

TWO NEW SPECIES OF BEILSCHMIEDIA (LAURACEAE) FROM BORNEO

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SUMMARY

Two new species of *Beilschmiedia* Nees (Lauraceae) from Borneo, *B. crassa* and *B. microcarpa*, are described and illustrated. *Beilschmiedia crassa* is distinguished from the other Bornean *Beilschmiedia* species by its thick and strongly coriaceous, narrowly ovate leaves and flowers with a thick receptacle. *Beilschmiedia microcarpa* is distinct in the combination of the following characters: its glabrous narrow buds, opposite, elliptic, chartaceous leaves with raised veins on the upper surface, flowers with short filaments, and relatively small fruits.

Key words: *Beilschmiedia*, Lauraceae, Borneo, new species.

INTRODUCTION

Beilschmiedia Nees is one of the larger genera of Lauraceae (Nishida, 2001) and includes about 250 species distributed mainly in the paleotropics (Van der Werff, 2001). It is usually distinguished from the other Lauraceae genera by its paniculate or racemose inflorescences not strictly cymose at the terminal division, bisexual and trimerous flowers with six equal to subequal tepals, six to nine fertile stamens with 2-celled anthers, and fruits lacking cupules (Nishida, 1999).

Revisonal studies have been made for the genus in several regions: in China and Indochina (Liou, 1934), Taiwan (Liao, 1995), Congo and tropical Africa (Robyns & Wilczek, 1949), Cameroon (Fouilloy, 1974), Madagascar (Van der Werff, 2003), the neotropics (Kostermans, 1938; Nishida, 1999), New Zealand (Wright, 1984) and Australia (Hyland, 1989). However, the genus has still to be revised for the Flora Malesiana region, except for the fact that Kochummen (1989) treated the genus for the Tree Flora of Peninsular Malaysia. Since this region is apparently one of the centres of species diversity for this genus, taxonomic revision of the genus in the region has been awaited.

The author intends to revise the genus *Beilschmiedia* in the Flora Malesiana region, and is now focusing on the Bornean species. Twenty-eight species (and one variety) were recognized for the genus on the specimen labels from Borneo (Nishida, 2001), but after careful study of specimens including types, only 22 species were confirmed to occur on the island. Besides them, three species were found as new after publishing the checklist (Nishida, 2001). One of them was published recently (Nishida, 2005) and the last two are presented here.

MATERIAL AND METHODS

Specimens used for the descriptions and illustrations were loaned from K, KEP, L, SAN and SAR. To compare these specimens, specimens from A, BO and UC were also examined. All dimensions given are for dried materials except for the floral characters. Flowers were soaked in boiling water before observation and measurement.

DESCRIPTION OF TAXA

1. *Beilschmiedia crassa* Sach. Nishida, *spec. nov.* — Fig. 1

A congeneris borneensibus, receptaculo crasso, et foliis crassis anguste ovatisque dif-fert. — Typus: *Nooteboom 1661* (holo L; iso SAR), Malaysia, Borneo, Sarawak, Kalabit Highlands, Bario, alt. c. 1000 m, fl., 25 March 1970.

Tree to 20 m tall. *Bark* brown to reddish brown, smooth. All parts, except for terminal buds and inflorescences, glabrous. *Twigs* terete, slightly compressed when young, 3–5 mm diam., light to dark brown; buds ovoid, reddish brown, sparsely pubescent with short and curly or dusty hairs. *Leaves* alternate or subopposite, evenly arranged; blade thick, strongly coriaceous, narrowly ovate, 13–23 by 3–9.5 cm, base obtuse, margin flat, apex acute, both surfaces drying ochre, upper surface slightly glossy, lower surface matt, unknown whether glaucous or not, midrib impressed or slightly raised above, raised below, secondary veins 7–10 pairs, raised on both sides, tertiaries not percurrent, minor venation coarse, conspicuously raised on both sides, minor veins thick; petioles 1.3–1.7 cm long, flat to canaliculate above, drying almost black. *Inflorescences* axillary, paniculate, 4–6 cm long, sparsely pubescent, each bearing 20–30 flowers; pedicels c. 1 mm long. *Flowers* red, c. 3 mm long, c. 2 mm diam. at anthesis. *Tepals* 6, almost equal, c. 1 by 0.8 mm, pubescent on both sides. *Stamens* 6–9, c. 0.8 mm long, all filaments shorter than anthers, pubescent; anthers glabrous, obtuse to truncate at apex. *Staminodes* 3 (when stamens are 9) to 6 (when stamens are 6); staminode (3 or less) in third whorl narrowly sagittate, c. 0.9 mm long, with a pair of glands; 3 staminodes in fourth whorl subulate, c. 0.7 mm long. *Pistil* c. 1.4 mm long; ovary ovoid, sparsely pubescent, c. 1 mm long; style terete, glabrous, c. 0.4 mm long. *Receptacle* c. 1 mm thick. *Infructescences* 6–7 cm long; pedicels c. 5 mm diam., not apically constricted. *Fruits* spherical, c. 3 by 3.3 cm, drying brown, surface warty.

Distribution — Endemic to Borneo, known only from Bario and Kapit in Sarawak.

Habitat & Ecology — In mossy montane forests on sandstone. Altitude 880–1000 m. Flowering: March; fruiting: August.

Notes — This species is distinct firstly in its flowers with a thick (c. 1 mm) receptacle. It is very rare for *Beilschmiedia* to have flowers with a thick receptacle; at least there is no other species with such a character in Borneo, Peninsular Malaysia, Sumatra or Java. In vegetative characters, *B. crassa* is distinct in the thick and strongly coriaceous, narrowly ovate leaves from the other Bornean *Beilschmiedia* species.

Beilschmiedia crassa also differs from most of the other Bornean *Beilschmiedia* species in the flowers with often less than 9 fertile stamens. Flowers of *Beilschmiedia* have usually 6 or 9 fertile stamens representing the first to third whorls, and in the case with only 6 fertile stamens 3 stamens in the third whorl are sterile. Flowers of *B. crassa* have 6–9 fertile stamens (usually less than 9), because stamens in the third whorl are

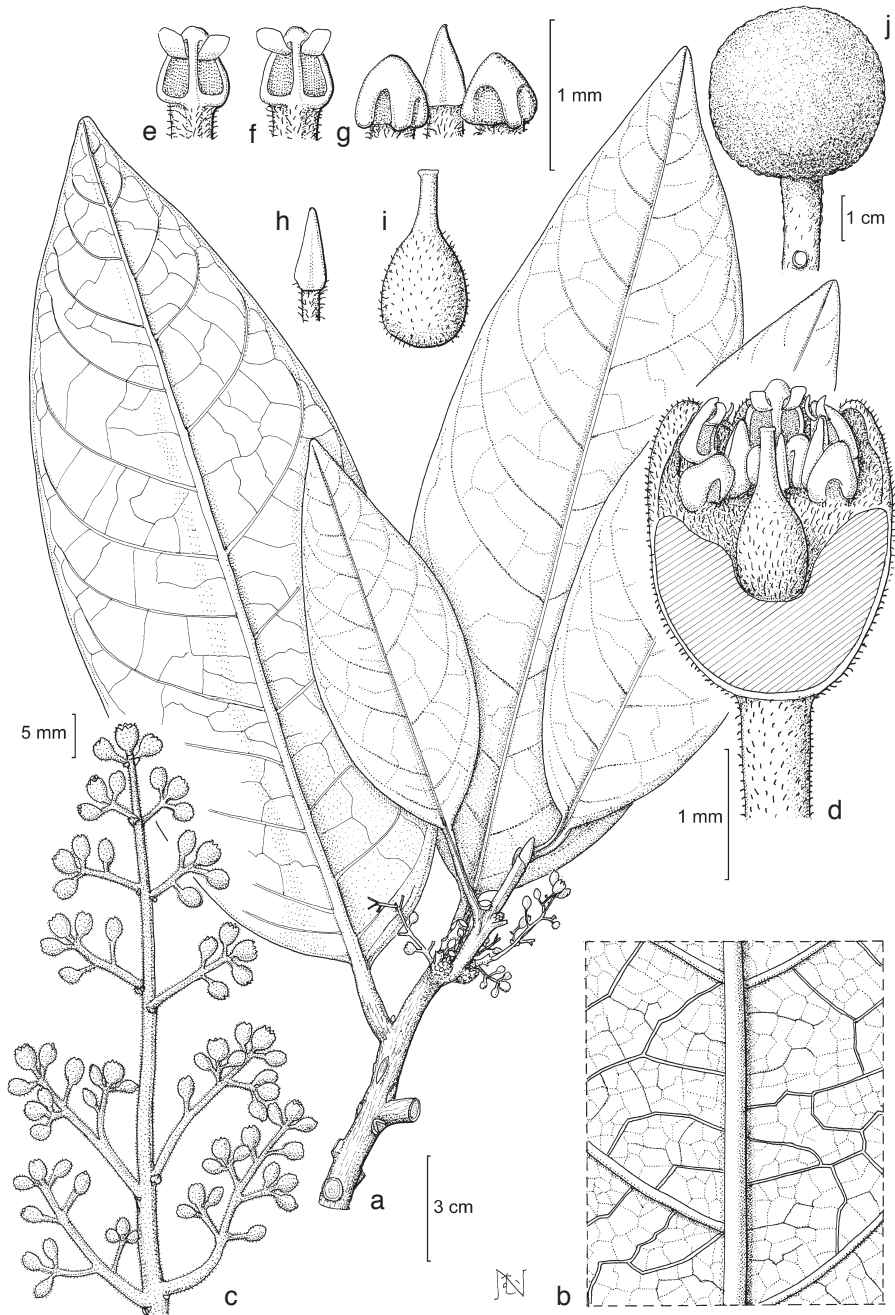


Fig. 1. *Beilschmiedia crassa* Sach. Nishida. a. Habit; b. venation pattern (abaxial view); c. inflorescence; d. flower (front part removed); e. first whorl stamen (adaxial view); f. second whorl stamen (adaxial view); g. third whorl staminode (abaxial view); h. fourth whorl staminode (abaxial view); i. pistil; j. fruit (a, b, d–i: *Nooteboom 1661*; c: reconstructed from *Nooteboom 1661*; j: *S 36124*).

often sterile. Since the flowers do not appear abnormal, this floral feature seems to be a character of this species. Variation in the number of stamens is also seen in the other *Beilschmiedia* species. *Beilschmiedia tooram* (Bailey) B. Hyland from Australia sometimes has flowers with 4 or 5 stamens, although there are 6 stamens in a perfect flower (Hyland, 1989). *Beilschmiedia hexanthera* van der Werff from French Guiana is characterized with 6 fertile stamens representing the first and second whorls, but the author recognized a few flowers with 7 stamens (because of one fertile stamen in the third whorl) even in the type collection.

Additional specimens examined:

MALAYSIA. Sarawak: S 36124 (SAR), S 36333 (L, SAR).

2. *Beilschmiedia microcarpa* Sach. Nishida, *spec. nov.* — Fig. 2

Haec species *Beilschmiediae glauciphyllae* affinis, sed a qua foliis chartaceis, floribus minoribus, fructibus ellipsoideis et minoribus differt. — Typus: SAN 82219 (*Krispinus*) (holo L; iso K, KEP, SAN, SAR), Malaysia, Sabah, Tawau, NBT camp, Luasong, fl., 14 March 1977.

Tree to 9 m tall. *Bark* greyish to reddish brown, smooth. All parts, except for the flowers, almost glabrous. *Twigs* terete, c. 2 mm diam., greenish brown to dark brown; buds narrowly ovoid (c. 2 mm diam.), blackish. *Leaves* opposite, evenly arranged, blade chartaceous, matt or slightly glossy, elliptic, 11–19 by 5–8 cm, base cuneate to obtuse, margin flat, apex acuminate, lower surface green, midrib impressed or slightly raised above, raised below, secondary veins 7–9 pairs, slightly raised above, raised below, tertiary veins not percurrent, minor venation relatively coarse, slightly raised on both sides; petioles 0.7–1.5 cm long, flat above, drying brown. *Inflorescences* axillary or crowded around a node of new twigs, paniculate, 8–12 cm long, each bearing c. 20 flowers; pedicels 2–5 mm long. *Flowers* greenish or whitish yellow, c. 2 mm long, c. 2 mm diam. at anthesis. *Tepals* 6, equal, ovate, c. 1.7 by 1 mm, sparsely pubescent inside and along edges. *Stamens* 9, in first and second whorls c. 0.9 mm long, in third whorl c. 1.2 mm long, all filaments shorter than anthers, pubescent; anthers glabrous, acute at apex. *Staminodes* 3, sagittate, c. 0.6 mm long. *Pistil* glabrous; ovary ovoid, c. 0.5 mm long; style terete, c. 0.7 mm long. *Infructescences* 5–8 cm long; pedicels 1.5–3 mm diam., constricted at apex when young, but not constricted when mature. *Fruits* ellipsoid, c. 3.5 by 1.6 cm, drying brown, surface smooth.

Distribution — Endemic to Borneo, known from N Borneo (Miri, northern tip of Sarawak, and Sabah) and E Kalimantan (Kutei).

Habitat & Ecology — Primary forests on hills; on loam soils containing limestone, sandy or clay soils. Altitude up to 1300 m. Flowering: late January, March; fruiting: October, February.

Notes — There are ten opposite-leaved species of *Beilschmiedia* in Borneo, but among them only *B. glauciphylla* Kosterm. and this new species share a combination of the following characters: narrow glabrous terminal buds, elliptic leaves and short filaments. The most discriminating character between the two species is in the fruits: fruits of *B. glauciphylla* are club- or spindle-shaped and large (up to 12 cm long), while the fruits of *B. microcarpa* are ellipsoid and relatively small (up to c. 3.5 cm long). Flower size is also different: usually c. 4 mm diam. in *B. glauciphylla* and c. 2 mm diam.

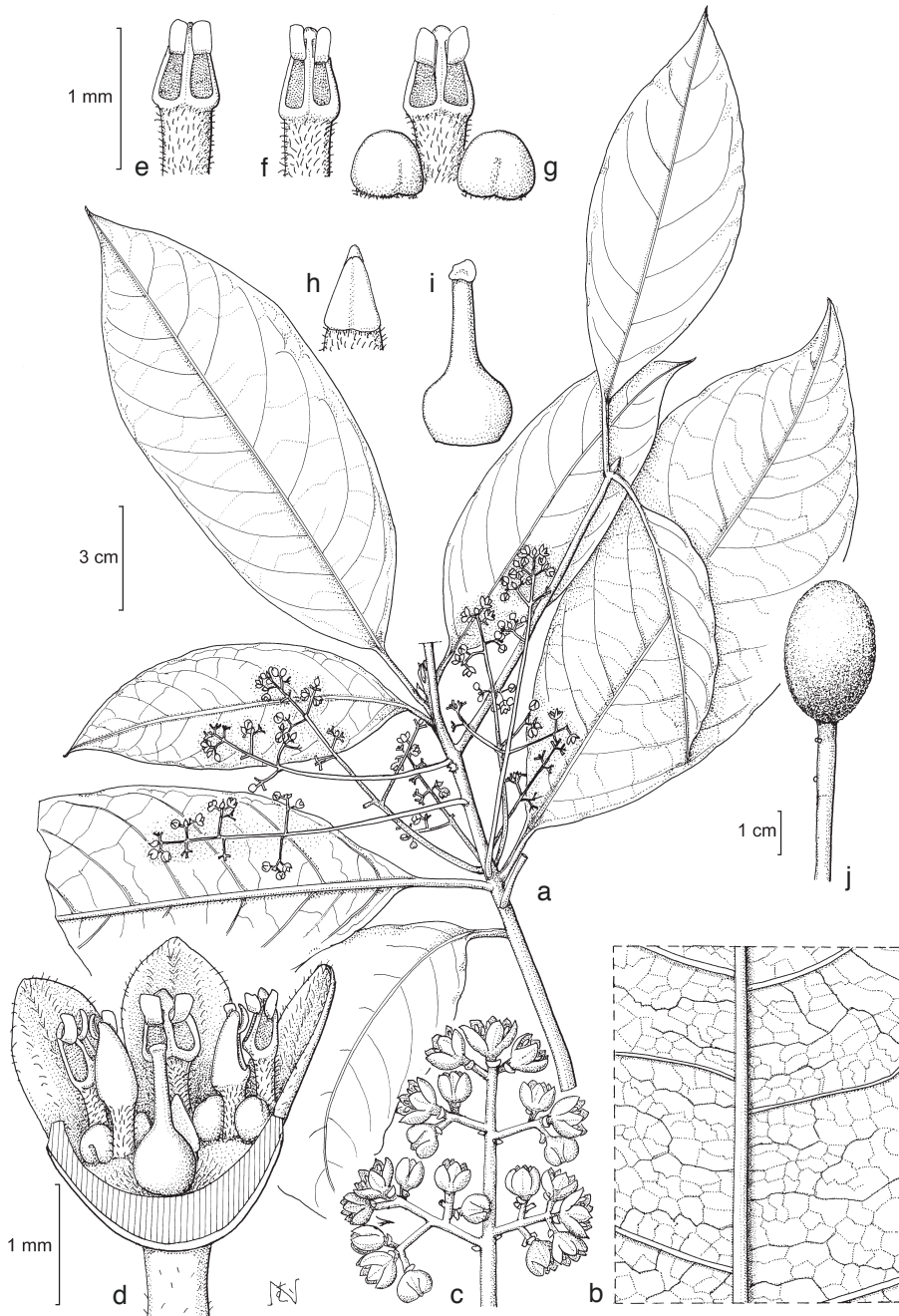


Fig. 2. *Beilschmiedia microcarpa* Sach. Nishida. a. Habit; b. venation pattern (abaxial view); c. inflorescence; d. flower (front part removed); e. first whorl stamen (adaxial view); f. second whorl stamen (adaxial view); g. third whorl staminode (abaxial view); h. fourth whorl staminode (abaxial view); i. pistil; j. fruit (a, b, d–i: SAN 82219; c: reconstructed from SAN 82219; j: SAN 65307).

in *B. microcarpa*. Vegetatively, they can be usually distinguished by the leaf texture: *B. glauciphylla* has coriaceous leaves and *B. microcarpa* has chartaceous leaves, although the leaf texture may have some variation under different conditions. *Beilschmiedia glauciphylla* is distributed in the central part of Sarawak, while *B. microcarpa* is found in the northern part of Sarawak, Sabah and the eastern part of Kalimantan.

This new species was named with the epithet '*microcarpa*'. This is because this species has smaller fruits than *B. glauciphylla*, a species most closely approaching the new species. In fact the fruits of *B. microcarpa* are not so conspicuously small compared to the other species of this genus.

Additional specimens examined:

MALAYSIA. Sarawak: *S 38033* (KEP, L). — Sabah: *SAN 33320* (K, SAR), *SAN 65307* (L, SAN), *SAN 136935* (SAN).

INDONESIA. East Kalimantan: *Kostermans 21418* (L, SAR).

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