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Cheirostylis takeoi (Orchidaceae), a new record for Thailand

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ABSTRACT

Cheirostylis takeoi, a new national species record from Mae Sai District, Chiang Rai Province, northern Thailand, is described, photographed and illustrated based on Thai material. Furthermore, we outline how it differs from the morphologically most similar species in Thailand, *C. thailandica*. The newly recorded species is mainly characterized by its narrowly oblong-lanceolate, obtuse to subacute, entire, strongly recurved labellum that lacks appendages inside the slightly concave base.

KEYWORDS: *Cheirostylis takeoi*, new record, Orchidaceae, Thailand.

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INTRODUCTION

Cheirostylis Blume is a genus of small terrestrial or lithophytic orchids belonging to subfamily Orchidoideae (Pridgeon *et al.*, 2003). Currently, the genus consists of ca 50 species, distributed in tropical (to subtropical) regions from Africa through South and South-East Asia to New Guinea, Australia, and the western Pacific islands (Chen *et al.*, 2009; POWO, 2023). In Thailand, eight species have been recorded, distributed in all floristic regions of Thailand (Pedersen, 2011).

During field observations on the plant diversity of Khun Nam Nang Non National Park (Mae Sai District, Chiang Rai Province) under the "Cave and Karst topography management in National Park a Peripheral area project", specimens of a puzzling *Cheirostylis* species were collected along the nature trails of Liang Pha Cave. Based on examination of herbarium specimens, consultation of the literature (including recent floristic treatments such as Averyanov, 2008, Chen *et al.*, 2009 and Pedersen, 2011), and studies of digital images of type specimens accessed online, the material was identified as *Cheirostylis takeoi* (Hayata) Schltr. This species was not previously known from Thailand but only from Taiwan, northern Vietnam and Japan (Ryukyu Islands). Thus, our new discovery in Thailand has extended the known species range considerably towards the west.

In this paper, we provide a comprehensive morphological description, a line drawing and eight colour photographs of *Cheirostylis takeoi*, based on Thai material. Furthermore, we outline how it differs from the morphologically most similar species in Thailand, *C. thailandica* Seidenf.

TAXONOMIC TREATMENT

Cheirostylis takeoi (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 171. 1919.; L. Averyanov, Turczaninowia 11(1): 107. 2008.; S.C.Chen *et al.* in Z.Wu *et al.* (eds), Fl. China 25: 60. 2009.— *Arisanorchis takeoi* Hayata, Icon. Pl. Formosan. 4: 110. 1914.— *Cheirostylis chinensis* var. *takeoi* (Hayata) T.P.Lin, Taiwania 66: 356. 2021. Type: Taiwan, Chiayi, Arisan, inter Karapin et Suisharyo, ad 3300 ped. alt., 28 Mar. 1914, *Takeo Ito s.n.* (holotype **TI** [T00906, photo seen]). Figs. 1–2.

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— *Cheirostylis tatewakii* Masam., J. Soc. Trop. Agric. 4: 195. 1932.— *Goodyera tatewakii* (Masam.) S.S.Ying, Quart. J. Chin. Forest. 11(2): 102. 1978. Type: Taiwan, Taroko, 14 Mar. 1932, *Tatewaki et Kitamura s.n* (holotype not located).

— *Arisanorchis tairae* Fukuy., Acta Phytotax. Geobot. 14: 136. 1952.— *Cheirostylis tairae* (Fukuy.) Masam., Sci. Rep. Kanazawa Univ., Biol. 9(1): 129. 1964. Type: Japan, Ryukyu islands, Okinawa, *Y. Taira n. 3465* (holotype **TAI** n.v.).

— *Cheirostylis anomala* Ohwi, Bull. Natl. Sci. Mus. Tokyo, n.s., 1: 2. 1954. Type: Japan, Okinawa, 27 Feb. 1953, *T. Amano 7116*, (holotype **TNS** [TNS105987, photo seen]; isotype **AMES** [00082370, not seen], **FKSE** [KAG072633, photo seen], **US** [US00006908, photo seen]).

— *Cheirostylis eglandulosa* Aver., Bot. Zhurn. (Moscow & Leningrad) 81(10): 80. 1997. Type: N Vietnam, Cao Bang, Tra Linh, 22 Oct. 1995, *Averyanov et al. CB 032a* (holotype **LE**, [LE01059134, photo seen]).

Terrestrial, sympodial herb with a creeping and branching rhizome; new shoots arising from nodes of the rhizome, erect from a decumbent base, with 1–2 newly developing rhizome branches distally (from which the aerial shoots are produced) and 1 old rhizome branch proximally (the latter completely decaying during anthesis). *Rhizome* greenish brown, moniliform, fleshy, 1.5–4 cm long, 0.4–1.3 cm in diameter, each branch consisting of 4–8 internodes. *Foliage leaves* (2–)3–6, placed in a basal rosette, petiolate, sheathing at base, often absent or withered at anthesis; petiole 0.3–1 cm long; lamina greenish brown with a white to pale green band along midrib, lanceolate to broadly ovate with rounded to subcordate base, acute, 1–4.2 × 0.6–2 cm, glabrous, margins entire. *Inflorescence* terminal, racemose, erect, 8–15 cm tall; peduncle greenish brown, 7–14 cm long, 0.1–0.2 cm in diameter, sparsely glandular-pubescent; sterile bracts 2–3, lanceolate-ovate, sheathing at base, acuminate, 1-veined, glandular-pubescent on the dorsal surface; rachis ca 1 cm long, laxly 1- to 5-flowered; floral bracts light olive-pink, ovate, 7–14 × 3–7 mm, acuminate to cuspidate, shorter than ovary. *Flowers* short-pedicelled, not widely opening, ca 5 mm in diameter, mainly olive-green to pale brown with white petals and a white labellum. *Sepals* olive-green to pale brown, connate to form a tubular synsepal that is slightly saccate at base, 10–12 mm long, apically trilobed with triangular, obtuse lobes and sparsely glandular-pubescent on the outer surface. *Petals* white, free, appressed to the synsepal, obliquely oblanceolate to falcate, 10–12 × 3–3.5 mm, obtuse to subacute, 1-veined. *Labellum* white, narrowly oblong-lanceolate, obtuse to subacute, strongly recurved, 8–10 × 2–3 mm, slightly concave at base, devoid of appendages, margins entire and incurved. *Column* 2–3.7 mm long; stigma bipartite; stylids 2, linear-triangular, parallel to rostellum, usually shorter than rostellum lobes; rostellum bifid with linear lobes, 1.5–2 mm long; anther cuspidate-appendiculate in front, 1.5–2 mm long; pollinia 2, 1.5–2 mm long; stipe ca 2.5 mm long; viscidium 1, 2–2.5 mm long. *Ovary* (including pedicel) green to brownish green, cylindric-fusiform, 5–10 mm long, sparsely glandular-pubescent. *Capsule* suberect, short-pedicelled, obovoid, sparsely glandular-pubescent.

Thailand.— NORTHERN: Chiang Rai [Mae Sai District, Pong Pha Subdistrict, Tham Luang Khun Nam Nang Non National Park, Nature trail to Liang Pha Cave-Pha Ya Nak Cave, ca 480 m alt., 18 Mar. 2021, *Rakarcha et al. 1318* (**BKF!**, **QBG!**); 16 June 2021, *Pingyot et al. 634* (**BKF!**, **QBG!**); 1 Mar. 2022, *Pingyot et al. 815* (**BKF!**, **QBG!**)].

Phenology.— Flowering and fruiting in March–April. After the flowering and fruiting period, new shoots and leaves usually arise from early rainy season (May) to late winter (February).

Distribution.— Taiwan (type), Japan (Ryukyu Islands), northern Vietnam.

Ecology.— Terrestrial orchid in deciduous forest on limestone hill, ca 480 m alt. The population of *Cheirostylis takeoi* grows in humus-rich soil on limestone hills in the same area as *C. thailandica*.

Provisional conservation status assessment.— Following the latest guidelines for using the IUCN red list categories and criteria (IUCN Standards and Petitions Committee, 2022), we have assessed the global conservation status of *Cheirostylis takeoi* as Endangered (EN B2ab(iii)). Thus, whereas the extent of occurrence (EOO) of this species is large (ca 1,123,697.155 km^2), its known area of occupancy (AOO) is small (ca 26 km^2, based on a defined cell width of 1 km) as well as severely fragmented, and we have estimated a continuing decline in the area, extent and quality of its habitat.

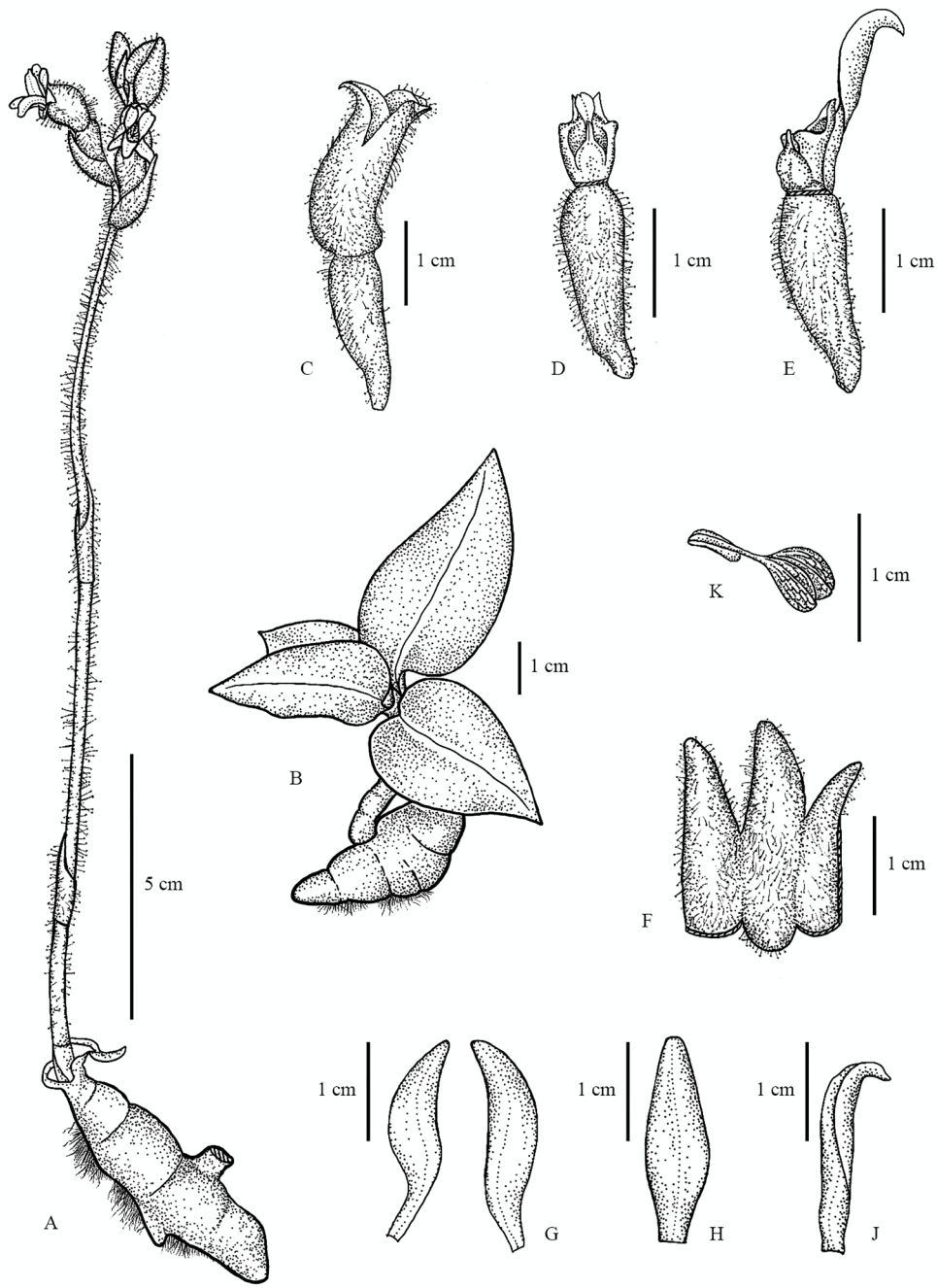

Figure 1. *Cheirostylis takeoi* (Hayata) Schlechter. A. habit with inflorescence; B. habit with leaves; C. flower, lateral view; D. column and ovary (synsepal, petals and labellum removed); E. ovary, column and labellum (lateral view); F. sepals; G. petals; H. labellum, front view; J. labellum, lateral view; K. pollinarium. Materials from *Pingyot et al. 815* (A), *Pingyot et al. 634* (B), *Rakarcha et al. 1318* (C–J). Drawing by Thitiporn Pingyot.

Figure 2. *Cheirostylis takeoi* (Hayata) Schlechter. A. habit with leaves; B. rhizome (at the time of anthesis); C–D. flowering plant in natural habitat; E–F. inflorescences; G. flower, front view; H. flowers, lateral view. Photos by Anchalee Nuammee (A–D, F–H) and Wattana Tanming (E).

We have not attempted a national conservation status assessment of *Cheirostylis takeoi* in Thailand using IUCN criteria. However, the only known population, though growing in a national park, is evidently so small that it could be extirpated with a single stochastic event.

Vernacular.— Ueang phai chaek pak laem (เอื้องพายแฉกปากแหลม)(proposed here).

Notes.— *Cheirostylis takeoi* was originally described as *Arisanorchis takeoi* by Hayata (1914) based on material in TI collected from "Arisan: inter Karapin et Suisharyo, ad 3300 ped. alt." in Taiwan. This species is mainly characterized by its oblong-lanceolate, obtuse to subacute labellum which has entire margins and lacks any papilla-like appendages inside. In this paper, we have followed Averyanov (2008), Chen *et al.* (2009), Iwatsuki *et al.* (2016), Lin *et al.* (2016) and Lin (2019) in treating the later described *C. tatewakii*, *C. tairae*, *C. anomala* and *C. eglandulosa* as heterotypic synonyms of *C. takeoi*.

Using the key to the species of *Cheirostylis* in Flora of Thailand (Pedersen, 2011), *C. takeoi* would be identified as *C. thailandica* (though with a certain mismatch in the labellum character applied). However, *C. takeoi* differs from *C. thailandica* in having an obtuse to subacute (rather than emarginate to bilobed) labellum and in lacking two rows of papilla-like appendages inside the concave labellum base.

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REFERENCES

Averyanov, L. (2008). The orchids of Vietnam. Illustrated survey. Part 1. Subfamilies Apostasioideae, Cypripedioideae and Spiranthoideae. Turczaninowia 11(1): 5–168.

Chen, X., Gale, S.W., Cribb, P.J. & Ormerod, P. (2009). *Cheirostylis* Blume. In: Z. Wu, P.H. Raven & D. Hong (eds), Flora of China 25: 57–63. Missouri Botanical Garden Press, St. Louis.

Hayata, B. (1914). Icones Plantarum Formosanarum nec non et contributiones ad Floram Formosanam. Volume 4. The Bureau of Productive Industries, Government of Formosa, Taihoku.

IUCN Standards and Petitions Committee (2022). Guidelines for using the IUCN Red List categories and criteria. Version 15.1. Prepared by the Standards and Petitions Committee. https://www.iucnredlist.org/documents/RedListGuidelines.pdf

Iwatsuki, K., Boufford, D.E. & Ohba, H. (2016). Flora of Japan IVb. Kodansha Ltd., Tokyo.

Lin, T.P. (2019). The orchid flora of Taiwan, a collection of line drawings. National Taiwan University Press, Taipei, Taiwan.

Lin, T.-P., Liu, H.-Y., Hsieh, C.-F. & Wang, K.-H. (2016). Complete list of the native orchids of Taiwan and their type information. Taiwania 61(2): 78–126.

Pedersen, H.Æ. (2011). *Cheirostylis*. In: T. Santisuk & K. Larsen (eds), Flora of Thailand 12(1): 29–42. The Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation, Bangkok.

POWO (2023). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; http://www.plantsoftheworldonline. org/. (Accessed on 7 August 2023).

Pridgeon, A.M., Cribb, P.J., Chase, M.W. & Rasmussen, F.N. (eds) (2003). Genera Orchidacearum 3. Orchidoideae (part 2), Vanilloideae. Oxford University Press, Oxford.