Taxonomic Notes on Indian *Horsfieldia* and *Endocomia* (Myristicaceae)

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In the myristaceous genera *Horsfieldia* Willd. and *Endocomia* W. J. de Wilde, four taxa are recognized in India, viz., *Endocomia macrocoma* (Miq.) W. J. de Wilde subsp. *prainii* (King) W. J. de Wilde and *Horsfieldia irya* (Gaertn.) Warb., *H. amygdalina* (Wall.) Warb. var. *amygdalina* and *H. kingii* (Hook. f.) Warb. Morphological characters of *Horsfieldia* and *Endocomia* were described based on our specimens collected during 2000 and 2012–2014 in India and previous specimens kept in Indian herbaria. Keys to the taxa are provided for easy identification. All the taxa are listed with synonyms, type specimens, descriptions, distribution, phenological data, vernacular names and examined specimens. *Endocomia macrocoma* subsp. *prainii* is newly recorded in Assam and Tripura states.

**Key words:** Diversity, *Endocomia*, *Horsfieldia*, India, Myristicaceae, taxonomy.

The genus *Horsfieldia* Willd. belongs to the family *Myristicaceae* R. Br., *nom. cons.* in the order *Magnoliales* Juss. ex Bercht. & J. Presl (Chase and Reveal 2009). In APG III the order is placed in the clade Magnoliids. In the Linear Angiosperm Phylogeny Group (LAPG) III, the family is placed 16th in the sequence (Haston et al. 2009).

The genus *Horsfieldia* ranges from Sri Lanka and India, through SE Asia to New Guinea, the Solomon Islands and Northern Australia and consists of ca. 100 species in all types of tropical primary forests. Noteworthy treatments of the genus by Sinclair (1958, 1975) and de Wilde (1984b, 1985a, 1985b, 1986a, 2000) superseded the consideration of the genus as a synonym of *Myristica* Gronov. or various sections under it (Blume 1837, De Candolle 1856, Bentham and Hooker 1883, Hooker 1890, King 1891). The genus was treated discretely and with confusion in several regional floras which were devoid of updated nomenclature and citation of type specimens. The present study on these genera *Horsfieldia* and *Endocomia* W. J. de Wilde (de Wilde 1984a) (formerly treated under *Horsfieldia*) aimed to solve lack of data for India.

**Methodology**

Standard taxonomic procedures were followed. The protologues of all the relevant synonyms were consulted along with major and minor revisionary and monographic and other relevant literature. The types and herbarium specimens in the family *Myristicaceae* in CAL, ASSAM, ARUN, APFH, TBGT, K, BM, E and LLOYD were studied for macro- and micro-morphological characters. Primary
forests were surveyed for living specimens with the due permission from Forest Department, Government of India whenever required. The phenological data, data on habitat, vernacular names, uses of various parts of different species were collected in the field or from herbarium labels or literature. To update the nomenclature and for citation the ICN, 2011 (McNeill et. al. 2012) was followed. The herbarium abbreviations are as in Holmgren et al. (1990), unless otherwise mentioned.

Results

Nearly 200 specimens in the herbaria mentioned were studied and their identity were confirmed or changed. The study found that *Endocomia* is represented in India only by *Endocomia macrocoma* (Miq.) W. J. de Wilde subsp. *prainii* (King) W. J. de Wilde. It is sparsely distributed in Assam, Tripura and in the Andaman and Nicobar Islands. *Horsfieldia* with *H. irya* (Gaertn.) Warb., *H. amygdalina* (Wall.) Warb. and *H. kingii* (Hook. f.) Warb. are sparsely distributed in North East India and in the Andaman and Nicobar Islands in India.

As seen in situ both *Horsfieldia* and *Endocomia* have a stout arborescent habit with straight trunk and horizontal branching restricted to upper 1/4 of the trees, paniculate and ebracteolate inflorescences. *Endocomia* differs from *Horsfieldia* in being monoecious, with elenticellate twigs, perianth lobed nearly to the base, tepals pubescent on both the surfaces, at anthesis the androecium distinctly stalked, seeds shortly pointed at one side and in having laciniate or entire red aril. *Horsfieldia* is dioecious, with lenticellate twigs, perianth lobed 1/4 to 1/2 of the length, tepals glabrous inside, suberect at anthesis, the androecium (sub)sessile and seeds blunt on both ends with an entire orange aril.

Most *Myristicaceae* are dioecious but *Endocomia* and an American genus *Iryanthera* Warb. are monoecious.

There are about 20 genera in *Myristicaceae*. Examples of the parallel development and reticulate relationships among the genera *Endocomia* and *Horsfieldia* are presented in the paper. The circumscription of these different genera presented in the paper are based upon combinations of morphological characters based on previous workers viz., Warburgh (1897), Sinclair (1958) and de Wilde (1984b) etc.

The sections under the genus *Horsfieldia* can easily be distinguished by morphological characters and sometimes also by geographical distribution. Intragenic diversity within *Horsfieldia* is represented in sect. *Irya* having two tepals, cup shaped synandrium with apically free anthers in male flowers and globose fruits with a confined distribution only in Andaman and Nicobar Islands, while sect. *Pyrrhosa* has 3–4 tepals, tri to multi-lobed, globose, trigonolobous or ellipsoid synandrium with anthers united at apex and ellipsoid fruits. This latter section is distributed in North Eastern India and in Andaman Nicobar Islands. The interspecific diversity of *H. amygdalina* and *H. kingii* is in the variation in pubescence in the male inflorescence, morphology of the synandrium, and persistence of perianth in mature fruits. *H. amygdalina* has glabrous male inflorescence, ellipsoid synandrium and caducous perianth in fruit. *H. kingii* has puberulous male inflorescence, globose or trigonolobous synandrium and persistent perianth in fruit. However, the Indian individual tree of *H. kingii* (D. Banik & P. P. Bora 4205) from Holongapar Gibbon Wild Life Sanctuary shows glabrous male inflorescence which was not recorded earlier.

Male and female individuals of *H. kingii*, *H. amygdalina* and *E. macrocoma* subsp. *prainii* were collected from the primary forests and their macro- and micro-morphological characters used for the descriptions and illustrations. Photographs, phenological data, data on habitat, vernacular names, uses of various parts of different species were obtained.

The present study found an extended
distribution of *E. macrocoma* subsp. *prainii* in Assam and Tripura and *H. kingii* in Tripura which was not reported earlier. The present study found that *H. amygdalina* was misidentified as *H. glabra* in different regional floras and in the deposited herbarium sheets.

**Taxonomy**

An updated nomenclature of the taxa along with types, distribution, phenological data, habitat, vernacular names, uses and notes are presented below.

**Key to the genera**

1a. Plants monoecious, tepals hairy on both surfaces, tepals splitting the perianth nearly to base, revolute at anthesis ........ *Endocomia*

1b. Plants dioecious, tepals glabrous inside, splitting nearly to 1/3, involute at anthesis .... *Horsfieldia*


**Type:** *Endocomia macrocoma* (Miq.) W. J. de Wilde.

Trees monoecious; twigs terete, elenticellate. Leaves chartaceous, reticulation lax. Inflorescences axillary or pseudoterminal, paniculate, branched several times, male and female flowers present in the same cymule, in different stages of development, flower pedicellate, ebracteolate. Male flower buds globose-ellipsoid, 3–5-lobed, recurved at anthesis, united only at base; synandrium globose to shortly ellipsoid, androphore short or long, narrow; stamens 2–8; anthers ellipsoid, completely fused to androphore. Female flowers similar to male, fewer, ovary glabrous, stigma sessile, minute, 2-lobed, each lobe lobulate. Infructescences up to 30 cm long. Fruits ellipsoid or obovoid, glabrous; pericarp thin to thick, aril partly laciniate, seeds pointed at apex, variegated; albumen ruminate.

Distribution: ca. four species are distributed from India and southern China to Malesia (New Guinea); only one species in India (Assam, Jatinga valley; Tripura, Teliamura, Jampui hills; S. Andamans).

*Endocomia macrocoma* (Miq.) W. J. de Wilde


**Lectotype** (designated by de Wilde, Blumea 30: 187, 1984): INDIA. Andaman Islands, Dr. King’s collector 417 (L, CAL!, BM!, K!–isolectotypes).


Tree 10–20 m high; twigs glabrous, strigate, apical bud 1–1.2 cm long, 1.5–2 mm broad, acute, puberulous, brown. Leaves alternate; lamina 13.4–27.5 cm long, 7.2–11.2 cm broad, slightly pandurate-obovent or elliptic, base acute-obtuse, apex acute-acuminate, glabrous; midrib flat or depressed above, raised below, finely...

striate; secondary nerves brochidodromous; arising from the mid rib at an angle of $\leq 55^\circ$–$85^\circ$ on acroscopic side and $\leq 50^\circ$–$65^\circ$ on basiscopic side, alternate-opposite, 13–17 pairs; tertiary nerves not prominent; petiole 1.7–2.5 cm long, glabrous, finely striate. Inflorescences axillary,
Fig. 2. *Endocoma macrocoma* (Miq.) W. J. de Wilde subsp. *prainii* (King) W. J. de Wilde. A. Portion of flowering twig. B. Portion of inflorescence (enlarged). C–D. Male flowers. E. Female flower. F. Fruit. G. Portion of infructescence. A. From Dr. King’s collector 417 (CAL). B–C, E. From Dr. King’s collector s.n. (CAL). D. From Mr. Proudlock s.n. (CAL). F–G. From D. B. Deb 2244 (CAL). Scale bars: 1.8 cm (A), 55 mm (B), 1.2 mm (C–D), 2 mm (E), 1.8 cm (F), and 1.6 cm (G).
branched 3 times, (3–)9–10 cm long, (7–)8–9 cm broad, flowers 4–9, puberulous, brown when young; bracts at the bases of young cymules, deciduous, triangular, 1.5–2 mm long, 1 mm broad, acuminate, puberulous, brown; persistent semilunar scars at the base of primary and secondary branches. Male flower: pedicel slender, 2–4 mm long; hairs brown, 2–3 armed; flower globose-ellipsoid, 1–2 mm long, 1–3.5 mm broad, perianth bud campanulate; tepals 3–4, 0.8–1.8 mm long, 0.8–1.5 mm broad, triangular, united up to 0.2 mm at base, coriaceous, striated, recurved at anthesis; stamens 5–6 or 7–9; synandrium globose, 0.5–0.8 mm in diameter, subsessile or androphore up to 0.2 mm long; anthers linear, 0.5–1.2 mm long, 0.15–0.2 mm broad, adnate to their back, extrorse. Female flower: pedicel 1.5–2 mm long, 1 mm broad; hairs brown, 2–3 armed, flower bud globose, 1–1.5 mm in diameter. Infructescence 13–24 cm long, branched, pendulous, with scars of pedicels; peduncle 1.5–2 cm long, finely striate, glabrous; fruit stalk 1–1.2 cm long, finely striate, glabrous. Fruit yellow to orange, obliquely ellipsoid, 3.4–3.5(–4.8) cm long, 1.3–1.6(–2.8) cm broad, base narrowly cuneate, apex acute, pericarp wrinkled, 1.5–6 mm thick, glabrous, brown, aril entire or laciniate, red; seed elliptic, 2.9–3.1 cm long, 1–1.3 cm broad.

Distribution: India (Assam; Tripura; S. Andamans), Bangladesh, China (S. Yunnan), Myanmar, Thailand, Laos, Indonesia (W. Sumatra, W. Java, Papua), the Philippines, Papua New Guinea.

Flowering: February–May; August–December.
Fruiting: January–April.
Habitat: Forest on hilly land and near the shore.
Uses: Wood used in construction work.
Note: The extended distribution of this species in Assam and Tripura was found during the present study.
Specimens examined: INDIA. ANDAMAN & NICOBAR ISLANDS: Andamans, 1884, Dr. King’s collector s.n., fl. (CAL); Dr. King’s collector s.n., fl. (K, CAL); South Andamans, Namunaghar, Hilly land, 2–3 m, 16 August 1890, Dr. King’s collector s.n., fl. (CAL, BM); South Andamans, North Bay, Near Shore, 12 September 1891, Dr. King s.n., fl. (CAL); In Andaman group and also a tree west side near South end of Jacquemont avenue. Cultivated in Bot. Garden, Calcutta Div, Flowered Oct. 1895, Mr. Proudluck s.n. (BM, CAL); Little Andaman, Hut Bay, Inland Forest, 15 January 1977, N. Bhargava 5141, fl. (CAL). ASSAM: Cachar district, Jatinga valley, Damcherra, 25°01'45.3"N, 092°46'23.1"E, 2 June 2014, D. Banik & P. P. Bora 4294, fr. (NEIST). TRIPURA: Teliamura, 20 January 1960, D. B. Deb 2244, fr. (CAL); North Tripura, Jampui hills, Vanghnmun to Hmnpui, 24°00'28.2"N, 092°16'43.0"E, 27 May 2014, D. Banik & P. P. Bora 4283, fr. (NEIST).


**Type:** *Horsfieldia iryaghedhi* (Gaertn.) Warb.

Shrubs or trees, dioecious. Twigs terete or angular or with two ridges in between petioles or (in)conspicuously lenticelate. Leaves distichous or tristichous (in *H. kingii*). Lamina membranous to coriaceous, brittle when dry, rarely papillose beneath (in *H. iryaghedhi*) warty; mid rib flat or sunken, raised dorsally, secondary nerves arising from midrib at varied angles on acroscopic and basiscopic sides, brochidodromous to eucamptodromous; alternate or opposite, (8–22 pairs for Indian species); tertiary nerves, sometimes looping prominent beneath. Inflorescences axillary or cauline, paniculate branched several times, pubescent or glabrous, at base of common peduncle with a few minute cataphylls; male inflorescences larger than female; braacts caducous or persistent-accrescent (in *H. kingii*). Flowers pedicellate, rarely sessile (in *H. iryaghedhi*), ebracteolate, solitary or in loose clusters or fascicles at same or different stages of development; Male buds
glabrous or pubescent, globose, transversely ellipsoid, reniform, pear-shaped or clavate, laterally compressed or not, membranous, coriaceous or fleshy, glabrous inside, greenish to yellowish; splitting shallowly to deeply into 2 or 3 or 4-lobes; androecium either cup shaped or globose to ellipsoid, cylindrical or trigonolobous, laterally compressed or not, sessile or with short androphore; anthers many; anthers erect or curved; apical parts incurved or inflexed into the central cavity to various depths; 2-celled, thecae often septate when young, extrorse. Female inflorescences short, compact, racemose or paniculate, branched once or twice; flowers larger than the male, pedicellate; buds subglobose or ovoid or ellipsoid, obovoid, (H. amygdalina); ovary globose or ovoid, glabrous or pubescent, stigma sessile, sometimes several lobed (in H. iryaghedhi) or with a median depression (H. kingii); fruits globose, ellipsoid or obovoid (in H. amygdalina); pericarp fleshy, drying brown or blackish, often with lenticels like tubercles, glabrous or pubescent, rarely with persistent perianth at base (in H. kingii), dehiscing by 2 valves; seed 1, ellipsoid, rarely globose (in H. irya), testa not variegated; aril completely covering the seed, entire or shallowly lobed or convoluted at apex; albumen ruminate, with fatty oil but no starch; cotyledons connate at base.

Distribution: ca. 100 species are distributed in India, Sri Lanka, China (Yunnan, Hainan), SE Asia through Malesia to New Guinea, the Solomon Islands, Australia (North). Two species in India (North Eastern India and Andaman and Nicobar Islands).

Three sections are recognized, viz., sect. Horsfieldia W. J. de Wilde (1984); sect. Irya (Hook. f. & Thomson) Warb. and sect. Pyrrhosa (Blume) Warb. of which the first one does not occur in India, sect. Irya is represented by H. irya in India and sect. Pyrrhosa is represented by H. amygdalina and H. kingii in India.

Note: sect. Horsfieldia consists of only one species H. iryaghedhi (Gaertn.) Warb., originally distributed from Sri Lanka and in Malesia sporadically cultivated for its strongly sweet-smelling flowers. It is strange that this species is rare and seems extinct in Sri Lanka, and also that it seems unknown as cultivated in India.

**Key to the Indian sections of Horsfieldia**


**Type:** Horsfieldia irya (Gaertn.) Warb.

Distribution: ca. 40 species are distributed in Eastern Malesia; 1 species in India.

C. E. Parkinson, Forest Fl. Andaman Isl.: 223 (1923).

**Type: SRI LANKA.** Gaertner’s drawing (1788: t. 41). [Fig. 3]

*Myristica javanica* Blume, Bijdr.: 576 (1825) & in Rumphia 1: 190, t. 62 (1835). Type: INDONESIA. Blume (L, missing) in Rumphia 1: 190, t. 62 (1835).


*Myristica micrantha* Wall., Cat. 6807 (1832), nom. nud. Voucher specimen: THAILAND. Tailegs from Siam and under Wall. Cat. 6807 (K!, K-Wall!, CAL!).


Tree 10–20 m high. Twigs glabrous, 2-ridged, lenticillate. Apical bud ca. 1.3 cm long, puberulous. Leaves distichous; petiole 0.5–0.8(–1.1) cm long, glabrous; lamina 8.4–28.0 cm long, 2.9–7.9 cm broad, membranous to coriaceous, elliptic, flat below; secondary nerves brochidodromous; arising from midrib at an angle of ≤60°–90° on acroscopic side and ≤60°–75° on basiscopic side; 15–18(–22) pairs; tertiary loops present. Inflorescences axillary; male inflorescence branched twice, 4.8–12.5 cm long, tomentose when young, on maturity glabrous at base; hairs stellate (with 2–4 arms); bracts triangular to ovate, acuminate, membranous, interior glandular, deciduous. Male flower pedicel ca.1 mm long, puberulous with branched hairs; bud globose-transversely ellipsoid, 1–1.25 mm in diameter, 0.5–0.75 mm long, 1–1.25 mm broad, perianth lobes (tepals) united up to 0.25 mm from base; tepals 2, each lobe half-globose-broadly ovoid, entire, membranous, glabrous inside, puberulous to glabrous outside; synandrium transversely elliptic, cup shaped, ca. 0.25 mm long and 0.5–0.75 mm broad; androphore obscure; stamens 14–16; anthers linear, upto 0.25 mm long, slightly unequal, free at apices, adnate laterally and at base, incurved. Female inflorescence contracted, branched once, 2–2.5 cm long. Female flower: pedicel 1–1.5 mm long, hairs shorter than in male; bud globose to obovoid, depressed at apex; perianth campanulate, 1.5–1.75 mm long, tepals 2(–3), united 1–1.50 mm from base, valvate, each lobe triangular, acute, coriaceous, glabrous inside, granular outside and stellate at base; ovary ovoid, 1–1.25 mm long, 0.75–1 mm broad, glabrous; stigma sessile, bilobed, blakish. Fruit globose, 1.25–1.5 cm in diameter, pericarp chartaceous, 1–1.5 mm thick, glabrous; seed globose.


Conservation status: Lower risk/least concern ver. 2.3 (IUCN 2013.2).

Flowering: January–August; December. Fruiting: June–October.

Vernacular names: Choglum, Mutwinda (Andamans).

Uses: Seeds are used for preparing candles. Decoction of bark is used for gargling sore throat and flowers used as perfume (Anonymous 1959).

Specimens examined: INDIA. ANDAMAN & NICOBAR ISLANDS: Andamans, 1884, Dr. King’s collector s.n. (CAL); Dr. King’s collector s.n., male fl. (BM); South Andamans, Runguchang near sea coast, eastern side, 2 May 1891, Dr. King’s collector s.n. (CAL); Hope town, S. Kurz s.n. (CAL); S. Kurz 192, fr. (E);
Fig. 3. *Horsfieldia irya* (Gaertn.) Warb. A. Portion of male flowering twig. B. Male flower. C. Synandrium. D. Portion of female flowering twig. E. Female flower. F. Ovary. G. Longitudinal section of female flower showing basal placentation. H. Fruit. A–C. From Dr. King’s collector s.n. (CAL). D–H. From S. Kurz s.n. Acc. No. 381617 (CAL). Scale bars: 1 cm (A), 0.5 mm (B–C), 0.85 cm (D), 0.9 mm (E), 0.75 mm (F), 1 mm (G), and 1 cm (H).
Towards south point, S. Kurz s.n. (CAL); South Andaman, 23 September 1867, S. Kurz s.n., fr. (K); Hope Town, Near Port Blair, 22 January 1884, Dr. King’s collector 45 (CAL); Port Mouat hill jungle, 3 March 1894, Dr. King’s collector s.n. (CAL); Andamans, C. E. Parkinson 466 (CAL), Middle Andamans, Long Island, 2 June 1913, C. E. Parkinson 1057, male fl. (K); – 0–100 ft, 17 December 1915, C. E. Parkinson 792 (CAL).

**MYANMAR.** Birma and Malay Peninsula, Herb. Griffith, Herbarium of Late East India Co. No. 4357 (K); Great Cocos Island, David Prain, 1889, male fl. (E).


**Type:** *Horsfieldia glabra* (Blume) Warb.


**Key to the species**

1a. Male inflorescence axis puberulous.

Synandrium globose or trigonolobous.

Perianth persistent in fruit ............... *H. kingii*  
1b. Male inflorescence axis glabrous.

Synandrium ellipsoid. Perianth caducous in fruit ............ *H. amygdalina* var. *amygdalina*


**Type:** *MYANMAR. Moulemyne 1827, Wall. Cat. 6797 (K-W!–holotype; K!, BM!, CAL!, G–isotypes).  

**Myristica kurzii** King in *Ann. Roy. Bot. Gard. Calcutta* 3: 310 (1891), nom. nud. Voucher specimens: MYANMAR (BURMA). Kurz s.n. (CAL!); Kurz 984 (CAL!). INDIA. S. Andamans, Hutbaypur, interior of jungle hill land, 6 September 1890, Dr. King’s collector s.n. (K!). INDIA. S. Andamans, Danda/Danola Pet, 1890, Dr. G King s.n. (K!, CAL!). INDIA, Andamans, Than/Dhani Kari, Hill jungle, 15 January 1891, Dr. King’s collector s.n. (K!, CAL!).

*Horsfieldia tonkinensis* Lecomte in *Not. Syst.* 1(4): 100 (1909); *Fl. Indo-China* 5(2): 101 (1914). Type: VIETNAM (TONKIN), Bon 4272
Fig. 4. *Horsfieldia amygdalina* (Wall.) Warb. var. *amygdalina*. A. Habit. B. Apical twig. C. Male Inflorescence (inset enlarged). D. Fruit. E. Male flowers. F. Apical part of young male inflorescence. A–B, F. From D. Banik & P. P. Bora 4242 (NEIST). C, E. From D. Banik 3298 (NEIST). D. From D. Banik & P. P. Bora 4288 (NEIST). Scale bars: 2 mm (C), 1 cm (D), 2 mm (E), and 1 mm (F).
Fig. 5. *Horsfieldia amygdalina* (Wall.) Warb. var. *amygdalina*. A. Portion of male flowering twig. B. Portion of male inflorescence. C. Synandrium. D. Male flower. E. Tepals of male flower. F. Transverse section of synandrium. G. Female flower. H. Part of female flower. I–J. Ovary. K. Mature fruit. A–C. From D. Banik (NEIST). D–F. From N. P. Balakrishnan 3937 (CAL). G–I. From R. P. Dwivedi (CAL). J. From U. N. Kanjilal 4774 (CAL). K. From Dr. G. King s.n. (CAL). Scale bars: 1 cm (A, K), 2.5 mm (B, E), 0.75 mm (C), 3 mm (D), 1.5 mm (F), 2.75 mm (G), 3.5 mm (H), and 1.5 mm (I–J).


Tree 6–35 m high. Twigs glabrous, lenticellate; apical bud 0.8–1.5(–2.1) cm long, 1–2.5 mm broad, brown, puberulous. Leaves alternate; petiole (0.6–)1.1–2.0 cm long, glabrous; lamina obovate-elliptic(-narrowly elliptic), 13–24 cm long, 3.5–8 cm broad, base attenuate(-obtuse); apex acute, acuminate; midrib depressed or flat above, raised below; secondary nerves brochidodromous, arising from the midrib at an angle of ≤45°–80° on acroscopic side and ≤45°–75° on basiscopic side, 8–14(–20) pairs; tertiary nerves obscurely prominent. Inflorescences axillary. Male inflorescence branched 2–3 times, 6.2–16.5 cm long, 3.5–5.5 cm broad, 7–many-flowered, glabrous or brown-puberulous; hairs to 0.2 mm long, armed, caducous; bracts-1, 2–5 mm long, 1–3 mm broad, elliptic-ovoid, base acute-obtuse-rounded, entire, apex acute to acuminate, brown, puberulous or glabrous, sometimes larger, 7–8 veined similar to leaves, caducous to persistent. Male flower pedicel 1–1.5 mm long; bud globose to obovoid, 2–2.5 mm long, 1.5–2 mm broad, tepals 3 united to 1.5 mm from base; broadly triangular, coriaceous, outside glabrous to scarcely brown puberulous; synandrium transversely elliptic, 1.25–1.5 mm long, 1.25–1.5 mm broad, sessile, trilobed, depressed-emarginate at apex; sessile or androphore 0.1–0.2 mm long; stamens 8–29(–38); anthers linear, incurved to 1 mm long, slightly unequal, connate laterally. Female inflorescence axillary, contracted, once branched, 1.5–5.3 cm long, 6–11 flowered, woody, brown puberulous. Female flowers downwardly directed, pedicel woody, 1–2.5 mm long, tomentose; buds ellipsoid to ovoid, 1.5–1.75 mm long, 1.5–2 mm broad, tepals 2(–3) united to 1.25 mm from base, obtuse, coriaceous (0.8–1 mm thick), glabrous or puberulous outside; ovary globose to ovoid, 0.5–1.5 mm long, 0.8–1 mm broad, sulcate, sessile, glabrous; stigma sessile, obscurely 2-lobed, each apiculate, ovule 1. Fruit ellipsoid or ovoid (-globose), rounded at both ends, perianth caducous, pericarp 1.7–4.2 cm long, 1.3–2.3 cm broad, coriaceous, 2.5–5 mm thick, glabrous or puberulous only at base; aril orange, entire; seed ovoid to ellipsoid, 1.5–3 cm long, 0.8–1.3 cm broad.

Distribution: India (Andaman: North Andamans, Middle Andamans, South Andamans; Nicobar Islands, S. Nicobar; Assam: Goalpara, Sivasagar, Cachar; Meghalaya: Ribhoi, Khasia & Jaintia Hills, Quinine Village; Tripura: Shilbari, Dhalai; Mizoram: Tepai) also in Bangladesh, Myanmar, China (Guangdong, Guangxi, Hainan, Yunnan), N. Thailand, Laos, N. and C. Vietnam (Tonkin, N. and C. Annam).

Flowering: September–December; Feburary, July.

Fruiting: January–April; October.

Habitat: Shaded places in inland forests, on clayey and sandy loam, sublittoral forests up to 900 m.

Vernacular names: Dieng-Soh-jodao, Dien-ja-lyntep (Khasi); Pakna-Kala (Cachar); Bolchepok (Garo); Dieng Bolong (Khasi); Dettakarong, Pran-dang-arong (Mikir); Ching-liang-pai (Naga); Sial-tuai (Lushai); Amol (Assamese)

Uses: Seeds and arils are eaten (Anonymous 1959).

Notes: The species was misidentified as Horsfieldia glabra (Blume) Warb. which is distributed in Western Malesia. It differs from the present species in black dots on the lower
Fig. 7. *Horsfieldia kingii* (Hook. f.) Warb. A. Portion of female twig. B. Longitudinal section of fruit. C. Portion of male twig. D. Dried fruit. E–F. Female flower. G–H. Ovary. I. Transverse section of ovary. J. Male flower. K–L. Synandrium. A–B. From D. Banik & P. P. Bora 4201 (NEIST). C. From G. King s.n. (CAL). D. From G. A. Gammie s.n. (CAL). E–I. From G. A. Gammie s.n. (CAL). J–L. From G. King s.n. (CAL). Scale bars: 1 cm (A, D), 1.3 cm (B), 2 cm (C), 1.25 mm (E), 1.15 mm (F), 0.55 mm (G), 0.58 mm (H), 2.2 mm (I), 1.09 mm (J), 0.52 mm (K) and 0.31 mm (L).
surface of leaf lamina (de Wilde 1984b).

Specimens examined: **INDIA. ANDAMAN & NICOBAR ISLANDS**: Tenasserim and Andamans, Herb. Helfer, British provinces of Tenasserim, Indo-China, 1838, Dr. Helfer 1012 (Herbarium of East India Company No. 4358, K); North Andamans: Diglipur, 17 November 1976, NG Nair 4804 (CAL); Middle Andamans, Dhaní Kari, Hill jungle, 14 January 1884, Dr. King’s collector 33 (CAL), Boru. Sung. La. 150 ft, Nov. 1915, C. E. Parkinson 716 (CAL); South Andamans, Hutbaypur – hill jungle, 4 March 1893, Dr. King’s collector s.n.: Alumasjed and Bumilitan hill jungle, 2 October 1893, Dr. King’s collector s.n. (CAL); Between Alumasjid & Bumilitan Hill jungle, 21 October 1893, Dr. King’s collector s.n. (CAL); Ali-Masjid Reserve, March 1915, C. E. Parkinson 373 (CAL); Chirihatapu, 0–200 ft, 19 January 1916, C. E. Parkinson 886 (CAL); Nicobar Islands, Nancowry Island, 4 km from Malacca, 24 May 1997, N. Bhargava 5086 (CAL); 19 km on road to Pygmaion Point, Inland forests, sea level, 17 May 1976, N. P. Balakrishnan 3825 (CAL); South Nicobars, 34 km on East-West Road, 175 m, 22 July 1976, N. P. Balakrishnan 3937 (CAL); 37 km on East-West Road, 1 October 1980, D. K. Hore 8254 (CAL); 33 km on East-West Road, 4 October 1980, D. K. Hore 8268 (CAL); Kopen Heat, 3 February 1981, R. P. Dwivedi 7809 (CAL); Laful forest, 18 May 1981, R. P. Dwivedi 8540 (CAL); ASSAM, Masters s.n. (CAL, E); Tinsukia (Sibsagar), Barpather (Borhola Road), 270 ft, 25 April 1914, U. Kanjilal 3896 (CAL, ASSAM); Chachar district, Katakhal Reserve, 13 December 1914, U. Kanjilal 4860 (ASSAM); Hailakandi, Lallacherra, 16 December 1914, U. Kanjilal 4885 (CAL, ASSAM); N. C. Hills, Haflong, 1650 ft, 9 May 1915, U. Kanjilal 5646, fr. (ASSAM); Goalpara station, plains, 1890, Dr. King’s collector s.n. (CAL); Nowgong dist, Doboka Sal forest 260 ft, 29 December 1913, U. Kanjilal 4311 (ASSAM); MEGHALAYA: Herbarium Hookerianum Sc. J., 17 May 1884, C. Y. Wu in Acta Myristicae N. Gen. & Sp. 1: 43 (1932); Tsang & Fung 317 (2): 218 (1957); Tsiang & Li, Fl. Reipubl. Popul. Sin. 30(2): 199, fig. 91 (1979). Type: CHINA. Hainan, Hung Mo Shan and vicinity, Lai (Loi) area, beside a large stream half way up the mountain, 17 June 1929, Tsang & Fung 317 [Lingnan university 17851], fr. (NY–holotype, non vidi; K!, BM!–isolateypes). [Figs. 6, 7] **Horsfieldia hainanensis** Merr. in Lingnan Sc. J. 11: 43 (1932); Tsang & Li, Fl. Reipubl. Popul. Sin. 30(2): 199, fig. 91 (1979). Type: CHINA. Hainan, Hung Mo Shan and vicinity, Lai (Loi) area, beside a large stream half way up the mountain, 17 June 1929, Tsang & Fung 317 [Lingnan university 17851], fr. (NY–holotype, non vidi; K!–isolateype). **Horsfieldia tetratapeala** C. Y. Wu in Acta Phytotax. Sin. 6(2): 218 (1957); Fl. Yunnan. 1: 12, fig. 4 (1–8) (1977); Tsang & Li, Fl. Reipubl. Popul. Sin. 30(2): 197, fig. 90 (1979). Type: CHINA. Yunnan Expedition, Sino-ross. 2770 [KUN–non vidi; PE–non vidi, photo!].

Tree 10–15 m high. Twigs glabrous, striate, lenticellate; apical bud 1.5–2.7 cm long, 1.5–7 mm wide, tomentose; hairs dendroid, 2–3 branched; bracteate. Leaves alternate;
petiole 1.4–2.8 cm long, 2.7–3.8 mm wide, glabrous; lamina 16.2–33.4 cm long, 5–11.7 cm broad, membranous, obovate, base attenuate, apex acuminate, cuspidate, glabrous; midrib depressed to flat above, raised puberulous below, brochidodromous eucamptodromous; nerves arising from midrib at an angle of ≤45°–65° on acroscopic side and ≤55°–70° on basiscopic side; (8–)12–16 pairs; tertiary nerves more prominent below. Male inflorescence branched twice, 5.8–9 cm long, tomentose; hairs branched. Male flower: pedicel ca. 1.5 mm long, tomentose to puberulous; bud globose, 2.5–3 mm long, 2.75–3 mm broad, perianth campanulate; tepals 3–4, united to 1 mm at base, each lobe triangular, coriaceous (thick ca. 1 mm), puberulous; synandrium globose or transversely elliptic, 1.25–1.5 mm in diameter or 0.75–1 mm long, trilobed to multilobed; sessile or androphore 0.25–0.5 mm long; stamens 32–43; anthers linear, ca. 1 mm long, slightly unequal, connate laterally. Female inflorescence contracted, 2.5–3 cm long, 7–8 flowered, tomentose. Female flower: pedicel 1.5–2 mm long, tomentose; bud globose, 3–3.75 mm long, 3.5–4 mm broad, tepals 2–3, united to 1.5–2 mm at base, each lobe triangular, coriaceous (1.5–2 mm thick), puberulous; ovary globose to obovoid, slightly bilobed depressed at apex, 1–1.5 mm in diameter or 1.5–2 mm long, 1–1.5 mm broad, brown, tomentose; stigma sessile, 2-lobed, black. Fruit yellowish green, ellipsoid, base cuneate, apex beaked, perianth members persistent at base, 4.5–7.2 cm long, 3–4 cm wide, pericarp coriaceous, 2.5–15 mm thick, rugose puberulous, later on glabrous; aril orange yellow, entire; seed ovoid to elliptic, 2.5–3.5 cm long, 1.3–2 cm wide.

Distribution: India (Assam, Cachar; N West Bengal, Tista, Mungpoo; Sikkim, Sivoke, Runig, Rishap, Tista; Tripura, North Tripura), Eastern Nepal, Bangladesh, Myanmar, China (Yunnan, Guangxi, Hainan). Flowering: June.

Fruiting: April–July; January.

Vernacular names: Amol (Assamese); Mijing-ikum-asing; Pandika choa-phang (Kach); Siltui (Lushai); Bolong, Bolouchi (Garo); Ramgwa, Runchepot (Nepali, Sikkim); Kaol-kung, Donglukung (Lepcha).

Uses: Fruit edible but also can cause intoxication; the seed is used as substitute of arecanut. The red latex is dried and used to treat sore throat (Anonymous 1959).

Note: The present study has found extended distribution in Tripura in India.

Specimens examined: INDIA. ARUNACHAL PRADESH: Aka hills, August 1934, N. L. Bor 18942 (field no. 1111) (ASSAM); NEF tracts, Pasighat Forest, 2 July 1938, G. K. Deka 16987 (ASSAM); Lower Subansiri, Chessa, 9 March 1983, Buru Loder 0542 (APFH); Papum Pare District, Rono Hill, Rajib Gandhi University, Botanical Garden, 86 m, 26°05.847ʹN; 93°43.994ʹE, 28 July 2013, D. Banik & P. P. Bora 4213 (NEIST); Khamir village, Poma extension, 274 m, 27°03.398ʹN; 93°30.849ʹE, 3 August 2013, D. Banik & P. P. Bora 4226 (NEIST); ASSAM: July 1845, Masters coll. s.n. (CAL); Masters s.n. (K); Simons s.n. (48) (CAL); 23 July 1846 Jenkins s.n. (CAL); Sat....Master 1679 (CAL); Cachar, Patakhal Forest, May 1885, N. G. Youn s.n. (CAL); Sibsagar, Mikir Hills, near Kaziranga, 23 January 1914, U. Kanjilal s.n. (82P) (ASSAM); Dhikari ghat, 330 ft, 16 February 1914, U. Kanjilal 6657 (CAL); Darrang, Batasip, March 1960, from Silviculturist, Shillong no. 4 (ASSAM); Lakhimpur, Makum range, 350 ft, U. Kanjilal 6854, male fl. (ASSAM); Assam, N. L. Bor 17423 (field no. 1197) (ASSAM); NE Frontier, Khrumpani, 8 December 1913, U. Kanjilal 3162 (ASSAM); Golaghat District, Deopahar, 120 m, 26°36’07.9ʺN; 93°45’50.5ʺE, 11 November 2012, D. Banik & P. P. Bora 4201, fr. (NEIST); Jorhat District, Holongarpar Gibbon Wild Life Sanctuary, Compartment – 2, 7 July 2013, D. Banik & P. P. Bora 4205, fr. (NEIST). MANIPUR: Senapati District, Charoi Pandongba, Before Tamenglong District, Towards Noney, 4 December 2013, D. Banik & P. P. Bora 4241 (NEIST). MEGHALAYA: Khasia and Jaintia Hills, 37 miles Gauhati Road, 4 July 1935, Shri Ram Sarma 12010, male fl. (ASSAM); Nongpoh, Balaiya Tilla, 2600 ft, 31 July 1964, Joseph 37492, female fl. (ASSAM); Umteswar forest, 4 May 1936, Sri Ram Sharma 13277 (ASSAM). SIKKIM: Rishop below hut, 1500 ft, 1 September 1875, G. King 2380, fr. (BM); Rishap, 2000 ft, 15 January 1887, G. A. Gammie s.n. (CAL); Rungeet, 2000 ft, 18 April 1911, Ribu 5000, fr. (LLOYD, CAL), E.; Sikkim, June 1899, C. G. Rogers s.n. (LLOYD, CAL); Sikkim Himalayas, 1900
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G. H. Cave s.n. (LLOYD); Surgli, 2000 ft, 21 May 1914, ...., Dong Kloo Kung (LLOYD); Rongpong, in forest, 2000 ft, 19 July 1922, G. H. Cave s.n., fr. (LLOYD); Mumkhola, from Rongpong to Gangtok, 3 June 2000, D. Banik 27816 (CAL); Ranikhola, second mile, near Rumtek, 4 June 2000, D. Banik 27819 (CAL); East Sikkim, D. Banik 27816 (CAL); Ranikhola, second mile, near Mumkhola, from Rongpong to Gangtok, 3 June 2000, forest, 2000 ft, 19 July 1922, G.

Anonymous 1959. The Wealth of India- An Encyclopedia

Bengal, Tista valley, 800

Mungpoo, May 1900, Dr. Prain’s collector s.n. (CAL); Forests, 2500 ft, June 1900, G.

(CAL); WEST BENGAL: Darjeeling District, Mongpu, 1914, ......, Dong Kloo Kung

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Brigitta E.

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Forest Officers (DFOs)/Forest Personnel, Forests

Chief Wild Life Warden (CWLW)/Divisional

Principal Chief Conservator of Forests (PCCFs)/

In-charge of the herbaria mentioned in the text,

Director, Botanical Survey of India and Keeper/

& Technology, Government of India and the

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D. Banik, P. P. Bora: インド産 Horsfieldia 属と Endocemia 属（ニクズク科）の分類学的ノート

インド産ニクズク科の2属、Horsfieldia Wild. と Endocemia W. J. de Wilde において、次の4種を認めた：Endocemia macrocoma (Miq.) W. J. de Wilde subsp. prainii (King) W. J. de Wilde, Horsfieldia irya (Gaertn.) Warb., H. amygdalina (Wall.) Warb. var. amygdalina および H. kingii (Hook. f.) Warb.

これらの4種の形態的特徴を、2000年と2012–2014年にインド国内で行った調査で採集した標本とハーバリウムに収蔵された標本にもとづいて記載した。ここで認めた全ての種について、シノニム、タイプ標本、記載、分布、フェノロジー、俗名、引用標本を挙げた。なお、Endocemia macrocoma subsp. prainii はアッサム州とトリプラ州では初めての報告となる。

（インド・CSIR-North East Institute of Science & Technology）