



One new species and one new record of *Begonia* from Xizang of China

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ABSTRACT: Southern Xizang harbors the highest diversity of plants in Xizang of China, and recently there have been many new species discovered in this region. Based on field surveys and review of literature and herbarial specimens, one new species (*Begonia renqinbengensis* D.K.Tian & W.G.Wang) and one new record (*B. leptoptera* Hara) of *Begonia* are diagnosed and reported in this paper. Also *B. leptoptera* is redescribed with illustrations. The conservation statuses of two species are assessed according to Guidelines for Using the IUCN Red List Categories and Criteria.

KEY WORDS: *Begonia renqinbengensis*, *Begonia leptoptera*, new taxa, new records, taxonomy, flora of China, conservation.

INTRODUCTION

Xizang is an autonomous region of China. Due to high coverage of forest and diverse topography, Southern Xizang harbors the highest diversity of plants in Xizang. Recently the researchers have made a lot of surveys in this region and discovered many new species and new records of *Begonia* (Li *et al.*, 2018; Chen *et al.*, 2019; Wang *et al.*, 2019; Taram *et al.*, 2020, 2021, 2022, 2023; Tian *et al.*, 2020, 2021; Borah *et al.*, 2024). In 2017 and 2020, we conducted field surveys on begonias and other plants in Xizang, and found several new species and new records of *Begonia*. Here, we report one new species (*Begonia renqinbengensis* D.K.Tian & W.G.Wang) and one new record (*Begonia leptoptera* Hara) of *Begonia* from Xizang of China, which are compared with their allied species. The newly recorded species is morphologically redescribed. The conservation statuses of two species are assessed according to Guidelines for Using the IUCN Red List Categories and Criteria (IUCN Standards and Petitions Committee, 2024).

TAXONOMIC TREATMENT

Begonia renqinbengensis D.K.Tian & W.G.Wang, *sp. nov.* 仁钦崩秋海棠 Figs. 1, 2

Type: CHINA. Xizang Autonomous Region, Motuo county, Motuo village, near Renqinbeng temple, 29°18'25"N, 95°21'22"E, alt. 1980 m (Fig. 6), growing on the wetland or decayed tree trunk along the creek under forest, 8 Sept. 2020, Daiké TIAN, Fan WEN, Qinggong MAO, Zhu LU, TDK4737 (holotype: CSH0186885, CSH!; isotypes: CSH!).

Diagnosis: *Begonia renqinbengensis* is mostly similar to *B. lorentzonii* Wahlsteen & D.Borah (Wahlsteen and Borah, 2022) in leaf morphology but

differs by having leaf length 2/3 (vs. nearly to leaf base) lobed, flowers 1 to 3 (vs. ≥ 5), perianth white (vs. yellow or greenish yellow), ovary densely pubescent (vs. sparsely red tubercular). It is also close to *B. panchtharensis* S.Rajbhandary (Rajbhandary *et al.*, 2010) and *B. koelzii* R.Camfield (Camfield and Hughes, 2018) in having deeply lobed leaves in the same section but easily differs mainly by the latter two's absence (vs. presence) of erect stems, deeper (3/4 to longer vs. 2/3 leaf length) lobed leaves and branched (vs. unbranched) inflorescence with ≥ 5 (vs. 1–3) flowers. *Begonia panchiharensis* has pistillate flower with 4–8 tepals differing from other three species. The detailed comparison in morphological differences of four species is summarized in table 1.

Description: Herb perennial, evergreen, monoecious, 15–50 cm tall. **Rhizome** horizontal, brown or light green, unbranched or occasionally branched, 8–15 cm long, 4–12 mm thick, internodes inconspicuous to ca. 1 cm long. **Stipules** red, only visible at the rhizome apex (shoot tip) or the apex of the aerial stem, triangular, ca. 7 mm long, 4–5 mm wide. **Stem** light green, usually with 2 internodes, internodes 2.5–28 cm long, 4–12 mm thick, grayish-white or light brown pubescent, hairs less than 2 mm long. without or occasionally with one to two basal leaf on mature individuals, cauline leaves 2–4, often 2–3 at stem top. **Petiole** light green, cylindrical, 6–31 cm long, 2–7 mm thick, with a full-length groove, grayish-white pubescent, hairs less than 2 mm long. **Leaf blade** green, 10–26 × 7–22 cm, palmately lobed ca. 2/3 leaf length, lobes further pinnately divided, middle lobe deeply divided twice, lobule apex acuminate or caudate; leaf base forming an angle less than 50 degree; adaxially green, sparsely grayish-white pubescent, hairs less than 1 mm long, denser on primary and secondary veins, inclined upward; abaxially light-green, grayish-white

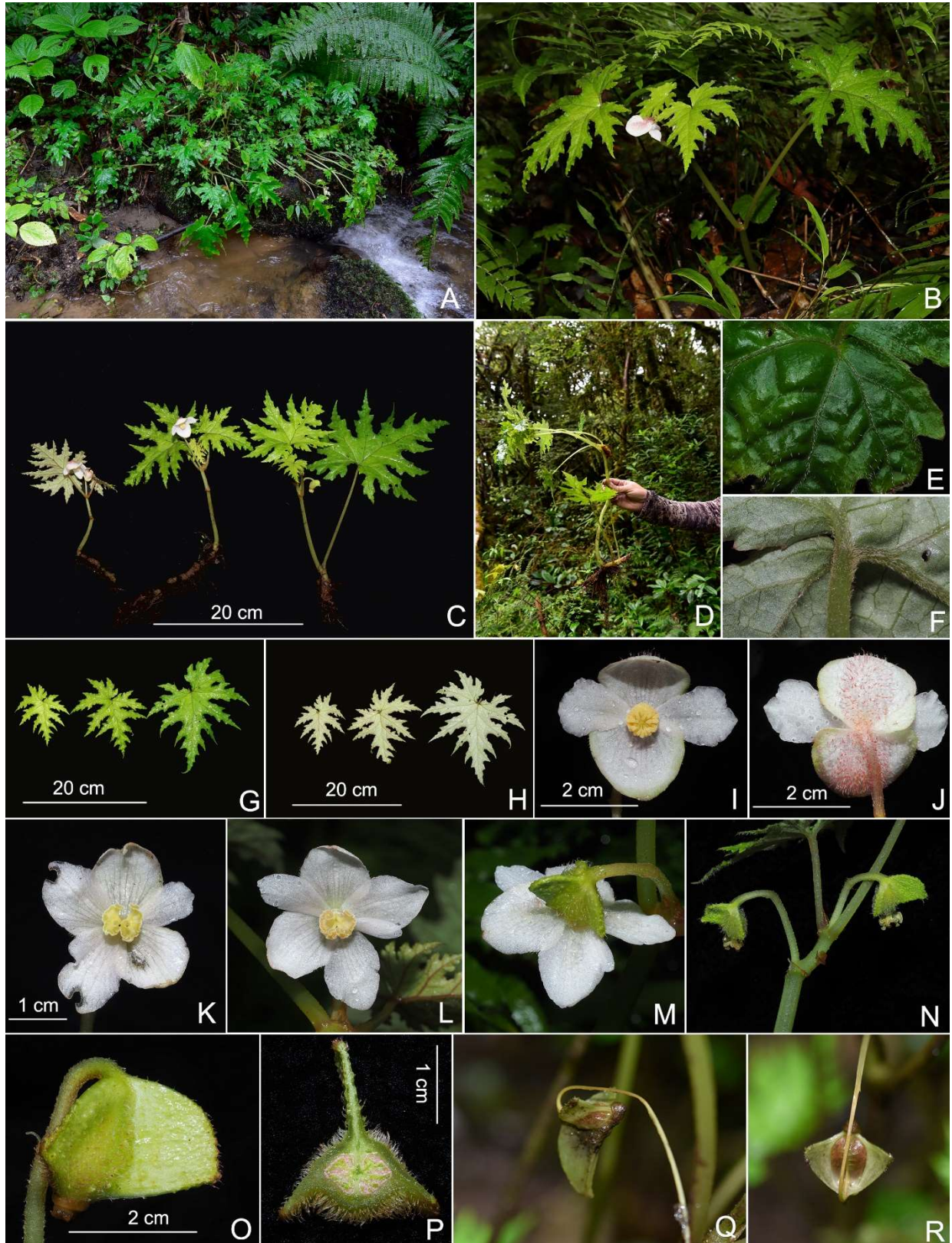


Fig. 1. Habitat and morphology of *Begonia renqinbengensis*. **A.** Habitat; **B–D.** Mature plants in flowering; **E, F.** Adaxial and abaxial surfaces of leaf section; **G, H.** Adaxial and abaxial leaf surfaces; **I, J.** Front and back views of staminate flower; **K.** Pistillate flower with 5 tepals; **L.** Pistillate flower with 6 tepals; **M.** Back view of pistillate flower; **N, O.** Young fruits; **P.** Crossing section of ovary; **Q, R.** Side and adaxial views of dried fruits. (Photos A–P by Wenguang Wang, Q, R by Daike Tian)

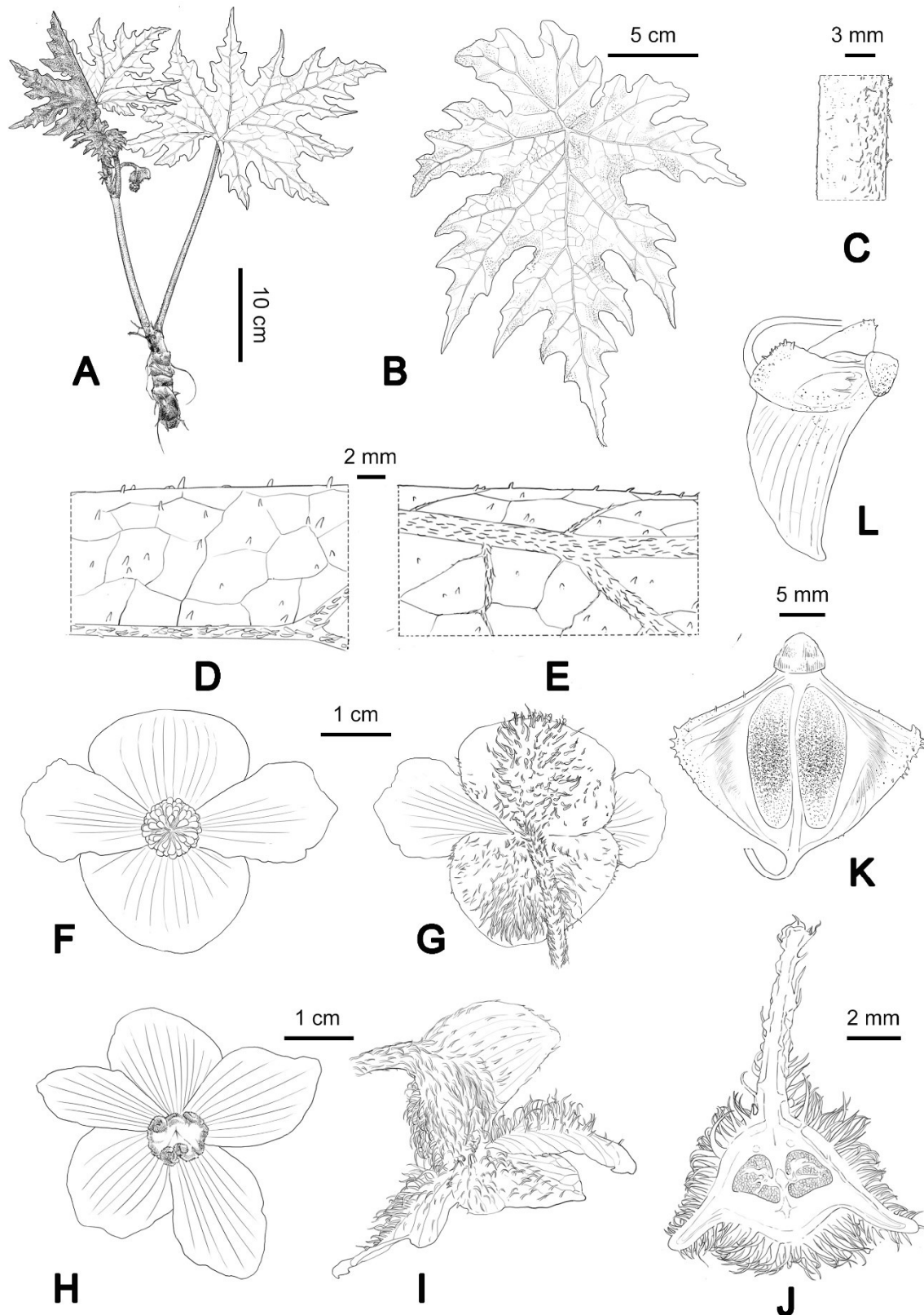


Fig. 2. Drawn morphology of *Begonia renqinbengensis*. **A.** Plant; **B.** Leaf; **C.** Petiole section showing hairs; **D, E.** Adaxial and abaxial surfaces of leaf section; **F, G,** Front and back views of staminate flower; **H, I.** Front and side view of pistillate flower; **J.** Cross-section of ovary; **K, L.** Adaxial and side views of fruit. (Drawn by Olivia Iris Tian)

**Table 1.** Morphological comparison of *Begonia renqinbengensis* and three allied species

Characteristic	<i>B. renqinbengensis</i>	<i>B. lorentzonii</i>	<i>B. panchtharensis</i>	<i>B. koelzii</i>
Erect stem	Present	Present at anthesis	Absent	Absent
Leaf	Basal and cauline	Basal and cauline	Basal only	Basal only
Petiole	Grayish-white pubescent, unspotted	With long setae, unspotted	Glabrous, with red linear dots	Sparsely puberulous, with red linear dots
Lobe length	2/3 leaf length to shorter	Nearly to leaf base	2/3 to nearly leaf base	3/4 to nearly leaf base
Blade upper surface	Sparsely pubescent	Glabrous	Sparsely hirsute	Sparsely strigose
Inflorescence	Simple, unbranched	Compound cyme	Cyme, branched	Cyme, branched
Flower number	≤ 3	4–8	≥ 5	≥ 10
Tepal color	White	Greenish yellow	Pinkish white	Pink
Tepal number of pistillate flower	5	5	6–8	5
Fruit wing	Green, densely pubescent	Green, with few setae	Red, glabrous	Dark red, strigose near base of main wings

pubescent, hairs inclined upward, less than 1 mm long, mainly on primary and secondary veins; venation palmate, primary and secondary veins slightly raised on both surfaces, the rest veins embedded. Inflorescence terminal or just below terminal node, multiple condensed swollen nodes often forming slightly above the attachment point of inflorescence, frequently rooting at these nodes. **Inflorescence** 3–11 cm long, unbranched, peduncle 2–8 cm long, 1.8–3 mm thick, flowers 1–2(3), bracts deciduous. **Staminate flower:** pedicel 1.3–2 cm long, 1.5–2 mm thick, densely covered with upward-tilted pink pubescence, hairs less than 1.5 mm long; flower 3.6–5 × 3.5–4.8 cm, tepals 4, outer 2 white with pink tinge, ovate to broadly ovate, 18–23 × 20–25 mm, adaxially densely pink pubescent, hairs up to 3 mm long, sparsely on edge; inner 2 nearly white, smaller, obovate-lanceolate, 18–22 × 2–15 mm, glabrous; androecium capitate, 6–8 mm in diameter; filaments fused at the base; anthers pale yellow, apex rounded. **Pistillate flower:** pedicel 1.5–2 cm long, 1.5–2 mm thick, densely covered with light brown upward-tilted to nearly appressed pubescence, hairs less than 2 mm long; flower 3.5–4.2 cm in diameter; tepals 5 (occasionally 6), outer 4 white, ovate to obovate, 15–20 × 12–14 mm, middle-back covered with white to gray-white pubescence; inner 1 (rarely 2) significantly smaller, oblanceolate, 14–16 × 6–8 mm, sparsely grayish-white pubescent on back; styles 2, stigmas pale yellow, well-developed; ovary green, densely grayish-white to pinkish-white pubescent, hairs less than 2 mm long, gradually enlarging and thickening downward to base, 2-loculed, placentae axile, 4 or 5 branched each placenta, ovules pink-white. **Fruit** green, unequally 3-winged, dorsal wing larger, nearly broadly triangular, 14–16 × 15–18 mm; lateral wings shorter, ca. 3 × 12 mm. Flowering June to July, fruiting July to August.

Etymology: The specific epithet refers to “renqinbeng”, the place name of type locality.

Phenology: The plants bloom from June to July, the fruits ripen from July to August.

Distribution and ecology: The new species is endemic to Xizang of China, and currently it is only known from Motuo village of Motuo county. The plants

grow on wetland or decayed tree trunk along a small creek at 1980 m altitude.

Conservation status: Critically Endangered (CR) (B1B2aD) (IUCN Standards and Petitions Committee, 2024). The new species is only found in type locality with one small population of less than 50 mature individuals.

Note: The new species belongs to *Begonia* sect. *Platycentrum* although its placenta each locule has 4 or 5 branched laminas based on other characteristics.

Additional specimens examined: CHINA, Xizang, Motuo county, Motuo village, near Renqinbeng temple, 28 Sept. 2017, 29°18'25"N, 95°21'22"E, alt. 1980 m, Daiké TIAN, Yan XIAO, Xin ZHONG, Lizhi TIAN TDK3382 (CSH); Same location, 27 Jun. 2020, Jianyong SHEN, Wenguang WANG, Xingda MA, Youyun LI 1960 (HITBC).

Begonia leptoptera Hara, J. Jap. Bot. 48(4): 98 (1973).

狭翅秋海棠 Figs. 3–5

Type: Nepal, Kalingchok, Thala Tale-Bisauana, 27°49'N, 85°57'E, Alt. 2500 m, 10 Sept. 1970, H. Kanai, C. Chuma & T. Nagano No. 4032 (or 675174) (holotype: TI 00021535, TI).

Diagnosis: *Begonia leptoptera* is mostly close to *B. flagellaris* Hara (Hara, 1973; Tian *et al.*, 2020) in morphology, but differs mainly by its stolon absent (vs. stolon present), leaf often lobed (vs. unlobed), adaxial leaf surface densely (vs. sparsely) hairy, upper (vs. both) outer tepal of staminate flower hairy. Although *B. adscendens* C.B. Clarke (Clarke, 1879) is similar to this species in the shape of fruits, but the leaves of the former are unlobed, glabrous above and pilose only on veins beneath.

Description: **Herb** perennial, deciduous, monoecious; tubers spheroid, 3–5 connected, 5–25 mm in diameter. **Stem** absent. **Leaf:** solitary, petiole green, often purplish-red at base, with pale white longitudinal stripes, 6–48 cm long, 1.5–11 mm thick, covered with brown pubescence and a full-length groove deepening downward the base; blade asymmetrical or nearly symmetrical, broadly ovate, 4–32 × 3.5–30 cm, broad side 1.8–17 cm wide, narrow side 1.8–15 cm wide, basal lobes extending downward 1.5–7 cm; adaxially green, sometimes purplish-green along middle vein in the middle to lower position, densely oblique gray-white hispidulous, hairs less than 0.5 mm long, occasionally mixed with some slightly coarser red hairs at blade base, hairs up to 1 mm long; abaxially light

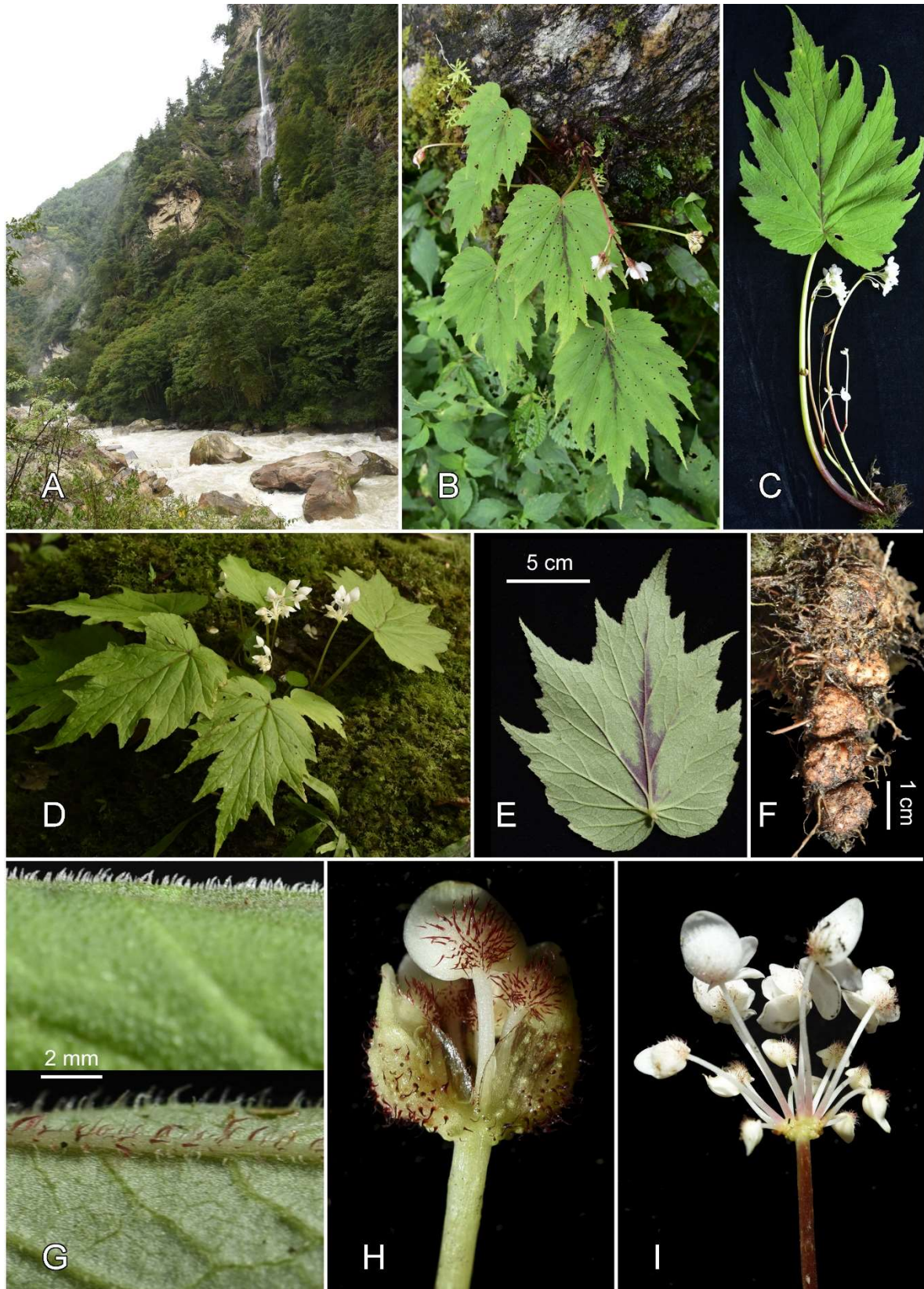


Fig. 3. Habitat and morphology of *Begonia leptoptera*. **A.** Habitat; **B,D.** Habit; **C.** Larger mature plant in flowering; **E.** Abaxial leaf surface showing purple central area; **F.** Tubers connected; **G.** Adaxial and abaxial surfaces of leaf section; **H.** Young inflorescence showing bracts and staminate flower buds; **I.** Umbellate inflorescence. (Photos by Daike Tian)

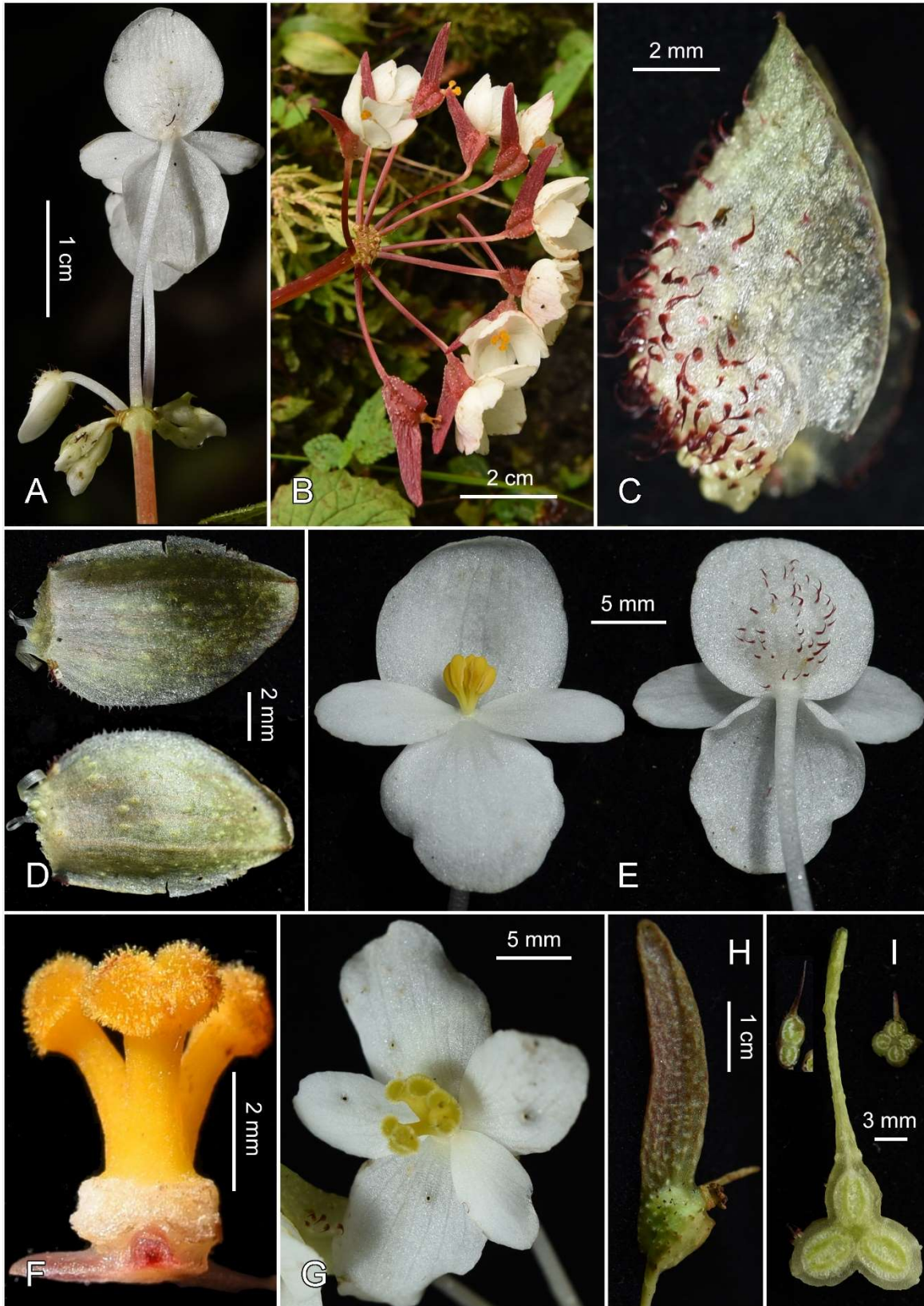


Fig. 4. Flower and fruit morphology of *Begonia leptoptera*. **A, B.** Inflorescence; **C.** Adaxial surface of bract; **D.** Adaxial and abaxial surface of bract; **E.** Front and back views of staminate flower; **F.** Side view of styles and stigmas; **G.** Pistillate flower with 5 tepals; **H.** Fruit; **I.** Cross-section of ovary showing locule variation and placenta. (Photos by Daiké Tian)

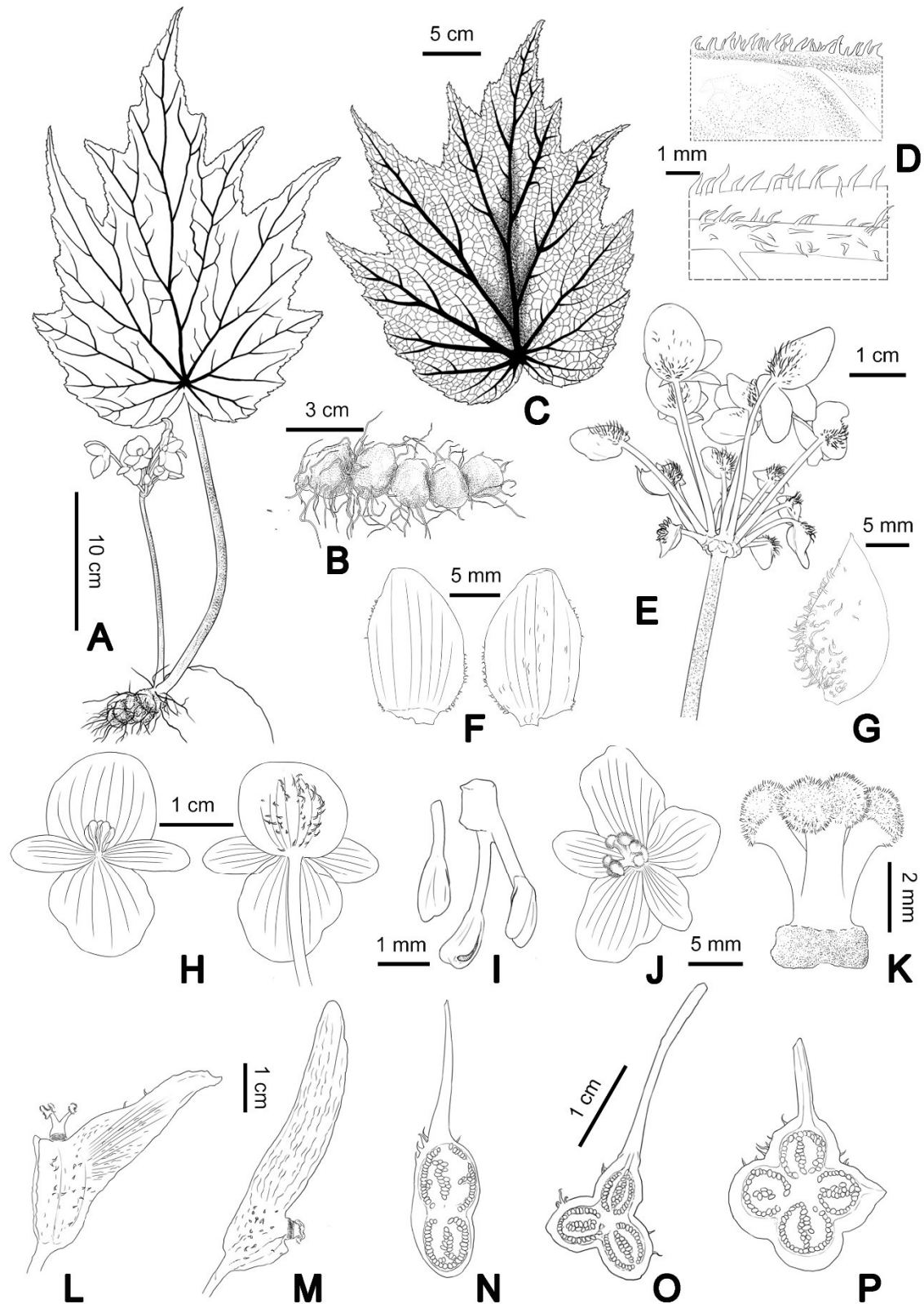


Fig. 5. Drawn morphology of *Begonia leptoptera*. **A.** Flowering plant; **B.** Tubers connected; **C.** Abaxial leaf surface; **D.** Adaxial and abaxial surface of leaf section; **E.** Inflorescence, **F.** Side view of bract; **G.** Adaxial and abaxial surface of bract; **H.** Front and back views of staminate flower; **I.** Stamens; **J.** Front view of pistillate flower; **K.** Side view of styles and stigmas; **L, M.** Fruit showing different shapes of dorsal wing; **N–P.** Cross-section of ovary showing locule variation. (Drawn by Olivia Iris Tian)



green, sometimes purplish or purplish-red along middle vein in the middle to lower parts, gray-white pubescent, hairs slightly more and longer on main veins, up to 1 mm long; often shallowly and unequally lobed, lobe acuminate or caudate, occasionally unlobed with small serrations; margin toothed with purplish-red tips and purplish-red cilia; base cordate, slightly oblique to nearly symmetrical. Venation palmate, veins 7–9, adaxially notably concave, abaxially prominently raised. **Inflorescence** umbellate, usually 1, rarely 2, often branched once in larger plants, 6–36 cm long; peduncle 4.5–15 cm long, 1.2–5 mm thick, often purplish-red, or green in the middle to upper parts, gradually turning purplish-red downward the base, glabrous or puberulous, 2–23 flowers. **Bracts** green to red, papery, nearly ovate, basal pair 10–15 × 7–12 mm, hairy on back, hairs mostly red, secondary bracts nearly glabrous, ca. 5 × 3 mm, apex rounded. **Staminate flower**: pedicel white to red, glabrous, 12–26 mm long, 0.8–1.2 mm thick; flower 18–28 × 15–20 mm, tepals 4, white or pink, not fully extended; outer 2 larger, ovate, 9–17 × 7–12 mm, upper one stiffer, white or red pubescent in the middle to lower parts, hairs less than 1 mm long, lower one glabrous; inner 2 smaller, glabrous, obovate-lanceolate or oblanceolate, 7–10 × 4–5 mm; androecium bisymmetrical, 2–3 mm long, 2–3 mm wide; stamens 12–20; filaments fused at the base for 1–1.5 mm length, free parts 1–1.5 mm long; anthers yellow, ca. 1 mm long. **Pistillate flower**: pedicel white to red, glabrous, 18–30 mm long, ca. 1 mm thick; flower 15–20 mm in diameter, tepals 5, white or pink; outer 2 larger, ovate or obovate, 7–13 × 6–11 mm, glabrous, or very sparsely pubescent only at the back base of the outermost one; inner 3 gradually turning smaller, obovate, oblanceolate, or nearly elliptic, 5–7 × 2.5–5 mm, glabrous; styles + stigmas ca. 4 mm long, approximately 3 × 2 mm wide; styles 3, pale yellow, ca. 2 mm long, shallowly U-shaped, stigmas pale yellow; ovary 3-loculed, rarely 2- or 4-loculed, placentae axile, bilamellate, thick. **Fruit**: stalk green or purplish-red, glabrous, 40–50 mm long; capsule green or red, nearly oblong, covered with white or red bristles and greenish-white warts, unequally three winged, wings green or pink; dorsal wing emerging from the middle to upper position of fruit, narrowly long-triangular, 34–40 × 11–13 mm, with greenish-white warts; lateral wings very short and narrow or nearly reduced to absence, 1–5 × 5 mm. Flowering August to September, fruiting September to October.

Additional specimens examined: **China**: Xizang, Dingjie county, Chentang town, Zangga village, Gamagou, under forest, 13 Jul. 2013, 27°51'47.3"N, 87°24'4.5"E, alt. 2426 m, *PE-Xizangdui 3241* (PE); Same village, on steep slope or rock surface, 19 Sept. 2017, 27°52'19"N, 87°25'6"E, alt. 2240 m, *Daike TIAN, Yan XIAO, Zhu LU TDK3291* (CHS); Same village, on steep slope or rock surface, 27°51'52.51"N, 87°24'29.98"E, alt. 2342m, same date and same collectors *TDK3292* (CHS); Same village, on rock surface or steep slope, 27°52'18"N, 87°25'7"E, Alt. 2370 m, same date and same collectors *TDK3301* (CHS); Same village, on rock surface or steep slope, 27°52'13.90"N, 87°24'7.79"E, Alt. 2313 m, same date and same collectors *TDK3303* (CHS); Same village, on rock surface or steep slope, 27°50'42"N, 87°25'58"E, alt. 2240

m, same date and same collectors *TDK3304* (CHS); Same village, on rock surface or steep slope, 27°50'36"N, 87°25'56"E, alt. 2200 m, same date and same collectors *TDK3305* (CHS); Riwu town, Nadang village, on steep slope under forest, 27°50'49"N, 87°26'23"E, alt. 2460 m, 24 Aug. 2020, *Daike TIAN, Fan WENG, Qinggong MAO TDK4420* (CHS); Chentant town, Zangga village, Mahuanggou, on rock surface under forest, 27°51'43"N, 87°25'22"E, alt. 2870 m, same date and same collectors *TDK4432* (CHS); Same village, river valley, on rock surface under forest, 27°52'13"N, 87°25'1"E, alt. 2330 m, 25 Aug. 2020, same collectors *TDK4438* (CHS); Same village, on mossy rock surface under forest, 27°51'52"N, 87°25'19"E, 2270 m, same date and same collectors *TDK4445* (CHS); Between Chentant town and Shalie village, on rock surface of steep slope under forest, 27°53'6"N, 87°23'54"E, alt. 2810 m, 26 Aug. 2020, *Daike TIAN, Fan WENG, Qinggong MAO, Zhu LU TDK4454* (CHS); 27°50'41"N, 87°26'1"E, alt. 2200 m, same date and same collectors *TDK4462* (CHS). Nielamu county, Zhangmu town, beneath rock under forest, pink flower, alt. 2700–2900 m, 11 Aug. 1972, *Xizang Chinese Medicine Expedition 1182* (PE02067830, PE); Same town, alt. 2300 m, 18 Aug. 1972, *Xizang Chinese Medicine Expedition 1137* (PE02067832, PE); Same county, unknown place, alt. 2500 m, fruits, 17 Sept. 1992, *Jiarui Chen 92244* (PE); Between Nielamu to Zhangmu, valley along highway, pink flower, 18 Aug. 2011, *Shengxiang Yu, Yuantong Hou, Xiaoxia Zhang 5658* (PE02233395, PE); Same county, Zhangmu town, Port Foreign Trade Market, pink flower, 27°57'48.0"N, 85°58'19.30"E, 13 Sept. 2020, *PE-Xizang Kaochadui 11862* (PE01841050, PE). **Nepal**: Unknown location, pink flower, alt. 900–1200 ft. 1930, *Major. Lall Dhwoj No. 400* (E00022017, E); Chevrassijj Khasi Hills, pale pink flower, 4000 ft. 29 Jul. 1946, F. Kerington Ward 16048 (E); S. of Tkucha, Kali Gandalci, under thick shrubs, pale pink flowers, alt. 8000 ft, 27 Aug. 1954, *Stainton, Sykes & Williams 7510* (E00157138, E); East Nepal: Arun Valley, Hatari, N. of Num, alt. 7000 ft, 21 Aug. 1956, *John D.A. Stainton 1414* (E00300500, E); Taplejung, Taplethok—Helok, 27°29'N, 87°44'E, 6 Nov. 1963, *H. Hara, H. Kanai, S. Kurosawa, G. Murata, M. Togashi, T. Tuyama* (No. 6304546, TI); Kali Kandaki Tal (Lete), 30 Aug. 1967, *H. J. Lange No. 20* (B); Near Syarpargaon, alt. 8500 ft, 10 Oct. 1970, *H. Halliwell 26* (K); Koshi Zone, Sankhuwa Sabha district: Num-Dhadkhet-Arun Khora-Vedghari-Sedua, 27°53'N, 87°18'E, alt. 940 m, *M. Minaki, C. Yonebayashi, F. Miyamoto, H. Takayama, H. Sugita, H. Yagi, M. N. Subedi & H. Ikeda* (TI 9019137, TI); Sankhuwasabha district: Arun River Gorge, S. of Hatiya, on cliff, pink flower, 27°43'N 87°22'E, alt. 1320 m, 14 Oct. 1991, *D. G. Long, R. J. D. Mcbeath, D. R. Mackean, D. A. H. Rae, N. P. Bhattaraiemak 788* (E0002038, E); Central development region: Bagmati Zone, Sindhupalchok district: S of Bimbu, damp gully with stream, pink flower, 27°53'50"N, 85°50'31"E, alt. 1938 m, 10 Sept. 2011, *M. F. Watson, C. A. Pendry, D. A. Gray, R. S. Dani & N. Phuyal No. EKSIN 47* (E00576147, E) and *No. EKSIN 49* (E00576148, E); Same district: above Golu, on steep slope, pink flower, 27°54'23"N, 85°49'39"E, alt. 2588 m, 11 Sept. 2011, *M. F. Watson, C. A. Pendry, D. A. Gray, R. S. Dani & N. Phuyal No. EKSIN 76* (E00576116, E); Eastern development region: Rmath Sagarmatha, Solu Khumbu, Phakding, Trackside at N. edge of village, 11 Sept. 2005, Third Darwin Nepal Fieldwork Training Expedition: *M. F. Watson, K. R. Rajbhandari, K. K. Shrestha et al. No. DNEP3 BX4* (E00256017, E).

Distribution and ecology: This species is distributed from Chentang town of Dingjie county and Zhangmu town of Nielamu county of Xizang, China to Central Nepal (Fig. 6). It grows on rock surface usually with moss in shady or half shady places along cliff or steep slopes. Several to over one hundred individuals could be seen in one subpopulation.

Conservation status: Least Concern (LC) (IUCN Standards and Petitions Committee, 2024) internationally due to its widely distribution with large populations in good condition in the border regions between Xizang of China and Nepal. China: Vulnerable (V) (B1B2ab(ii, v)), only distributed in several places of Chentang town of Dingjie county and Zhangmu town of Nielamu county of Xizang, China.

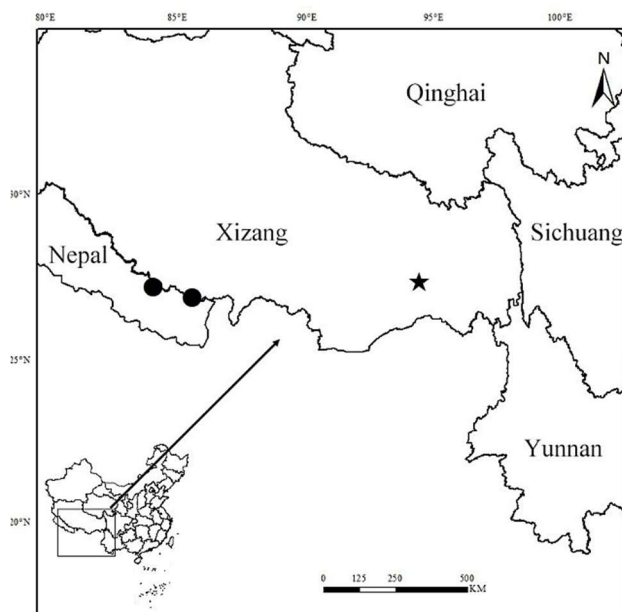


Fig. 6. Distribution of two *Begonia* species. ★*Begonia renqinbengensis*, ●*B. leptoptera*

Note: The specimen of holotype of *B. leptoptera* was collected from the two small individuals. This species has two types of flower colors, including white flowered population in Dingjie county of China and east Nepal, and pink flowered population in Nielamu county of China and Central Nepal. Further study is needed on if it should be divided into two varieties based on flower colors and isolated distribution. Nielamu county, Chongdai river side (冲堆江岸), pink flower, alt. 2600–2700 m, 16 Aug. 2001, Sino-Japan Expedition to Xizang: S. G. Wu, A. Akiyama, H. Ikeda, Y. L. Lu, S. T. Cheng, J. Y. Xiang, Y. Zhen No.106746 (XZ0011052, XZ). This specimen possibly belongs to *B. leptoptera* but has short stem. It need further investigation for confirmation.

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of Peking University (PE), Herbarium of Shanghai Chenshan Botanical Garden (CSH), Herbarium of Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences (HITBC), Herbarium of Xizang University (XZ).

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