



Hexasepalum teres (Rubiaceae): A potential New World invasive alien weed from Eastern Ghats

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Abstract

Hexasepalum teres (Walter) J.H.Kirkbr. (Rubiaceae), a Neotropical invasive weed, is reported here for the first time from Eastern Ghats. The occurrence of this species raises alarm of its rapid invasion.

Keywords: Eastern Ghats, *Hexasepalum teres*, invasive weed, Kolli Hills

Introduction

Introduction of plants is a primordial phenomenon that happened either with a purpose or accidentally. Many of the introduced species have either naturalized or have become invasive. Invasive alien species can be defined as, “A non-native species to the ecosystem or country under consideration that spreads naturally, interferes with the biology and existence of native species, poses a serious threat to the ecosystem and causes economic loss”. A total of 1226 alien species were recorded from Tamil Nadu, of which 200 species have been categorized as naturalized or potentially invasive. About 60% of these are introduction from the new world region (Narasimhan *et al.*, 2009).

Hexasepalum is a recent segregate genus from *Spermacoce-Diodia* complex which comprises *c.* 15 species (Kirkbride & Delprete, 2015; Cabaña Fader *et al.*, 2016; WCSP, 2018). This is a Neo-American genus except for *H. vaginale* which is restricted to the Atlantic coast of continental Africa (Cabaña Fader *et al.*, 2016). A few species of *Hexasepalum* have spread to other regions of the world and have naturalized or become invasive. *Hexasepalum teres* (Walter) J. H. Kirkbr. has been widely reported during the past two decades from tropical regions of Africa, Asia and Australia (Kirkbride, 2014; WCSP, 2018). However in India this alien weed has been reported about three decades ago by Ravi *et al.* (1989) and remained a very poorly known taxon.

During the floristic exploration in Kolli Hills, a hill range in southern Eastern Ghats of Tamil Nadu, authors collected an unidentified species of the family Rubiaceae. After critical study, the species was identified as *Hexasepalum teres*, an invasive alien weed. Here we provided an updated nomenclature, detailed description and a photo plate to facilitate identification for researchers and foresters.

Hexasepalum teres (Walter) J.H. Kirkbr., J. Bot. Res. Inst. Texas 8(1): 17. 2014. *Diodia teres* Walter, Fl. Carol. 87. 1788; Ravi *et al.*, J. Bombay Nat. Hist. Soc. 86 (2): 277. 1989. *Diodella teres* (Walter) Small, Fl. Lancaster Co. 271. 1913.

Type: UNITED STATES, South Carolina, Georgetown Co., Georgetown, old field, 24.08.1939, R.K. Godfrey & R.M. Tryon 1682 (Neotype designated by Ward, 2008. GH!; Isonotypes: NY, US!).

Fig.1

Annual herbs, stems erect or decumbent, branched, up to 45 cm high, scabrous with hirsute, woody. Leaves sessile or subsessile, blade linear, apex acute, base subcordate, margins scabrid-ciliate, apices with a prominent setae, 13–25 × 3–7 mm, scabrous; stipules, connate with petiole, bristly at apex; fimbriae 9–11, 4–6 mm long. Inflorescence axillary, 1–4 flowered. Flowers *c.* 5.5 × 3 mm, sessile. Calyx 4-lobed, glabrous to scabrous outside, persistent; lobes unequal, ovate - lanceolate, 0.6–1.5 × 0.3–0.6 mm, scabrous at margins, acute, setose at apex. Corolla infundibuliform, *c.* 4.2 mm long, scabrous,

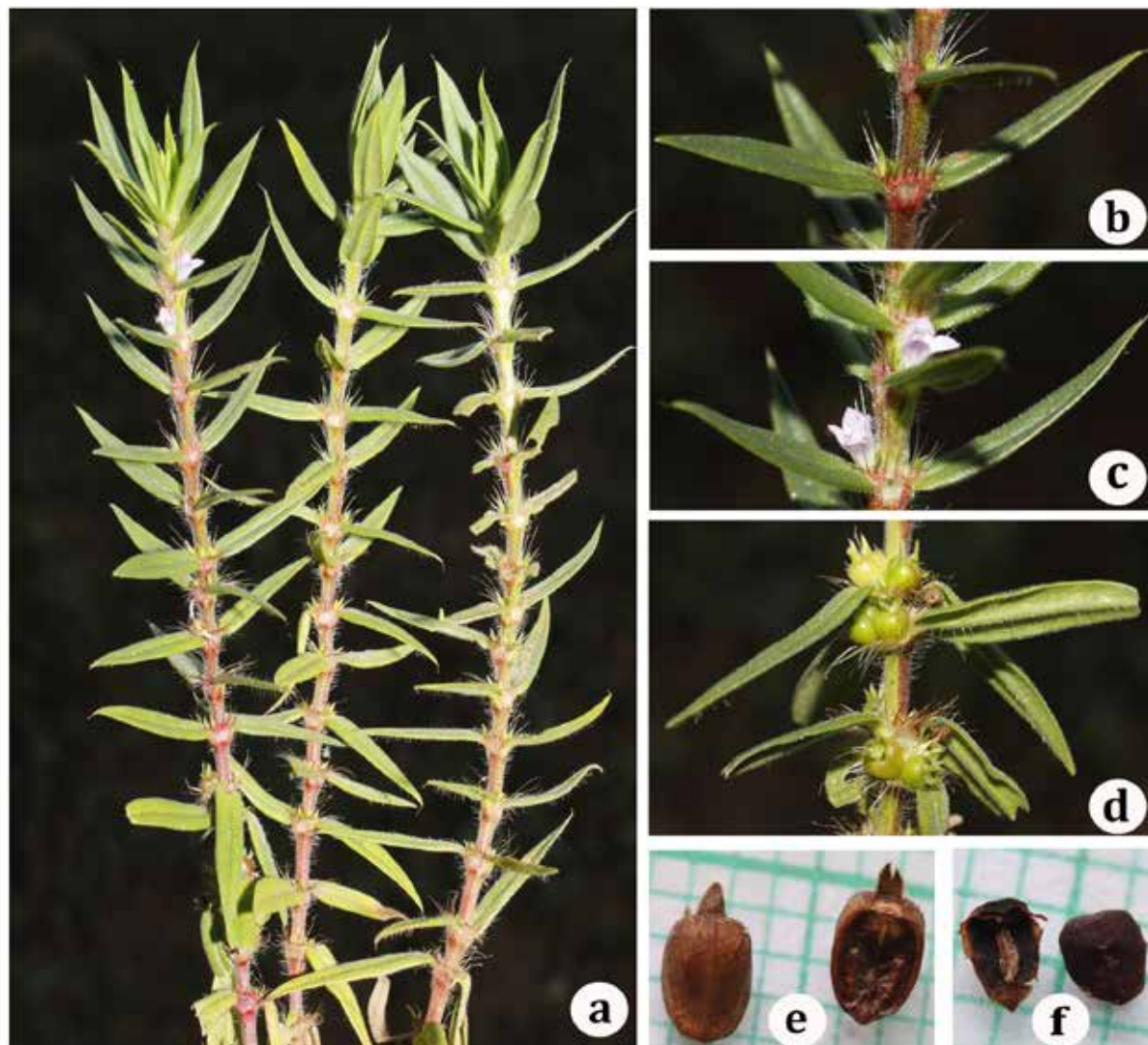


Fig. 1. *Hexasepalum teres* (Walter) J.H. Kirkbr.: **a.** Habit; **b.** Close-up view of stipule; **c.** Close-up view of flowers; **d.** Close-up view of fruits; **e.** Dorsal and ventral view of mericarps; **f.** Ventral and dorsal view of seeds

pale purple; tube 3-3.4 mm long, glabrous with a ring of hairs at base inside; limb 4-lobed; lobes ovate, *c.* 1.8 × 1.2 mm, ciliolate at margins, acute at apex, scabrous. Stamens 4, exserted. Hypanthium obconical, *c.* 1 × 1 mm, scabrid. Ovary obovoid, *c.* 1 × 0.8 mm, truncate at apex, scabrid; style 3-3.5 mm long; stigma 2-lobed, each lobe globose, papillate. Capsules obovoid to obconical, 2.2-3 × 1.7-2 mm, sparsely hispid above, crowned by persistent calyx; mericarps 2, indehiscent, dorsally 1-3 carinate; seeds obovoid to obconical, *c.* 2.2-2.8 × 1.8 mm, incurved at apex, dorsally concave with shallow groove, ventrally sulcate with Y shaped depression, coarsely reticulate, dark brown.

Flowering & fruiting: July – December.

Habitat: *H. teres* is found growing from coast to hill top, moist open rocks in evergreen forest margins,

stream banks and margins of the cultivated lands above 1200 m.

Associated species: This species grows along with *Chamaecrista mimosoides* (L.) Green, *Cyanotis arachnoidea* C.B. Clarke, *Cyanotis pilosa* Schult. & Schult.f., *Fimbristylis dichotoma* (L.) Vahl., *Habenaria longicornu* Lindl., *Heliotropium scabrum* Retz., *Justicia simplex* D. Don, *Mitracarpus hirtus* (L.) DC., *Murdannia spirata* (L.) G. Brückn., *Oldenlandia herbacea* (L.) Roxb. and *Spermacoce latifolia* Aubl.

Distribution: A native of tropical American regions (U.S.A., Mexico, Cuba, Hispaniola, Jamaica, Margarita, Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Guyana, Surinam, French Guiana, Ecuador, Peru, Bolivia, Brazil, Paraguay), introduced in Australia, Cape Verde, Gambia,

Guinea-Bissau, India, Japan, Korea, Madagascar, Netherland, Senegal, Southeast China and Sri Lanka.

Specimens examined: INDIA, **Kerala**, Kollam district, S.N. College campus, Chathannoor, 10 m, 6.7.1988, *Ravi* 2429 (CAL). **Tamil Nadu**, Namakkal district, Kolli Hills, Vazhavandhi RF (Sakkarapatti), 11° 16' 265" N, 78° 20' 547", 1246 m, 27.8.2015, *Devanathan* 10023; Vazhavandhi RF (Slope near Botanical garden view point), 11° 16' 390" N, 78° 19' 054", 1199 m, 30.9.2016, *Devanathan* 10915; Periyasami koil solai (Maasilaaruvi) 11° 18' 359" N, 78° 23' 511", 1144 m, 1.10.2016, *Devanathan* 10949; Vazhavandhi RF (Semmedu) 11° 17' 184" N, 78° 19' 968", 1126 m, 22.2.2018, *Devanathan & Narasimhan* 11218 (CAL).

Notes: The species has been reported as an invasive weed in cultivated fields including in its native range (Jordan, 1989, 1991). The first report of this species in India is by Ravi *et al.* (1989) as a weed from an institutional campus and adjacent areas of Chathannoor, a Coastal town in present day Kollam district of Kerala state. It could be an accidental introduction in to India by the sea-route along with horticultural plant trade. It is noted in three different locations of forest regions as well as margins of cultivated lands of Kolli Hills with sizable population. This indicates *H. teres* is naturalizing rapidly and if unchecked can become invasive. Since Kolli Hills known for its horticultural crops such as Pepper, Tapioca and Coffee, this species has probably made its entry in to the Eastern Ghats through horticultural activities. Its occurrence elsewhere in the Eastern Ghats and Western Ghats need to be explored. *H. teres* has been reported as a difficult weed to eradicate probably due to the thick wall of the mericarp that protects the seed from weedicides and render resistance for mechanical removal (Cabaña Fader *et al.*, 2016). Hence it is important to take urgent measures to control further spread of the species.

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