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## *Deinostigma serratum*, a new species of Gesneriaceae from central Vietnam

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**ABSTRACT:** *Deinostigma serratum* F.Wen, L.N.Tuan & D.Dien, a new species of Gesneriaceae is described and illustrated from the central Vietnam. It resembles *D. eberhardtii* in habit, but easily differs in several characters, especially in its odontoid margin of corolla petals. The ecological information, geographic distribution and conservation status of this new taxon are also provided here.

**KEY WORDS:** *Deinostigma eberhardtii*, Didymocarpoideae, Flora of Vietnam, new taxon.

### INTRODUCTION

*Deinostigma* W.T.Wang & Z.Y.Li was once considered a monotypic genus of Gesneriaceae, based on the type species, *D. poilanei* (Pellegr.) W.T.Wang & Z.Y.Li, and was endemic to Vietnam (Wang and Li, 1992). After 24 years, this genus had been expanded to be a small one and include several species, which were mistakenly placed in former *Chirita* Buch.-Ham.exD.Don and *Primulina* Hance. Meanwhile, a new species, *Deinostigma fasciculatum* W.H.Chen & Y.M.Shui (Shui *et al.*, 2020), was published in the last year. Thus, there are eight species of *Deinostigma* besides the newly described one here. They are *D. cicatricosum* (W.T.Wang) D.J.Middleton & Mich.Möller, *D. cycnostylum* (B.L.Burtt) D.J.Middleton & H.J.Atkins, *D. cyrtocarpum* (D.Fang & L.Zeng) Mich.Möller & H.J.Atkins, *D. eberhardtii* (Pellegr.) D.J.Middleton & H.J.Atkins, *D. fasciculatum* W.H.Chen & Y.M.Shui, *D. minutihamatum* (D.Wood) D.J.Middleton & H.J.Atkins, *D. poilanei*, *D. tamianum* (B.L.Burtt) D.J.Middleton & H.J.Atkins (Möller *et al.*, 2016, 2020). There into, five species are endemic to Vietnam and three ones are only distributed in China at present. To sum up, Vietnam is the center of *Deinostigma* and this genus is being shared by China and Vietnam. However, there is not new taxon of *Deinostigma* was confirmed and published after *D. tamianum* (former *Chirita tamiana* B.L.Burtt (Burtt 1999)), though Vietnam is the modern distribution and speciation center of *Deinostigma* (Möller *et al.* 2016). Some species looks like certain one of *Deinostigma* from Vietnam, but they belong to different genus, for example *Michaelmoelleria* F.Wen, Y.G.Wei & T.V.Do (Wen *et al.*, 2020).

During the botanical fieldwork in mountainous areas of Thua Thien Hue province in central Vietnam in winter 2020, we collected an unusual species of Didymocarpoideae, Gesneriaceae. This unknown species belongs to *Deinostigma* because of its alternate leaf arrangement, pedicels with hooked hairs, peltate leaf-blade, ovary fusiform. However, the odontoid petal margin can help us to distinguish all known species in this genus. After consulting relevant literature (Wang *et al.*, 1998; Li and Wang, 2005; Wei *et al.*, 2010; Shui *et al.*, 2020) as well as collections of different herbaria (e. g. E, K, P, HN, IBK, IBSC, KUN, LE, PE, VNF, VNMN), we identified these plants as a new species by its morphological characters. This new species is described and illustrated here.

### TAXONOMIC TREATMENT

*Deinostigma serratum* F.Wen, L.N.Tuan & D.Dien, *sp. nov.* 齒瓣奇柱苣苔 Figs. 1 & 2

**Type:** VIETNAM, Thua Thien Hue province, Phong Dien district, Phong Xuan commune, 16°23'38.72"N, 107°11'56.33"E, ± 400 m asl, 5 December, 2020, Dien Dinh, Ngoc Tuan Le, Minh Duc Tran, Tuan Anh Le LTA 1001 (holotype: VNMN!; isotypes: IBK!, TAI!, VNMN!).

**Diagnosis:** *Deinostigma serratum* F.Wen, L.N.Tuan & D.Dien can be easily distinguished from all species of *Deinostigma* by its serrate margin of corolla lobes. Further, it is the mostly similar to *D. eberhardtii* in plant morphology, but it differs from the congener by leaf blade shape (broadly ovate & apex subacute in *D. serratum* vs. oblong, obovate, apex obovate, acute to slightly acuminate in *D. eberhardtii*, same order followings) and margin (shallowly obtuse-dentate or shallowly undulate-

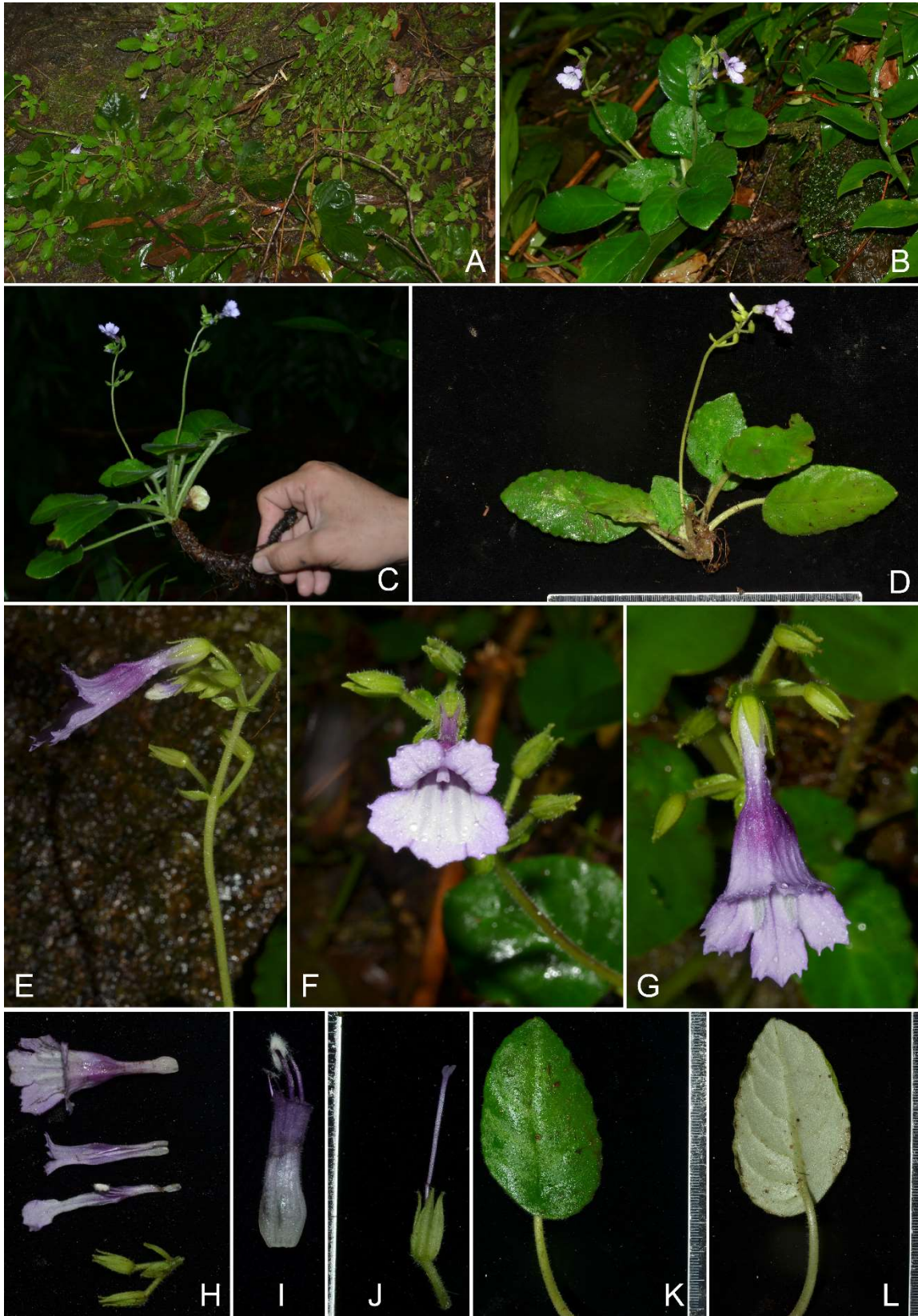


Fig. 1. *Deinostigma serratum*. **A & B:** Habitat. **C:** flowering plant compared with a hand. **D:** Plant. **E:** Cyme and lateral view of corolla. **F:** Frontal view of corolla. **G:** Top view of corolla. **H:** Adaxial surface of leaf blade. **I:** Abaxial surface of leaf blade. **J:** Flower and opened flower. **K:** Calyx lobes and pistil (style). **L:** Stamens and half of corolla tube.

**Table 1.** The characters comparison of *Deinostigma serratum* and *D. eberhardtii*.

Characters	<i>D. serratum</i>	<i>D. eberhardtii</i>
Leaf blade size	9–11 × 7–10.5 cm	3–6 × 1.2–2.5 cm
Leaf blade shape	broadly ovate and apex subacute	oblong to obovate, apex obovate, acute to slightly acuminate
Leaf blade lateral veins	5–6 on each side	3–5 on each side
Leaf blade margin	shallowly obtuse-dentate or shallowly undulate-serrate	crenate
Bract shape	ovate	Heart-shaped
Bract size	9–10 × ca. 4 mm	5–6 × 3–4 mm
Bract indumentum	abaxially glandular-pubescent	abaxially villous
Pedicel length	0.8–1.0 cm	1.5–6 cm
Calyx lobes size	5–6 × ca. 2 mm	ca. 6 × 1.3 mm
Corolla size	2.3–3.1 cm long, ca. 0.7 cm wide at the throat; tube ca. 2.0 cm long	3–3.3 cm long, ca. 0.2 cm wide at the throat; tube 0.8–1.0 cm long
Corolla lobes margin	serrate	entire
Stamens' place	adnate to corolla tube ca. 8 mm from base	adnate to corolla tube ca. 10 mm from base
Staminode number	3	2
Ovary	ca. 4 mm long	5–6 mm long

serrate vs. crenate); adaxial bracts indumentum (glandular-pubescent vs. villous); shorter pedicel (0.8–1.0 cm long vs. 1.5–6 cm long); smaller corolla size (2.3–3.1 cm long vs. 3–3.3 cm long).

Herbs perennial. Stem ascending to erect, short, 10–15 cm tall, 1–2 cm in diameter, simple, densely glandular villous. Leaves simple, alternate near stem apex; petiole 2.5–5.5 cm long, leaf blade nearly carnose, broadly ovate, peltate, 9–11 × 7–10.5 cm, apex subacute, base cordate, margin shallowly obtuse-dentate or shallowly undulate-serrate, slightly curved, glandular villous on both surfaces, dark green above, silvery-white pubescent below; lateral veins 5–6 on each side. Inflorescence compound cymes, axillary, fasciculate; peduncle 5.5–13.2 cm long, densely glandular villous; bracts 2, ovate, caducous, 9–10 × ca. 4 mm, abaxially densely glandular-pubescent; bracteoles 2, lanceolate, caducous, ca. 6 × 3 mm, adaxially sparsely glandular pubescent, abaxially densely glandular pubescent; pedicel 8–10 mm long, densely hooked glandular pubescent. Calyx 5-parted to the base, segments lanceolate, 5–6 × ca. 2 mm, apex acute, margin entire, outside densely glandular villous, inside sparsely glandular villous. Corolla funnelform, zygomorphic, 23–31 mm long, ca. 7 mm wide at the throat, outside pale purple, densely glandular pubescent, inside pale purple, glabrous; tube ca. 20 mm long; limb distinctly 2-lipped; adaxial lip 2-lobed, lobes serrate, 4–5 × 6–7 mm, bright purple on both surfaces, sparsely glandular villous; abaxial lip 3-lobed, lobes 5.5–6.5 × 6–7 mm, lobes serrate, bright purple and sparsely glandular villous on both surfaces; Stamens 2, adnate to corolla tube ca. 10 mm from base, coherent in pair at the anther; anthers densely villous; filaments densely villous, ca. 7 mm long; staminode 3, lateral 2, villous, slightly coherent with the anthers, adnate to corolla tube ca. 10 mm from base, ca. 5 mm long; middle 1, adnate to corolla tube ca. 10 mm from base, ca. 0.5 mm long; pale violet to white. Disc ring-like, ca. 1 mm high, margin 5-lobed, glabrous. Pistil ca. 17 mm

long; ovary linear, densely glandular pubescent, ca. 4 mm long; style linear, ca. 13 mm long; stigmas obtrapeziform, emarginate. Fruit unknown.

**Phenology:** The flowering period lasts about four weeks, typically in December.

**Etymology:** The specific epithet '*serratum*' is derived from its special corolla lobes. All lobes have serrated margin so that it can be easily distinguished from others of *Deinostigma*.

**Vernacular name:** "Mỡ nhụy răng cưa" (Understood as a species with a beautiful serrate lobes margins of corolla lobes).

**Distribution and ecology:** *Deinostigma serratum* is quite common in the moist shady areas under evergreen broad-leaf forest at an altitude ranging from 350 to 450 m asl. in type locality. The plants are growing in the moist sloppy regions on the rocky crevices in association with *Liparis balansae* Gagnep., *Habenaria rhodocheila* Hance, *Hoya crassipetiolata* Aver., V.T.Pham & T.A.Le, *Podochilus microphyllus* Lindl., and so on.

**Preliminary Conservation status and IUCN Red List category:** The new species has only been found in Hua Thien Hue province, Vietnam. The populations and habitats are vulnerable to local human activities such as road construction and deforestation for crops. According to detailed field observations, this species has four known populations with about 10,000 mature individuals and AOO < 20 km<sup>2</sup>. Thus, it is considered as "Vulnerable" (VU, D2) according to the IUCN Red List Criteria, based on the Criterion "12.1.4 Very restricted distribution and plausibility and immediacy of threat (VU D2)" (IUCN Standards and Petitions Committee 2019).

**The morphologically related congener and Taxonomic Notes:** There are some common characters in *Deinostigma*, for example leaf-blades slightly peltate, and pedicels with hooked hairs (Möller *et al.* 2016). Those two characters of the new taxon, *D. serratum*, hints it belongs to the genus. However, it is very special because



its serratus margin of corolla lobes, which is the first discovered in *Deinostigma*. The character can also help distinguish it from all other species of *Deinostigma* from China and Vietnam. Besides the distinguished characters mentioned in Diagnosis, all main distinctive features are shown in Table 1.

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