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Short communication

Hygrophila madurensis (N.P. Balakr. & Subram.) Karthik. & Moorthy: An overlooked endemic species of Tamil Nadu, India

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INTRODUCTION

The family Acanthaceae is positioned under the order Lamiales and belong to the core class Euasterids I of Core Eudicots (Chase & Reveal 2009). According to the recent estimate (Karthikeyan *et al*. 2009) 593 Acanthaceae taxa (475 species and 118 varieties) are present in India. The genus *Hygrophila* R.Br. belongs to the tribe Ruellieae of family Acanthaceae (Scotland & Vollessen 2000) and comprises about 100 species (Hu & Daniel 2011). India is known to have 18 species (Karthikeyan *et al*. 2009, Sunojkumar & Prasad 2014), of these *H. madurensis* and *H. thymus* are endemic to Tamil Nadu (Singh *et al*. 2015, Kottaimuthu *et al.* 2018).

During the course of our recent studies on the wetland plants of Madurai District, we have collected an interesting species of Acanthaceae that is characterized by distinctly pedicellate flowers, pedunculate cymes and linear–oblong capsules. Critical studies with pertinent literature; it is identified as *Hygrophila madurensis* (N. P. Balakr. & Subram.) Karthik. & Moorthy (Balakrishnan & Subramanyam 1963, Balakrishnan 1988, Raja *et al.* 2015). A perusal of literature revealed that this species is listed as critically endangered and endemic to Tamil Nadu, found along the foothills of the Eastern Ghats (Balakrishnan 1988, Nayar 1996, Walter & Gillett 1998, Reddy *et al*. 2006, Arisdason 2011). However, this species was not included in Acanthaceae of Eastern Ghats (Pullaiah *et al*. 2011). A detailed description, photographs, associated species and threat status are provided for easy identification and conservation of this little known endemic species.

Hygrophila madurensis (N. P. Balakr. & Subram.) Karthik. & Moorthy, Fl. Pl. India 22. 2009. Raja *et al*. in J. Threat. Taxa 7(9): 7582. 2015.

Santapaua madurensis N.P. Balakr. & Subram. in J. Indian Bot. Soc. 42: 411. 1963; G. R. Kumari in A. N. Henry, G. R. Kumari & V. Chithra, Fl. Tamil Nadu, Ind., Ser I: Analysis 2: 160. 1987; N. P. Balakr. in Red Data Book Indian Pl. 2: 7. 1988. **(Fig. 1)**

Herbs, 10–35 cm high; branchlets decumbent, arising from base; stems quadrangular, swollen at nodes. Leaves opposite, decussate, thin, membranous, glabrous, lanceolate or oblong–oblanceolate, base cuneate, margin minutely crenulate, acute or subacute at apex, lateral nerves 5–7 pairs, prominent below; rhaphides scattered on upper surface, petioles 2–3 mm long. Flowers in axillary open dichasial cymes becoming sympodial and unilateral, usually shorter than leaves; primary peduncle *ca.* 5 mm long; internodes *ca.* 3 mm long; bracts linear, acute, 2–5 mm long; pedicels *ca.* 1 mm long. Calyx 5 lobes, free, sub equal, linear, acute, 4–5×1 mm. Corolla purple, bi-lipped, 5–10 mm long; tube funnel-shaped, broad, pubescent inside; upper lip bifid, emarginate, lobes rounded; lower lip trifid, lobes obtuse, rounded. Stamens 4, didynamous; filaments linear, filiform, glabrous, 2–4 mm long; anthers oblong, ellipsoid, 1.0–1.3 mm long. Ovary pubescent, oblong or oblong–ellipsoid, 2 mm long, 2-celled with many ovules; style linear, 4mm long, hairy; stigma simple. Capsules linear-oblong, flat, sessile, 6–8 mm long; seeds bearing throughout the length of the capsule; retinacula minute, conical, straight, slender. Seeds 20–40, small, ellipsoid or ovoid–ellipsoid, compressed, 107.5–108.6 × 163.24 – 164.34 µm, glandular puberulous, when wet; hairs 24–27.61 µm long

Flowering & Fruiting: November to March.

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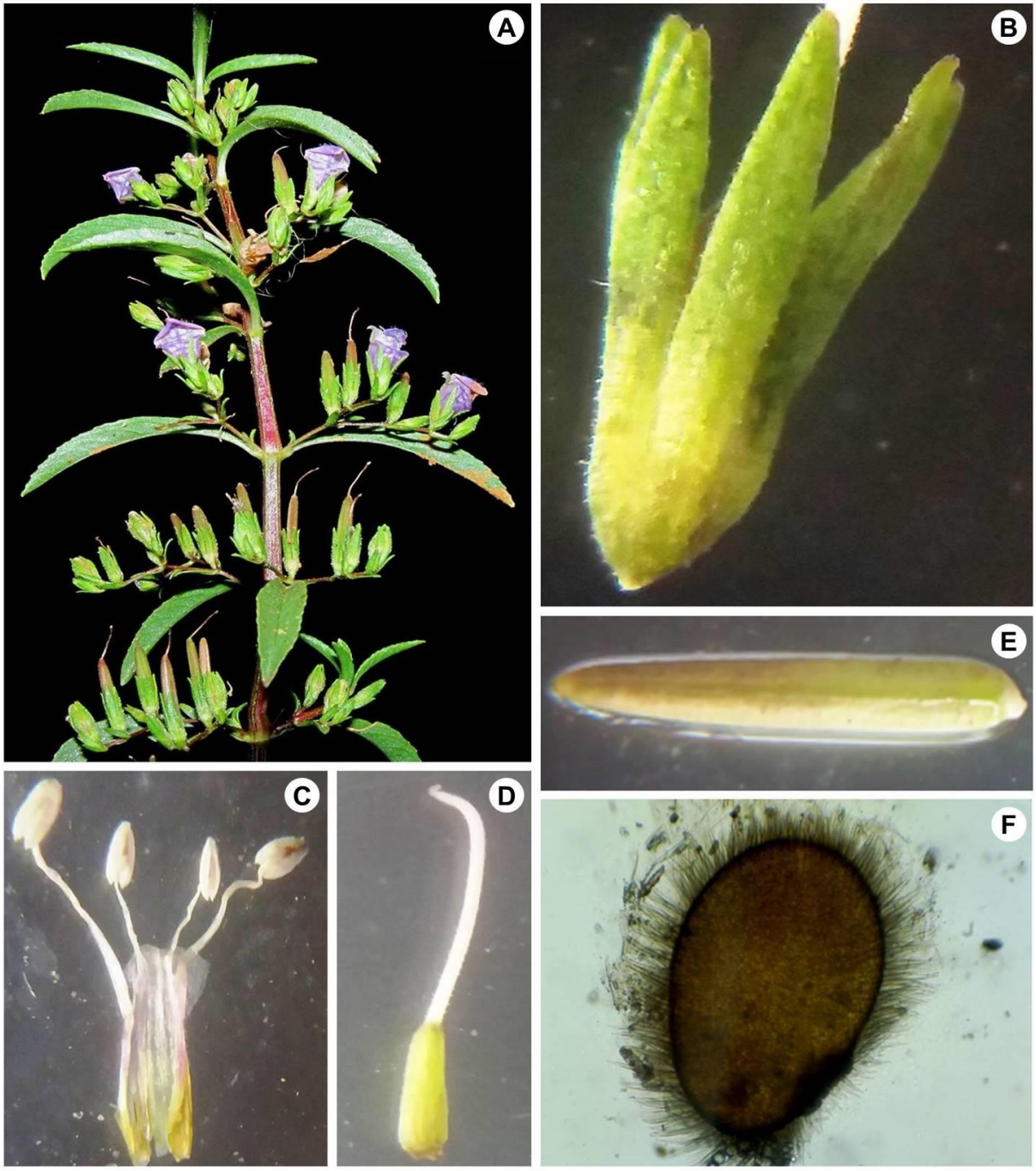

Figure 1. *Hygrophila madurensis* (N. P. Balakr. & Subram.) Karthik. & Moorthy: **A,** Flowering twig; **B,** Calyx; **C,** Stamens; **D,** Ovary; **E,** Capsule; **F,** Seed close up.

Specimens examined: INDIA, Tamil Nadu, Madurai Dis., 08.03.2018, *Sakkimangalam, Ayyankulam and C. P. Muthupandi 65* (Thiagarajar College Herbarium); 10.03.2018, *C. P. Muthupandi & R. Kottaimuthu 112* (Thiagarajar College Herbarium).

Distribution: INDIA (Tamil Nadu), Endemic.

Biotic Association: A single population of about 20 individuals were observed in the present locality and it is often associated with the following species, *Bergia ammannioides*, *Ludwigia perennis*, *Ammannia baccifera*, *Echinochloa colona*, *Vahlia dichotoma*, *Lindernia parviflora*, *Scoparia dulcis*, *Chloris barbata*, *Mollugo pentaphylla*, *Desmodium triflorum*, *Fimbristylis* sp., *Leptochloa* sp., *Ludwigia hyssopifolia*, *Prosopis juliflora*, *Coldenia procumbens*, *Euphorbia thymifolia*, *Cyanodon dactylon*, *Nothosaerva brachiata*, *Aeschynomene indica*, *Sphaeranthus indicus*, *Heliotropium indicum*, *Cyperus difformis*, *Phyllanthus maderaspatensis*, *Fimbristylis milliacea*, *Corchorus fascicularis*, *Epaltes divaricata* and *Eclipta alba*.

Nomenclature: *Hygrophila madurensis* was originally described by Balakrishnan & Subramanyam (1963) under the genus *Santapaua* as *Santapaua madurensis*. However, later authors (Heine 1962 & 1971, Cramer

1989 & 1998, Sidwell 1999), agreed to follow the broader generic concept and placed *Adenosma*, *Asteracantha*, *Cardanthera*, *Hemiadelphis*, *Nomaphila*, *Plaesianthera* and *Synnema* under *Hygrophila* and this was accepted in the classification of Acanthaceae (Scotland & Vollessen 2000). Following this broader concept, Karthikeyan *et al.* (2009) reduced the genus *Santapaua* into *Hygrophila*.

The type specimen was collected by K. Subramanyam near Nallakulam in Alagar Hills. Later Ravikumar (1993) relocated this species from the type locality and there after it was also collected by Arulappan in Narthamalai in Pudukkottai district (Balakrishnan 1988). Now the population becomes endangered due to narrow distribution and over-grazing in the natural habitat (Reddy *et al*. 2006).

CONCLUSION

The range extension of endemic species will provide a wealth of research opportunities for ecologists and conservation biologists in understanding the key drivers of endemism (Kottaimuthu 2017, Kottaimuthu *et al*. 2018). Hitherto this species is known only to very few locations. Hence, periodical assessment in all the known localities and searching for other sites of occurrence in Tamil Nadu is strongly recommended. Moreover, all the known population is prone to maximum human interference hence urgent conservation measures are recommended for *H. madurensis*.

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