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DISCOVERY OF THREE NEW ANGIOSPERM RECORDS FOR BANGLADESH FROM JURI FOREST RANGE-1 UNDER MOULVIBAZAR DISTRICT

SARDER NASIR UDDIN[1], MD. EMDADUL HAQUE KHOKAN, BUSHRA KHAN AND KHANDAKAR KAMRUL ISLAM

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

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Abstract

This paper deals with three angiosperm new records for Bangladesh from Juri Forest Range-1 under Moulvibazar district. They are: *Embelia parviflora* Wallich *ex* A. de Candolle, *Sarcopyramis napalensis* Wallich and *Staurogyne simonsii* (T. Anders.) O. Kuntze. Among these three genera, *Sarcopyramis* Wallich is a new genus record for the country also. Updated nomenclature, important synonyms, description, ecology, geographical distribution and photographs are provided for each species.

Introduction

Since 1970, Bangladesh National Herbarium (BNH) has been involving in floristic survey of the country (*i.e*. Khan and Hassan, 1984; Huq, 1988; Mia and Huq, 1988; Khan *et al*., 1994; Uddin *et al.*, 1998; Uddin and Rahman, 1999; Khan and Huq, 2001; Rashid and Mia, 2001). These are reports of description, relatedness and occurrence of various species in different areas and thus contributing toward the completion of floristic survey of the country. Conducting floristic survey of an area/forest/ecosystem maximizes the likelihood of locating new species/records and special plant species that may be present. Recently a number of new species and new records were added to the list of Bangladesh flora (*i.e*. Uddin and Hassan, 2009; Khatun *et al.*, 2010; Alfasane *et al.*, 2010; Mia *et al.*, 2011; Rahman *et al*., 2011; Uddin *et al*., 2012; Ara and Hassan, 2012; Rahman and Yusuf, 2012 and 2013; Rahman *et al*., 2014). Thus the plant list of the country is being constantly updated with more exploration and discovery of new species. Still now, many areas/forests/ecosystems of Bangladesh remain floristically unexplored. To complete the floristic survey of the country, BNH has under taken a number of floristic survey programs at different forest areas of the country as its routine work and Juri forest range is one of them.

Juri forest range is located in the North-eastern part of Bangladesh under Juri Upazila of Moulvibazar district and the area is managed by the Sylhet Forest Division. It lies between 24°32'56"-24°44'29" N and 92°12'01"-92°16'53" E. Previously, it was a part of Hararganj reserve forest. It is bounded by India on the East, Golabganj and Beanibazar Upazillas on the North, Kulaura Upazilla on the South. Kulaura and Fenchuganj Upazillas on the West. It has an area of 6844.67 ha and consists of four forest beats namely Lathitila (2278.28 ha), Putichara (1368.01 ha), Shagarnal (1700.4 ha) and Ragna (1497.98 ha). The area enjoys a moist tropical climate characterized by a period of high precipitation from April to September and five months of relatively dry period from November to March. Average annual precipitation is 3334 mm and average temperature varies between 33.2°C - 13.6°C (Ibrahim *et al*., 2012). The topography of the area is mostly undulating with medium to steep slopes and hillocks of different elevations (10-100 m above the sea level), valleys, ridges, and water courses. The soils of the area are clay-loam on level ground to sandy-loam on hill slopes of upper tertiary origin.

[1]Corresponding author. E-mail: nsarder@yahoo.com

Juri is a biodiversity-rich primary forest in Bangladesh. Sarker *et al*. (2014) reported 146 vascular plant species (including 78 tree species) belonging 122 genera under 66 families from the area. The forest is generally classified as tropical semi-evergreen forest. The top canopy of the forest consists of a number of tall tree species (i.e. *Dipterocarpus turbinatus, Tectona grandis, Artocarpus chaplasha, Tetrameles nudiflora, Hopea odorata, Dillenia pentagyna, Lophopetalum fimbriatum, Pygeum acuminatum, Lagerstroemia speciosa,* and *Ficus variegata*) and the middle canopy consists of a number of evergreen tree species (i.e. *Elaeocarpus floribundus, Quercus spicata, Castanopsis tribuloides, Chukrassia tabularis, Ficus racemosa, Toona ciliata, Aphanamixis polystachia, Xylia dolabiformis*). Under the shade of the middle canopy a luxurious growth of herb, shrub, bamboo, epiphyte and climbers are seen.

The main goal of this floristic survey was to discover new plant species for the country and floristic novelties within the area. This report describes the methods and results of floristic surveys conducted on Juri forest range-1 by the authors.

Materials and Methods

Floristic survey was conducted by the authors at different seasons between the years 2013 and 2014. The areas were surveyed by walking along the forest trails and springs (*charas*) to record all species encountered. At least one set of voucher specimen of each different species encountered in flowering condition was collected and preserved at BNH. Collection of voucher specimens were conducted in a manner that is consistent with conservation ethics. Location, date, habit and any other notable ecological characteristics were recorded at each collection. Both fresh materials and herbarium specimens were studied. All available taxonomic resources *viz.* literatures, herbarium specimens and botanical illustrations were taken under consideration to identify the species. Digital imagery of the species was also used to supplement plant identification and document their habitats. The new records are based on 20 specimens and all of them are deposited at DACB after labeled properly.

Results and Discussion

About five hundred plant specimens were collected from the areas by the authors in the course of the taxonomic study during the period of 2013-2014. In the process, three angiosperm species were encountered for which no herbarium specimens had ever been collected from the country. Later on, those species have been identified as *Embelia parviflora* Wallich *ex* A. de Candolle, *Sarcopyramis napalensis* Wallich and *Staurogyne simonsii* (T. Anders.) O. Kuntze. Among these three genera, *Sarcopyramis* Wallich is also a new genus record for the country. Three specific taxa in the following list belong to 3 genera and 3 families. Those species are being described here to be new report for Bangladesh as they have never been mentioned in any publication on the flora covering the present territory of Bangladesh *viz.* Clarke, 1879, 1882, 1884 & 1885; Prain, 1903; Heinig, 1925; Kanjilal *et al*., 1938 & 1939; Sinclair, 1956; Alam, 1988; Mia and Khan, 1995; Rahman 2004a & 2004b; Islam and Hossain, 2009; Begum *et al*., 2008; Rahman, 2009.

Detailed taxonomic accounts including photographs of all the species is given below and entries are arranged in alphabetical order.

1. Embelia parviflora Wallich *ex* A. de Candolle, Trans. Linn. Soc. London 17: l30. l834. (**Fig. 1**)

Myrsinaceae

Embelia myrtifolia Hemsley & Mez, Notizbl. Bot. Gart. Berlin, 3: 107. 1900.

Embelia pulchella Mez, Engl. Pflanzenreich, Myrsin. IV, 236: 324. 1902.

Ribesiodes parviflorum (Wallich *ex* A. de Candolle) Kuntze, Rev. Gen.: 403. 1891.

Samara parviflora (Wallich *ex* A. de Candolle) Kurz, Journ. As. Soc. Beng. 46, II: 223. 1877.

Scandent shrubs or small trees, up to 4 m tall; branchlets terete, 2.5-3.0 mm in diameter, densely rusty tomentose, sparsely lenticellate, glandular, branchlets and leaves bifarious. Leaves ovate, ovate-oblong or elliptic, 1.2-2.5 × 0.6-1.2 cm, base broadly rounded to truncate or cordate, apex obtuse or rounded, margin entire, papery, glossy, glabrous adaxially, sparsely red punctate near apex, villous or scaly beneath, midrib impressed above, lateral nerves inconspicuous; petiole canaliculate, 0.5-1.0 mm long, rusty tomentose. Inflorescences axillary, male usually cymose, 8-15 mm long, 1-4(-6) flowered; female usually subumbellate, 4–8 mm long, 2-5-flowered; bisexual fasicled, 3-5 mm long, 3–8-flowered, pendulous; bracts lanceolate to subulate, 0.5-1.0 mm long, red punctate, densely villous. Flowers white or greenish white, 5-merous, membranous, 1.5-3.0 mm diameter. Pedicel 0.5-8 mm long. Sepals ovate or oblong, densely red punctate, glabrous

Fig. 1 *Embelia parviflora* Wallich *ex* A. de Candolle.

except sparsely villous basally, margin entire, glandular ciliate. Petals free, ovate, lanceolate, or oblong, papery, glabrous outside, red or black punctate, densely red glandular granulose inside, margin glandular ciliate, apex obtuse or emarginate. Stamens slightly longer than petals in staminate flowers, anthers broadly ovate to lanceolate, base cordate, apex acute or slightly emarginate, connective densely black punctate. Style sparsely glandular papillate basally, stigma capitate, 4-lobed. Fruit globose, 3-5 mm in diameter, greenish-white, red in ripening, black when dry, punctate-lineate. Flowering and fruiting: May-November.

Ecology: Dense mixed forests, evergreen broad-leaved forests, shrubby areas, hillsides, humus-rich soil, shady places; up to 600 m altitude.

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

Specimen examined: **Moulvibazar**: Lathitilla Forest Beat, Juri Forest Range, 22 ix 2014, S.N. Uddin N5620 (DACB).

Note: Embelia Burm. f. is a genus of about 140 species mainly distributed in Africa, SE Asia, Australia and the Pacific Islands (Jie and Pipoly, 1996). From Bangladesh, Islam and Hossain (2009) listed four species (*viz*. *Embelia nutans* Wallich, *Embelia ribes* Burm. f., *Embelia robusta* Roxb. and *Embelia tsjeriam-cottam* (Roem. & Schult) A. DC.) under the genus.

2. Sarcopyramis napalensis Wallich, Tent. Fl. Napal. 32. 1824. **(Fig. 2)**

Melastomataceae

Phyllagathis chinensis Dunn, J. Linn. Soc. Bot. 38: 360. 1908.

Sarcopyramis dielsii Hu, Bull. Fan Mem. Inst. Biol. Peiping, Bot. Ser. 7: 216. 1936.

Sarcopyramis lanceolata Wallich *ex* Bennett, Cat. n. 6290.

Erect herbs, 10-40 cm tall, branched. Stems 4-sided, succulent, glabrous. Petiole 1.2-2.8 cm long, narrowly winged; Leaves opposite, unequal, leaf blade broadly ovate, or rarely sublanceolate, 5-10 × 2.5-4.5 cm, membranous, abaxially puberulous or glabrescent, purple, adaxially sparsely strigose and with or without white spots, dark green, secondary veins 1 or 2 on each side of midvein, base cuneate to subround and slightly decurrent, margin serrulate, apex acuminate. Inflorescences terminal cymes, nearly capitate, 1-3-flowered, with 2 bracts at base;

Fig. 2. *Sarcopyramis napalensis* Wallich.

bracts subsessile, foliaceous, ovate. Pedicel 2-6 mm, 4-sided, narrowly winged on angles. Hypanthium cupular to cupular-funnelform, ca. 5 mm diameter, 4-sided, narrowly winged on angles. Calyx lobes 4, apex of calyx lobes truncate and with a membranous disk, disk margin fimbriate. Petals 4, pink, obovate, ca. 7 mm long, oblique, apex truncate. Stamens 8, equal; anthers obcordate or obcordate-elliptic, dehiscience poricidal; connective decurrent, forming a short spur or minute bulge. Ovary inferior, 4-celled, apex with a membranous crown, crown margin repand. Capsule cup-shaped, 4-sided, 4-poricidal, membranous crown exserted from hypanthium. Seeds small, numerous, long obovate, densely papillose tuberculate. Flowering and fruiting: August-January.

Ecology: Evergreen forests, streamsides, shaded damp places; 400-600 m altitude.

Distribution: Bhutan, India, Nepal, Myanmar, Thailand, China, Indonesia, Malaysia and the Philippines.

Specimen examined: **Moulvibazar**: Lathitilla Forest Beat, Juri Forest Range, 01 xii 2014, MEH Khokan & K.K. Islam, EHK202 (DACB).

Note: Sarcopyramis Wallich is a genus of 2 species distributed in Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, Philippines and Thailand (Chen and Renner, 2007). From Bangladesh, no species under the genus is reported so far.

3. Staurogyne simonsii (T. Anders.) O. Kuntze, Rev. Gen.: 497. 1891. (**Fig. 3**)

Ebermaiera simonsii T. Anders., Journ. Linn. Soc. ix. 451. 1867. **Acanthaceae**

A stout, erect herb or undershrub, up to 20 cm high, stem villous upwards. Leaves opposite, simple, blades elliptic to oblong-lanceolate, 12-18 × 4-8 cm, apex acute to obtuse, base cuneate to attenuate, margins entire, membranous to subcoriaceous, upper surface green, sparsely hairy or finally glabrate, lower surface paler, densely brown pupescent on veins, nerves 11-16 pairs, prominent beneath; petiole 4-14 cm long, densely brown tomentose. Inflorescence from terminal or in axils of apical leaves, racemes sparingly branched or laxly paniculate, 5-10 cm long, white-hairy, many flowered; bracts linear, 1.0-1.3 cm long; bracteoles linear, ca. 9 mm. Flowering pedicels 3-4 mm long. Sepals 5, linear, 1.0-1.4 cm long, covered with glistening white hairs.

Fig. 3. *Staurogyne simonsii* (T. Anders.) O. Kuntze.

Corolla tube cylindric, 1.0-1.2 cm long, apically expanding into a campanulate throat, limb sub-actinomorphic to 2-lipped, 5-lobed, lobes subequal, patent, descending cochlear in bud, nearly glabrous. Stamens 4, didynamous, included or anterior pair slightly exserted, filaments usually hairy, anthers 2-thecous, thecae parallel, usually equal, staminode 1, sometimes absent. Ovary with usually 12-40 ovules arranged in 2 rows per locule, style glabrous, stigmas 2-lobed, sometimes repeatedly 2-lobed. Capsules oblong, 6-7 mm long, many seeded. Seeds minute, cuboid. Flowering and fruiting: August-October.

Ecology: In primary hilly forest, near water courses, on sandy soils; up to 800 m altitude.

Distribution: India (Khasi and Jaintia Hills).

Specimen examined: **Moulvibazar:** Lathitila Forest Beat, Juri Forest Range; 22 ix 2014, S.N. Uddin & MEH Khokan, N5619 (DACB).

Note: Staurogyne Wallich is a genus of about 140 species distributed in tropical regions worldwide (Deng *et al.*, 2011). From Bangladesh, Begum and Hassan (2008) listed seven species under the genus.

This study added three new and rare plants like *Embelia parviflora* Wallich *ex* A. de Candolle, *Sarcopyramis napalensis* Wallich and *Staurogyne simonsii* (T. Anders.) O. Kuntze to the flora of Bangladesh. The significance of such field research is the detection of novel additions to a floristic region, which subsequently improve our understanding of plant biogeography as well as species diversity of the country. The purpose of the survey was to gather data on the floristic and ecological diversity of the area, which can be used by the Forests Department for the management and conservation of biodiversity for the Juri Forest Range.

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