



Heterostemma saolaense (Apocynaceae: Asclepiadoideae), a new species from central Vietnam

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ABSTRACT: *Heterostemma saolaense*, a new species from Vietnam is described, illustrated and compared with the similar species *Heterostemma maculatum*. The two species differ in stem pubescence, peduncle, calyx and corolla size.

KEY WORDS: Angiosperms, Ceropegieae, *Heterostemma maculatum*, Saola Nature Reserve, taxonomy.

INTRODUCTION

The genus *Heterostemma* Wight & Arn. comprises 30 to 40 species of terrestrial climbers and is widely distributed from India and China to Australia and the Western Pacific Islands (Li *et al.*, 1995; Swarupnanandan *et al.*, 1989; Forster, 1992).

In Vietnam, *Heterostemma* was first revised by Costantin (1912); subsequently it was briefly treated by Ho (1993) with additions by Tran (2005), and fully revised by Tran (2017) including seven species. A new endemic species was published by Tran *et al.* (2020).

A checklist of the genus was published by Rodda (2016); among neighbouring countries a recent revision is available for Thailand (Thaithong *et al.*, 2018).

Fieldwork in central Vietnam (Thua Thien Hue province) in 2019 led to the collection of an unidentified species of *Heterostemma*. Based on the examination of specimens at A, BM, BO, E, HN, K, LAE, P, SING and VNMN (acronyms following Index Herbariorum, Thiers, continuously updated) and the literature cited above, we were able to confirm that it is distinct from all known species of *Heterostemma* known so far and therefore it is here described as a new species. We also provide an updated key to the nine species of *Heterostemma* of Vietnam.

TAXONOMIC TREATMENT

Heterostemma saolaense Rodda & T.A.Le, *sp. nov.*

Figs. 1 & 2

Type: Vietnam, Central Vietnam, Thua Thien Hue province, Nam Dong district, Thuong Quang commune, 16°07'27.9"N 107°36'19.7"E, primary evergreen forest on sandy alluvial terrace and slopes of river valley between karstic limestone hills at elevation ± 350 m a.s.l.,

19 September 2019, Tien Chinh Vu, Tuan Anh Le, Dien Dinh LTA 635 (holotype VNMN, isotypes HN, SING).

Diagnosis: Similar to *Heterostemma maculatum* (Kerr) Rodda in shape of corolla (rotate), corona lobe shape (oblong-ovate, outer process rounded), but different in flower size (c. 2 cm in *H. maculatum* vs. 1.5–1.7 cm in *H. saolaense*), stem pubescence (uniformly sparsely pubescent in *H. maculatum* vs. pubescent along two lines only in *H. saolaense*), peduncle size (subsessile in *H. maculatum* vs. 1.5–3 cm long in *H. saolaense*), and calyx size (c. 3 × 1 mm, not reaching corolla lobe sinus in *H. maculatum* vs. 4–6 × 2.5–3 mm reaching or exceeding the corolla lobe sinus in *H. saolaense*)

Climber with twining and pendulous stems 5–10 m long; white latex present in all vegetative parts. Stem and branches terete; internodes 9–20 cm long, pubescent along two lines, Leaves: petiole terete, 3.0–5.3 cm × 3.0–4.2 mm, sparsely pubescent; lamina coriaceous, elliptic to elliptic-oblong, 12–16 × 6.5–8.1 cm, glabrous to sparsely pubescent; base rounded, apex acute to shortly acuminate; venation pinnate with 2 or 3 basal secondary veins, and 3–5 secondary veins departing from each side of the main vein, veins prominent on lower surface; colleters 6–9 at base of lamina. Inflorescences 1–2(–9) flowered cymes; peduncle 1.5–3.0 × 0.2–0.3 cm, greenish white, densely pubescent. Pedicel 14–21 × 1.0–1.3 mm, greenish white, densely pubescent. Buds 5-angled. Calyx lobes oblong to triangular, 4–6 × 2.5–3.0 mm, reaching or exceeding the corolla lobe sinus, whitish-green, outside pubescent, inside glabrous; basal colleters 1 at each calyx lobe sinus, lanceolate, 0.8–1.0 mm long, apex acuminate. Corolla rotate, 1.5–1.7 cm diam., tube shallowly campanulate 4–5 mm long, inside yellow with fine red-brown spots (becoming more concentrated towards the centre), glabrous or sparsely pubescent, outside pale greenish-yellow, covered in rusty-brown hairs, early caducous and

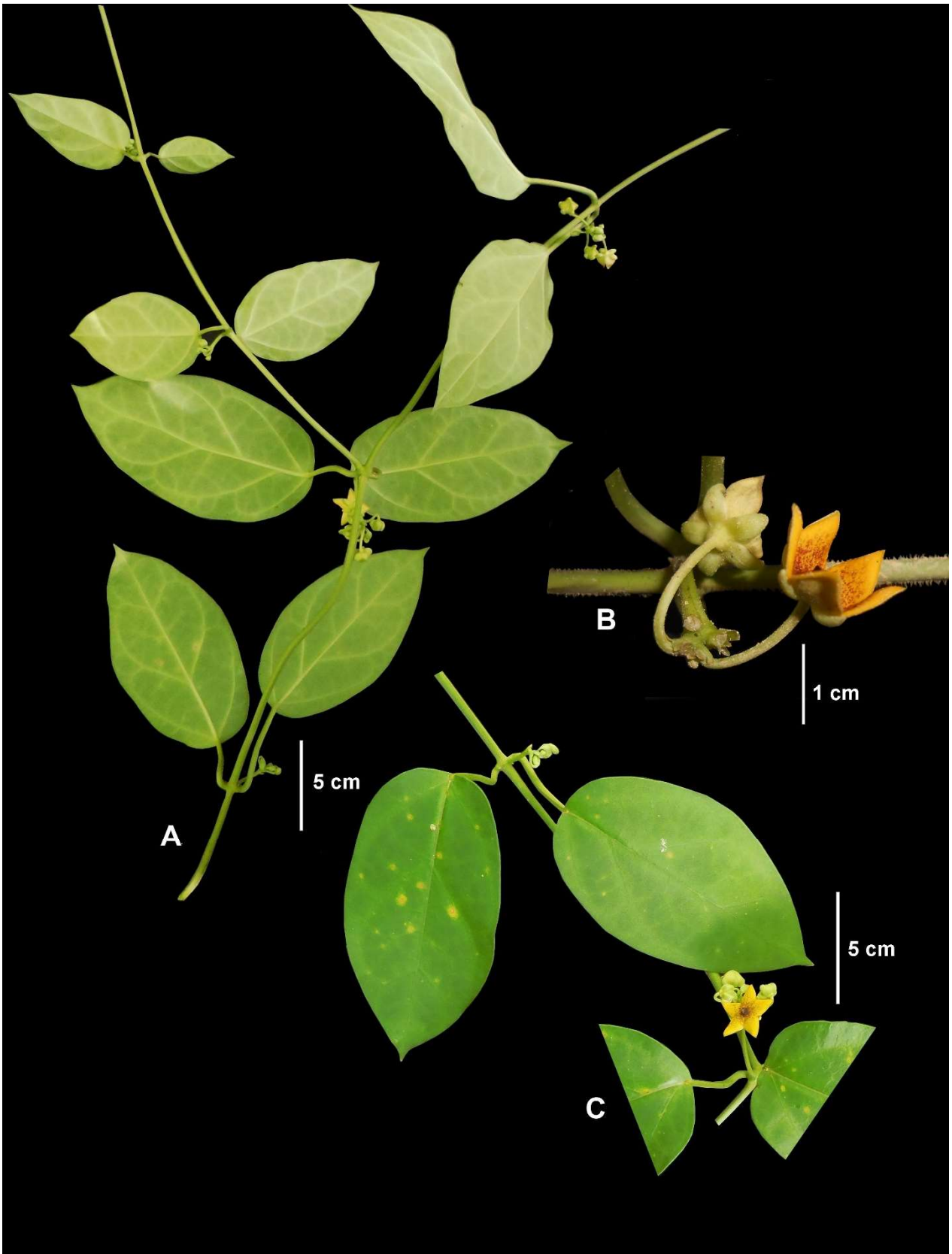


Fig. 1. *Heterostemma saolaense* Rodda & T.A. Le. **A.** & **B.** flowering branch; **C.** inflorescence, with evident stem pubescence arranged along two lines. Photos by Tuan Anh Le, from *Tien Chinh Vu, Tuan Anh Le, Dien Dinh LTA 635 (VNMN)*

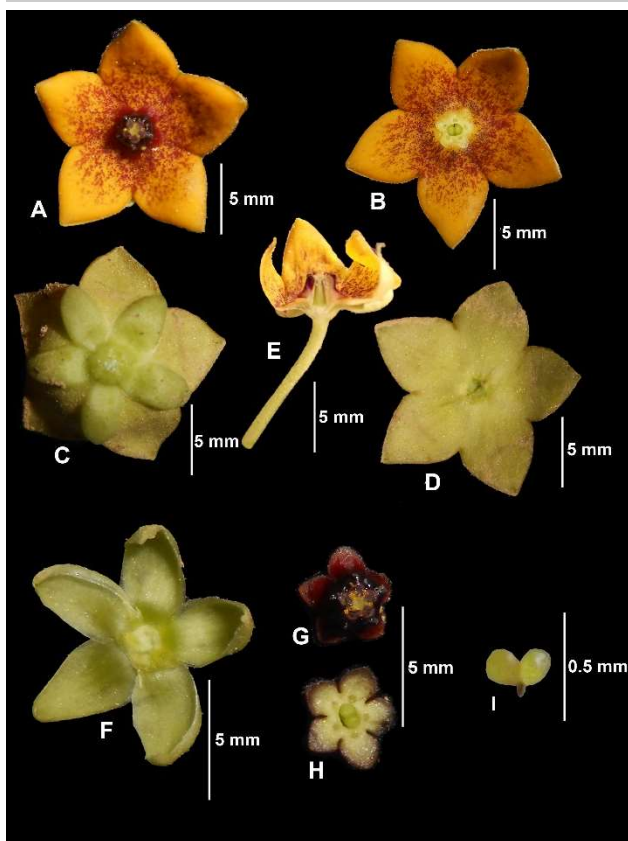


Fig. 2. *Heterostemma saolaense* Rodda & T.A. Le. **A.** flower, view from above; **B.** corolla with corona removed, view from above; **C.** corolla and calyx, view from underneath; **D.** corolla with calyx removed, view from underneath; **E.** flower, longitudinal mid-section showing ovary; **F.** calyx, view from above with corolla and ovary removed; **G.** corona, view from above; **H.** corona, view from underneath; **I.** pollinarium. Photos by Tuan Anh Le, from *Tien Chinh Vu, Tuan Anh Le, Dien Dinh LTA 635 (VNMN)*.

often lost in dry specimens; lobes deltate, 4.5–6.0 × 5–6 mm, inside yellow with fine red-brown spots concentrated at the basal and central portion, glabrous or sparsely pubescent, outside pale greenish-yellow, covered in rusty-brown hairs, early caducous, margins ciliate. Corona staminal, 4.0–4.5 mm diam., ca. 2 mm high, glabrous; lobes oblong-ovate 1.5–1.8 × 1.5–1.8 mm, outer process spreading horizontally on the corolla surface, flattened and slightly spatulate, apex rounded, inner process raised in the centre, ca. 2 mm high, oblong with a rounded tip; upper surface red with inner process becoming almost black, lower surface pale yellow. Pollinarium: pollinia erect, broadly elliptic, 0.20–0.21 × ca. 0.16 mm, yellow, germination crests translucent, ca. 0.12 × 0.02 mm; corpusculum linear lanceolate, ca. 0.18 × 0.04 mm, brown; caudicles ca. 0.05 × 0.04 mm. Ovary conical, ca. 1.3–1.5 × 1.0–1.2 mm, greenish-white, sparsely pubescent. Fruits and seeds not observed.

Etymology. The species is named after the type locality, Saola Nature Reserve, in Thua Thien Hue Province, central Vietnam.

Distribution and Ecology. *Heterostemma saolaense* is known from only one locality, Thuong Quang commune, Nam Dong district, Thua Thien Hue province, Central Vietnam (Fig. 3). It was found in primary evergreen forest on soils derived from degraded limestone. Other plants observed at the type locality are *Rubus cochinchinensis* Tratt., *Alpinia vietnamica* H.D.Trần, Luu & Škorničk., *Ophiorrhiza baviensis* Drake, *Paraphlomis membranacea* C.Y.Wu & H.W.Li, *Schismatoglottis* sp. and *Marsdenia hainanensis* Tsiang. It was observed in flower from August to October.

Provisional IUCN conservation assessment. Since *Heterostemma saolaense* is currently only known from a single collection in Saola Nature Reserve in Hue province, it is considered as Data Deficient (DD; IUCN, 2012). The Saola Nature Reserve in Hue province has had a number of small surveys conducted by Hue University of Agriculture and Forestry, L.V. Averyanov (Komarov Botanical Inst. of the Russian Academy of Science, Russia) and Inst. of Ecology and Biological Resources, Vietnam Academy of Science and Technology. However, the area is extensive (15,500 ha) and difficult to explore extensively as it is dissected by rivers, streams and karst areas. Even though *H. saolaense* has been sighted only once it might occur in other yet unexplored areas of the reserve.

Notes. All species of *Heterostemma* known so far have relatively small calyx lobes compared to the size of the corolla, and never reaching or exceeding the calyx lobe sinus. *Heterostemma saolaense*, with its prominent calyx lobes, is therefore easily distinguished. We consider it most similar to *Heterostemma maculatum*, a species endemic to Thailand. As mentioned in the diagnosis the two species differ in stem pubescence, peduncle size, calyx and corolla size.

Another *Heterostemma* species with a relatively large calyx (but not reaching the corolla lobe sinus) is *Heterostemma menghaiense* (H.Zhu & H.Wang) M.G.Gilbert & P.T.Li, from China, Laos and Thailand (Thammarong *et al.*, 2021). Its calyx lobes are oblong-triangular, 2.4–3 × 1.7–2 mm, densely pubescent outside, glabrous inside, with a rounded apex. It can be separated from *H. saolaense* because of stem pubescence (densely brownish-yellow pubescent to pilose, vs. pubescent along two lines only in *H. saolaense*), peduncle size (subsessile vs. 1.5–3 cm long in *H. saolaense*) and corolla size (2.2–2.8 cm vs. 1.5–1.7 cm in *H. saolaense*)

Key to the species of *Heterostemma* in Vietnam

1. Mature stems developing a corky bark with age *H. suberosum*
- Mature stems not becoming covered with a corky bark 2
2. Calyx lobes reaching or exceeding the corolla lobe sinus *H. saolaense*
- Calyx lobes not reaching the corolla lobe sinus 3
3. Corolla diam. > 6 times corona diam., corona pubescent
..... *H. xuansonense*
- Corolla diam. < 4 times corona diam., corona glabrous 4

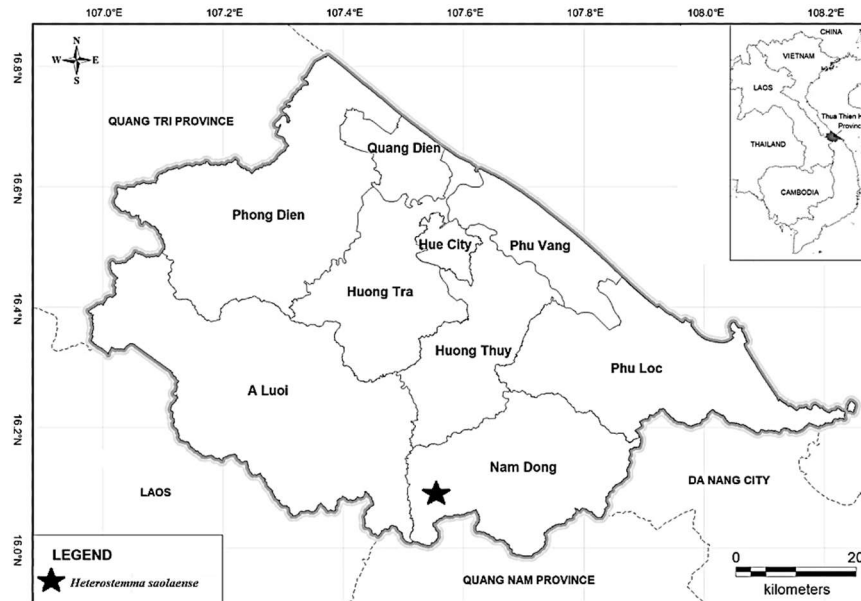


Fig. 3. The known geographical distribution of *Heterostemma saolaense* Rodda & T.A. Le, from Saola Nature Reserve in Hue, Thua Thien Hue province, central Vietnam.

4. Peduncle < 5.5 mm long, stout, 2–3 mm thick 5
 - Peduncle > 6 mm long, slender, 1–1.5 mm thick 6
 5. Pedicels 5–10 mm long *H. cucphuongense*
 - Pedicels 20–32 mm long *H. oblongifolium*
 6. Corona lobes shorter than corolla tube 7
 - Corona lobes as long as or longer than corolla tube 8
 7. Corona lobes spreading on surface of corolla, almost flat, outer apex simple *H. brownii*
 - Corona lobes raised from the corolla surface, outer apex trilobed
 *H. acuminatum*
 8. Peduncle 7–25 mm long, corolla < 8 mm diam *H. piperifolium*
 - Peduncle 25–60 mm long, corolla > 10 mm diam *H. grandiflorum*

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