

DISCOVERY OF THREE NEW RECORDS OF ANGIOSPERM FOR BANGLADESH FROM SYLHET DIVISION

MAHBUBA SULTANA¹, MOHAMMOD SYEDUR RAHMAN,
MOHAMMAD AMDADUL HOQUE AND SARDER NASIR UDDIN

Bangladesh National Herbarium, Chiriakhana Road, Mirpur-1, Dhaka-1216, Bangladesh

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Abstract

This paper deals with three angiosperm species new records for Bangladesh from Sylhet division. These are: *Asystasiella neesiana* (Wall.) Lindau, *Cissampelos glaberrima* A.St.-Hil. and *Euonymus laxiflorus* Champ. ex Benth. Updated nomenclature, important synonyms, taxonomic description, ecology, geographical distribution and photographs are provided for each of the species.

Introduction

Bangladesh National Herbarium (BNH) has involved in a number of floristic inventories throughout the country resulting in the compilation of a number of checklist floras (i.e. Khan and Hassan, 1984; Huq, 1988; Mia and Huq, 1988; Uddin *et al.*, 1998; Khan and Huq, 2001; Rashid and Mia, 2001, Islam *et al.*, 2016 a,b; Rahman *et al.*, 2018; Islam *et al.*, 2018; Uddin and Rahman 2021; Islam and Uddin 2021). These are reports of occurrence of various species in different areas and thus contributing toward the completion of floristic survey of the country. Conducting floristic survey of a forest area maximize the possibilities of locating new species and special plant species. Recently a number of new species and new records are added to the flora of Bangladesh (i.e. Ara and Hassan, 2012; Ara and Hassan, 2018; Islam and Rahman, 2017; Islam *et al.*, 2018; Hossain *et al.*, 2019; Khatun *et al.*, 2010; Mia *et al.*, 2011; Rahman and Hassan, 2017; Rahman and Uddin, 2018; Uddin and Hassan, 2009; Uddin *et al.*, 2012; Uddin *et al.*, 2015a,b,c,d; Uddin 2018). Thus the plant list of the country is being constantly updated with more exploration and discovery of new species. However, many areas of the country remain botanically unexplored or poorly explored till now. To complete the floristic survey of the country, BNH has under taken floristic survey programs at Madhabkundo Eco-Park and Khadimnagar National Park of the country. During these botanical explorations, scientists of BNH found few specimens of Angiosperms belonging to the families Acanthaceae, Celastraceae and Menispermaceae were not matched with any known plant species of Bangladesh.

Materials and Methods

Botanical survey was conducted at Madhabkundo Eco-Park between 2009 to 2016 and Khadimnagar National Park between 2018 to 2021. The areas were surveyed by following general walk-over method to ensure all species encountered. Specimens of each species encountered in flowering and/or fruiting condition were collected. Collection of voucher specimens were conducted in a manner that is consistent with conservation ethics. At each collection, location, date, habit and any other notable ecological characteristics were recorded. Freshly collected specimens were processed using standard herbarium techniques and preserved at Bangladesh National Herbarium (DACB). The photographs of fertile specimens in natural habitat were taken during the field trips. The taxonomic investigation on the morphological characters of these specimens was conducted using long arm stereomicroscope in the laboratory of BNH. The

¹Corresponding author: E-mail: mahbuba9471@gmail.com

taxonomic identification of these specimens was confirmed through matching their characters with the relevant taxonomic literatures (Hooker, 1872-1897; Prain 1903; Begum 2008, Uddin 2008 and Mia 2008). Digital images of the species are also used to supplement plant identification and document their habitats. Nomenclatural information was incorporated following recent taxonomic publications (Wu *et al.*, 2008a,b & 2011) and the nomenclatural databases of IPNI (2008), The Plant List (2013) and TROPICOS (2010). The voucher specimens have been deposited at DACB with proper labeling.

Results and Discussion

During taxonomic study of two forest areas, approximately 418 plant specimens were collected from Madhabkundo Eco-Park and 1,800 plant specimens from Khadimnagar National Park. In the process, three angiosperm species were encountered for which no herbarium specimens had ever been collected from the country. After critical microscopic observations and matching with the help of floras, those species have been identified as *Asystasiella neesiana* (Wall) Lindau, *Cissampelos glaberrima* A.St.-Hil. and *Euonymus laxiflorus* Champ. *ex* Benth under families Acanthaceae, Menispermaceae and Celastraceae respectively. These three species are being described here to be new report for Bangladesh as they never appeared previously in any publication on the flora covering the present territory of Bangladesh *viz.* Hooker, 1872-1897; Prain, 1903; Alam, 1988; Uddin *et al.*, 2003; Begum 2008; Khatun, 2008, Mia, 2008, Uddin and Hassan, 2010; Sobuj and Rahman, 2011; Arefin *et al.*, 2011; Uddin *et al.*, 2011; Haque *et al.*, 2018; Rahman and Uddin, 2018; Rahman *et al.*, 2018a,b; Uddin and Hassan, 2004; Uddin, 2018 and Uddin and Hassan, 2018a,b;)

Taxonomic description of these three new records are furnished with updated nomenclature, synonyms, english name (if any), flowering and fruiting period, photographs & illustrations, ecology, distribution, representing specimens and uses. The species are arranged alphabetically in the text.

1. *Asystasiella neesiana* (Wall.) Lindau, Nat. Pflanzenfam. 4 (3b). 326. 1895. (Figs. 1a & 1b)

Acanthaceae

Asystasiella neesiana (Wall.) Lindau, H.G.A. Engler & K.A.E. Prantl, Nat. Pflanzenfam. 4(3b): 326. 1895.

Asystasiella chinensis (S.Moore) E.Hossain, Notes Roy. Bot. Gard. Edinburgh 32(3): 405. 1973.

Asystasia neesiana Nees, Pl. Asiat. Rar. 3: 89 1832.

Asystasia neesiana (Wall.) Nees, N. Wall., Pl. Asiat. Rar. 3: 89. 1832.

Asystasia chinensis S.Moore, J. Bot. 13: 228. 1875.

Mackaya neesiana (Wall.) Das, Fl. Assam 3: 447. 1939.

Ruellia neesiana Wall., Pl. Asiat. Rar. 1: 73, pl. 83. 1831.

Ruellia crucis Steud., Nomencl. Bot., ed. 2, 2: 481. 1841.

Ruellia tetragona Thunb., Fl. Jav.: 22. 1825.

English name: East-Himalayan Bell-Bush.

Annual or perennial herbs or shrubs, up to 1 m tall. Stems slightly 4-angled, sulcate, 2-fariously puberulent to subglabrous. Leaves simple, glabrous or sparsely pubescent; leaf blade lanceolate, ovate-elliptic to oblong or ovate-cordate, 4-20 × 2-10 cm, membranous, both surfaces glabrous or slightly pubescent, valvet haiary on nerves beneath, secondary veins 6-8; base attenuate and decurrent onto petiole, uppermost pair of leaves almost stalkless with a nearly heart-shaped base, margin entire to sinuate-crenate to subdentate, apex acuminate; petioles 0.5-5.0 cm long. Inflorescences terminal, spikes or racemes, unbranched or with one or more basal branches



Fig. 1a: *Asystasiella neesiana* (Wall.) Lindau.



Fig. 1b: *Asystasiella neesiana* (Wall.) Lindau a) Flowering shoot; b) petal with stamen; c) open fruit; d) pistil with sepal; and e) seed.

forming a panicle, 6-15 cm long; rachis usually gland-tipped pubescent; bracts and bracteoles triangular, 1-2 × 0.8-1.0 mm, minutely pubescent. Pedicel 1-3 mm long. Calyx 4-7 mm long; lobes linear-lanceolate, usually gland-tipped pubescent. Corolla pink to purplish blue, 4-6 cm long, outside gland-tipped pubescent; tube with cylindric basal portion narrow, elongate, 3-4 cm long; lobes of lower lip ovate, 4-6 × 6-8 mm; lobes of upper lip suborbicular, about 5-7 × 5-7 mm. Stamens with longer pair c. 5 mm long, shorter pair about 2 mm long; anther thecae subequally inserted. Style 3.6-5.2 cm long, glabrous. Capsule 2-3 cm long, gland-tipped pubescent, 4-seeded in the upper parts, basal stalk 1.0-1.5 cm. Seeds ovate in outline, about 4 × 3 mm, compressed.

Flowering and fruiting: July - November.

Ecology: Moist places, stream sides and forest trails in evergreen forests.

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

Specimen examined: **Sylhet:** Khadimnagar National Park, 17 x 2020, M. Sultana & M.S. Rahman, DMS 3241(DACB 67095).

Use: Leaves are used as vegetables and also have medicinal use.

2. ***Cissampelos glaberrima*** A.St.-Hil., Fl. Bras. Merid. 1: 57. 1825.

(Figs. 2a & 2b)

Menispermaceae

Cissampelos clematidea C.Presl, Abh. Königl. Böhm. Ges. Wiss., ser. 5, 3: 437. 1845.

Cissampelos errabunda Miers, Contr. Bot. 3: 138. 1871.

Cissampelos galapagensis A.Stewart, Proc. Calif. Acad. Sci., ser. 4, 1: 66. 1911.

Cissampelos glaberrima var. *orbicularis* Chodat & Hassl., Bull. Herb. Boissier, sér. 2, 3: 421. 1903.

Cissampelos parmata Miers ex Diels, H.G.A.Engler (ed.), Pflanzenr., IV, 94: 298. 1910.

Cissampelos parriera Vell., Fl. Flumin. 10: t. 138. 1829.

Cissampelos glaberrima St. Hil. in Fl. Bras. Merid. 1:46. 1825.

Climbers, up to 3 m long. Stems striate, glabrous. Leaves petiolate, conspicuously peltate to 20 mm, broadly ovate to suborbicular, 3-8 × 3-7 cm, base truncate to rounded, apex acute to rounded, mucronate, margin entire to crenate, membranous, palmately 5-12 nerved, conspicuous below, glabrous, dark green above, silvery and sometimes glaucous below; petioles 2-6 cm long, glabrous or rarely pilose. Male inflorescence multi-flowered fasciculate dichasia arranged in an ebracteate racemiform manner, up to 10 cm long or as cymose clusters axillary from normal leaves or rarely cymose clusters within the axils of reduced leaves or bracts of secondary axillary branches; 1-2 dichasia per fascicle; peduncle 2 cm long, glabrous or rarely pilose; bracts of secondary branches large and foliaceous, basifixed, broadly ovate to cordate, entire to undulate, 4-13 × 5-15 mm, membranous, glabrous, petiole 0-8 mm long; bracteoles linear, about 0.5 mm long, glabrous. Male flowers white or greenish: sepals 4, elliptic to obovate, 1.0-1.7 × 0.7-0.9 mm, glabrous; corolla cupuliform, 0.5-0.9 × 0.5-1.0 mm, rarely patelliform, glabrous; synandrium 0-0.8 mm high, anthers 4, glabrous. Female inflorescence composed of individual flowers fasciculate in axils of bracts upon racemiform secondary bracteate axillary branches to 15 cm long; 1-2 flowers per fascicle; bracts large and foliaceous, often silvery and terminally grouped, basifixed, sessile or petiolate to 10 mm long, reniform, cordate or broadly ovate, entire to undulate, mucronate, 3-18 × 3-6 mm, membranous, glabrous. Female flowers: sepal 1, elliptic to obovate, 1.4-1.8 × 0.8-1.0 mm, glabrous; petal 1, reniform to deltoid, 0.6-0.8 × 0.8-1.0 mm, glabrous; carpel 1, slightly gibbose, 0.8-1.1 mm long, sessile, glabrous, stigma 3-lobed. Drupe red, obovoid, 4-5 × 3-4 mm, glabrous, rarely puberulent, sometimes glaucous; fruiting stalk 3-4 mm long.



Fig. 2a: *Cissampelos glaberrima* A.St.-Hil.



Fig. 2b: *Cissampelos glaberrima* A.St.-Hil.: a) Flowering shoot; b) fruiting shoot; c) staminate flower; d) pistillate flower; and e) seed.

Flowering and fruiting: August- October.

Ecology: Trailing over shrubs or rocks in open areas or at edges of thickets and woodlands.

Distribution: Brazil, Bolivia, Colombia, Costa Rica, Cuba, Ecuador, Guatemala, Jamaica, Madagascar, Martinique, Paraguay, Peru, Puerto Rico and Venezuela.

Specimen examined: Sylhet: Khadimnagar National Park, 19 x 2020, M.Sultana and M.S. Rahman, DMS 3437(DACB 670); 23 ix 2021, M. Sultana *et al.*, DMS 4072 (DACB 67096).

Use: This species is used medicinally.

3. *Euonymus laxiflorus* Champ. *ex* Benth., Hooker's J. Bot. Kew Gard. Misc. 3: 333. 1851.

(Fig. 3a & 3b).

Celastraceae

Euonymus crosnieri H.Lev.& Vaniot, Bull. Soc. Bot. France 51: 146. 1907.

Euonymus cuspidatus Loes., Notizbl. Königl. Bot. Gart. Berlin 3: 77. 1900.

Euonymus forbesianus Loes., Bot. Jahrb. Syst. 30: 457. 1902.

Euonymus incertus Pit., Fl. Indo-Chine 1: 874. 1912.

Euonymus paniculatus Wight *ex* M.A.Lawson, Fl. Brit. India 1: 609. 1875.

Euonymus pellucidifolius Hayata, Icon. Pl. Formosan. 3: 57. 1913.

Euonymus rostratus W.W.Sm., Notes Roy. Bot. Gard. Edinburgh 10: 36. 1917.

Euonymus rubescens Pit., Fl. Indo-Chine 1: 875. 1912.

Euonymus vaniotii H.Lév., Repert. Spec. Nov. Regni Veg. 13: 259. 1914.

Masakia pellucidifolia (Hayata) Nakai, J. Jap. Bot. 24: 11. 1949.

Shrubs, 2-4 m tall. Branches glabrous, greenish gray, terete, twigs greenish, 4-angled or striate when dry. Leaves opposite, simple, exstipulate; leaf blade elliptic-obovate or ovate, 6-10 × 2.5-3.5 cm, base attenuate, margin quite entire or with a few crenatures, apex caudate or obtusely-acuminate; leathery, smooth, shiny, lateral veins unclear or invisible; petiole 3-8 mm long. Inflorescence axillary or supra-terminal cymes, lax, dichotomously branched with about 7 flowers together; peduncle slender, 2.0-3.5 cm long; pedicel 6-10 mm long. Flowers 5-merous, scarlet, c. 8 mm in diameter. Sepals semi-orbicular, imbricate, red. Petals 5, scarlet, sub-orbicular, margin crenate, wavy. Stamens 5, filaments very short, alternate to petals, inserted on disc; anthers yellow. Disc large, 4-5-lobed, fleshy, flat, green. Ovary sunk in the disc; style short, thick; stigma 3-5 lobed, ovule 2, in each locule, erect. Capsule obovoid, base attenuate, 5-angled and grooved, pinkish or reddish when fresh, brown or yellow-brown to red-brown when dry, 8-10 × 7-9 mm. Seeds ovoid, dark brown, partially covered by orange aril.

Flowering & fruiting: March-November.

Ecology: Evergreen forests, scrubs, along water courses; between 300-500 m altitude.

Distribution: Cambodia, China, India, Japan, Laos, Malaysia, Myanmar, Nepal, Taiwan and Vietnam.

Specimen examined: Moulvibazar: Madhabkundo Eco-park, Barolekha, 18 vii 2009, S.N. Uddin, N-5253 (DACB 43670).

Use: Plant can be used for ornamental purposes.



Fig. 3a: *Euonymus laxiflorus* Champ. ex Benth.



Fig. 3b: *Euonymus laxiflorus* Champ. ex Benth.: a) Flowering shoot; and b) flower.

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