

# *Gastrodia punctata* (Orchidaceae): An addition to the Flora of Thailand

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**Abstract:** *Gastrodia punctata* Aver., previously known from Vietnam and China (Hainan Island), was newly discovered in the lower montane forest in northern Thailand. A description, line drawings and photographs are provided. This species has been assessed here as Endangered.

**Keywords:** Mycoheterotrophic orchid, Northern Thailand, Range extension

## Introduction

*Gastrodia* R.Br. is the largest genera in the tribe *Gastrodieae* (Epidendroideae: Orchidaceae), with about 100 currently accepted species (Bandara *et al.*, 2023; Chen *et al.*, 2023; Hroneš *et al.*, 2024; Khanal *et al.*, 2024; POWO, 2024). The genus is widely distributed from tropical western Africa and Madagascar, throughout southern and southeastern Asia, to Japan and south the Russian Far East, eastern Australia, New Zealand and Pacific islands (POWO, 2024). The members of the genus are characterized by mycoheterotrophic habit, tuberous rhizomes, a floral tube formed by united sepals and petals, a basally positioned stigma and two pollinia without caudicles (Pridgeon *et al.*, 2005). Currently, there are seven accepted species of *Gastrodia* recorded from Thailand, including *G. albidoides* Y.H. Tan & T.C. Hsu, *G. exilis* Hook.f., *G. fimbriata* Suddee, *G. javanica* (Blume) Lind., *G. phangngaensis*

Suddee, Sirim. & Chamch., *G. theana* Aver., and *G. verrucosa* Blume (Seidenfaden, 1978; Suddee, 2005, 2014; Suddee & Harwood, 2009; Chantanaorrapint *et al.*, 2017).

In August 2022, during a botanical survey in Doi Pha Hom Pok National Park, northern Thailand, an interesting species of the genus *Gastrodia* was found. Based on relevant literature (e.g. Averyanov & Efimov, 2006; Averyanov, 2011; Suddee, 2014; Huang *et al.*, 2015; Chen *et al.*, 2023), it was identified as *Gastrodia punctata* Aver., which is a new record for the country. A morphological description based on the collected plants from Thailand, along with the photographs, illustrations and notes on their ecology and distribution are provided below.

## Taxonomic treatment

***Gastrodia punctata*** Aver., *Rheedeaa* 16: 7. 2006.  
*Type:* VIETNAM, **Lam Dong Province**, Lac Duong District, Da Chais Municipality, territory of Bi Doup - Nui Ba National Park, around point 12°06'44" N 108°39'27" E, at 1800–2000 m. on Wester slope of Bi Doup Mt., 15.10.2005, *Averyanov, P.K. Loc, J. Regalado, T.T.T. Trang, T.V. Thao, NV. Duy, N.T. Vinh*, HLF 5237a (holo HN; iso LE).

**Figs. 1 & 2**

Terrestrial mycoheterotrophic achlorophyllous herbs, with scaly leaves. Roots few, filiform, arising from neck at the top of rhizome, up to 150 mm long, c. 1 mm in diameter, branched. Rhizome horizontal, fleshy, tuberous, irregularly cylindrical

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to fusiform, gradually narrowed to apex, 25–40 mm long, 5–7 mm in diameter, grayish brown, hairy. Flowering shoot erect, to 250 mm tall, 2–3 mm in diameter at base, unbranched, pale brown

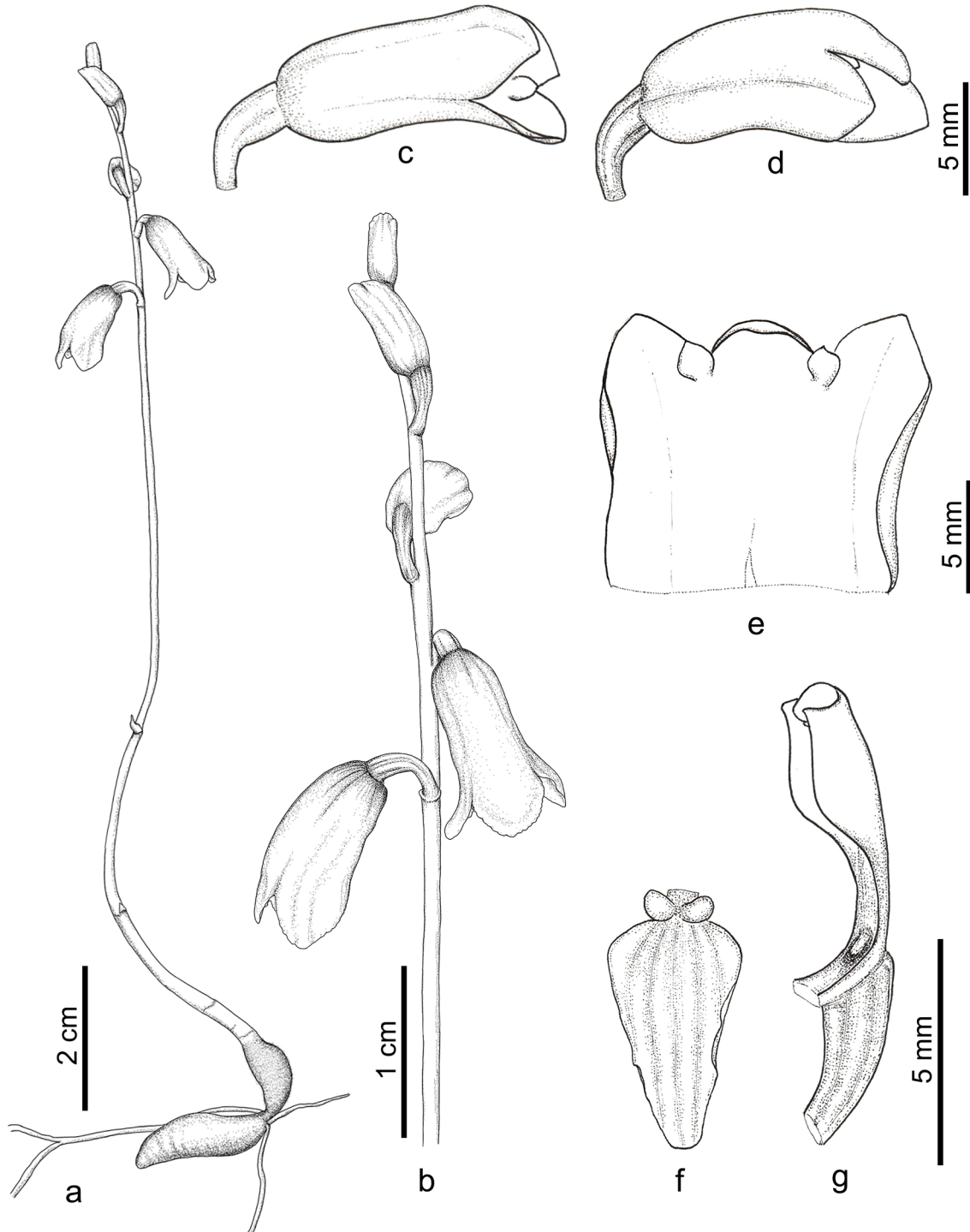
at base, dark brown to grayish brown above, with 2–3 membranous sheaths at base and 2–3 scales above. Inflorescence racemose, 80–120 mm long, 5–8-fowered; rachis glabrous. Floral bracts ovate-



**Fig. 1.** *Gastrodia punctata* Aver. **a** & **b**. Plants in natural habitat; **c**. Whole plant; **d**. Inflorescence; **e**. Flower-front view; **f**. Sepals and petals; **g**. Labellum; **h**. Column with ovary and pedicel-side view (all from *Sevanakun, Suwanmala & Chantanaorrapint* 669; photos by S. Chantanaorrapint).

triangular, 1.5–2.0 mm long, 2–2.5 mm wide, glabrous, persistent, dark brown. Flowers pointing slightly downwards, widely opening, bell-shaped, 10–12 mm long, 5–6 mm in diameter, resupinate, brown to grayish brown without silvery white

spots. Sepals connate, forming a tube at base, free at apex; dorsal sepal fused with the lateral once about 3/4 their length; lateral sepals fused for 2/3–3/4 their length; free portion of dorsal sepal broadly ovate, 3–4 mm long, 4–5 mm wide,



**Fig. 2.** *Gastrodia punctata* Aver. **a.** Whole plant; **b.** Portion of inflorescence; **c** & **d.** Flowers, side view; **e.** Sepals and petals; **f.** labellum; **g.** Column with ovary and pedicel-side view (all from *Sevanakun, Suwanmala & Chantanaorrapint* 669; drawn by O. Suwanmala).



margin slightly undulate, apex obtuse or round; free portions of lateral sepals spreading, ovate-triangular, 4–5 mm long, 4.5–5.5 mm wide, margin slightly undulate, apex acute. Petals attached on the sinus between dorsal and lateral sepals, ovate, 1.8–2 mm long, 1–1.2 mm wide, apex obtuse, base contracted. Labellum free, white with pale orange at base, narrowly ovate, 4.5–5.5 mm long, 3–3.5 mm wide; apex obtuse or truncate, apical margin slightly undulate; base with 2 spherical calli, callus *c.* 1 mm diameter; disc thickened with distinctly 2-ridged at basal part and two similar keels toward the apex. Column straight, 5–5.5 mm long, white at the upper half and pale brown to grayish brown below; with a pair of triangular stelidia at apex; base with short foot; lateral winged towards apex; rostellum well developed; stigma located near base; anther cap suborbicular, *c.* 1 mm diameter; pollinia 2, soft and mealy, without caudicles. Pedicel with ovary slightly bent upwards or downwards, 4–5.5 mm long, 2–2.5 mm in diameter, glabrous, dark brown. Capsules not seen.

*Flowering & fruiting:* Flowers in August; fruits not observed.

*Habitat:* In Thailand, *Gastrodia punctata* was found Growing on leaf litter on the forest floor in the lower montane forest at an elevation of *c.* 2120 m.

*Distribution:* *Gastrodia punctata* was previously known from Vietnam (Lam Dong) and China (Hainan Island) (Chen *et al.*, 2023) and now in Thailand. The species may have been overlooked during previous botanical explorations due to its specific habitat and flowering in the rainy season. In Thailand, it is presently known only from Chiang Mai province, but it may have a wider distribution range and could potentially occur in other areas of northern Thailand.

*Specimen examined:* THAILAND, Chiang Mai, Fang, Doi Pha Hom Pok National Park, N 20°03'13.47", E 099°08'35.88", 2120 m 19.08.2022, Sevanakun, Suwanmala & Chantanaorrapint 669 (PSU, spirit).

*Conservation status:* *Gastrodia punctata* was first described as a very rare species, known only from one locality in Vietnam (Averyanov, 2011). Later, Lu *et al.* (2017) reported this orchid from Hainan Island, and its conservation status was assessed as Critically Endangered (C2ai). This species is now known from three different sites, one in Bi Doup - Nui Ba National Park (Vietnam), Hainan Bawangling National Nature Reserve (Hainan Island, China) and Doi Pha Hom Pok National Park (Thailand). The total number of known mature individuals for this species is fewer than 100. The Area of Occupancy (AOO) is estimated as 12 km<sup>2</sup>. Therefore, this species can now be considered as Endangered [EN B2ab (ii,v)] following the guidelines for the IUCN Red List Categories and Criteria (IUCN, 2024). However, further studies on population size, distribution and population trends and threats are encouraged and it should be reassessed if more information becomes available.

*Notes:* The collection of *G. punctata* from Thailand exhibited few minor variations from the type description and the specimens from Hainan Island, such as gray-brown to brown flowers without silvery-white spots (*vs.* the presence of 1 silvery-white spots), and labellum being white with pale orange at base (*vs.* reddish-orange at apex and base). However, we consider this as natural variation in the species. *Gastrodia punctata* is morphologically similar to *G. huapingensis* X.Y. Huang, A.Q. Hu & Yan Liu which is endemic to Guangxi, China (Huang *et al.*, 2015). These two species share several common features, *viz.* several-flowered inflorescence, bell-shaped floral tube and labellum with four longitudinal ridges. However, *G. huapingensis* differs from *G. punctata* in having dimorphic (straight and incurved) columns. One could argue that *G. huapingensis* could simply represent an abnormal form of another *Gastrodia* species, such as *G. major* Aver. and *G. punctata*.

There are now eight species of *Gastrodia* known from Thailand. An updated key to distinguish these species is given below (modified from Suddee, 2014).

## Key to species of *Gastrodia* in Thailand

1. Labellum adnate to synsepal below for 1/2 or most of its length..... 2
1. Labellum not adnate to synsepal..... 3
2. Flowers white or pinkish-white; floral tube cylindric; labellum ornamented by 2 linear-oblong calli near base, apex fimbriate ..... *G. fimbriata*
2. Flowers dark pinkish-brown; floral tube campanulate; labellum without calli or keels, apex entire..... *G. phangngaensis*
3. Lateral sepals only connate at the base; labellum usually more than 8 mm long ..... *G. javanica*
3. Lateral sepals connate for most of their length; labellum usually more less 8 mm long.....4
4. Flowers pale brown..... 5
4. Flowers white, pinkish-white or white cream ..... 6
5. Inflorescence an elongate raceme with loosely arranged flower; floral bracts persistent; sepals almost equally joined into floral tube ..... *G. punctata*
5. Inflorescence a condensed raceme, subumbellate in appearance; loral bracts caducous; sepals unequally joined into floral tube..... *G. verrucosa*
6. Inflorescence an elongate raceme with loosely arranged flower; sepals equally joined into floral tube, sepal lobes erose to lacinate ..... *G. exilis*
6. Inflorescence a strongly condensed raceme with subdensely arranged flowers, subumbellate in appearance; sepals unequally joined into floral tube, sepal lobes subentire ..... 7.
7. Floral tube slightly verrucose towards apex, otherwise smooth; lateral sepals fused for 1/2 their length..... *G. albidoides*
7. Floral tube distinctly striate and verrucose throughout; lateral sepals fused for 1/4–1/3 their length..... *G. theana*

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