Vegetos
https://doi.org/10.1007/s42535-024-01011-1

RESEARCH ARTICLES

Two new distributional records to the flora of Odisha, India

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Received: 26 February 2024 / Revised: 30 July 2024 / Accepted: 3 August 2024

Abstract
During the floristic survey in Ganjam and Gajapati districts of Odisha, two species, namely *Ipomoea rubens* Choisy of Convolvulaceae and *Trigastrotheca stricta* (L.) Thulin of Molluginaceae, were collected and identified, which forms a new report to the Flora of Odisha, India. Detailed descriptions, phenology, and distribution along with a coloured plate, are provided for easy identification.

Keywords Convolvulaceae · Eastern Ghats · Ganjam · Gajapati · Mahendragiri hills · Molluginaceae

Introduction

As per the mandate of the Botanical Survey of India, Ministry of Environment, Forests, and Climate Change, the authors carried out regular floristic surveys in Odisha. Due attention was paid to surveying the southern districts of Odisha (Ganjam being one of the coastal districts and Gajapati, floristically the under-explored district) in the first phase. Both of these districts are very rich and diverse in flora, including coastal aquatic plants. During the survey, the authors collected two interesting flowering plant specimens from the coastal area of Ganjam district and Eastern Ghats of Gajapati district. After a critical study, these two species were identified as *Ipomoea rubens* Choisy (Convolvulaceae) and *Trigastrotheca stricta* (L.) Thulin (Molluginaceae). Scrutiny of literature (Swamy and Ramana 2018; Ravi et al. 2023) revealed that *Ipomoea rubens* is distributed in Andhra Pradesh, Assam, Telangana, and West Bengal, while *Trigastrotheca stricta* is distributed in Kerala, Maharashtra, and Tamil Nadu (Sivarajan and Usha 1983; Vajravelu and Arisdason 2020). However, these species have not been reported from Odisha (Saxena and Brahmam 1995; Vajravelu and Arisdason 2020). Hence, the present collections are noteworthy and reported here as new distributional records for the flora of Odisha state. Detailed descriptions, phenology, distribution, and coloured photographs are provided to facilitate identification. Voucher specimens were deposited at the Botanical Survey of India, Deccan Regional Centre (BSID), Hyderabad, Telangana, and the Department of Botany, Andhra University, Visakhapatnam, Andhra Pradesh.

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Taxonomic treatment

Ipomoea rubens Choisy, Mem. Soc. Phys. Genève 6(2): 463. 1833. *Convolvulus rubens* Wall., Numer. List [Wallich] n. 1421. 1829. *Lettsomia rubens* C.B. Clarke in Hook.f., Fl. Brit. India 4: 195. 1883. *Pharbitis fragrans* Bojer, Hortus Maurit. 227.1837. *Ipomoea fragrans* Bojer ex Choisy in DC., Prodr. 9: 341, 393. 1845. (Fig. 1: A-D).

Climbers, up to 15 m high. Stems are hollow, terete, striate when dry, and densely velutinous. Leaves simple, alternate, broadly ovate, 6–12 × 4–9 cm, deeply cordate with rounded auricles at base, entire along margin, acuminate with mucronulate tip at apex, upper surface minutely tomentose when young, become glabrescent when mature, lower surface sericeous/grey-tomentose; lateral nerves 7–9 pairs; petiole 4–6 cm long, slender, striate, densely covered with silky hairs. Inflorescence axillary formed of 2–10-flowered cymes; cymes sub umbellate; peduncles 4–9 cm long, secondary peduncles up to 8 mm long,

Published online: 22 August 2024

Fig. 1 Ipomoea rubens Choisy (A-D). **A**. Habit, **B**. Inflorescence, **C-D**. Flowers. Trigastrotheca stricta (L.) Thulin (E-I). **E**. Habit; **F**. Flowering Branch; G-H. Both views of flower; I. Seeds

densely covered with silky hairs; pedicels 5–12 mm long. Flowers pink with dark at centre, 4–4.5 cm long. Bracteoles linear, 2.5–3 × 0.4–0.6 mm, fall off before anthesis, outer side covered with long soft hairs, glabrous inner side. Sepals slightly unequal, connate at base; outer sepals elliptic-oblong, ca. 9 × 3 mm, acute at apex; inner sepals ovate-elliptic, somewhat broader than the outer ones, 7–8 × 3–4 mm, acute or obtuse at apex; both the sepals covered with long soft hairs above, sparsely pubescent on veins beneath. Corolla funnel-shaped, pink with dark centre, 4–6 cm long; tube 2.5 cm long; limb 5–6 in diam., covered with fine silky hairs apically. Stamens 5, unequal, 9.5–18 mm long, included; filaments 7–14 mm long, dilating and hairy at base, glabrous above; anthers 4 mm long, cordate at base, subacute at apex; tail 8–9 mm long. Ovary 1–1.2 × 0.8–1 mm, 2-celled, glabrous; style

slender, 1.2–1.5 cm long, glabrous; stigma bilobed; lobes globose, unequal. Capsule globose with persistent style, 1.5–1.8 mm in diam., enclosed by sepals, glabrous, 4-seeded. Seeds are dull black, ca. 6 × 4.5 mm long, and pilose.

Floral formula: Br Brl ⊕ ☿ K5 C(5) A5 G(2).

Flowering and Fruiting: December-March

Distribution: Bangladesh, India (Andhra Pradesh, Assam, Telangana, and West Bengal), Odisha (present collection), Thailand, Vietnam, Indonesia, the Philippines, tropical America, and tropical Africa, including Madagascar.

Habitat: Occasional in fresh water swamps near the coast; associated with *Colocasia esculenta* (L.) Schott, *Cordia dichotoma* G. Forst, *Combretum albidum* G. Don, *Glochidion zeylanicum* (Gaertn.) A. Juss., and *Pandanus odorifer* (Forssk.) Kuntze.

Specimens examined: ODISHA, Ganjam district, Chhatrapur, Krishna Nagar, 11.02.2024, *Pragada Venkata Ramana* & *V. Jalander* 395 (BSID, AUH).

Trigastrotheca stricta (L.) Thulin in Taxon 65(4): 784. 2016. *Mollugo stricta* L., Sp. Pl., ed. 2.: 131.1762; Sivarajan & Usha in Taxon 32 (1): 123–124. 1983; Vajravelu & Arisdason in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 1: 602. 2020. *Mollugo pentaphylla* var. *stricta* (L.) Hochr. in Candollea 2: 356. 1925. *Pharnaceum strictum* (L.) Spreng. in Syst. Veg., ed. 16. 1: 949.1824. (Fig. 1: E-I).

Annuals, slender, erect, ascending, small herbs, up to 30 cm high. Stem minutely winged, angled, simple to branched, green in colour, glabrous, and dilated at nodes. Radicle leaves rosulate, oblanceolate-spathulate; cauline leaves in pseudowhorles of 3, seldom 1–5; stipules lanceolate, acute, minute, membranous; blades sessile, 1.5–3.0 × 0.01–0.03 cm, attenuate at base, lanceolate to linear- narrowly elliptic, margin entire, acute to apiculate at apex, glabrous and punctate on both sides, midrib prominent on beneath, shallowly grooved towards upper surface, lateral veins obscure. Inflorescence leaf-opposed or terminal; peduncle 1–2 cm long, slender, minutely angled; pedicles of the flowers 1–1.5 mm long. Flowers bracteate, pale green in colour, and persistent. Tepals 5, oblong, elliptic, creamy on the inner side, pale green on the outer side, persistent. Stamens 3, 0.5 mm long, persistent; filaments filiform, dilated at base; anthers white. Ovary broad ellipsoid to rotund, wall thin and membranous, 3-loculed; styles three, linear, short, persistent; discnot present. Capsule sub-globose, as long as persistent tepals, wall thin, membranous, tardily loculicidal dehiscent with three valves. Seeds: 3–5 per locule, orbicular-reniform, papillose, and chestnut brown.

Flowering formula: Br ⊕ ☿ P5 A3 G(3).

Flowering & fruiting: July to September.

Habitat: Occasional on foot hills of Eastern Ghats. It is associated with *Spermacoce articularis* L.f. and *Trigastrotheca pentaphylla* (L.) Thulin.

Distribution: India: Kerala, Maharashtra, Tamil Nadu (Sivarajan and Usha 1983; Vajravelu and Arisdason 2020), Odisha (present collections). Widespread in tropical and subtropical Asia and Australia, it also occurs as an occasional introduction in Africa and South America (Thulin et al. 2016).

Specimens examined: India, Eastern Ghats, Odisha, Gajapati district, way to Mahendragiri Hills, between Gangabadi and Kainapur, 18°56′ 04.8″ N,84° 21′ 40.0″ E, 15.10.2023, *Pragada Venkata Ramana* 359 (BSID, AUH).

Conclusion

The study revealed that both the Ganjam and Gajapati districts falling under the Eastern Ghats of India have potential and biodiversity points of view that are very rich, warranting further extensive as well as intensive studies. The possibilities of getting new species or species so far not reported from the state of Odisha are very high and can't be overcome. Hence, there is a need for further explorations.

Acknowledgements The authors are thankful to the Director, Botanical Survey of India (BSI), and Scientist in-Charge, AJC Bose Indian Botanic Garden, BSI, Howrah, for facilities, support, and encouragement.

Declarations

Conflict of interests The authors have no competing interests to declare that are relevant to the content of this article.

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