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Two new species of *Agapetes* (Ericaceae) from Yunnan, China

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ABSTRACT: *Agapetes wenpeiana* Bin Yang & Y.H.Tan and *Agapetes mingyuaniana* H.B.Ding, Bin Yang & Y.H.Tan, two new species of Ericaceae from Yingjiang County, western Yunnan Province, China, are described and illustrated. *Agapetes wenpeiana* is morphologically similar to *A. putaoensis* but differs in having dark red corollas in the late flowering stage, longer corollas and stamens, and anthers without spurs. It is one of only two Chinese *Agapetes* species possessing dark red corollas and strongly reflexed corolla lobes in the late flowering stage. *Agapetes mingyuaniana* is morphologically similar to *A. variegata* but differs in having ridged branchlets, shorter pedicels, longer corollas, stamens and styles, and anthers without spurs. It is unique among Chinese *Agapetes* species in combining ridged branchlets and corollas longer than 5.5 cm. Detailed descriptions, color plates and notes on these two new species are provided.

KEY WORDS: *Agapetes mingyuaniana*, *Agapetes putaoensis*, *Agapetes variegate*, *Agapetes wenpeiana*, floristics, Yingjiang.

INTRODUCTION

Agapetes D.Don ex G.Don (1834: 862) comprises ca. 117 species (POWO, 2025; Xie *et al.*, 2025; Zou *et al.*, 2025), most of which are distributed in the Asian subtropical monsoon region (Wang *et al.*, 2021). Approximately 65 species and four varieties are found in China (Tong *et al.*, 2024; Yang *et al.*, 2024; Xie *et al.*, 2025; Zou *et al.*, 2025). Over the past decade, 14 new species and three new varieties of *Agapetes* have been described from China and adjacent regions (Tong and Xia, 2014; Tanaka *et al.*, 2016; Tong, 2016; Zhou *et al.*, 2017; Tong *et al.*, 2019, 2021, 2022, 2024; Yang *et al.*, 2019, 2022b, 2023, 2024; Xie *et al.*, 2025; Zou *et al.*, 2025). Two new species—*A. yingjiangensis* Y.H.Tong, B.M.Wang & N.H.Xia (Tong *et al.*, 2019), and *A. lihengiana* BinYang & Y.H.Tan (Yang *et al.*, 2023) and two new records for the flora of China—*A. nana* (Griff.) Benth. & Hook.f. (Wang *et al.*, 2021) and *A. wardii* W.W.Sm. (Tong *et al.*, 2023; our observations and collections) have been discovered in Yingjiang county, southwestern China, suggesting that additional new species remain to be discovered.

Yingjiang County, located in western Yunnan Province, lies at the convergence of the "East Asian Floristic Region" and the "Paleotropical Floristic Region," and harbors exceptionally rich plant diversity. In recent years, many species have been discovered from this region (e.g., Xue *et al.*, 2017; Gong *et al.*, 2018; Wang *et al.*, 2018; Zhang *et al.*, 2020; Yang *et al.*, 2022a; Yue *et al.*, 2023; Ding *et al.*, 2023), but baseline surveys on the region's plant diversity remain incomplete. During recent field expeditions to survey plant diversity in Yingjiang County, two unknown *Agapetes* species were collected. After detailed morphological comparison with congeneric species (Roxburgh, 1832; Don, 1834; Airy Shaw, 1948, 1958; Banik and Sanjappa, 2014; Tong and Xia, 2014; Yang *et al.*, 2021), we confirmed these two taxa as new to science and describe and illustrate them herein.

TAXONOMIC TREATMENT

Agapetes wenpeiana Bin Yang & Y.H.Tan, ***sp. nov.***
Figs. 1 & S1

***Type*: CHINA.** Yunnan Province, Yingjiang County, Kachang Town, epiphytic on trees near riverside, 625 m, introduced from the wild and cultivated at the greenhouse of Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences. Voucher specimens collected from the cultivated plant, 21 December 2024, *B. Yang, YB1899* (holotype: HITBC [HITBC0128720!]; isotypes: HITBC [HITBC 0128773!], KUN!).

Diagnosis: *Agapetes wenpeiana* is morphologically similar to *A. putaoensis* Y.H.Tong & N.H.Xia in having elliptic-lanceolate leaf blades, cylindrical-conical corollas, and strongly reflexed corolla lobes at anthesis. It can be clearly distinguished by its leaf blades with 7–12 pairs of

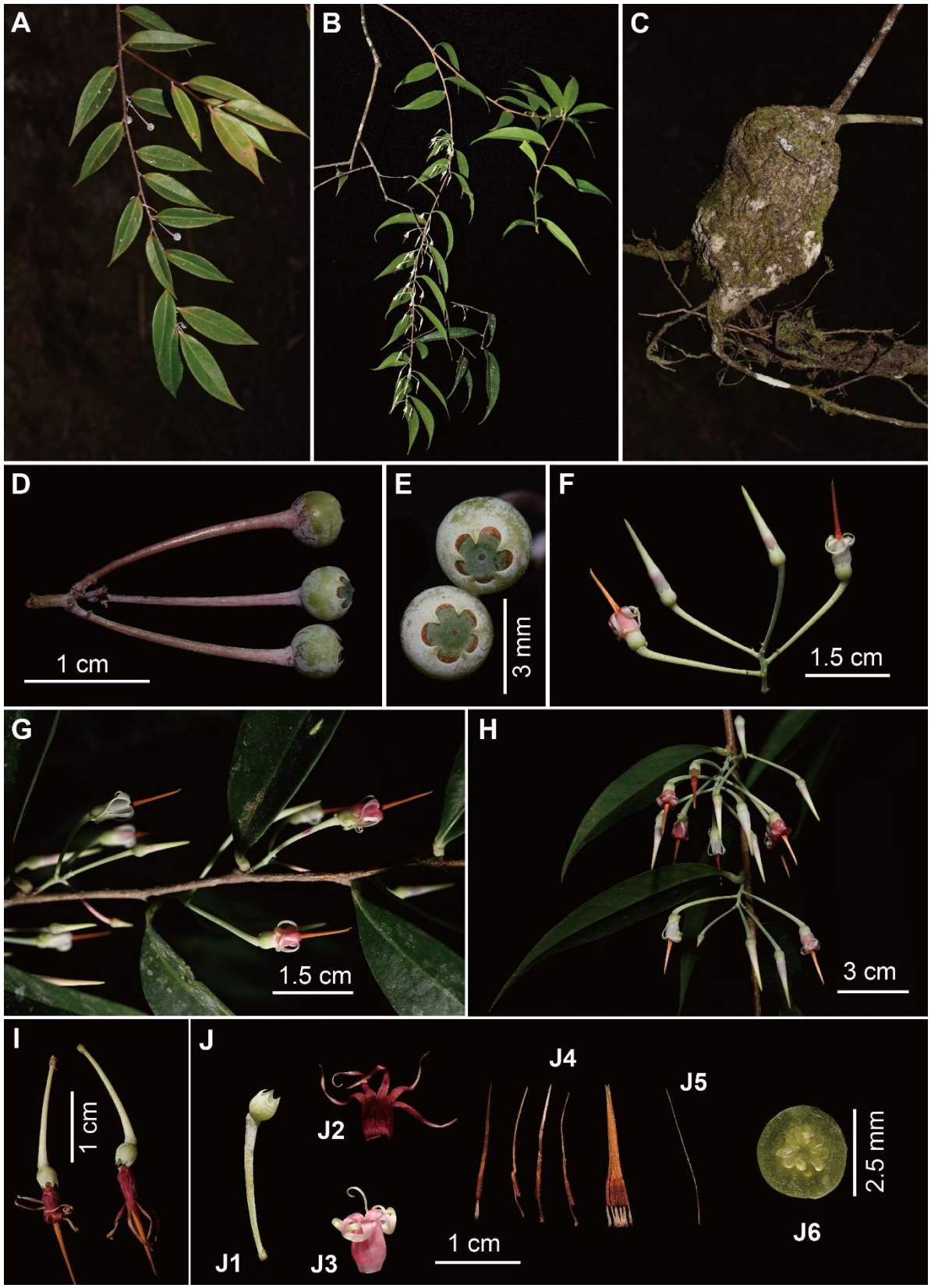

Fig. 1. ***Agapetes wenpeiana*** Bin Yang & Y.H.Tan. **A.** Fruiting branch; **B.** Flowering branch; **C.** Root; **D.** Infructescence; **E.** Berries (bottom view); **F.** Inflorescence; **G.** & **H.** Part of flowering branch; **I.** Flowers; **J.** Dissection of flower (J1. flower with corolla, stamens and style removed; J2. & J3. corolla; J4. stamens; J5. style; J6. cross-section of ovary). (Photos: by Bin Yang).

secondary veins (vs. 3–5 pairs in *A. putaoensis*), corolla 12.5–14 mm long (vs. 8–10 mm), corolla lobes 9–10 mm long (vs. 5–6 mm), corolla dark red in the late flowering stage (vs. reddish white), stamens 12–14 mm long (vs. 8–9 mm), filaments 2.5–2.7 mm long (vs. ca.1 mm), anthers 11–12 mm long (vs. 7–8 mm), anthers without spurs (vs. spurs present), and style 1.4–1.5 cm long (vs. ca.1 cm). (Fig. S2).

***Description*:** Shrubs, epiphytic, evergreen, 0.5–1.5 m tall, with oblate root tubers, much-branched, branches pendulous. **Branchlets** terete, longitudinal-striate, slender, 1–3 mm in diam., glabrous. **Leaves** spirally scattered and alternate; petiole 4–6 mm long, 1.0–1.3 mm in diam., glabrous; blades elliptic-lanceolate, 5.0–13.2 × 1.2–2.2 cm, thinly leathery, glabrous on both surfaces, with one pair of glands at base, midvein raised on both surfaces, secondary veins 7–12 pairs, with delicate veins slightly conspicuous on both surfaces, basalmost pair of secondary veins ascending closely along the leaf margin, arching and fusing to form an intramarginal vein, distinct adaxially, slightly visible or sometimes indistinct abaxially, base cuneate to attenuate, margin entire, slightly revolute, apex caudate-acuminate. **Inflorescences** axillary or on leafless stems, corymbose, pendent, 1–11-flowered, glabrous; peduncle 1.5–5.9 mm long, 0.3–0.5 mm in diam. **Bracts** deltoid, ca. 0.5 mm long, glabrous. Flowers articulated with pedicel, **bracteoles** 2–3, borne at the base of pedicel, triangular, 0.1–0.2 mm long. **Pedicel** slender, 1.5–2.0 cm long, ca. 0.2 mm in diam., glabrous, slightly expanded distally. **Hypanthium** greyish green when fresh, pale creamy brown to dark greyish brown when dried, glabrous, 1.5–2.5 × 2.0–2.5 mm; calyx limb glabrous, 1.3–1.5 × 2.0–3.5 mm, calyx lobes 5, triangular-lanceolate, 1.0–1.2 × ca. 0.5 mm, apex attenuate to acuminate. **Corolla** white at bud stage and early flowering, gradually turning pink and finally dark red, cylindrical-conical, 12.5–14.0 × ca. 2.2 mm, glabrous; corolla tube 3.5–4.0 mm long, corolla lobes 5, triangular-lanceolate, 9.0–10.0 × 0.9–1.0 mm, strongly reflexed in late flowering. **Stamens** 10, 12–14 mm long. **Filaments** flat, 2.5–2.7 mm long, sparsely white-pilose. **Anthers** 11–12 mm long; thecae 2.4–2.6 mm long, papillate; tubules ca. 8.8–9.2 mm long, without spurs. **Ovary** pseudo-10-locular, 1.5–2.0 mm in diam., glabrous. **Style** 14–15 mm long, glabrous, stigma punctate. **Berry** green when immature, greyish white when mature, globose, 3.5–6.0 mm in diam., glabrous, glaucous; disk becoming outwardly bulged as fruit matures, with calyx lobes appressed to disk.

***Distribution and habitat*:** *Agapetes wenpeiana* is known only from Yingjiang County in western Yunnan Province, southwest China. It is typically epiphytic on trees along streams in evergreen broad-leaved forests at 600–700 m elevation.

***Phenology*:** *Agapetes wenpeiana* flowering occurs from December to February of the following year, and fruiting from March to July.

***Etymology*:** The specific epithet is named in honor of Prof. Wen-Pei Fang (1899–1983), who made significant contributions to the taxonomic study of Ericaceae in China, the investigation of Chinese plant resources, and the training of botanical professionals.

Proposed Chinese name: Wen Pei Shu Luo Bo 文培树萝卜.

***Preliminary conservation status*:** During our survey, only one population with a few individuals was recorded. Its locality is outside of protected areas, and the remaining big trees on which the species grows along the river are vulnerable to cutting. Therefore, in accordance with IUCN guidelines (IUCN Standards and Petitions Committee, 2024), this species is assessed as vulnerable (VU, B1B2ab(iii,v)C2a(i,ii)b). To ensure the conservation of this rare species, sensitive collection details (e.g., micro-localities, GPS coordinates) of the type specimens have been anonymized, retaining only county/town-level information.

***Notes*:** According to Airy Shaw's infrageneric classification (Airy Shaw, 1935, 1958), *Agapetes wenpeiana* should be assigned to *Agapetes* sect. *Agapetes* ser. *Graciles* Airy Shaw (1935: 25) subser. *Longifoliae* Airy Shaw (1958: 490) as based on its slender stems, alternate leaves, most leaves over 6 cm long, inflorescence corymbs, short filaments, and anthers without spurs.

In the key to the Chinese species of *Agapetes* (Fang and Stevens, 2005), *A. wenpeiana* keys most closely resembles *A. graciliflora* R.C. Fang, but differs by having entire leaf blade margins (vs. remotely serrulate), longer pedicels (1.5–2.0 cm vs. 0.5–0.8 cm), corollas white during the bud stage and early flowering, gradually turning pink and finally dark red (vs. greenish, tinged with red), longer corolla lobes (9–10 mm vs. 1–1.5 mm), and shorter filaments (2.5–2.7 mm vs. 6–7 mm).

Agapetes wenpeiana is one of only two Chinese *Agapetes* species with dark red corollas and strongly reflexed corolla lobes in the late flowering stage, the other being *A. nana* (Griff.) Benth. & Hook.f., a new record for China also discovered in Yingjiang County (Wang *et al.*, 2021). *A. wenpeiana* can be distinguished from *A. nana* by its alternate leaves (vs. pseudo-verticillate), longer corolla (12.5–14 mm vs. 10–11 mm), and anthers without spurs.

***Additional specimens examined*:** **CHINA.** Yunnan Province, Yingjiang County, epiphytic on the trees near a riverside, 625 m, 3 April 2023, *B. Yang, Y.J.W. Yang & M.M. Yue, YB1275* (HITBC, KUN, PE); introduced and cultivated at the greenhouse of Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, 18 July 2023, *B. Yang, YB1355* (fr.) (HITBC); 5 February 2024, *B. Yang, YB1569* (fl.) (HITBC). ***Specimens of Agapetes putaoensis*: MYANMAR.** Kachin State, Putao, Renan, epiphytic on trees, 27°42'6″N, 98°2'14″E, 970 m, 15 March 2009, *Ayeyarwady Expedition 2416* (holotype: IBSC; isotypes: CDBI, IBSC); Putao, Wasadam, 29 April 2016, *Y.H. Tan & S.S. Zhou M201634* (HITBC); Putao, on the way from the mountain top to Namti, 14 May 2017, *Y.H. Tan et al. M1777* (HITBC); Putao, Northwest of Zeyadam, on the way from Camp 1 to Zeyadam, 12 May 2017, *S.S. Zhou & X.D. Zeng M2123*

(HITBC). **CHINA.** Yunnan Province, Lüchun County, Qimaba Township, Huangliangshan National Natural Reserve, 22°50'30.75″N, 102°14'41.15″E, 1100 m, 11 April 2020, *J.W. Li 5402* (HITBC); Sanmeng Township, Lagu Village, 1500 m, 10 April 2018, *Lüchun Team 5326310565* (IMDY).

Agapetes mingyuaniana H.B.Ding, Bin Yang & Y.H.Tan, ***sp. nov.*** **Figs. 2, S3**

***Type*: CHINA.** Yunnan Province, Yingjiang County, Kachang Town, epiphytic on rocks near a riverside, 664 m, 23 October 202*3, H.B. Ding, J.W. Li, & Z.S. Yu D793* (holotype: HITBC [HITBC0128771!]; isotypes: HITBC [HITBC0128772!]; KUN, PE).

Diagnosis: *Agapetes mingyuaniana* is morphologically similar to *A. variegata* (Roxb.) D.Don ex G.Don in having lanceolate leaves, pink corollas, and stamens with short filaments, but differs by its ridged branchlets, spirally scattered alternate leaves (vs. pseudowhorled), secondary veins of 15–25 pairs (vs. 8–10 pairs), pedicels 1.7–2.1 cm long (vs. 2.5–2.7 cm), corollas 5.8–6.3 cm long (vs. 4.5–5.5 cm), corolla lobes 10–16 mm long (vs. 6–7 mm), stamens 5.3–5.9 cm long (vs. ca. 4.8 cm), anthers 4.8–5.2 cm long (vs. 4.1–4.3 cm), absence of anther spurs (vs. spurs obscure), styles 5.8–6.3 cm long (vs. ca. 4.7 cm), and stigma punctate, ca. 1 mm in diam. (vs. 5-lobed, glandular-capitate, ca. 2.5 mm in diam.).

Description: Shrubs, epiphytic, evergreen, 1–2 m tall, much-branched, with spindly to oblate tuberous roots. Branchlets terete with ridges, stout, 3–15 mm in diam., glabrous. **Leaves** spirally scattered, alternate; petiole 10.0–26.0 × 1.3–2.0 mm, glabrous; blades lanceolate or elliptic-lanceolate to oblong-lanceolate, 10.2–17.8 × 2.4–6.7 cm, coriaceous, glabrous on both surfaces, midvein slightly impressed adaxially, prominent abaxially, secondary veins 15–25 pairs, prominent adaxially, inconspicuous to slightly prominent abaxially, the basalmost pair sometimes ascending closely along leaf margin, arching and fusing to form an intramarginal vein below middle of blade, the remaining secondary veins occasionally connecting near the margin to form an incomplete intramarginal vein, tertiary venation slightly prominent adaxially, reticulate, obscure abaxially; base cuneate, margin entire, with 1–2 pair of glands near base, apex acute to attenuate. **Inflorescences** borne on leafless old branches, corymbose or fasciculate, 4–12-flowered, peduncle 2.5–3 mm long. **Bracts** numerous, triangular, 1.0–1.8 × 0.5–1.0 mm, glabrous. **Bracteoles** 3, borne at base of pedicel, deltoid, ca. 1.0–1.5 × 0.5 mm. **Pedicel** 17–21 × 0.8–1.0 mm, glabrous. **Hypanthium** pink to pink with greyish green when fresh, reddish brown when dried, glabrous, cup-shaped, 5.0–6.0 × 6.0–6.5 mm when fresh, 3.5–4.0 × 2.5–3.5 mm when dried; calyx limb 3.0–4.0 × 5.0–6.5 mm, calyx lobes 5, deltoid, 2.5–3.5 × 1.7–2.3 mm. **Corolla** tubular, glabrous, slightly expanded near middle, 5.8–6.3 cm long, 1.5–1.6 cm in diam., whitish pink to pink or orangish red when fresh, rust-coloured to dark red when dried, with 5 vertical orangish pink ridges and numerous distinct dark red reticular horizontal stripes; corolla tube 4.5–4.8 cm long, corolla lobes 5, deltoid-lanceolate, 10.0–16.0 × 3.6–5.5 mm, apex attenuate, reflexed. **Stamens** 10, 5.3–5.9 cm long. **Filaments** flat, incurved, 5–7 × 1–1.5 mm, glabrous inside, subglabrous to sparsely puberulous near apex outside. **Anthers** 4.8–5.2 cm long; thecae 7.5–10.0 mm long; tubules parallel, 4.1–4.3 cm long, without spurs. **Disk** brownish yellow, ca. 4 mm in diam., glabrous. **Ovary** pseudo-10-locular, 3.5–4.5 mm in diam. when fresh, 2.5–3.5 mm in diam. when dried. **Style** 5.8–6.3 cm long, stigma punctate, ca. 1 mm. **Berry** cupuliform, shiny brownish red, ca.1.5 × 1.2 cm when fresh, 10.6–12.8 × 7.8–11.1 mm when dried, glabrous, with persistent calyx lobes.

***Distribution and habitat*:** *Agapetes mingyuaniana* is known only from Yingjiang County in western Yunnan Province, southwestern China. It is typically epiphytic on trees of evergreen broad-leaved forests at 600–800 m elevation.

***Phenology*:** *Agapetes mingyuaniana* flowering occurs in October and fruiting from November to April of the following year.

***Etymology*:** The specific epithet is named in honor of Prof. Ming-Yuan Fang, who has made significant contributions to the taxonomic study of Ericaceae in China.

Proposed Chinese name: Ming Yuan Shu Luo Bo 明渊树萝卜.

***Preliminary conservation status*:** During our field survey, only two populations with a few individuals were recorded. The species grows in forests outside protected areas, and the large host trees along the riverside are threatened by deforestation. Additionally, its attractive flowers and tuberous roots lead to destructive collection by local people for sale via online platforms. Following the IUCN Red List Guidelines (IUCN Standards and Petitions Committee, 2024), *A. mingyuaniana* is assessed as Critically Endangered (CR, B1B2ab(iii,v)C2a(i,ii)b).

***Notes*:** According to Airy Shaw's infrageneric classification (Airy Shaw, 1935, 1958; Banik and Sanjappa, 2014), *Agapetes mingyuaniana* should be assigned to *Agapetes* sect. *Agapetes* ser. *Agapetes* subser. *Agapetes* as based on its stout stems, spirally arranged coriaceous leaves with entire margins, truncate stigmas, corymbose inflorescences, corollas > 2 cm long, and short filaments.

In the key to Chinese *Agapetes* species (Fang and Stevens, 2005), the new species most closely resembles *A. angulata* (Griff.) Hook.f. but differs by having entire leaf blade margin (vs. sparsely serrulate), more secondary veins (15–25 pairs vs. 8–9 pairs), and a longer corolla (5.8–6.3 cm vs. 1.5–2.7 cm). *Agapetes mingyuaniana* is unique among Chinese *Agapetes* species in combining ridged branchlets and corollas longer than 5.5 cm.

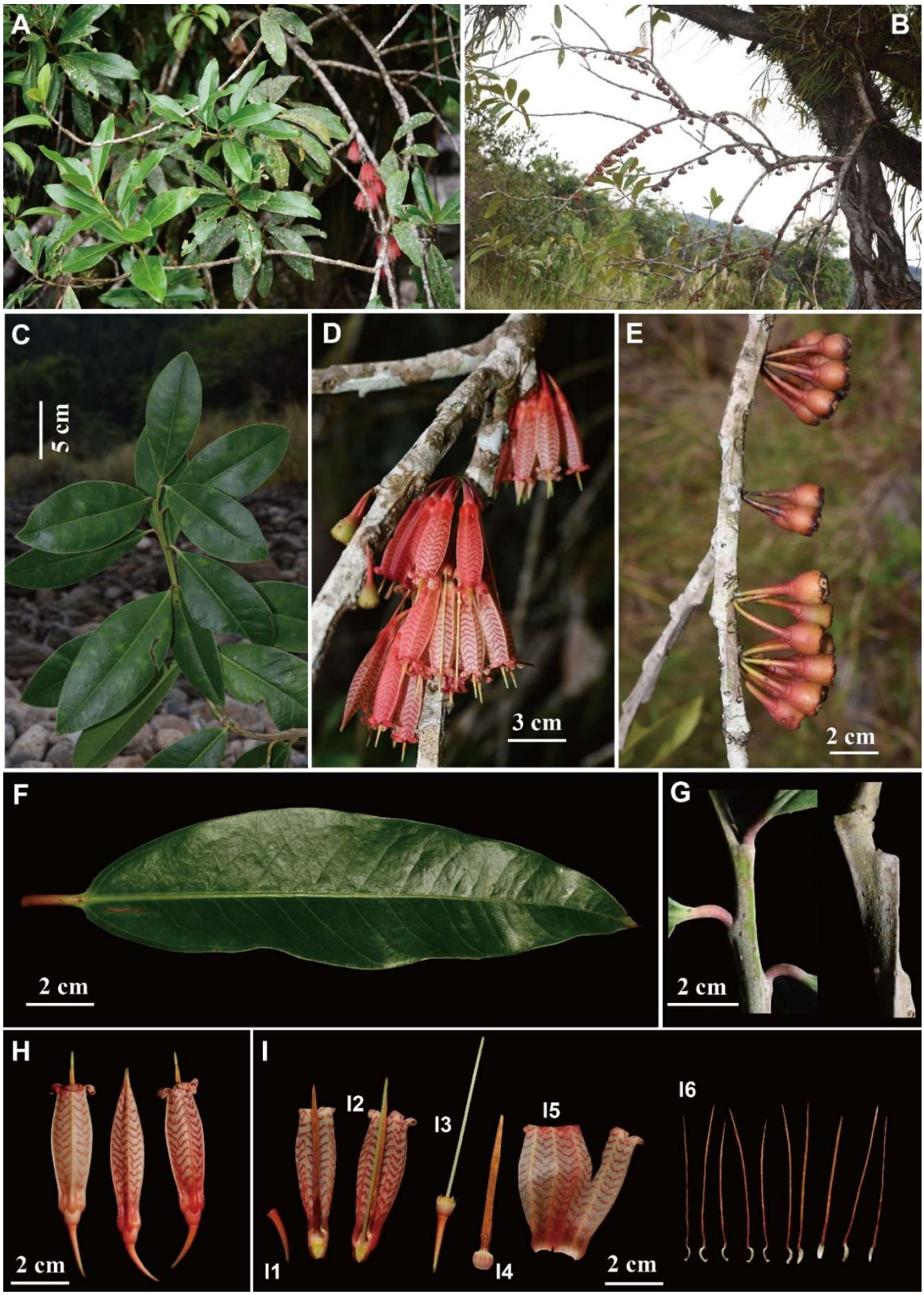

Fig. 2. ***Agapetes mingyuaniana*** H.B.Ding, Bin Yang & Y.H.Tan. **A.** Branches (flowering stage); **B.** Habit (fruiting stage); **C.** Branch (showing alternate leaves); **D.** Part of flowering branch (showing inflorescences); **E.** Part of fruiting branch (showing infructescence); **F.** Leaf (adaxial view); **G.** Part of branchlets with ridges; **H.** Flowers; **I.** Dissection of flower (I1. pedicel; I2. longitudinal dissection of a flower; I3. flower with corolla and stamens removed; I4. stamens; I5. opened corolla; I6. stamens). (Photos: A, D, F, H, I by Hong-Bo Ding, B, C, E, G by Bin Yang).

In the protologue of *Ceratostema variegatum* Roxb. (Roxburgh, 1832), the basionym of *A. variegata* (Don, 1834), the stigma is described as five-lobed. Banik and Sanjappa (2014) noted that the stigma is glandular-capitate, consistent with the illustration in Roxburgh (1832; http://www.plantillustrations.org/illustration.php?id_illustration=462644). This character is considered one of the important taxonomic characters of *Agapetes* (Murata and Murata, 2020), thus clearly differentiating *A. variegata* from *A. mingyuaniana*. However, Banik and Sanjappa (2014) also reported that *A. variegata* has obscure anther spurs and pseudowhorled leaves and verified that an 1813 collection by W. Roxburgh (*W. Roxburgh s.n.* [BM013719389], https://data.nhm.ac.uk/object/e2e8dfbb-45a3-4f50-a1f8-3a666fc99e60/1748251284062) belongs to this species. However, we found that these character states do not match the illustration in the protologue, suggesting that the taxonomy of *A. variegata* requires reevaluation. Additionally, the lateral veins of this collection by W. Roxburgh anastomose completely at the margin to form a distinct intramarginal vein, prominent abaxially and adaxially with greater prominence on the adaxial surface.

***Additional specimens examined*: CHINA.** Yunnan Province, Yingjiang County, epiphytic on trees near riverside,781 m, 3 April 2023, *B. Yang, Y.J.W. Yang & M.M. Yue, YB1272* (HITBC, KUN); ibid., 607 m, 23 March 2023, *J.W. Li, H.B. Ding, X.D. Zeng, M.M. Yue WPY949* (HITBC). ***Specimens of Agapetes variegata*: INDIA.** *s.l.*, 1813, *W. Roxburgh s.n.* (BM [BM013719389]).

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