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THREE NEW RECORDS OF FAGACEAE FROM BANGLADESH

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Abstract

Three species of Fagaceae *viz*. *Castanopsis inermis* (Lindl.) Benth. & Hook.f., *Lithocarpus dealbatus* (J.D. Hooker & Thomson) Rehder and *Lithocarpus grandifolius* (D. Don) S. N. Biswas are being reported as new records for Bangladesh. These species are described with updated nomenclature, important synonyms, taxonomic description, ecology, geographical distribution and illustrations.

Introduction

The Fagaceae is a family of flowering plants commonly known as the beech family that also includes chestnuts and oaks. The family is moderately large, consisting of some 7-12 genera and 900-1000 species in the world [Wu *et al*. (1999)]. Most of the species are deciduous in temperate regions, whereas in the tropics many species occur as evergreen trees and shrubs. Hooker (1879) documented 8 species, Prain (1903) 9 species and Kanjilal *et al*. (1939) 6 species respectively under Fagaceae which are recorded from the present territory of Bangladesh. Alam (2009) added to our knowledge documenting 18 taxa of Fagaceae occurring in Bangladesh. Very recently, Uddin and Hassan (2018) recorded 14 species under 3 genera from Chittagong and the Chittagong Hill tracts.

Floral descriptions provide detailed information about the key characteristics of plants belonging to different families. This information is vital for identifying and classifying plants correctly. By examining features like flower structure, leaf arrangement, stem type, and other taxonomic characteristics, researchers and botanists can determine the family to which a plant belongs. This accurate identification forms the foundation of taxonomic studies. Bangladesh National Herbarium (DACB) continue publishing the series of regular publication 'Flora of Bangladesh'; thus resulting in the compilation of 93 angiosperm families in 81 fascicles. But, a number of angiosperm family is still remaining untouched and Fagaceae is one of them. As no comprehensive taxonomic work on the family has been done, a program has been taken to complete a revisionary work on the family Fagaceae of Bangladesh. During the course of this work, while examining the collected specimens of the family Fagaceae from different districts of the country and specimens preserved at DACB, we came across some specimens were not matched with any known plant species of Bangladesh.

Materials and Methods

The paper is based on the herbarium specimens of Fagaceae collected from present Bangladesh territory and stored at DACB. While screening 103 specimens of the family stored at DACB, we came across some unknown specimens. Those specimens were identified by consulting relevant taxonomic literatures *viz*. Santisuk and Larsen (2008), Wu *et al*. (1999), GBIF (2023), WFO (2023), online specimens of Kew (K) and Central National Herbarium (CAL).

Results

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After critical examination, these specimens were identified as *Castanopsis inermis* (Lindl.) Benth. & Hook.f., *Lithocarpus dealbatus* (J.D. Hooker & Thomson) Rehder and *Lithocarpus grandifolius* (D. Don) S. N. Biswas. As the species were not mentioned in the relevant taxonomic literatures *viz*. Hooker (1879), Kurz (1877), Prain (1903), Heinig (1925), Cowan (1926), Cowan and Cowan (1929), Kanjilal *et al*. (1939), Raizada (1941), Datta and Mitra (1953), Sinclair (1956), Uddin and Hassan (2018), the species are new records for the flora of Bangladesh. After the study one species belong to the genus *Castanopsis viz*., *C. inermis* (Lindl.) Benth. & Hook.f., and two species belong to the genus *Lithocarpus viz*., *L. dealbatus* (J.D. Hooker & Thomson *ex* Miquel) Rehder & *L. grandifolius* (D. Don) S.N. Biswas. Each of these new records is cited with relevant taxonomic data on current name with synonyms (The Plant List, 2023), description, ecology, occurrence in Bangladesh and specimens examined. Illustration of each newly recorded species is provided based on herbarium specimens.

1. Castanopsis inermis (Lindl.) Benth. & Hook.f., Gen. Pl. 3: 409. 1880. **(Fig. 1)**

Callaeocarpus sumatrana Miq., Pl. Jungh. 14. 1851.

Castanea glomerata Blume, Mus. Bot. 1: 283. 1851.

Castanea inermis Lindl., Pl. Asiat. Rar. 2: 6. 1830.

Castanea sumatrana (Miq.) Oerst., Skr. Vidensk.-Selsk. Christiana, Math.-Naturvidensk. Kl. 5(9): 378. 1873. *Castanopsis mitifica* Hance, J. Bot. 16: 200. 1878.

Castanopsis sumatrana (Miq.) A.DC., J. Bot. 1: 182. 1863.

Tree, 9-20 m tall, 40-150 cm girth. Terminal bud ovoid-ellipsoid, ca. 3×5 mm, scales ovate, acute, ca. 5×2 mm, pubescent outside. Twigs pubescent then glabrous, sparsely lenticellate, blackish when dry. Bark ca. 2 cm thick, grey, shallowly reticulate fissured; inner bark dirty brown or whitish; sapwood white; heartwood brown. Stipules triangular, ca. 1 mm long, caducous. Leaves obovate, obovate-oblong, oblong or lanceolate, 7-17 × 5-7 cm; base slightly cuneate, obtuse; apex acute or obtuse, margins entire or sometimes serrate; subcoriaceous, glabrous, glossy green on the upper surface and pubescent then glabrescent on the lower, midrib prominent on the lower surface and depressed on the upper, lateral nerves 7-12 pairs, distinct on the lower surface and slightly depressed on the upper, scalariform and reticulate veins hardly distinct. Petiole 1.0-1.5 cm, glabrous. Inflorescence: male and female mixed or separate, terminal or axillary, pubescent. Male inflorescence always branched, spikelets 10-15 cm long; bracts and bracteoles ovate, acute, ca. 0.5 × 0.5 mm, tomentose outside. Male flowers white to yellowish, scented, usually in 3-flowered cluster; calyx 6-lobed, lobes free, obovate, ca. 1.0 × 0.5 mm, glabrous; stamens 12, 2-3 mm long, rudimentary ovary ovoid, flattened on top, ca. 1.0 mm in diameter; hirsute. Female inflorescence always spike 10-15 cm long. Female flowers solitary or in 1-3-5-flowered cluster, other characters as in male flowers. Styles 3, divergent, hairy near base; stigmata pointed. Fruit sessile, irregularly globose, 1.5-2.5 × 1.5-3.5 cm, on erect and woody infructescence 15-20 cm long. Cupule completely enclosing the nut except the umbo and more or less fused with nut; wall sparsely covered with simple, short, curled spines set in 3-5 lines. Nuts (1)-2-3 per cupule, ovoid, ca. 1×1 cm. usually emarginated at apex.

Ecology: Tropical evergreen rain forests, often near streams, on limestone and granite bedrock; up to 200 m altitude.

Distribution: Indonesia, Malaysia, Myanmar, Philippines, and Singapore.

Specimen examined: Khagrachhari, Machalong Reserve Forest, Baghaichari, 10 iv 2018, Kowser *et al.*, KH-9096 (DACB 87260).

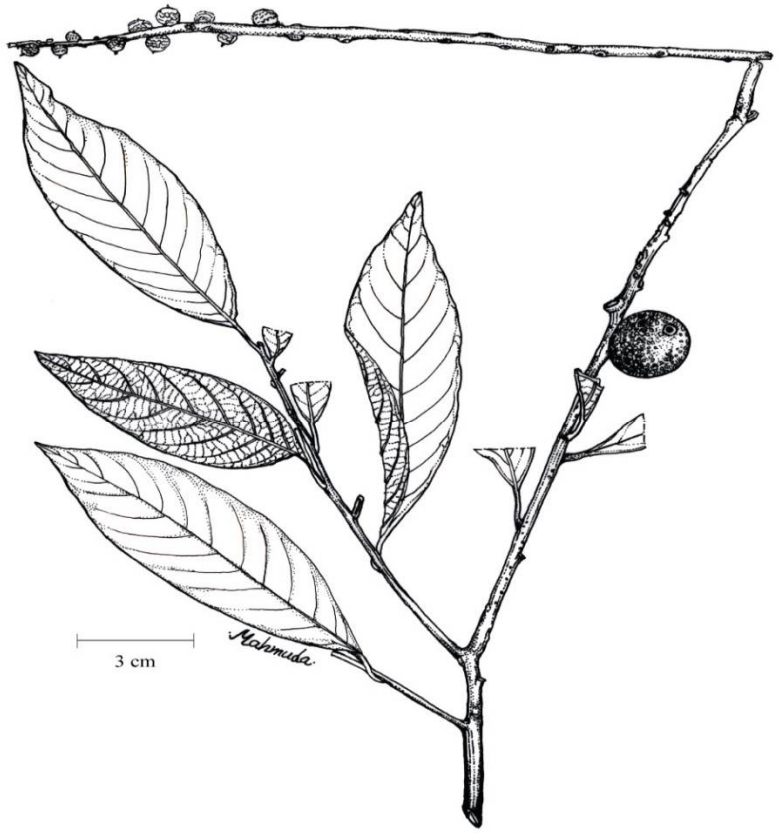

Fig. 1. **Castanopsis inermis** (Lindl.) Benth. & Hook.f. (Twig with infructescence).

2. Lithocarpus dealbatus (J.D. Hooker & Thomson *ex* Miquel) Rehder, J. Arnold Arbor. 1: 124. 1919. **(Fig. 2)**

Lithocarpus tapintzensis A.Camus, Bull. Soc. Bot. France 90: 199. 1944.

Lithocarpus viridis (Schottky) Rehder & E.H.Wilson, Pl. Wilson. 3: 210. 1916.

Pasania dealbata (Hook.f. & Thomson *ex* Miq.) Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1866: 84. 1866.

Pasania viridis Schottky, Bot. Jahrb. Syst. 47: 668. 1912.

Pasania yenshanensis Hu, Acta Phytotax. Sin. 1: 116. 1951.

Quercus dealbata Hook.f. & Thomson *ex* Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 107. 1864.

Synaedrys dealbata (Hook.f. & Thomson ex Miq.) Koidz., Bot. Mag. (Tokyo) 30: 194. 1916.

Synaedrys viridis (Schottky) Koidz., Bot. Mag. (Tokyo) 30: 198. 1916.

Quercus dealbata Hook.f. & Thomson *ex* Miq., Ann. Mus. Bot. Lugduno-Batavi 1: 107. 1864.

Tree, up to 20 m tall. Leaf blades abaxially, bud scales, branchlets, petioles, rachis of inflorescences, and scales of cupule tawny tomentose with short hairs. Petiole 1-2 cm long; leaf blade ovate, ovate-elliptic, or lanceolate, 7-14 × 2-5 cm, thickly papery to leathery, concolorous or abaxially greyish and with waxy scale, base cuneate, margin entire or rarely apically shallowly undulate, apex acuminate to acute; midvein adaxially slightly raised and usually sparsely pubescent; secondary veins (8-)10-13 on each side of midvein; tertiary veins abaxially conspicuous, ± parallel. Male inflorescences clustered at apex of branches, rarely to 15 cm long. Female inflorescences sometimes androgynous, rarely to 20 cm long; cupules in clusters of 3(-5). Infructescences usually 5-8 cm long. Cupule cupular, 0.8-1.4 × 1.0-1.8 cm, enclosing 1/2 to most of nut; bracts imbricate, triangular, appressed or a few spreading. Nut depressed globose to subglobose, slightly smaller than cupule, apex rounded, ± flat, or rarely convex, wall ca. 1.0 mm thick; scar covering ca. 1/3 (-1/2) of nut, convex.

Fig. 2. **Lithocarpus dealbatus** (J. D. Hooker & Thomson *ex* Miquel) Rehder: a) Twig with inflorescence and infructescence

Ecology: Mixed mesophytic forests, up to 1000 m altitude.

Distribution: Bhutan, China, India, Laos, Myanmar, Thailand and Vietnam.

Specimen examined: Bandarban: Exact locality unknown, 17 vi 1983, Huq, Rahman & Mia H-5873 (DACB 5748); Chittagong Hill Tracts, Collection date unknown, Dr. King 188 (CAL).

East Bengal, 1968, Griffith 4474 (K). Cox's Bazar: Dhalikchara near Ramu, 19 ii 1971, A.M. Huq 350 (DACB 5749); Chattogram: Komolchari, Rangunia, 10 x 2017, Md. Moniruzzaman, Al-Amin & Kawsar, MAK-5989 (DACB 52541). Sylhet: Sarighat Forest, 3 x 1983, Huq, Rahman, Mia & Mahbuba H-6317 (DACB 5734).

3. Lithocarpus grandifolius (D. Don) S.N. Biswas, Bull. Bot. Surv. India. 10: 258. 1968. **(Fig. 3)**

Tree, up to15 m tall, glabrous except for inflorescences. Petiole 5-10 mm long; leaf blade obovate, oblanceolate, or sometimes oblong, 15-40 × 5-15 cm, leathery to rigidly papery, concolorous, base often oblique and ± auriculate, subrounded, or rarely cuneate, margin entire, apex acute; secondary veins 13-20 on each side of midvein, fusing near margin; tertiary veins abaxially conspicuous. Male inflorescences usually solitary, occasionally 3-many in a panicle; rachis tomentose with short hairs, rarely glabrescent. Female inflorescences terminal, usually in pairs up to 20 cm long; rachis base 1.0-1.6 cm thick; cupules in clusters of 3-5, usually 1 or 2 developed. Cupule cupular, ca. 2.6 cm in diameter, enclosing 1/3-2/3 of nut, wall to 4 mm near base and woody; basal bracts often connate into horizontal ridges, broadly ovate to broadly rhomboid, puberulent. Nut depressed globose, 1.5-2.2 × 2.0-2.6 cm, apex flat and ± concave or rarely rounded and pointed, wall 1.5-2.0 mm thick; scar 1.6-2.0 cm in diameter, concave but center sometimes convex.

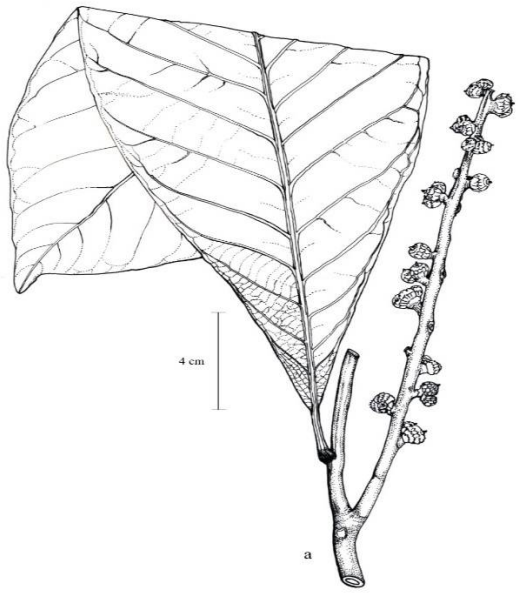

Fig. 3. **Lithocarpus grandifolius** (D. Don) S. N. Biswas: a) Twig with infructescence.

Ecology: Broad-leaved evergreen forests; up to 600 m altitude.

Distribution: Bhutan, China, India, Laos, Myanmar, Nepal and Thailand.

Specimen examined: Khagrachhari, Kassalong Reserve Forest, 2 v 2017, Kowser *et al*. KH-4710 (DACB 87261).

Note: Some authors mentioned that the species is synonymous to *L. elegans* (Blume) Hatus. *ex* Soepadmo, but differing from *L. elegans* (Blume) Hatus. for its bigger, oblanceolate leaves; smaller in size, globose and concave nut.

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