 1.5–2 mm diam., at first with rusty tomentum of hairs 0.5–1 mm long; bark of older twigs finely striate, not flaky. Leaves thinly coriaceous, (oblong-)lanceolate, 6–15 by 1–1.5(–2) cm, base (narrowly) attenuate, drying (light) brown above, pale brown beneath. Male perianth in bud c. 3 by 4 mm, pedicel 2–2.5 mm long; anthers 6 or 7. Female perianth c. 4 mm long. Fruit obovoid, 13–18 by 10–12 mm, with rusty indumentum of rough hairs c. 1 mm long.

Distribution — Borneo: E Sarawak (Mt Mulu area), Brunei, Sabah.

Habitat & Ecology — Hill dipterocarp forest, ridge-side forest; sandy-clay soil; 300–550 m altitude. Fl. July; fr. July, Sept., Oct.



Fig. 1. Various taxa of *Knema* susceptible to being confounded in the vegetative state; all $\times 0.5$. — a. *Knema latericia* Elmer subsp. *albifolia* (J. Sinclair) W.J. de Wilde, mature fruit. — b. *K. latericia* Elmer subsp. *ridleyi* (Gand.) W.J. de Wilde forma *nana* W.J. de Wilde, mature fruit. — c. *K. minima* W.J. de Wilde, fruit slightly immature. — d. *K. tridactyla* Airy Shaw aff. subsp. *sublaevis* W.J. de Wilde (a: SAN 38982; b: Wong WKM 1411; c: Keßler c.s. 394; d: Wong WKM 1366).

Notes — 1. Field-notes: Bark smooth or slightly flaky. Red exudate. Leaves glaucous below.

2. Specimens of the present forma *nana* were discussed under subsp. *latericia* var. *subtilis* (De Wilde, 1996: 388).

3. Possibly here also belongs *Keßler c. s. 692*, E Kalimantan, 20 m alt., a specimen with a somewhat coarser habit.

Collections — BORNEO. E Sarawak: *Anderson K 10; S 32311, S 38065*. — Brunei: *Wong WKM 1411*. — Sabah: *SAN 90486*.

c2. forma *olivacea* W.J. de Wilde, *forma nov.*

Forma typica foliis in sicco supra olivaceis infra pallidis, fructibus 2–3.5 cm longis differt. — Typus: *Endert 3342* (L), Borneo, W Kutai.

Small tree, 3–10 m. *Twigs* at apex 3–4(–6) mm diam., with dense rusty or light brown indumentum with hairs 0.5(–1) mm long, bark lower down soon longitudinally cracking and flaking. *Leaves* thinly coriaceous, (15–)20–35 by 4–9 cm; upper surface drying olivaceous, lower surface pale, grey-brown, nerves 14–16(–22?) pairs, yellowish brown, contrasting; petiole late-glabrescent. *Inflorescences* and *male* and *female* flowers as in the type form (of subsp. *ridleyi*) (but see notes 2 & 3). *Fruit* ellipsoid, 2–3.5 cm long, with indumentum of hairs (0.5–)1 mm long.

Distribution — Borneo: Sabah, E & SE Kalimantan.

Habitat & Ecology — Flat and hilly country; in forest on sandstone or sand/limestone; 10–700 m altitude. Fl. July, Nov.; fr. June, Sept.

Notes — 1. Field-notes. Treelet, bark smooth or scaly; living bark 13 mm, light red; exudate reddish; leaves blue-green below; flowers rusty, inside pink. Fruit brown.

2. Specimens of this form were previously included in subsp. *ridleyi* but differ by a singular pale, greenish drying colour of the leaves. The fruits are possibly slightly larger. Among the collections belonging to the present form there are two male flowering specimens: 1) *SAN 28792* from N Sabah, flowers (with 10 anthers) perfectly linking up with the typical form of subsp. *ridleyi*; 2) *Kostermans 7396*, doubtlessly belonging to the type of forma *olivacea*, with similarly looking male flowers, but an androecium with 14–17 anthers, arranged rather like those of *K. korthalsii*, but with a flat staminal disc. If future collections confirm that this is the normal situation in forma *olivacea*, then a status of a distinct species – possibly of hybrid origin – might be warranted. See also note 3.

3. Doubtful specimens. Two specimens superficially resembling forma *olivacea* but possibly not belonging there are *BNB For. Dept. 9395* (Sabah, low altitude) with immature long-ellipsoid fruit, and *Clemens 28325* (Sabah, Tenompok, 5000 ft); the latter has long-pedicelled male flowers, as in *K. korthalsii*, but the androecium (with 10 anthers) is rather like that of *K. latericia*.

Collections — BORNEO. Sabah: *SAN 28792 (Lajangah)*. — E & SE Kalimantan: *Endert 3178, 3342; Kostermans 5449, 7396, 13721; Kuswata Kartawinata 939*.

c3. forma *ridleyi*

Distribution — S Thailand, Peninsular Malaysia, Sumatra, Borneo.

Knema minima W.J. de Wilde, *spec. nov.* — Fig. 1c

Arbores humiles 2–5 m altae. Ramulis distaliter c. 1 mm crassis. Folia supra pallida in sicco. Perianthium masculinum globosum c. 2 mm diam., pilis c. 0.5 mm longis, antheris 7–10. — Typus: *Dransfield c.s. JD 7071* (L), Brunei.

Treelet, 2–5 m. Twigs at apex bluntly angular, 1–1.5 mm diam., with dense rusty tomentum of hairs c. 0.5 mm long, glabrescent; bark of twigs brown or yellowish brown, finely striate, not or faintly cracking. Leaves chartaceous, early glabrescent, at first with woolly yellow-brown tomentum of hairs c. 0.5 mm long; blade elliptic-oblong to lanceolate, 6–18 by 1–3(–4) cm, base cuneate, rarely nearly rounded, top acute; upper surface drying dull greenish, lower surface grey-green, without dots; midrib raised above, nerves 10–20 per side, at 60–80° with the midrib, flat or slightly raised above, pale yellow-brown, contrasting below; tertiary venation fine, not prominent; petiole 5–10 by 1(–1.5) mm, glabrescent. Inflorescences axillary to the leaves; in male sessile, simple (or 2- or 3-furcate) wart-like or worm-like scar-covered brachyblasts 2–5 mm long, terminally with 1–3 flowers, glabrescent. Female inflorescences shorter, 1- or 2-flowered. Flowers with dense indumentum of hairs c. 0.5 mm long. Male flowers: pedicel 1.5(–2) by 0.5 mm, with minute persistent bracteole at c. 1/3 from the top; mature perianth in bud globose or depressed globose, 1.5–1.8 by 2–2.2 mm, cleft for c. 4/5, lobes c. 0.3 mm thick; androecium 0.5–0.8 by 1–1.5 mm; column slender, 0.5–0.8 mm; staminal disc including anthers subcircular, flat, 1–1.5 mm diam., anthers 7–10, shortly stiped, 0.3–0.5 mm, opening outward. Female flowers (according to remnants under immature fruit) subsessile, perianth 1.5–3 mm long. Fruit 1 (or 2) per infructescence, obovoid-ellipsoid, 1.2–2 by 0.8–1 cm, with dense bright (yellow-rusty indumentum of hairs 0.5–1 mm; fruiting pedicel 1–1.5 mm long.

Distribution — Borneo: only known from a restricted area in S Brunei.

Habitat & Ecology — Mixed dipterocarp forest on ridges; possibly restricted to forest on sandstone or Setap shales; loamy or podsolic soil; 50–350 m altitude. Fl. Jan., Feb., June, July; fr. Jan., Mar., July.

Notes — 1. Field-notes. Small tree, 2–5 m; branches plagiotropic, young growth rusty brown; bark rough. Inflorescences racemose, axillary, few-flowered. Flowers deep red. Fruit solitary, axillary, rusty copper-brown. Leaves dull green above, paler, glaucous beneath, midrib brownish. Vernacular name: kumpang seluai (Iban).

2. Specimens of the present new species were formerly identified as *K. latericia* aff. subsp. *latericia* var. *subtilis* or as a tiny form of *K. latericia* subsp. *ridleyi*. They were discussed under *K. latericia* subsp. *latericia* var. *subtilis* by De Wilde (1996: 389). Recently seen additional material made it manifest that a separate species is concerned, on the one hand deceptively resembling delicate forms of *K. latericia*, but also strikingly similar to, but different from plants from the same area (*Wong WKM 1366, 1443*) which have provisionally been identified as *K. tridactyla* aff. subsp. *sublaevis* (Fig. 1d). *Knema minima* has the small male flowers in common with *K. tridactyla*, the latter with two subspecies, subsp. *tridactyla* with similar long-haired indumentum, and subsp. *sublaevis* with very short-haired indumentum. *Knema tridactyla* obviously is a related species but differs by various details, of which a different leaf texture and subsistent tomentum on the lower surface of the leaves are most striking.

3. Along with *K. curtisii* the present *K. minima* ranks among the species of the lowest stature; also the male perianth is small, perhaps the smallest known in the genus.

4. In the general key to male flowering specimens (De Wilde, 1979: 347) *K. minima* fits in by extending lead 60b as follows:

- 60a. (Unchanged) 62
 b. Inflorescences all sessile. — C & E Malesia 60-bis
 60-bis a. Male perianth 1.5–2 mm diam. Low tree, 2–5 m. — S Brunei **K. minima**
 b. Male perianth 2.5 mm diam. or more 61

The regional key for female flowering and fruiting specimens for Borneo is to be extended as follows (l.c.: 362):

- 26a. (Unchanged) **K. rufa**
 b. Leaves drying olivaceous or brown. Indumentum of fruits with hairs 0.1–1 mm long 26-bis
 26-bis a. Female flowers c. 2.5 mm long. Fruit 1.5–2 cm long. Small tree, 2–5 m. — S Brunei **K. minima**
 b. Female flower and fruit larger. Trees generally larger 27

Collections — BORNEO. Temburong District: *BRUN 15628, 15634; Dransfield c.s. 6638, 6639, 7071; Keßler c.s. 394, 398; Nielsen & Balslev 1091; Sands c.s. 5494.*

Knema tridactyla Airy Shaw, Kew Bull. 1939 (10) (1940) 543; W.J. de Wilde, Blumea 25 (1979) 434, f. 13.

A newly acquired specimen of this species (*SAN 134086*) appeared so aberrant from the known collections that the whole material has been studied again and provisionally divided into four instead of two subspecies. The collective species description should be emended by the following: an indumentum on twig apices, leaf buds, lower leaf surface and flowers with hairs to 1(–1.5) mm long, branches of male inflorescences 1–2(–2.5) mm thick, male perianths 1.5–2(–2.3) mm diam., and anthers 5–11

REVISED KEY TO THE SUBSPECIES

- 1a. Tomentum of twig apices, flowers and fruits with hairs 0.5–1 mm long. Anthers 6–11 2
 b. Tomentum consisting of hairs c. 0.1 mm long. Male perianth 1.5–2 mm diam. Anthers 5 or 6 **c. subsp. sublaevis**
 2a. Leaf blades 7–12 by 1.5–2.5 cm, lateral nerves 8–12 pairs. Male perianth c. 1.5 mm diam. Anthers 6 **b. subsp. salicifolia**
 b. Leaves larger, lateral nerves 12–23 per side 3
 3a. Hairs 0.5–1 mm long. Branches of male inflorescences (1–)1.5–2 mm thick; male perianth 1.5–2 mm diam.; anthers 7 or 8 **d. subsp. tridactyla**
 b. Hairs 1(–1.5) mm long. Branches of male inflorescences 2–2.5 mm thick; male perianth 2–2.3 mm diam.; anthers 10 or 11 **a. subsp. pachyactyla**

a. subsp. pachydactyla W.J. de Wilde, *subsp. nov.*

A subspecies typica inflorescentiae masculae ramulis 2(–2.5) mm crassi, perianthio masculino 2 mm diam., antheris 10 vel 11 differt. — Typus: *SAN 134086* (L. Madani et al.) (L), Sabah, male fl.

Tree, c. 7 m. Tomentum of twigs at apex, lower leaf surface, and flowers with hairs 1(–1.5) mm long. Branches of male inflorescences 2(–2.5) mm thick. *Male perianth* 2–2.3 mm diam.; anthers 10 or 11. *Female flowers* and *fruit* unknown.

Distribution — Borneo: N Sabah, Penampang Distr., Sugud Recreation Park; only known from the type collection (but see note 2).

Habitat & Ecology — On ridge; c. 400 m altitude. Fl. Aug.

Notes — 1. Field-notes. Small tree, 7 m tall; exudate red latex, the flower buds brownish.

2. This subspecies is described as new in order to cope with the annoying diversity within *K. tridactyla* subsp. *tridactyla* as accepted by De Wilde (1979: 434). The specimen on which the present subspecies is based represents an exceptionally stout plant. The distinction with subsp. *tridactyla* may prove to be problematic, but the type of *K. tridactyla*, with slenderly branched male inflorescences and small flowers (perianth c. 1.5 mm diam., 6 or 7 anthers), is quite differing. A transitional specimen, provisionally assigned to the type-subspecies, is e.g. *SAN 91618*, with male inflorescence branches c. 2 mm thick and with small male flowers, perianth c. 1.5 mm diameter.

b. subsp. salicifolia W.J. de Wilde, *subsp. nov.*

A subspecies typica in habitu graciliore differt, foliis salignis 7–11.5 cm longis 1.5–2.5 cm latis. — Typus: *SANA 4237* (Wood) (L), N Sabah, Kota Belud Distr., male fl.

Tree c. 10 m. Tomentum of twigs at apex, lower leaf surface and flowers with hairs c. 0.5(–1) mm. Leaves narrow, 7–11.5 by 1.5–2.5 cm. Branches of male inflorescences c. 1.5 mm thick. *Male perianth* c. 1.5 mm diam.; anthers 6. *Female flowers* and *fruit* not known.

Distribution — Borneo: N Sabah, Kota Belud Distr., S of Tabilong (mile 18 path from Kota Belud to Kudat); known only from the type collection.

Habitat & Ecology — On hill, c. 650 m altitude. Fl. Sept.

Note — Like subsp. *pachydactyla* this subspecies is mainly recognized because of its deviating general habit, with small leaves; it was formerly included in subsp. *tridactyla*.

c. subsp. sublaevis W.J. de Wilde, *Blumea* 25 (1979) 434.

Distribution — Borneo: W Sarawak, 1st Div.

Note — The collection *Wong WKM 1366*, from Brunei, possibly belongs here as well (see Fig. 1d).

d. subsp. tridactyla; W.J. de Wilde, *Blumea* 25 (1979) 434.

Distribution — Borneo: Sarawak, Brunei, Sabah.



Fig. 2. *Myristica inaequalis* W.J. de Wilde. Habit of leafy twig with 1-flowered female inflorescence, $\times 0.5$ (R. J. Johns 7699).

MYRISTICA Gronov.

Myristica inaequalis W.J. de Wilde, *spec. nov.* — Fig. 2

Arbor modesta. Folia infra papillosa indumento sparso pilis immixtis c. 0.1 ac c. 1 mm longis. — Typus: R. J. Johns 7699 (K; iso L; BO, MAN, n.v.), Irian Jaya, Bird's Head Peninsula.

Tree to 20 m. Twigs subterete, towards the apex 2.5–3 mm diam., at first with rusty hairs 0.5(–1) mm long, late glabrescent; twigs lower down blackish brown, finely striate, with scattered inconspicuous lenticels, bark not cracking nor flaking. Leaves chartaceous or coriaceous; blades elliptic-oblong, (13–)15–19 by 3–5.5 cm, top acute-acuminate, base cuneate; upper surface drying dark brown, lower surface drying light

brown, with (sub)persistent open indumentum of spaced hairs of mainly two types, short ones c. 0.1 mm long, and long slender ones c. 1 mm long, leaving sight on distinct papillate leaf surface (lens!); dark dots absent; midrib raised above; nerves 16–20 per side, 70–80° with the midrib, flat and inconspicuous above, lines of interarching thin though distinct beneath, tertiary veins generally indistinct. Petiole 8–15 by 2–2.5 mm, late glabrescent. Sterile terminal leaf bud c. 15 by 2–2.5 mm, with hairs 0.5–1 mm long. *Male inflorescences* unknown. *Female inflorescences* (known of a single specimen) axillary of leaves, almost of the *Knema*-type, i.e. a wart-like, scar-covered brachyblast c. 3 mm diam., 1- or 2-flowered, subsessile with a subterete peduncle, 1–4 mm long, c. 2 mm thick, with hairs 0.5(–1) mm long; bracts minute, caducous. *Male flowers* unknown. *Female flowers* with bright brown indumentum of hairs 0.5–1 mm long; pedicel stoutish, c. 10 by (1.5–)2 mm, with inconspicuous scar of fallen bracteole at about half-way; perianth ovoid-oblong, 12–13 by 5–6 mm, much narrowed in the upper half, cleft for c. 1/5 into 3 lobes, out-curved, 2.5–3 mm long, acute, at sutures c. 0.5 mm thick; ovary with dense golden brown hairs c. 1 mm. *Fruit* not seen, described on the field label as immature to 7 by 5 cm, ferruginous.

Distribution — Only known from the type in Irian Jaya, NE Bird's Head Peninsula, Arfak Mts, track from Wamare to Mokwam, 1° 00' S, 133° 57' E.

Habitat & Ecology — Ridge forest, at 800–850 m altitude. Fl. & fr. March 1994.

Notes — 1. Field-notes. Young stems densely covered with ferruginous hairs. Leaves borne horizontally to the stem. Leaves to 18 cm long, 3.5 cm broad, petiole to 1.5 cm. Female flower pedicel c. 1 cm long.

2. This new species has recently become known by a single gathering, with a single female flower seen in the K duplicate. The L duplicate carries only a c. 4 mm stalked female inflorescence without flowers. An immature fruit, c. 7 by 5 cm, is mentioned on the label and possibly this is present in BO and/or MAN; it is not seen by me. The species which is provisionally reckoned to the group with larger leaves (blade length 15 cm or more) and subsessile or short-stalked inflorescences (as in *Knema*) keys out beside *M. fusca* (to which it obviously is closely related), and can be inserted in the general key to the species of New Guinea (De Wilde, 1995: 257) as follows:

- 153a. Leaves below papillose (lens!) between the scattered, up to 1.5 mm long, dark brown hairs 153-bis
- b. Leaves below either not or indistinctly or irregularly papillose; hairs generally closer set or much shorter 154
- 153-bis a. Twigs at apex 4–5 mm diam. Hairs of lower leaf surface of mixed size, 0.5–1.5 mm long. Bracteole inserted towards the apex on female pedicel. — Fruit oblong, 6–7 cm long, dry pericarp 4–5 mm thick, tomentum with hairs 1–1.5 mm long. C & E New Guinea **M. fusca**
- b. Twigs at apex 2.5–3 mm diam. Hairs of lower leaf surface mixed of two types: short ones, c. 0.1 mm long, intermixed with slender long ones, c. 1 mm long. Bracteole situated about half-way the female pedicel. — Fresh immature fruit said to be 7 by 5 cm. N Bird's Head Peninsula **M. inaequalis**

The caducous bracteole, as situated on the pedicel about half-way, is reminiscent of *Myristica mediovibex* from about the same area.

Myristica rosselensis J. Sinclair, Gard. Bull. Sing. 23 (1968) 205, f. 16.

KEY TO THE SUBSPECIES

- 1a. Mature male perianth c. 5.5 mm long, the pedicel about as long as the perianth **b. subsp. rosselensis**
 b. Mature male perianth c. 3.5 mm long, the pedicel c. 1 mm long, i.e. much shorter than the perianth **a. subsp. minutiflora**

a. subsp. minutiflora W.J. de Wilde, *subsp. nov.*

Subspecie typica periantho masculino minore c. 3.5 mm longo, pedicello brevior c. 1 mm longo differt. — Typus: *Brass* 28245 (K), Rossel I.

Tree 7–25 m tall. *Leaves* 6–10 cm long. *Male inflorescences* with two opposite sessile scar-covered slender brachyblasts 10–20 mm long, the central branch reduced to one flower or absent. *Male perianth* (ellipsoid-)oblong, c. 3.5 by 1.5 mm, cleft for 1/4, lobes 0.8 mm long. Androecium cylindrical, 2.8–3 by 0.7 mm; synandrium cylindrical, c. 1.5 mm long, anthers c. 5 (or 6?), contiguous, sterile apex blunt, c. 0.2 mm; androphore about as wide as the synandrium, c. 1.5 mm long, glabrous. *Female perianth* ovoid-oblong, c. 4.5 by 2.5–3 mm, somewhat narrowed to the top; cleft for c. 1/5, lobes c. 1 mm long; ovary ovoid-oblong, densely short-pubescent with hairs c. 0.1 mm long, c. 3.5 by 2 mm, narrowed to above into 2-lipped stigma c. 0.4 mm long; pedicel 1–2 mm long, the bracteole leaving a scar slightly below the perianth.

Distribution — Louisiade Archipelago.

Habitat & Ecology — Rain forest on ridge crest at 100–300 m altitude. Fl. Sept.

Field-note — Substage tree or lesser canopy tree, 7–25 m; leaves grey below; flowers yellow.

Collections — Rossel Island: *Brass* 28245 (male), 27961 (female, Sudest I).

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