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Two new species of Ericaceae from Xizang, Southwest China

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ABSTRACT: Two new species of Ericaceae from Motuo County, Xizang Autonomous Region, China, are described and illustrated. *Agapetes brevituba* X. C. Xie & Y. H. Tan closely resembles *A. praestigiosa* and *A. praeclara* but differs by its shorter pedicel and smaller, white urceolate corolla with dark dull red base and green apex. *Vaccinium longisetosum* X. C. Xie & Y. H. Tan resembles *V. lanigerum* in leaf shape and venation but can be distinguished by the brown bristle hairs on branches and fruit color. Detailed descriptions, color plates, and notes on the new species are included.

KEY WORDS: *Agapetes brevituba*, diversity, floristic exploration, Motuo County, taxonomy, *Vaccinium longisetosum*.

INTRODUCTION

The southeastern part of Xizang Autonomous Region of China is known for its rich biodiversity, including many rare and endangered species. This area is a part of the Eastern Himalayas, recognized as one of the 36 global biodiversity hotspots (Myers *et al.,* 2000). A recent comprehensive list of vascular plants in Xizang identifies 252 families, 2,049 genera, and 11,853 species (Chen *et al.,* 2023). Among these, the Ericaceae family is particularly notable, with 407 species across 18 genera. Currently, Xizang records 45 species of *Agapetes* and 32 species of *Vaccinium* (Fang and Stevens, 2005; Tong 2014, 2016; Tong *et al.,* 2021, 2024; Yang *et al.,* 2021, 2022; Chen *et al.,* 2023), including several new species described in recent years (Tong 2016; Tong *et al.,* 2021, 2024; Yang *et al.,* 2022). During a recent plant survey in Motuo County, we discovered two unidentified species belonging to *Agapetes* and *Vaccinium* respectively. After examining specimens and fresh materials of similar species and consulting relevant literature (Air Shaw 1935, 1958; Sleumer 1941; Fang 1986; Kress *et al.,* 2003; Fang and Stevens 2005; Subhasis 2012), we determined these plants represent two new species, which we describe and illustrate here.

MATERIALS AND METHODS

Specimens were collected from Motuo County, Xizang Autonomous Region, China, during field expeditions in April 2024. Descriptions are based on dried specimens and fresh materials, with dried specimens deposited in the herbaria of Xishuangbanna Tropical Botanical Garden (HITBC) and Kunming Institute of Botany, Chinese Academy of Sciences (KUN).

TAXONOMIC TREATMENT

Agapetes brevituba X. C. Xie & Y. H. Tan, ***sp. nov.***
Figs. 1 & S1

Type: CHINA, Xizang, Motuo County, Gandeng Township, Deergong Village, 29°8'46"N, 95°13'15"E, 2441 m a.s.l., Mixed coniferous broad-leaved forest, 19 April 2024, *J.W. Li, H.Y. Zhou & X.C. Xie 7425* (Holotype: HITBC0114177; isotype: HITBC, KUN).

Diagnosis: *Agapetes brevituba* resembles *A. praeclara* and *A. praestigiosa* in leaf shape but can be easily distinguished from *A. praeclara* by the corolla shape (urceolate vs tubular), colour (white with red base and green apex vs crimson or deep red) and length of corolla (10–12 mm vs 15–20 mm), and shorter anthers (9 mm vs 9–12 mm). It further differs from *A. praestigiosa* by its urceolate and pure white corolla with a dark dull red base and green apex (vs cherry-red and globose-urceolate), longer corolla (10–12 mm vs 5–7 mm), and longer anthers (9 mm vs 4–5 mm).

Description: Evergreen shrub, epiphytic on trees. Tuber globose 3–6 cm in diam,brown. Stems terete, with conspicuous lenticels, 3–5 mm in diam. Twigs, pendulous terete, 1–2 mm in diam., densely dark brown setose. Leaves scattered; petiole, ca. 1 mm long, glabrous; leaf blade, rigidly leathery, ovate or elliptic, 1.3–1.8 ×0.6–0.8 cm, glabrous, adaxially bullate; young leaf pubescent, glabrescent when old, midveins adaxially transversely bullate, secondary veins 3–5 pairs, inconspicuous abaxially, base broadly cuneate to rounded, apex acute,

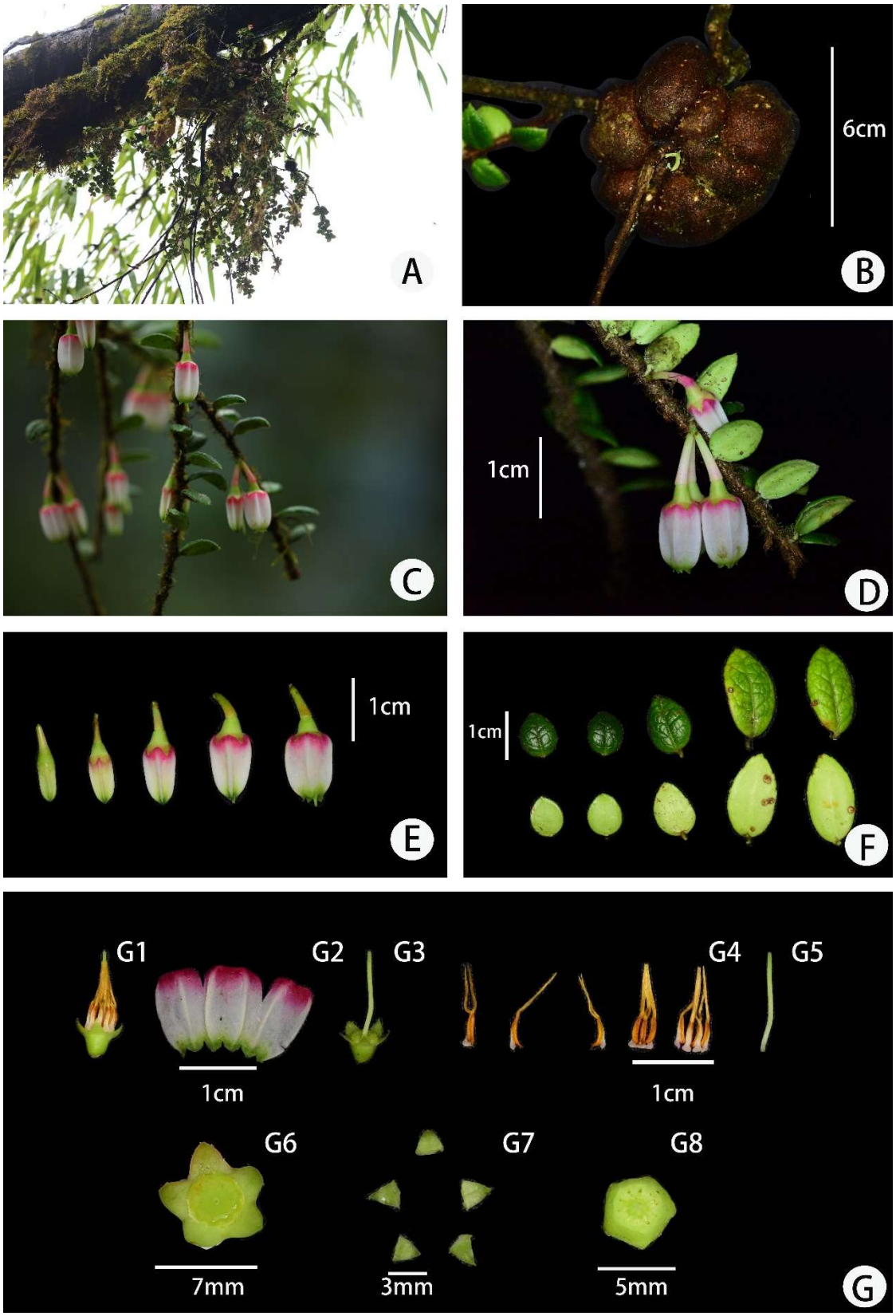

Fig. 1. ***Agapetes brevituba***. **A.** habit. **B.** tubers and roots. **C.** flowering branch. **D.** flowering branches (lateral view). **E.** flowers. **F.** leaves. **G.** Dissection of flower (G1 flower removed corolla; G2 opened corolla; G3 flower removed corolla and stamens; G4 stamens; G5 style; G6 calyx limb and disk; G7 calyx lobes; G8. cross-section of ovary.). Photographs by Xing-Chi Xie

Table 1. Morphological comparison of ***Agapetes brevituba***, ***A. praestigiosa***, ***A. praeclara*** (**Fig. S1**). The data of the latter two species are taken from Airy Shaw (1935).

Morphological trait	*A. brevituba*	*A. praestigiosa*	*A. praeclara*
Leaf blade size (cm)	1.3–1.8×0.6–0.8	1.5–2.2 × 0.6–1.1	Ca. 1.5 × 1
Leaf apex	Acute, nearly apiculate	Abruptly acuminate, nearly apiculate	Acute to sub-obtuse
Corolla color in vivo	White, dark dull red basally, green apically	Cherry-red	Crimson or deep red
Corolla shape	Urceolate	Globose-urceolate	Tubular
Corolla length (mm)	10–12	5–7	15–20
Anthers (mm)	Ca. 9	4–5	9–12

nearly apiculate, margin strongly recurved, remotely inconspicuously serrate, each side with 4–6 teeth. Inflorescences umbellate, 1–6–flowered, axillary, peduncles ca. 1 mm long, glabrous; bracts minute, triangular, 0.5–1 mm long, acuminate at apex, scaly, caducous; pedicel, 6–10 mm, glabrous, slightly expanded upwards, floral bracts and bracteoles minute, triangular, ca. 0.5 mm long, acuminate at apex. Calyx tube green, turbinate, ca. 3 mm in diam., glabrous; lobes green, triangular 2–3 mm long, glabrous, acuminate at apex. Corolla white, green at the apex and dark dull red at base, urceolate, 10–12 mm long, 3–4mm wide, strongly 5-angled, glabrous; lobes green, erect, triangular, ca. 0.5 mm long. Stamens 10, ca. 1cm long, filaments, ca. 0.5 mm long, glabrous; anthers, ca. 9 mm long, thecae caudate at the base, tubules, ca. 2–3 mm, without spurs. Disk light greenish ca. 3 mm in diameter, glabrous. Ovary inferior, pseudo-10-locular. Style linear, ca. 12 mm long. Stigma truncate. Fruit unknown.

Phenology: Flowering in April.

Etymology: The species epithet refers to its relatively short corolla tube in this genus. Its Chinese name is given as **短冠树萝卜**(Pinyin: duǎn guān shù luó bó)

Habitat and Distribution: *Agapetes brevituba* is known only from Deergong Village, Motuo County, Xizang Autonomous Region, southwest China. It is epiphytic on the trees of mixed coniferous broad-leaved forests at 2200–2500 m a.s.l.

Conservation status: Only one population was encountered during our survey. It is epiphytic on the trees, and the habitat is often at risk due to tree felling in the area. Furthermore, due to the lack of field surveys in adjacent areas, the distribution range and the number of populations still need to be investigated. This species is proposed to be assessed as Data Deficient (DD) following IUCN guidelines (IUCN, 2024).

Notes: According to Airy Shaw's infrageneric classification (Airy Shaw 1935, 1958), *Agapetes brevituba* should be assigned to sect *Agapetes* ser. *Graciles* Airy Shaw, due to its umbel inflorescence, leaves are usually narrow or small, extremely short filaments and anthers without spur on the back.

The key to sect. *Agapetes* ser. *Graciles*

1. Leaf blade obovate, elliptic to oblong …… 2
1. Leaf blade linear or oblong-lanceolate …… 3
2. Leaf apex acute or acuminate, base cuneate or rounded, margin plane, crenate above middle …… 4
2. Leaf apex rounded or obtuse, base rounded or obtuse, margin recurved, inconspicuously crenate or subentire …… ***A. miranda***
3. Leaf apex acuminate or long acuminate, base rounded, margin revolute, remotely dentate …… 6
3. Leaf apex caudate, base attenuate, margin slightly revolute, shallow and remotely undulate-denticulate towards apex. …… ***A. nutans***
4. Veins indiscernible …… 5
4. Veins conspicuous impressed adaxially, slightly raised or inconspicuous abaxially …… 7
5. Leaves crowded, blade elliptic, leathery …… ***A. lacei***
5. Leaves spirally alternate small, ovate, thinly leathery …… 8
6. Secondary veins inconspicuous ……9
6. Secondary veins slightly raised abaxially, impressed adaxially …..10
7. Inflorescence axillary, 1–or 2–flowered …… 11
7. Inflorescences corymbose, 2–8–flowered …… 14
8. Corolla sparsely puberulent with dense white to light yellowish-brown villi along the ridges, stamens 7.0–7.5 mm, berry villous and verrucose …… ***A. rhuichengiana***
8. Corolla densely white puberulent, stamens 10.0–10.5 mm, berry densely white puberulent …… ***A. huangiana***
9. Corolla lobes triangular …… 12
9. Corolla lobes conspicuously reflexed, lineartriangular, ca. 3 mm …… ***A. reflexiloba***
10. Inflorescences fasciculate, 1–3–flowered …… ***A. serpens***
10. Inflorescences axillary, corymbose …… 13
11.Corolla rose, ellipsoidal-tubular, 1.6–1.8 cm; lobes reflexed, linear-subulate, 7–8.5 mm, margin not revolute …… ***A. refracta***
11. Corolla bright red, tubular, ca. 2.5 cms; lobes spreading, pale or greenish, ovate-lanceo–late, 4–6 mm …… ***A. buxifolia***
12. Corolla bright red, with darker bands, narrowly funnelform, ca. 2 cm …… ***A. hyalocheilos***
12.Corolla dull crimson with a bluish bloom, with dark zig-zag bands, tubular, ca. 4 cm …… ***A. neriifolia***
13. Peduncles, 1.5-2.5 cm long enlarged apically. Calyx tube ca. 2.5 × 3 mm, not angled …… ***A. griffithii***
13. Peduncles, ca.6-10 mm long …… 15
14. Peduncles 4-6 cm slender, Pedicel red, 1–2 cm, stout, fleshy, cup-shaped apically …… ***A. pseudogriffithii***
14. Peduncles, 2-3cm long …… 16
15. Calyx lobes ovate-triangular …… ***A. dicolor***
15. Calyx lobes triangular or triangular-lanceolate …… 17
16. Corolla tubular, slightly angular …… 18
16. Corolla globose-urceolate …… 19
17.Corolla lobes triangular …… 20
17.Corolla lobes triangular-lanceolate …… ***A. atrosanguinea***
18. Corolla red, 2.0–2.1 cm × 6–7 mm; lobes broadly ovate-triangular, 1.2–1.5 × 2.5–3 mm, yellowish-green, obtuse to mucronate at apex …… ***A. camelliifolia***
18.Corolla tubular 1.5–2 cm …… 21
19. Corolla cherry-red, 5–7mm, strongly 5-angled, glabrous …… ***A. praestigiosa***
19. Corolla white, green apically and dark dull red basally, urceolate, 10–12 mm, strongly 5–angled, glabrous …… ***A. brevituba***
20. Corolla crimson, with dark red zig-zag bands, tubular ca. 2cm …… ***A. forrestii***
20. Corolla bright red, tubular, 2–2.5 cm, puberulous on angles …… ***A.mitrarioides***
21. Calyx tube scarlet, 2–3 cm; limb 5-veined, divided ca. 1/2 or more;

Table 2. Morphological comparison of ***Vaccinium longisetosum*** and ***V. lanigerum***. The data of the latter species are taken from Sleumer (1941).

Morphological trait	*V. longisetosum*	*V. lanigerum*
Trichome	Bristles	Feathery hairs
Leaf blade size (cm)	3.5–9× 1.5–3.5	8.5–11 × 3–4.5
Corolla shape	Urceolate–campanulate	Sub-campanulate
Fruit color	White-translucent	Purple

lobes triangular, 3–4 mm. Corolla green, lobes erect, triangular, ca. 1.3 mm ……..…… ***A. linearifolia***

21. Calyx tube ca. 2 cm, glabrous; limb divided nearly to base; lobes triangular, 1.5–2 mm. Corolla crimson or deep red …… ***A. praeclara***

Vaccinium longisetosum X. C. Xie & Y. H. Tan, ***sp. nov.*** **Fig. 2**

Type: CHINA, Xizang Province, Motuo County, Gandeng Township, Deergong Village, 29°8'36. 47"N, 95°12'8. 16"E, 1921 m a.s.l., mixed coniferous broad-leaved forest, 16 April 2024, *J.W. Li, H.Y. Zhou & X.C. Xie 7391* (Holotype: HITBC0114173, Isotype: HITBC, KUN).

Diagnosis: *Vaccinium longisetosum* is morphologically similar to *V. lanigerum* in having similar leaf blade shape and venation, but differs in branches and leaves being covered with brown bristles (vs feathery hairs) (Fig 3), and the white-translucent fruit (vs purple).

Description: Evergreen shrubs, epiphytic on trees, ca. 2 m tall, sparsely branched with inflated root tubers. Young twigs, terete, soft, pink or white, densely white setose; old branches terete, densely brown setose, glabrescent, bristles ca. 3 mm long; bud scales pink or green, densely bristles. Leaves scattered alternate, petiole ca. 1 mm long, indumentum same as stem; leaf blade oblong-ovate to broadly ovate, 3.5–9 × 1.5–3.5 cm, somewhat papery, coriaceous when old, abaxially sparsely brown hispid, adaxially glabrous, apex abruptly acuminate, cauda to 1–3 cm long, base rounded or broadly cuneate, midveins adaxially impressed, secondary veins 5–6 pairs, strongly ascending, slightly raised abaxially, sulcate adaxially, margin slightly recurved, entire. Inflorescences fasciculate, 1–2–flowered, 5–10 mm, pubescent; bracts persistent, many, imbricate, green or yellow-red, oblong, ca. 5–10mm, glabrous, margin entire. Pedicel ca. 1 mm long or subsessile; bracteoles 2, greenish-yellow, red on margin, caducous, usually borne near the base of the pedicel, occasionally at the lower part, shape similar to bracts, but smaller, ca. 1 × 0.5 mm. Calyx tube, ca. 1.5 mm, tomentulose, smooth when fresh, rugose when dry; calyx limb 5, 5-lobed to near the base, lobes green, narrowly triangular, 4–5 mm long, abaxially hispid and densely ciliate, apex acuminate, adaxially glabrous. Corolla green, urceolate-campanulate, 6–8 mm long, glabrous outside and pubescent inside; lobes reflexed, ca. 1 mm long, ovate-deltoid. Stamens 10, ca. 1cm long; filament ca.1 mm flat, slightly expanded at base, glabrous; anthers ca. 5 mm long, with two spreading spurs; thecae 1–1.2 mm long, more or less echinate on edges, with two small appendages at base; tubules opened by a long slit more than half of the tubules, parallel, ca. 2 mm long. Disk light yellowish, ca. 3.0 mm in diam., glabrous. Ovary inferior, pseudo-10-locular. Style 6–7 mm long. Stigma truncate. Fruiting pedicel 1–2 mm long; berry green when young, turning white-translucent at maturity, globose, 14–18 mm in diam., sparsely erect-pubescent, with persistent calyx lobes appressed at apex; Seeds ovoid, 1.2–1.5 × 0.8–1 mm, testa greenish, reticulate, soft.

Etymology: The species epithet refers to its branches and leaves covered with long bristles. Its Chinese name is given as 长毛越橘 (Pinyin: cháng máo yuè jú).

Phenology: Flowering in April.

Habitat and distribution: *Vaccinium longisetosum* is currently known only from Deergong Village in Motuo County, Xizang Autonomous Region, southwest China. It grows epiphytically on trees in mixed coniferous and broad-leaved forests at elevations of 1,800 to 2,700 m.

Conservation status: During our field survey, we encountered three populations of *Vaccinium longisetosum*, but their habitat is increasingly threatened by logging and road construction in the region. The exact number of populations is unknown, highlighting the need for further field surveys. Therefore, following IUCN guidelines (IUCN 2022), it is recommended that this species be classified as Data Deficient (DD).

Notes: *Vaccinium longisetosum* is classified under sect. *Pseudocephalanthos* C. Y. Wu & R. C. Fang, based on the description by C. Y. Wu et R. C. Fang (1987), which is characterized by leaf blades that are oblong-ovate to broadly ovate with an abruptly acuminate apex, and fasciculate inflorescences with one or two flowers. It differs from*V. lanigerum* regarding trichomes, leaf blade size, corolla shape and fruit color. (Table 2)

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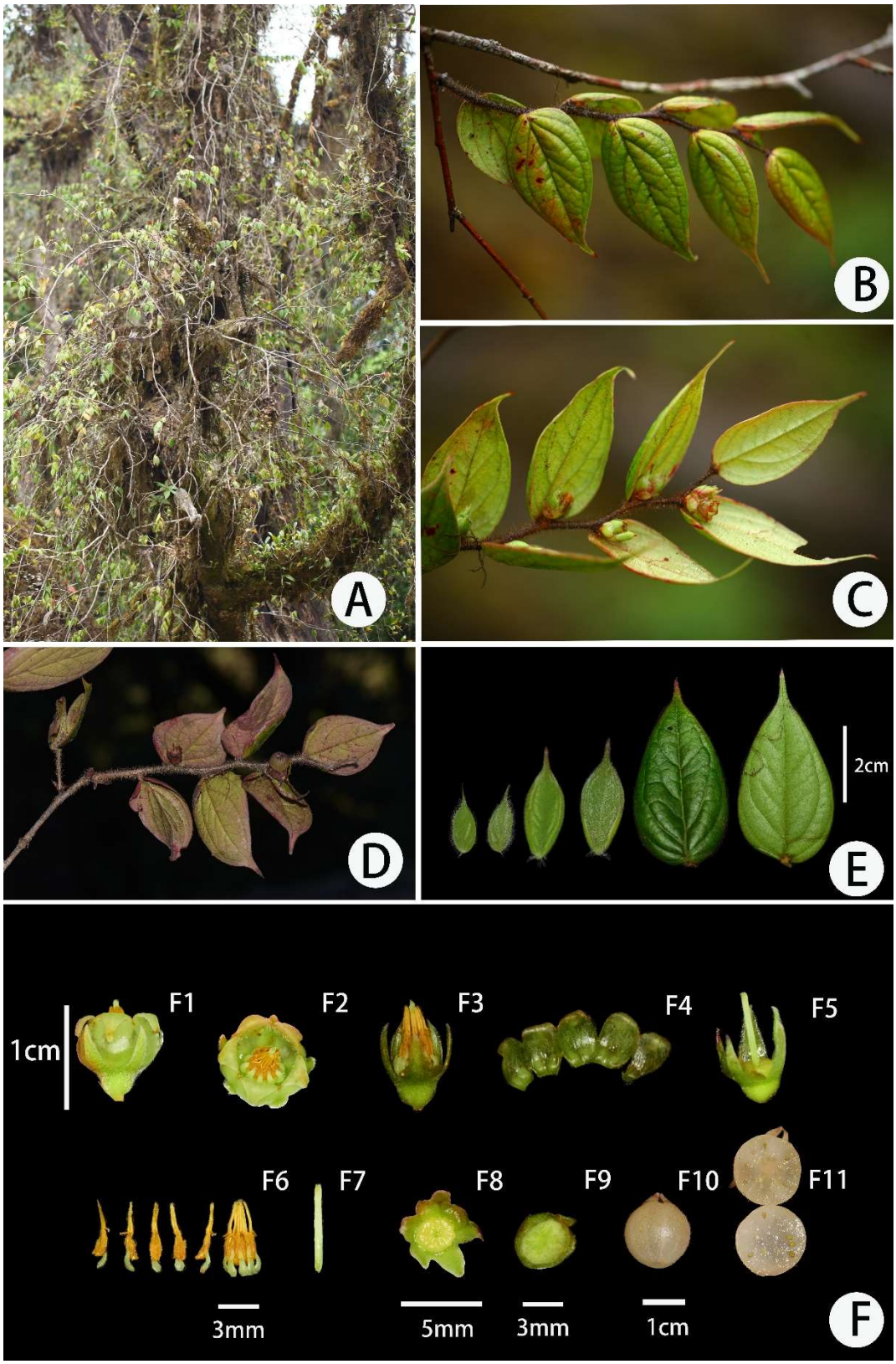

Fig. 2. ***Vaccinium longisetosum***. **A.** habit. **B.** leafy branch (adaxial view). **C.** leaves (abaxial view). **D.** fruiting branch (abaxial view). **E.** leaves. **F.** Dissection of flower and fruit (F1 Flower (side view); F2 Flower (front view); F3 calyx, style and stamen; F4 opened corolla; F5 calyx and style; F6 Stamens; F7 style; F8 calyx limb and disk; F9 cross-section of ovary; F10 fruit; F11 fruits, cross-section). Photographs by Xing-Chi Xie & Bing Yang

Fig. 3. The contrast between ***Vaccinium longisetosum*** and ***Vaccinium lanigerum*** twigs. **A.** setae of ***Vaccinium longisetosum***. **B.** feathery hairs of ***V. lanigerum***. (Photographed by B Yang)

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Supplementary materials are available from Journal Website