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A new species of *Helicteres* (Malvaceae) from southern Vietnam

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ABSTRACT: A new species of *Helicteres* (Malvaceae), *H. daknongensis* V.S.Dang & D.T.Bui from Gia Nghia district, Dak Nong province, southern Vietnam, is described and illustrated. This species is morphologically similar to *H. viscida* Blume and *H. hirsuta* Lour. but differs by having smaller petals and fruits, and different petal colour. A morphological description, photographs and a table comparing the new species with its closely related species are provided, as well as an updated key to *Helicteres* in Vietnam.

KEY WORDS: Dak Nong, *Helicteres daknongensis*, *Helicteres hirsute*, *Helicteres viscida*, Malvaceae, new species, taxonomy.

INTRODUCTION

The genus *Helicteres* L. (Malvaceae) includes about 60 species distributed in the tropics of Asia and America (Cowie, 2011; Mabberley, 2008). This genus can be readily recognized by stamens and pistil forming an androgynophore, united sepals, oblong fruits with hairs, and wingless seeds (Chantaranothai and Poompo, 2019). In Vietnam, eight species and one variety of the genus *Helicteres* have been recorded according to recent publications (Nguyen, 2003; Pham, 1999).

In June 2019, we carried out field surveys to assess plant diversity of the genus *Helicteres* in Dak Nong province, where some new species have been discovered in recent years, such as: *Aristolochia tadungensis* T.V.Do & T.H.Luu, *Capparis daknongensis* Sy *et al.*, *Lagerstroemia ruffordii* T.T.Pham & Tagane (Thuong *et al.*, 2013; Do *et al.*, 2015; Pham *et al.*, 2017). During our trips, a species of *Helicteres* was collected on a hillside of Gia Nghia district, Dak Nong province, southern Vietnam. After careful examination of *Helicteres* species in Tardieu-Blot (1945), Pham (1999), Cristóbal (2001), Phengklai (2001), Nguyen (2003), Tang (2007) and Cowie (2011), and as well as comparison to closely related species based on observations of herbaria specimens (E, HN, P, VNM and VNMN), and specimens images JSTOR Global Plants (https://plants.jstor.org/), we concluded that the collected specimens represent a new species to science that is described herein.

TAXONOMIC TREATMENT

Helicteres daknongensis V.S.Dang & D.T.Bui, ***sp. nov.*** **Fig. 1**

***Type*:** Vietnam, Dak Nong province, Gia Nghia district, Nghia Duc commune, 250 km south of Ho Chi Minh city, on the hillside, alt. 750 m, 12°00′72.08″N, 107°43′63.05″E, 12 June 2019, *Dang V.S., Bui D.T., Hoang N.S., Nguyen T.N.T. Dang 321* (holotype, VNM!; isotypes, HN!, VNM!, VNMN! and TAI).

***Diagnosis*:** *Helicteres daknongensis* is morphologically similar to *H. viscida* Blume in leaf morphology and calyx shape, but differs by having shorter inflorescences (1–2.5 cm long vs. 3 cm long), shorter petals (1.5–1.9 cm long vs. 2.5–3 cm long) and smaller fruits (1.5–2.5 × 0.5–1 cm vs. 2.5–3.5 × 1–1.2 cm), and whitish pink or pink petals (vs. white petals). It is also similar to *H. hirsuta* Lour. in calyx and inflorescence shape, but differs from it by having shorter petioles (0.3–0.5 cm long vs. 2 cm long), shorter petals (1.5–1.9 cm long vs. 2–2.5 cm long), and whitish pink or pink petals (vs. red or purplish red petals).

Shrub, 1–2.5 m tall; branches erect, 2–4 mm in diam., densely puberulent, with pinkish white, stellate trichomes. Stipules persistent, 0.5–1 cm long, linear, tomentose. Leaves alternate, blades ovate or oblong-ovate, 8–16 × 5–10 cm, subcoriaceous, yellowish brown when dry, adaxially sparsely puberulent, abaxially densely puberulent to tomentose, with whitish, stellate trichomes, apex acute or acuminate, base cordate, margins dentate; midrib slightly depressed adaxially, prominent abaxially; basal veins 5, secondary veins 5–7 pairs, obscure adaxially, prominent abaxially; petioles 0.3–0.5 cm long, densely puberulent, with whitish, stellate trichomes. Inflorescences axillary, cymose, 1–2.5 cm long, 2–7-flowered; extra-floral nectaries present; bracts 0.2–0.5 cm long; pedicels 0.2–0.8 cm long. Flowers with articulate pedicel; calyx tubular, 1–1.5 cm long, pinkish green, densely stellate villous to puberulent, calyx tube 0.8–1.1 cm long, calyx lobes 5, unequal, lanceolate to triangular, 0.2–0.4 cm long, lobes acute; petals 5, unequal in length, spathulate, 1.5–1.9 cm long, whitish pink or pink, yellowish at base of limb, slightly curved at anthesis,

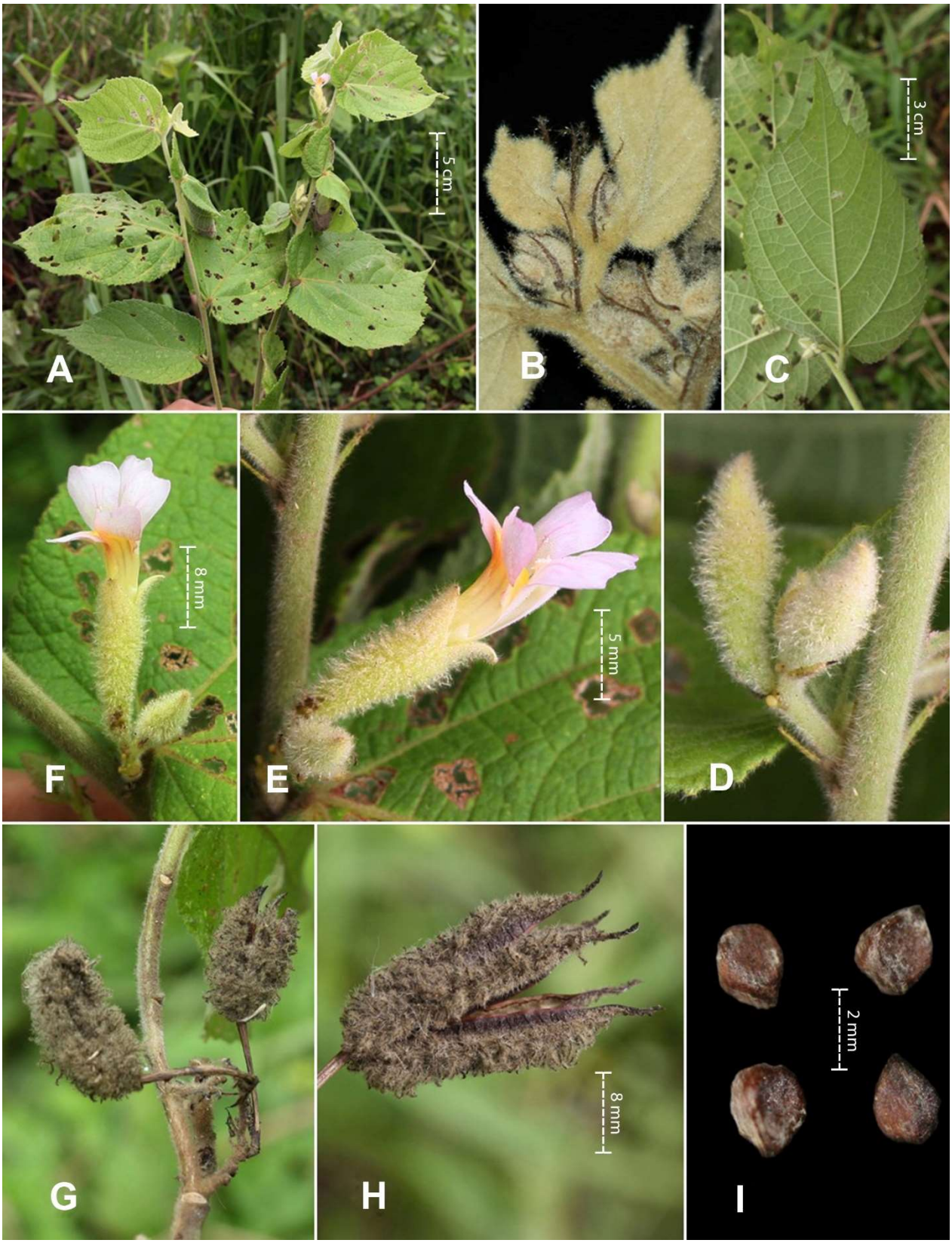

Fig. 1. ***Helicteres daknongensis*** V.S.Dang & D.T.Bui: **A.** Flowering branches, **B.** Close-up of young leaves and stipules, **C.** Abaxial leaf surfaces, **D–F.** Close-up of axillary inflorescence and flowers, **G–H.** Close-up of fruits, **I.** Seeds.

Table 1. Comparison of ***Helicteres daknongensis*** with its morphologically closest allies (modified from Tardieu-Blot, 1945; Pham, 1999; Phengklai, 2001; Tang 2007).

Morphological characters	*H. daknongensis*	*H. viscida*	*H. hirsuta*
Branch indumentums	densely pinkish white stellate puberulent	puberulent when young, glabrescent	stellate hairy on all parts
Petioles length	0.3–0.5 cm long	0.3–1 cm long	2 cm long
Leaf blade	8–16 × 5–10 cm	5–15 × 4.5–8.5 cm	5–15 × 2.5–5 cm
Inflorescence length	1–2.5 cm long	3 cm long	2 cm long
Calyx length	1–1.5 cm long	1.5–1.8 cm long	1.2–1.5 cm long
Petal color at anthesis	whitish pink or pink	white	red or purplish red
Petal length	1.5–1.9 cm long	2.5–3 cm long	2–2.5 cm long
Fruit size	1.5–2.5 × 0.5–1 cm	2.5–3.5 × 1–1.2 cm	3.5–4 × 1.1–1.2 cm
Seed length	1.5–2 mm long	2 mm long	1–2 mm long

limb cuneate, puberulent, with callus near base, apex truncate, lower 3 petals slightly longer than the upper two ones; androgynophore 1.2–1.6 cm long, straight, mostly glabrous, villous at base; stamens 10; staminodes 5, lanceolate; anthers transverse; ovary ovoid to ovoid-oblong, 5-locular, glabrous; style 1–1.5 mm long; stigma with 5 slender teeth. Fruit a capsule, cylindric, not spirally twisted, 1.5–2.5 × 0.5–1 cm, with 5 longitudinal lobes, densely villous, dehiscent, black when mature. Seeds many, rhomboid, small, 1.5–2 × 1–1.5 mm, dark brown, angled when dry.

Phenology: Flowering and fruiting specimens were collected in June.

Distribution: Known only from Gia Nghia district, Dak Nong province, southern Vietnam.

Habitat and Ecology: This new species was found growing along roadside and on the hillside where is mainly evergreen scrub, in association with *Helicteres viscida* Blume, *Chromolaena odorata* (L.) R.M.King & H.Rob., *Eleusine indica* (L.) Gaertn., *Heliotropium indicum* L., *Ageratum conyzoides* (L.) L., *Streptocaulon juventas* (Lour.) Merr. and *Litsea glutinosa* (Lour.) C.B.Rob., at elevations of 600–750 m.

Etymology: The specific epithet refers to the name of the province Dak Nong where this species was discovered.

***Vernacular name*:** Tổ kén đắk nông.

Additional specimens examined: Vietnam, Dak Nong province, Gia Nghia district, Nghia Duc commune, 250 km south of Ho Chi Minh city, on the hillside, alt. 750 m, 12°01′73.06″N, 107°42′66.02″E, 13 June 2019, *Dang V.S., Bui D.T., Hoang N.S., Nguyen T.N.T. Dang 321a* (HN, VNM).

Conservation status: This new species was collected from a small population along roadside and on the hillside in Dak Nong province at 750 m elevation. The habitat where we found this new species was easily affected by human disturbance. Therefore, we propose the status of this new species as CR under criterion D (IUCN, 2012).

Notes: *Helicteres daknongensis* V.S.Dang & D.T.Bui is morphologically similar to *H. viscida* Blume (**Fig. 2**) which is scattered along the edge of dry evergreen forest, and flowers and fruits at the same time from July to March and *H. hirsuta* Lour. (**Fig. 3**) which is common in deciduous and dry evergreen forest, and flowers and fruits all year round (Phengklai 2001), but clearly differs from those species in several characters which are summarised in Table 1.

Key to the species of *Helicteres* in Vietnam

1a. Leaves broadly, apex truncate; fruits spirally twisted after dehiscence ……. ***H. isora***
1b. Leaves usually narrower, apex not truncate; fruits not spirally twisted after dehiscence ……..…… 2
2a. Petal up to 1 cm long; leaf margin entire or slightly serrate ……. 3
2b. Petal more than 1.5 cm long; leaf margin obviously serrate …..... 6
3a. Mature leaves with long, dense, curled hairs …… 4
3b. Mature leaves without long, dense, curled hairs ……..…...…… 5
4a. Petal with 2 forms, lanceolate and spathulate, 0.8–1 cm long; leaves ovate ……... ***H. lannata***
4b. Petal with 1 form, spathulate, 1 cm long; leaves oblong ……..... ……..…….. ***H. poilanei***
5a. Leaf margin entire or slightly serrate near apex; stamens 10 …….. ……..…… ***H. lanceolata***
5b. Leaf margin entire to apex; stamens 15 ……..…. ***H. angustifolia***
6a. Calyx up to 0.5 cm long; petal 0.8–1 cm long …….. ***H. elongata***
6b. Calyx 1–1.8 cm long; petal 1.5–3 cm long ……..…….7
7a. Stigma flattened, slightly 5 teeth; petal red or purplish red …… ……..…. ***H. hirsuta***
7b. Stigma not flattened, conspicuously divided into 5 teeth; petal white, whitish pink or pink ……..…….. 8
8a. Inflorescences 3 cm long; petal 2.5–3 cm long; fruits more than 2.5 cm long ……...…… ***H. viscida***
8b. Inflorescences 1–2.5 cm long; petal 1.5–1.9 cm long; fruits 1.5–2.5 cm long ……..…… ***H. daknongensis***

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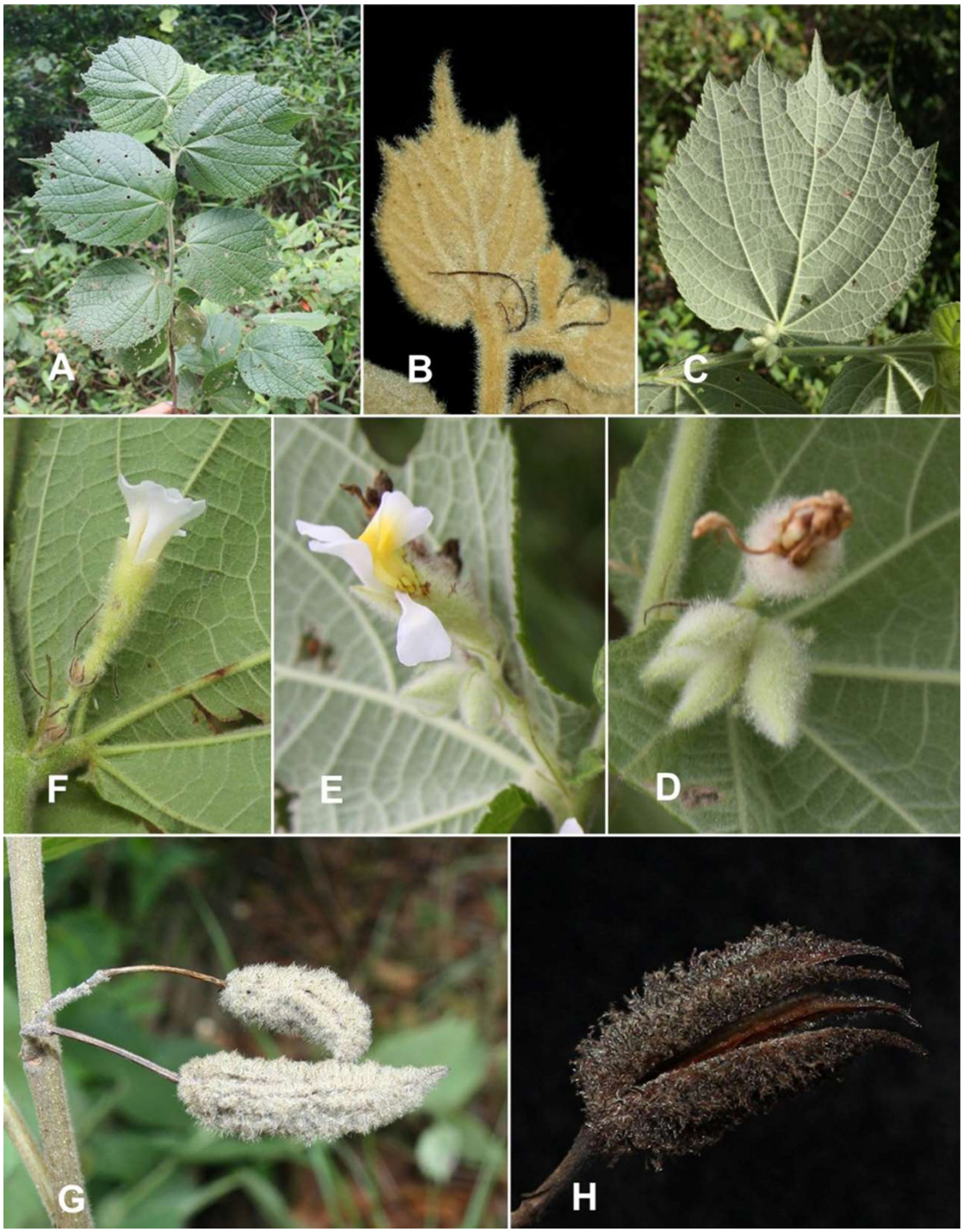

Fig. 2. ***Helicteres viscida*** Blume: **A.** Sterile branch, **B.** Close-up of young leaves and stipules, **C.** Abaxial leaf surfaces, **D–F.** Close-up of axillary inflorescence and flowers, **G–H.** Close-up of fruits.

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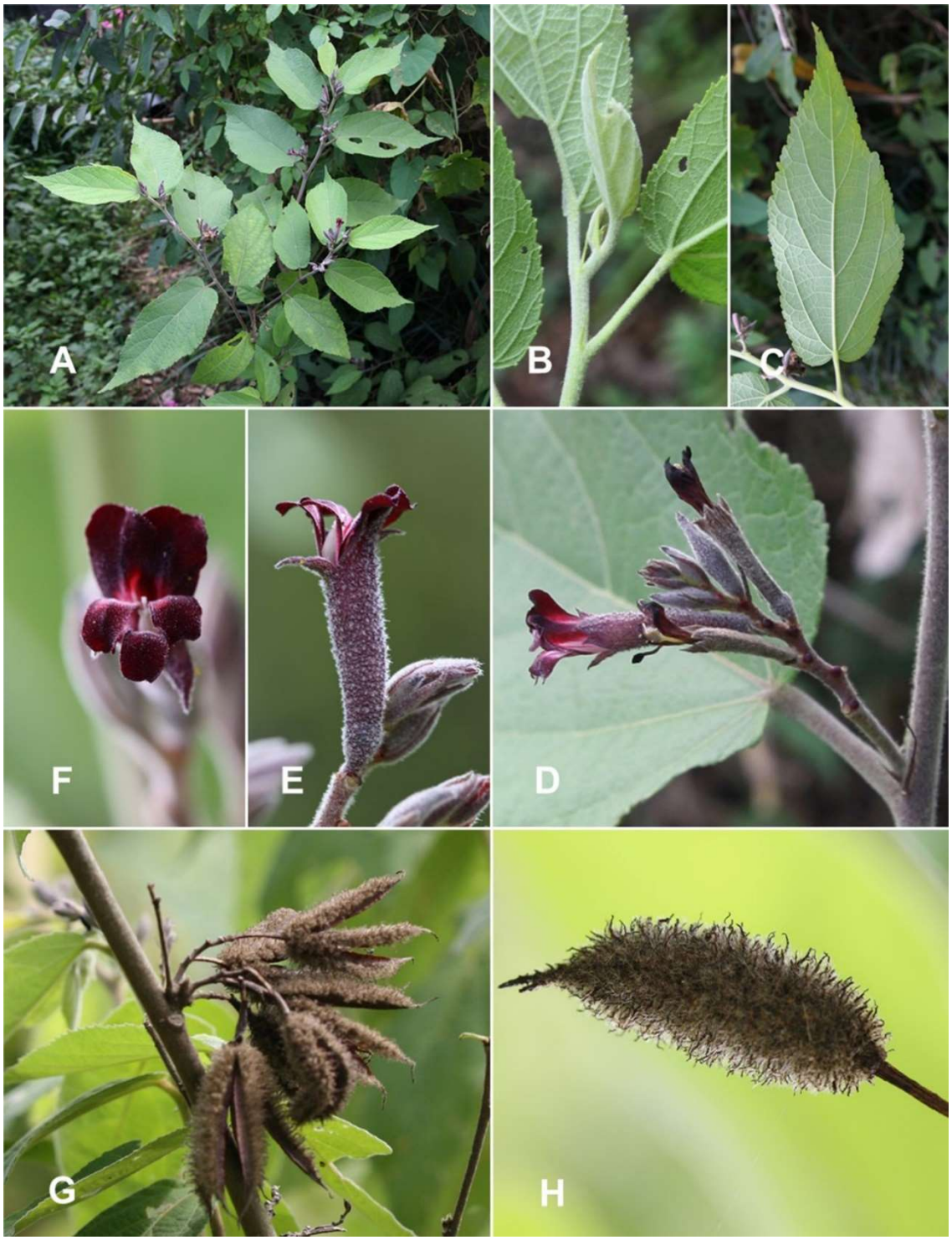

Fig. 3. ***Helicteres hirsuta*** Lour.: **A.** Flowering branches, **B.** Close-up of young leaves and stipules, **C.** Abaxial leaf surfaces, **D–F.** Close-up of axillary inflorescence and flowers, **G–H.** Close-up of fruits.

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