

NEW RECORDS OF THREE SPECIES AND A GENUS OF ANGIOSPERMS FOR BANGLADESH

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Abstract

Three species viz., *Cayratia maritima* Jackes of family Vitaceae Juss., *Leptadenia reticulata* (Retz.) Wight & Arn. of Apocynaceae Juss. and *Oberonia disticha* (Lam.) Schltr. of Orchidaceae Juss. have been reported here for the first time from Sundarban Mangrove Forest of Bangladesh. The genus *Leptadenia* R.Br. is a new addition to the Angiosperms of Bangladesh. Taxonomic description, photographs and illustrations of these species have been provided.

Introduction

Bangladesh harbors a total of 3715 species of Angiosperms (Ahmed *et al.*, 2008-2009; Rahman *et al.*, 2016; Rahman and Hossain, 2017; Islam and Rahman, 2017; Sourav *et al.*, 2017; Ara, 2018; Ara and Hassan, 2018; Uddin *et al.*, 2018; Alfasane *et al.*, 2019). During the botanical explorations in Sundarban Mangrove Forest of Bangladesh conducted in 2016-2018 by the authors, some specimens of Angiosperms were collected which did not match with any known plant species of Bangladesh. Following detailed taxonomic investigation, these specimens were identified as to belong to three species namely, *Cayratia maritima*, *Leptadenia reticulata* and *Oberonia disticha* of family Vitaceae, Apocynaceae and Orchidaceae, respectively. These species and the genus *Leptadenia* were never appeared previously in any taxonomic literature covering the flora of Bangladesh (*e.g.*, Hooker, 1875-1885; Prain, 1903a, b; Heinig, 1925; Khan, 1972-1987; Khan and Rahman, 1989-2002; Rahman and Hassan, 2017; Ahmed *et al.*, 2008-2009; Uddin and Hassan, 2010; Arefin *et al.*, 2011; Rahman *et al.*, 2015; Haque *et al.*, 2018). Therefore, the species *Cayratia maritima*, *Leptadenia reticulata* and *Oberonia disticha* and the genus *Leptadenia* are reported here as the new records for Bangladesh.

Materials and Methods

The plant specimens were collected from Kotka, Supati, Dublar Char and Nilkomol areas of Sundarban Mangrove Forest of Bangladesh during the floristic exploration conducted from 2016 to 2018. The freshly collected specimens were processed using standard herbarium techniques (Hyland, 1972; Jain and Raw, 1977) and preserved at Jahangirnagar University Herbarium (JUH). The taxonomic investigation on the morphological characters of these specimens was conducted in Plant Systematics and Biodiversity Laboratory of Jahangirnagar University. The taxonomic

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identification of these specimens was confirmed through matching their characters with the relevant taxonomic literatures (Bullock, 1955; Devis and Cullen, 1965; Geesink *et al.*, 1981; Hooker, 1875-1885; Prain 1903a; Wu *et al.*, 1995-2009, Siddiqui *et al.*, 2007 and 2008; Ahmed *et al.*, 2008-2009; Ali, 2019), voucher specimens housed at Bangladesh National Herbarium (DACB) and Jahangirnagar University Herbarium (JUH), and clear images available in the websites of few international herbaria (*e.g.*, K, P and MO). Nomenclatural information was incorporated following recent taxonomic publications (Ali, 2019; Wu *et al.*, 1995-2009) and the nomenclatural databases of The Plant List (2018) and TROPICOS (2018). The voucher specimens have been deposited at JUH. The taxonomic descriptions including images and illustrations have been produced based on the specimens collected from Sundarban Mangrove Forest of Bangladesh.

Results and Discussion

Cayratia maritima Jackes, *Austrobaileya* 2(4): 366 (1987). TYPE: Australia: Queensland, Cook pastoral district, Lakefield National Park, Lakefield, seashores, 26 June 1982, B.R. Jackes s.n. HT (BRI), IT (MEL, A, L, CANB, DNA, NSW). (Fig. 1).

Scrambling vine, stems angular, ca. 3-10 m long, young stems with simple hairs at nodes; tendrils bi- or tri-furcate, glabrous; leaves alternate, trifoliate, succulent; stipules 2, triangular, caduceous, leaving a broad scar; petioles 2-3.8 cm long, glabrous; leaflets glabrous abaxially and adaxially, central leaflets ovate to rhomboid, ca. 2.5-4.5 cm × 1.5-2.3 cm, usually larger than the lateral leaflets, lateral leaflets oblique, sometimes lobed, ca. 2-3.5 cm × 1.2-2.0 cm, apices acuminate, margins with obtuse teeth; inflorescence axillary, about as long as the compound leaves, corymbose; flowers 4-merous, small, actinomorphic, hypogynous; sepals 4, papillose; petals 4, ca. 1.8-2.0 mm, whitish, valvate, spreading, papillose; stamens 4, antipetalous, filaments 1-1.5 mm long, anthers oval, up to 0.5 mm long, dorsifixed, dehiscent longitudinally; floral disc 4-lobed; carpels 2, syncarpous, ovary superior, embedded in the disk, placentation nearly basal, style simple, connate; fruits berry, (sub-)globose, ca. 1 cm in diam., dark purple to black when matured; seeds 2-4 per fruit, about 5-6 × 4-5 mm. $2n = 40$ (Okada and Tsukaya, 2003).

Flowering and fruiting: Flowering occurs during December to May and fruiting during June to September.

Ecology: Found to grow near sea level to 100 m. but usually grows in forest margin or gallery and often near permanent depression areas of forest.

Uses: Local people use this plant in curing the stomach upset of cattle.

Distribution: Distributed mostly in tropical and subtropical Africa, Asia, Australia, and the Pacific Islands. Indonesia, New Guinea, Taiwan and neighboring Pacific Islands. In Bangladesh, this species is found to occur in Sundarban Mangrove Forest.

Representative specimen examined: **Bagerhat:** Shorankhola, Kotka, 14.10.2016, Mosharof 2103 and 2104 (JUH); Dublar Char, 26.09.2017, Mosharof 3285 (JUH).

The genus *Cayratia* Juss., consisting of 63 species (Jackes, 1987), is distributed mostly in tropical and subtropical Africa, Asia, Australia, and the Pacific Islands (Hus and Kuoh, 1999) and characterized by axillary inflorescences with bisexual, tetramerous flowers. Only three species of *Cayratia* viz., *C. japonica* (Thunb.) Gagnep., *C. pedata* (Lam.) Juss. ex Gagnep. and *C. trifolia* (L.) Domin were previously reported from Bangladesh (Hooker, 1875; Prain, 1903a; Ahmed *et al.*, 2009).

C. maritima differs from *C. japonica* by its tri-foliate leaves, and marginally obtusely toothed and abaxially glabrous lamina in contrast to 5-7 foliate leaves and marginally sparsely serrate and abaxially sparsely pubescent to pilose lamina of *C. japonica*. It differs from *C. trifolia* by its 2-3

branched tendrils, glabrous and obtusely toothed leaves in comparison to 3-5 branched tendrils, adaxially strigulose and abaxially pilose and sharply dentate leaves of *C. trifolia*. It is different from *C. pedata* by its tri-foliolate and glabrous leaves in contrast to *C. pedata*'s 5-7 foliate and adaxially or adaxially and abaxially sparsely pubescent to pilose leaves.

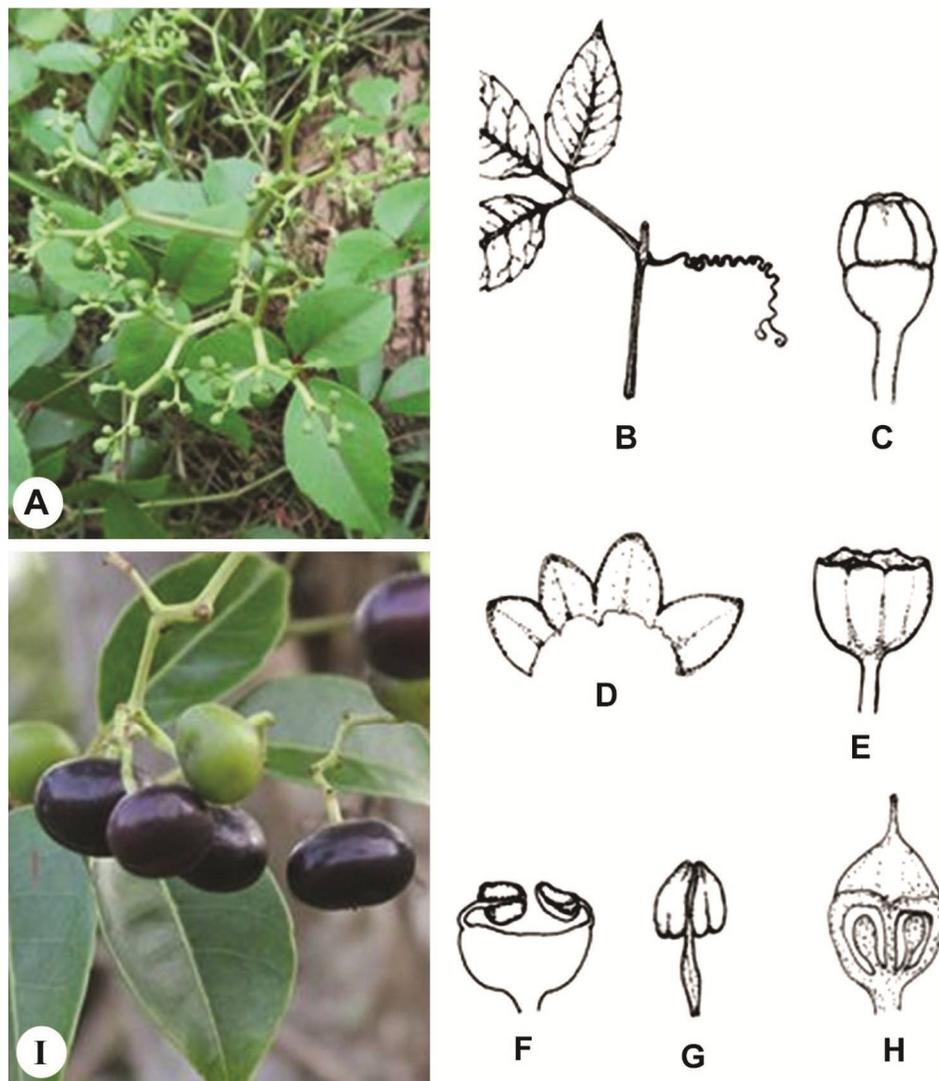


Fig. 1. *Cayratia maritima* Jackes: A. A partial view of habit ($\times 0.71$); B. A part of a branch with a tendril ($\times 0.8$); C. An unopened flower ($\times 12.5$); D. Petals ($\times 12.5$); E. Calyx cup ($\times 22$); F. Position of stamens ($\times 12.5$); G. A stamen ($\times 14.5$); H. LS of an ovary ($\times 15$); I. Fruits ($\times 4$).

Leptadenia reticulata (Retz.) Wight & Arn. In: Wight, Contr. Bot. India. 47 (1834). Trimen, Handb. Fl. Ceylon, 3:164 (1895); Lace, List Trees, Shrubs, etc. Burma, ed. 2 (Rodger), 117 (1922); Gamble, Fl. Madras, 2(5): 850 (1924); Press, *et al.*, Annotated Checklist of the Flowering Plants of Nepal (2000). (Fig. 2).

Cynanchum reticulatum Retz.; *C. asthmaticum* Butch.-Ham. ex Hook, Fl. Brit. India, 4:63(1883).

Perennial, much branched, laticiferous, twining climber; stems pale yellowish when mature but younger ones are greenish, glabrous, contain watery sap; leaves simple, opposite, ovate or ovate-oblong, gradually acute at apex, base truncate or shallowly cordate, coriaceous, and finely pubescent; petioles 1.5-2.5 cm long; lamina 4.5-7.0 cm × 2.5-3.5 cm; inflorescences axillary umbellate cymes; peduncles 4-5.5 mm long, finely pubescent; flowers yellowish green, bisexual, pedicels 3.5-4.0 mm long, pubescent; calyx five-lobed, sepals ovate, oblong or sub-acute (2-2.5 mm × 1-1.2 mm), silky with small hairs on surface; corolla rotate with short tube, corolla tube

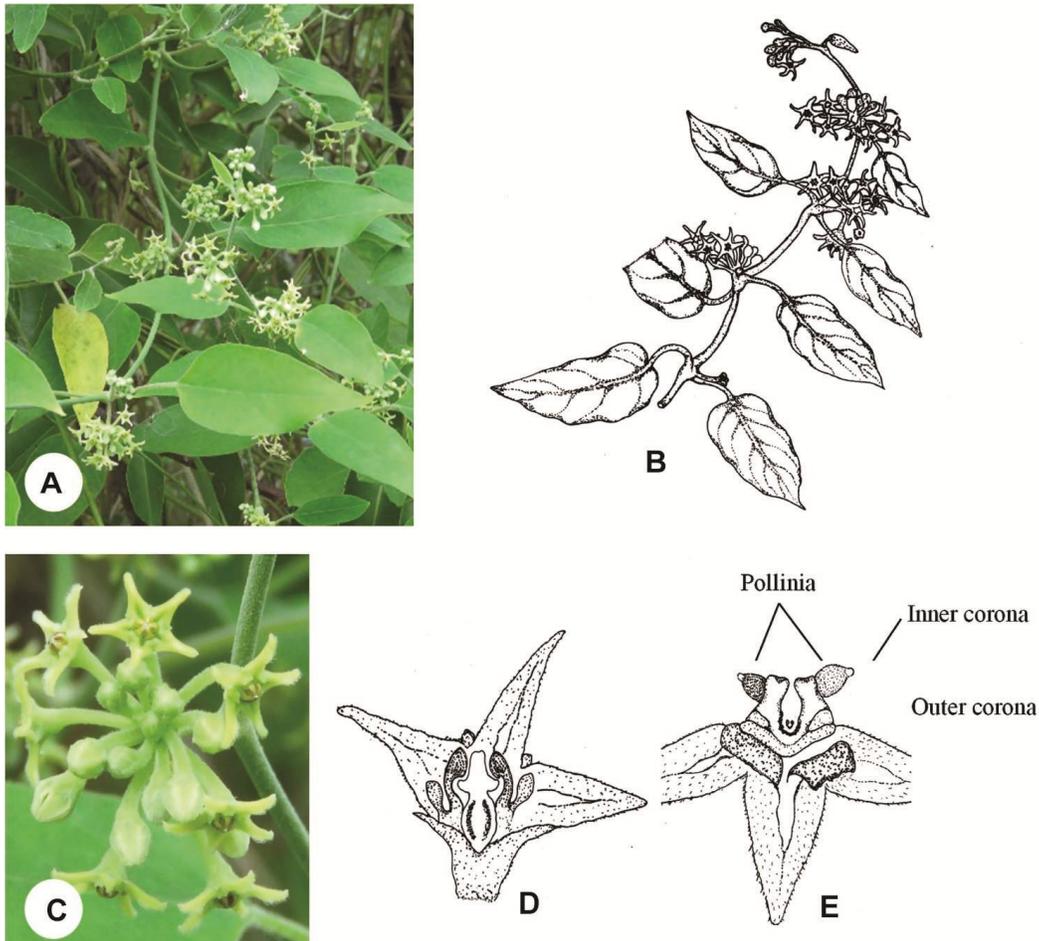


Fig. 2. *Leptadenia reticulata* (Retz.) Wight & Arn.: A. A partial view of habit ($\times 1.5$); B. A part of a flowering twig ($\times 0.33$); C. An inflorescence ($\times 0.75$); D. LS of a flower ($\times 1.18$); E. A part of flower showing pollinia and corona ($\times 1.23$).

shorter than the calyx, petals 5, gamopetalous, ovate or sub-acute (3.5-3.8 mm × 1.3-1.5 mm) with small hairs on surface; corona in double series, inner series reduced, outer series of 5 short, fleshy parts attached to the throat of corolla tube alternating with the corolla lobes; staminal column

short, stamens 5, filaments fused with the stigmatic head to form a five-angled disc or gynostegium, anthers incumbent on stigma with pellucid curved appendages at the tip; ovary bicarpellary with marginal placentation; fruits follicular, horned shaped and slender, bluntly acute at both ends; seeds lanceolate and comose.

Flowering and fruiting: Flowering occurs during July to October and fruiting during September to December.

Ecology: On sandy soil beside the forest margin and along the sand dune.

Uses: The plant is galactogogues and used as eye tonic. It is used to prevent prolapse of uterus and vulva in controlling habitual abortion in women (Anjaria *et al.*, 1975). It is useful to cure eye-diseases (Sivarajan and Balachandran, 1994), seminal debility, general weakness, cough, dyspnoea, fever, asthma, constipation, sore throat, and gonorrhoea. Extracts of roots and leaves of the plant act as antibacterial and anti-fungal agent (Patel and Dantwala, 1958).

Distribution: Native to Africa, including Madagascar, Mauritius, as well as southwest Asia and the Indian Subcontinent (Gibbs *et al.*, 1987; Bruyns and Forster, 1991).

Representative specimen examined: **Khulna:** Nilkomol, Balirgang, 12.10.2016, Mosharof 2094 and 2095 (JUH).

The genus *Leptadenia* R.Br., with about 10 species, is native to Africa, including Madagascar, as well as southwest Asia and the Indian Subcontinent (Abeywickrama, 1973; Gibbs *et al.*, 1987; Bruyns and Forster, 1991). The genus *Leptadenia* was never reported from Bangladesh previously. Hooker (1883) provided an account of this genus (as *Cynanchum* L.) for few areas of British India that do not cover Bangladesh. *L. reticulata* seems similar to *L. arborea* (Forssk.) Schweinf. from which it is differentiated by its corolla tubes that are shorter than the calyx in contrast to the those of *L. arborea* that are longer than the calyces.

Oberonia disticha (Lam.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 33: 132 (1924).

Epidendrum distichum Lam.; *Iridorchis equitans* (Thouars) Kuntze; *Malaxis brevifolia* (Lindl.) Rchb.f.; *Oberonia brevifolia* Lindl.; *Pleurothallis disticha* (Lam.) A.Rich. **(Fig. 3).**

Small epiphytic herb, 4-12 cm long, usually pendent, sometimes forms clumps; roots arising from the base of plant, fine, <1 mm in diameter; stems few to many, in cluster, 3-12 cm long; leaves several, 4-5 × 0.8-1.2 cm, distichous, usually imbricate, bilaterally flattened, succulent, light green, 2-5 × 0.5-1 cm, lanceolate, acute to acuminate, decreasing in size towards the stem apex; inflorescence terminal racemose, densely many-flowered, 4-10 cm long, cylindrical, tapering; flowers <2 mm in diameter, yellowish orange; sepals 0.6-0.7 × 0.4-0.5 mm, ovate, obtuse; petals 0.4-0.5 × 0.2 mm, elliptic to oblong, obtuse, lips 0.9-1.0 × 0.7 mm, oblong-pandurate, deflexed; column 0.5-3 mm long.

Flowering and fruiting: January to March.

Ecology: Epiphytic in riverine or evergreen forest and woodland with high rainfall, at 430-1250 m alt. This species can grow in pots filled with a mix of fine bark chips and coarse pit and in the outdoors with moderate temperatures and high humidity (Wodrich, 1997).

Uses: This species can be used as an ornamental.

Distribution: Central, East and Southern Africa, Madagascar, the Comoro and Mascarene Islands.

Representative specimen examined: **Bagerhat:** Shorankhola, Shupati, 10.02.2016, Mosharof 2142 and 2149 (JUH); Shupati, 30.09.2017, Mosharof 3370 (JUH).

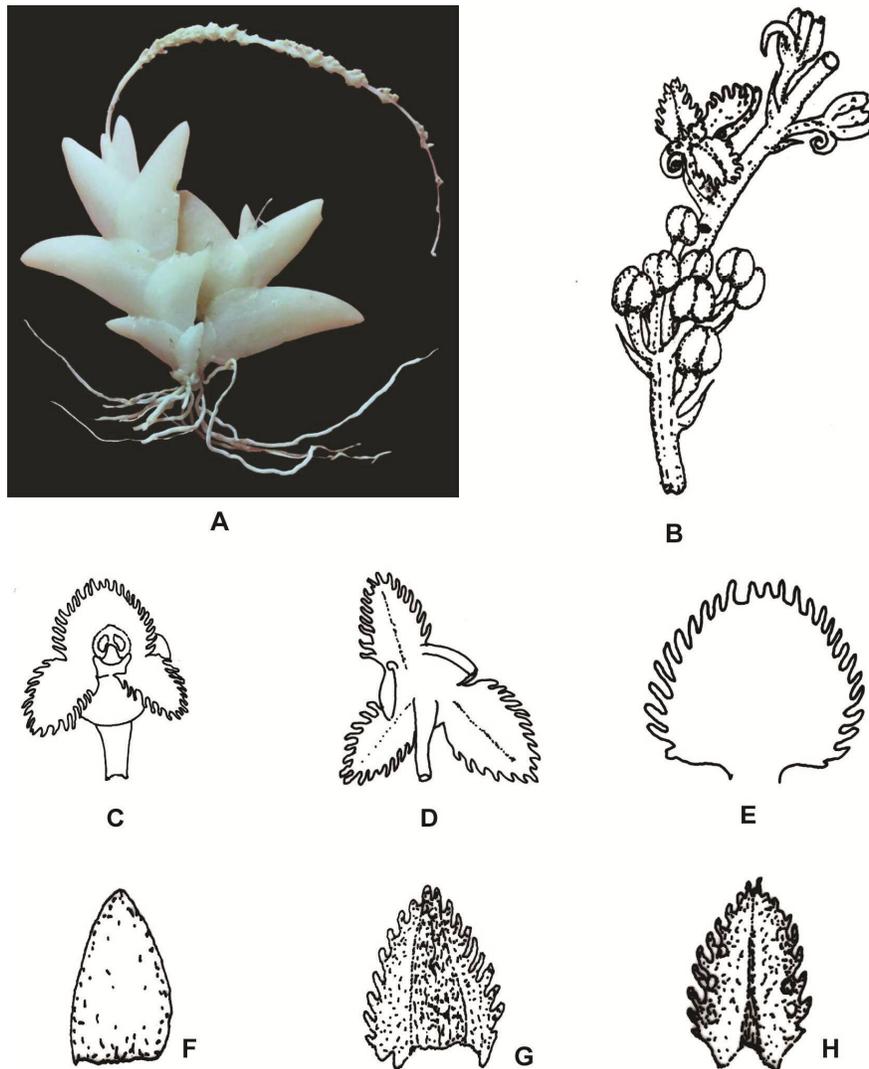


Fig. 3. *Oberonia disticha* (Lam.) Schltr.: A. Habit ($\times 1$); B. A part of an inflorescence ($\times 18$); C. Front view of a flower ($\times 15$); D. Dorsal view of a flower ($\times 18.5$); E. A lip ($\times 25.6$); F. A sepal ($\times 20.8$); G. Dorsal view of a petal ($\times 10.35$); H. Ventral view of a petal ($\times 12$).

The genus *Oberonia* Lindl. consists of about 300 species, distributed from South Africa through Asia to Australia and the Pacific Islands. In Bangladesh, five *Oberonia* species viz., *O. falconeri* Hook. f., *O. gammiei* King & Pantl., *O. mannii* Hook. f., *O. mucronata* (D. Don) Ormerod & Seidenf., *O. rufilabris* Lindl. have so far been described (Hooker, 1894; Prain, 1903a; Ahmed *et al.*, 2008), from which *O. disticha* can be differentiated by its leaf characters. *O. disticha* has bilaterally flattened and compressed, and distichous leaves arranged at the base to the lower part of the stem in contrast to sobulate to (sub-) falcate leaves of *O. gammiei*, linear and ensiform leaves of *O. mannii*, and narrowly oblong leaves (narrowly obovate lip with two basal threadlike segments) of *O. rufilabris* jointed at the base.

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