



Oreocharis thanhii (Gesneriaceae), a new species from Northwest Vietnam

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ABSTRACT: *Oreocharis thanhii*, a new species from Lai Chau Province, Northwest Vietnam, is described and illustrated. It is morphologically most similar to *O. obliqua* in purple flower, slender cylindrical corolla tube, and free anthers but differs from the latter by having fewer lateral veins, simple cyme or simple dichasium inflorescence, glandular-puberulent filaments and styles. Besides providing a detailed description and preliminary conservation status of this novelty, its key discriminative characteristics with related species are also presented in this paper.

KEY WORDS: Endemism, Indochina, Lai Chau province, *Oreocharis blepharophylla*, *Oreocharis obliqua*, Trichosporeae.

INTRODUCTION

Oreocharis Benth. was recently expanded by the inclusion of ten genera (Möller *et al.*, 2011) and placed in subtribe Didymocarpinae G. Don, tribe Trichosporeae Nees, subfamily Didymocarpoideae Arnott of Gesneriaceae (Weber *et al.*, 2013). With over 140 reported species globally (Lv *et al.*, 2022; GRC, 2023; POWO, 2023), the highest species diversity for the genus is found in Southern and Southwestern China, and Northern Indo-China (Kong *et al.*, 2022). Two main patterns of corolla color of species in this genus have been identified in China, which are correlated with their biogeographic distributions. Species with yellow corollas are mainly restricted to the Southwest, while those with purple corollas are found mostly in the South and Southeast regions of the genus distribution (Jin *et al.*, 2021). However, in Vietnam, both of these floral traits occur simultaneously.

The Flora of Vietnam has documented a total of nine species of *Oreocharis* (Vu, 2017; Chen *et al.*, 2017, 2018; Do *et al.*, 2017; Möller *et al.*, 2018; Le *et al.*, 2022; Wei *et al.*, 2022), and identification keys to these species have been compiled (Möller *et al.*, 2018; Le *et al.*, 2022). Of these, eight were found in Northern Vietnam, which is connected with Southwest China and known as the center of diversity of *Oreocharis* (Tan *et al.*, 2020; Jin *et al.*, 2022). However, only *O. phuongii* has been recorded from Central Vietnam (Le *et al.*, 2022).

During a recent botanical exploration of limestone areas in Lai Chau Province (Northwest Vietnam) on 12 October 2022, Mr. Thanh D.D. collected several specimens of a Gesneriad species. These specimens were

sent to HN (the Institute of Ecology and Biological Resources, Vietnamese Academy of Science and Technology; acronyms for all herbaria in the text follow Thiers (2023, continuously updated)) for the detailed study. Upon closer examination, it was discovered that this species is characterized by its spirally arranged leaves, axillary cymes, tubular, bilabiate flower, purple corolla, 4 stamens, non-coherent anthers, ring-like disc and loculicidal capsules, which indicate that it belongs to the genus *Oreocharis* (Wang *et al.*, 1998; Möller *et al.*, 2011). After consulting literature listed above and relevant publications (Li, 1983; Li and Wang, 2005; Wei *et al.*, 2010; Xu *et al.*, 2017; Wei, 2018), examining type specimens stored in IBK, IBSC, LE, PE, KUN, HN, VNM, and photos of relevant specimens available from E, P, K, Chinese Virtual Herbarium (CVH, <https://www.cvh.ac.cn/index.php>), Plant Photo Bank of China (PPBC, <http://ppbc.iplant.cn/>), Chinese Field Herbarium (CFH, <http://www.cfh.ac.cn/>), National Specimen Information Infrastructure (NSII, <http://www.nsii.org.cn/2017/home-en.php>), Global Biodiversity Information Facility (GBIF, <https://www.gbif.org/>) and JSTOR Global Plants (<http://plants.jstor.org>), and compared our plant with its closely relative congeners (Table 1). We confirm that the plant collected in Lai Chau represents a new species which is described below.

MATERIALS AND METHODS

Fresh flowers and parts of the inflorescences of collected plants were preserved in 50% ethanol for further morphological studies. The fixed materials and dried

**Table 1.** Key discriminative morphological characters of *Oreocharis thanhii*, *O. blepharophylla* and *O. obliqua*

Characters	<i>O. thanhii</i>	<i>O. blepharophylla</i>	<i>O. obliqua</i>
Leaf adaxial surface	sparsely pubescent to glabrous	tuberculate setose	sparsely villous to glabrous
lateral veins	5–6 pairs	5–6 pairs	7–11 pairs
Inflorescence	simple cyme or simple dichasium with (1–)2–4(–5) flowers	simple cyme or simple dichasium with 1–4 flowers	usually compound dichasium with 5–11 flowers
Corolla indumentum outside	puberulent and glandular	pubescent without glandular hair	glandular-puberulent
tube dimensions	13–18 × 3.5–4.5 mm	11–12 × 2.1–2.2 mm	ca. 10 × 2.5 mm
lobe shape	oblong	obovate	linear-oblong
Filament indumentum	glandular puberulent	glabrous	glabrous
Anthers	free	coherent in pairs	free
Disc margin	repand	shallowly 5-lobed	shallowly 5-lobed
Style indumentum	glandular puberulent	glabrous	glabrous
Fruit length	14–16 mm	10.5–13 mm	25–30 mm

Note: The characters of *O. blepharophylla* is from Chen *et al.* (2017) with photos of type specimens (LE 01067542, LE 01067243 and LE 01067258) from LE (<https://en.herbariumle.ru/>); and of *O. obliqua* is referred to Li (1983), Wang *et al.* (1998) with type specimens (PE 00030863, IBSC 0649608) and other specimens (PE 00155402, PE 00155404, PE 02106088, KUN 1296180, KUN 1385454) from CVH (<https://www.cvh.ac.cn/>), and photos of living plants from PPBC (<http://ppbc.iplant.cn/>).

specimens were kept at HN. Measurements of floral parts were made from both living and alcohol materials using the 14X Hastings Triplet (Bausch & Lomb) magnifier and a ruler with a reading scale of 0.5 mm. General terminology for plant description is mostly follows Beentje (2016).

TAXONOMIC TREATMENT

Oreocharis thanhii T.P.A. Tran, K.S. Nguyen & K. Tan, *sp. nov.* **Figs. 1, 2**

Type: VIETNAM, Lai Chau Province: Sin Ho District, Xa De Phin Commune, Mao Sao Phin Village, remnants of primary evergreen forest on a limestone mountain, elev. 1500–1800 m a.s.l., perennial terrestrial herbs, flowers purple, common on steep or vertical slopes, 12 October 2022, *Dinh Danh Thanh, DDT-SH 01* (holotype: HN!; isotypes: LE 01170176!, HN!).

Diagnosis: differs from its morphologically closest *Oreocharis obliqua* in having lateral veins 5–6 (vs. 7–11) pairs, simple cyme or simple dichasium with usually 2–4 flowers (vs. usually compound dichasium with 5–11 flowers), filaments and styles glandular-puberulent (vs. glabrous), and mature capsule 14–16 (vs. 25–30) mm long.

Description: Terrestrial or lithophytic, perennial herb. Stem basally brown, apically pale greenish to almost white, (2–)3–6(–8) cm long, 3–6 mm in diameter, densely white tomentose, with numerous fleshy, fibrous, adventitious roots. Leaves 13–21, consecutively spirally arranged along stem, basally in lax rosette, more congested apically, petiolate; petiole pale green, greenish or almost white, (0.8–)1.5–4.5(–5.5) cm long, 2.5–3.5 mm in diameter, somewhat flattened to slightly grooved on adaxial side, abaxially convex, densely light brownish to purplish red villous with multi-cellular long hair 3–4 mm long; leaf blade usually asymmetric, narrowly elliptic to oblanceolate, (3.5–)4–7.5(–8) × (1.2–)1.5–3(–3.2) cm, adaxially green to dark yellowish green, sparsely

pubescent to glabrous; abaxially paler green, with appressed brownish white to purplish red villous hairs on veins and margins; base cuneate, sometimes oblique, apex acute to obtuse, margin undulate to irregularly shallowly serrate and ciliate; veins adaxially inconspicuous and slightly sunken, abaxially conspicuously prominent, with 5–6 lateral veins on each side of midrib. Inflorescences 3–7 per plant, axillary, simple cyme or simple dichasium with usually paired flowers; flowers 2–4, rarely 1 or 5; peduncle pale brownish green, terete, (4–)5–9(–10) cm long, ca. 2 mm in diameter, brown to brownish red, pubescent with stiff glandular hairs (more numerous at apical part); bracts 2, dark green, opposite, adpressed to pedicel, narrowly lanceolate to ensiform, 3–5 × 0.7–0.9 mm, abaxially sparsely purplish red pubescent, adaxially glabrous, apex acute, margin entire; pedicel (4–)7–13(–15) mm long, 0.6–1.2 mm in diameter, glandular-pubescent with erect purplish red hairs or sparsely villous. Calyx light green, evenly 5-lobed, dissected to the base; lobes narrowly lanceolate, 4–6 × 0.6–0.8 mm, acute, margin entire, adaxially glabrous, abaxially pubescent with purplish red hairs. Corolla tubular, bilabiate, 18–25 mm long, externally pinkish purple to pale purple, sparsely throughout puberulent with erect purplish red and white glandular hairs; adaxially white with five light bluish purple to purplish red stripes running distally from middle corolla tube to lower half of corolla lobes, glabrous; tube almost straight, tubular, 13–18 mm long, 3.5–4.5 mm in diameter, somewhat constricted below throat; upper lip 2-lobed, lobes slightly oblique, oblong, 5–6 mm long, 1.8–2.3 mm wide; lower lip 3-lobed, longer than the upper lip, lobes narrowly oblong, lateral ones 7–9 × 2.3–2.8 mm, the central one 9–11 × 2.7–3.4 mm; all lobes obtuse to nearly round at apex, margin entire or slightly repand, glandular-ciliate. Stamens 4, anthers free and not coherent in two pairs, filaments white, thick, straight, sparsely glandular puberulent, terete, 5–6 mm long, ca.

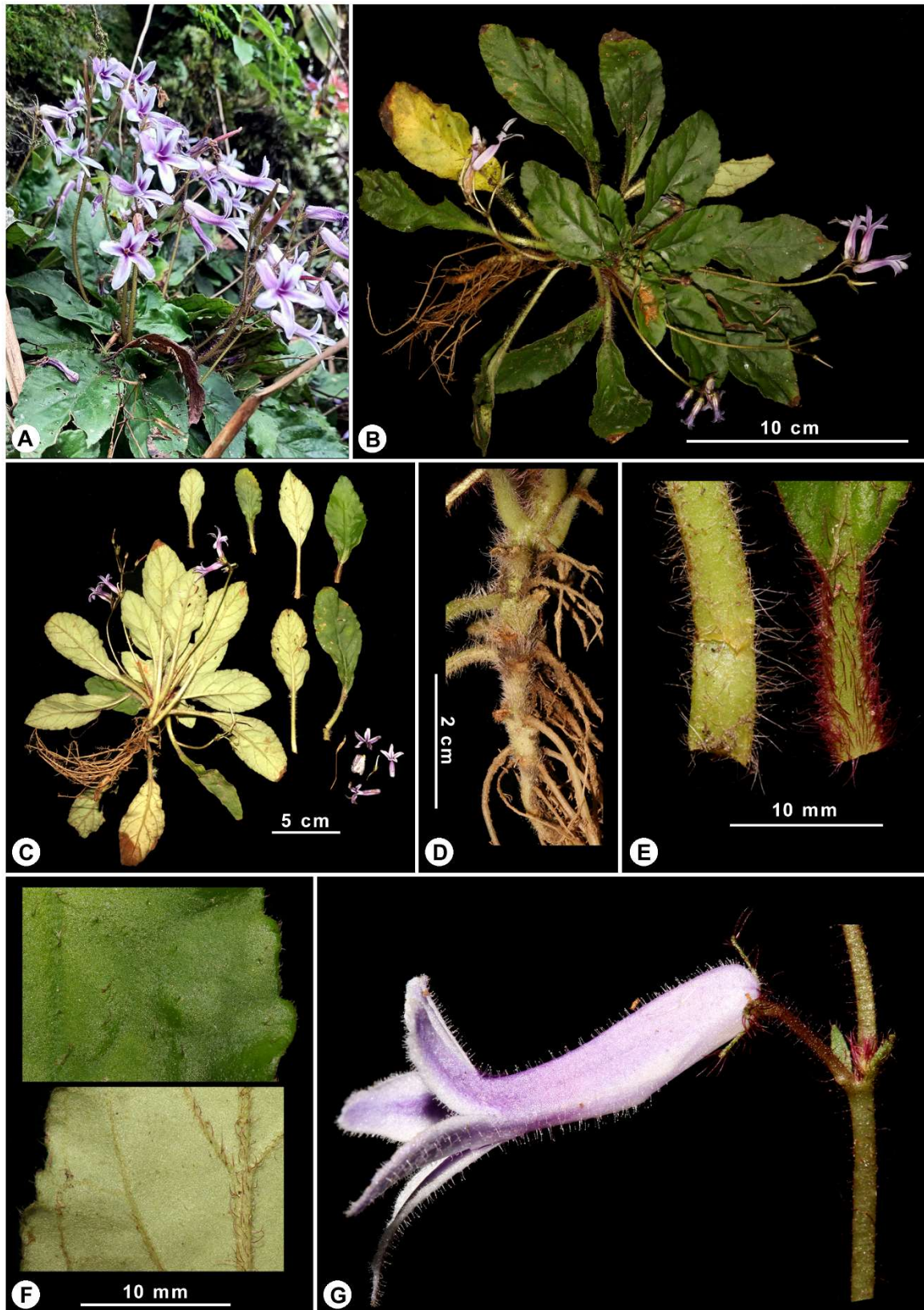


Fig. 1. Illustration of *Oreocharis thanhii* in nature and its type specimen. **A:** Plants in nature. **B–C:** Flattened flowering plant. **D:** Rhizome and roots. **E:** Abaxial and adaxial surfaces of petiole. **F:** Portion of adaxial and abaxial leaf surface. **G:** Flower, side view. Photo **A** by D.D. Thanh, **B–G** and design by K.S. Nguyen

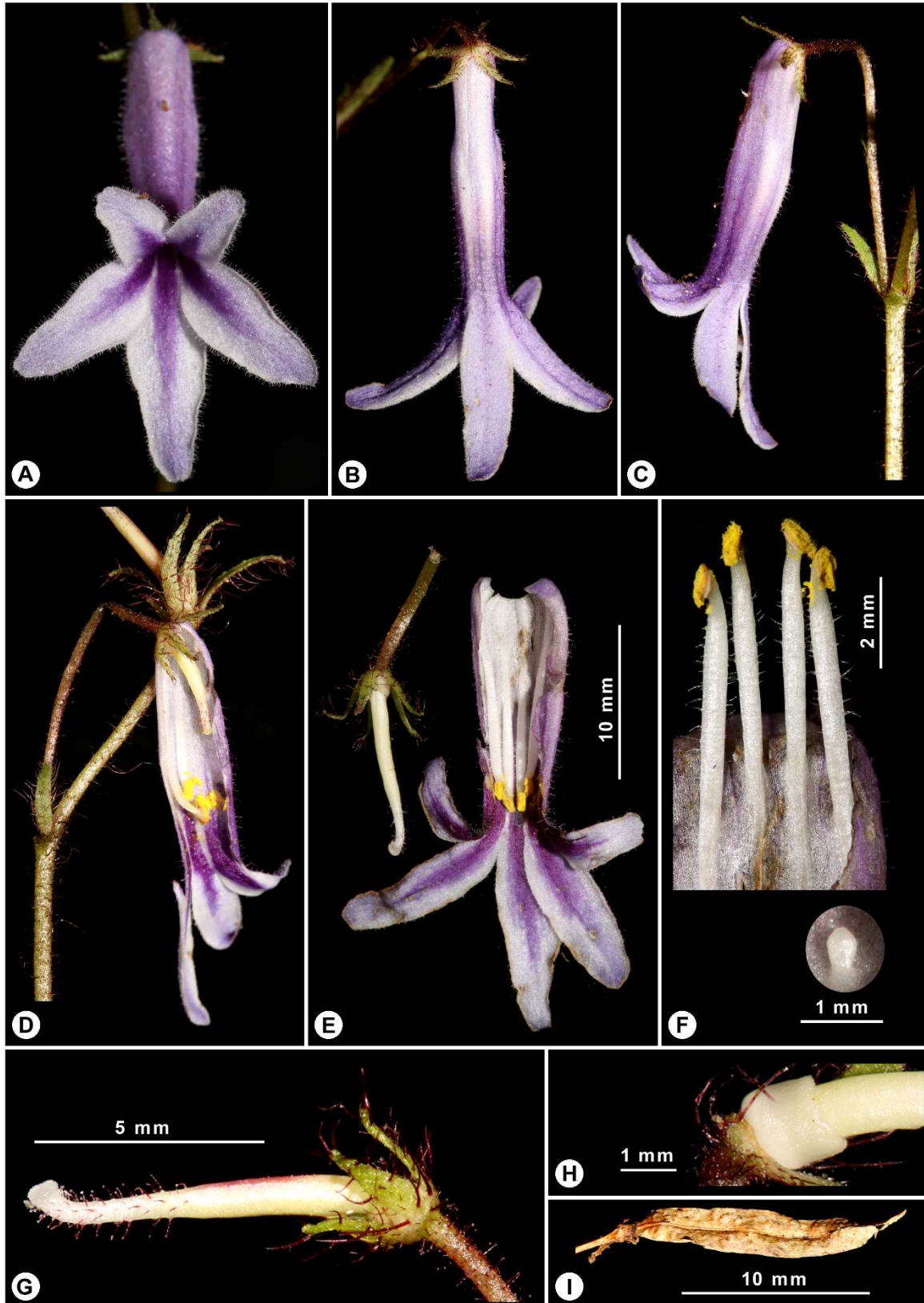


Fig.2. Reproductive morphology of *Oreocharis thanhii*. **A–C:** Flower, front, back and side view. **D:** Portion of flower, longitudinal cut. **E:** Dissected flower, showing opened corolla and pistil. **F:** Stamens and staminode. **G:** Pistil and calyx lobes. **H:** Disc. **I:** Mature capsule. Photos and design by K.S. Nguyen.



0.5 mm in diameter, upper and lower two adnate to 6–7 mm and 7–8 mm above tube base respectively; anthers dark yellow to pale yellow-orange, bean-shaped, 0.9–1.1 mm long, ca. 0.5 mm wide, basifixed, introrse; staminode 1, adnate to 3–4 mm above tube base, white, glabrous, almost sessile, nearly ellipsoid or oval, ca. 0.5 × 0.3 mm. Disc white, glabrous, ring-like or cup-shaped, 1.2–1.5 mm high, 1.7–1.9 mm in diameter, margin repand. Pistil pale greenish to almost white, terete, apically tapering, 9–11 mm long when mature; the boundary of ovary and style indistinct, ovary 6–8 mm long, ca. 1 mm in diameter, glabrous; style ca. 3 mm long, 0.5–0.8 mm in diameter, sparsely puberulent with purplish red glandular hairs, the junction of style and stigma usually curved; stigma truncate to nearly capitate, ca. 1 mm in diameter, papillate or densely puberulent with short white hairs. Capsule linear, terete or slightly flattened, straight to slightly curved, apex beaked, 14–16 mm long (including a beak or a persistent style ca. 2 mm long), 1.8–2.2 mm in diameter, loculicidal dehiscent. Seeds numerous, minute, dark brown to almost black.

Distribution, habitat and phenology: *Oreocharis thanhii* is currently only found in its type locality in Sin Ho District, Lai Chau Province, NW Vietnam, where it grows on wet, well-draining soil or rock, on shaded, steep slopes of limestone mountains covered by remnants of the humid primary evergreen broad-leaved forest at an elevation of 1400–1800 m a.s.l. The plant flowers in October, and fruiting may occur from October to December.

Etymology: The species epithet “*thanhii*” refers to the collector name Dinh Danh Thanh. In this context, the Vietnamese name “Nhạc Ngựa Thành” is proposed.

Preliminary conservation assessment: Single known population of new species was found near Mao Sao Phin Village, Xa De Phin Commune, Sin Ho District, Lai Chau Province (Northwest Vietnam). The population comprises less than 500 mature individuals growing on a moist, shaded limestone cliff. The plant population remains undisturbed by human activities and according to information obtained from local people, this species has not been exploited for ornamental or medicinal purposes. The habitat is located in a remote mountainous area. Following the IUCN Red List Categories and Criteria (IUCN, 2022), the species is provisionally assessed as data deficient (DD) because more field surveys are needed to understand its actual distribution range.

Taxonomic notes: Of the three similar species, *Oreocharis obliqua* was described by Li (1983) without floral characteristics, based solely on fruiting samples collected in China, Yunnan, Maguan, Laojunshan, alt. 1400–1600 m, on December 7, 1947, *K.M. Feng 13680* (isotypes: PE 00030863, IBSC 0649608, HUH A00353701). Fortunately, some populations with flowering plants were later found in Yunnan Province (see photos from <http://ppbc.iplant.cn/sp/30667>), and

several specimens with flowers are stored in PE and KUN (<https://www.cvh.ac.cn/index.php>). Notably, *O. obliqua* has a purple flower, slender cylindrical corolla tube, linear-oblong corolla lobes of the lower lip, and free anthers, which are most similar to *O. thanhii*. However, the latter differs from the former by its fewer lateral veins, simple cyme or simple dichasium with usually 2–4 flowers, glandular-puberulent filaments and styles, and mature capsule much shorter (see Table 1). The new species also resembles *O. blepharophylla* W.H.Chen, H.Q.Nguyen & Y.M.Shui on vegetative characteristics and floral traits such as purple flower and slender cylindrical corolla tube, but strikingly differs from it mainly by having villous (vs. strigose) abaxial surface of veins, glandular puberulent (vs. glabrous) filaments and styles, and anthers free (vs. coherent in pairs). The key discriminative morphological characters of *Oreocharis thanhii*, *O. blepharophylla* and *O. obliqua* are provided in Table 1.

New and all mentioned species share similar floral characteristics, namely slender cylindrical corolla tubes, gracile and long corolla lobes of the lower lip, and purple hues of flowers. Those characters indicate that they might be sharing more or less similar pollinators or correlated with their biogeographical patterns, as was observed in China (Jin *et al.*, 2021).

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