

ONE NEW SPECIES AND FOUR NEW RECORDS OF *BEGONIA* (BEGONIACEAE) FROM BHUTAN

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Begonia menchunaensis P.Gyeltshen & M.Hughes is described from the cool broadleaved forest of Punakha District in Bhutan. It is assigned to *Begonia* sect. *Diploclinium* because it has a tuberous habit and bifid placentae, and is allied to *B. picta*. Based on its restricted distribution, *Begonia menchunaensis* is assessed as Critically Endangered under the *IUCN Red List Categories and Criteria*. *Begonia picta*, *B. rex*, *B. roxburghii* and *B. xanthina* are reported as new records for Bhutan.

Keywords. *Begonia menchunaensis*, Begoniaceae, Bhutan, new species, sect. *Diploclinium*, taxonomy.
 Received 18 January 2022 Accepted 27 April 2022 Published 18 August 2022

Introduction

Begonia L. (Begoniaceae) comprises 2081 accepted species divided into 70 sections (Hughes *et al.*, 2015–), mostly distributed in the tropical and subtropical regions of the world (Moonlight *et al.*, 2018), with some species expanding the range of the genus into temperate regions (e.g. see Gyeltshen & Jamtsho, 2021). Most *Begonia* species have very narrow distributions (Hughes & Hollingsworth, 2008), meaning that many new species are being discovered as suitable habitats become better explored.

Bhutan, part of the Eastern Himalaya, has a mostly rugged mountain terrain with an elevation ranging from 100 to 7500 m. Such great variation in altitude has given rise to a wide spectrum of climatic conditions and ecological systems that support a flora with diverse affinities. Grierson (1991) recognised 20 species of *Begonia* in the *Flora of Bhutan*, including 13 species confirmed as recorded for Bhutan. Recently, a species new to science has been described and several new records reported for Bhutan (Gyeltshen & Jamtsho, 2021; Gyeltshen *et al.*, 2021a; Gyeltshen *et al.*, 2021b [which includes a key to *Begonia* sect.

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Diploclinium]). However, the diversity of the genus in the country has still not been fully explored, and further investigations are much needed as many new species await discovery and new distribution records will be made.

In June to December 2020 and 2021, specimens of some interesting *Begonia* taxa were collected by Phub Gyeltshen, Pema Zangpo, Sherab Jamtsho and Cheten La. After a critical examination of the specimens and comparison with the protologues of related species described from the Eastern Himalayan region, it was concluded that one species is new to science and four species are new records for Bhutan; these are described and illustrated below.

Taxonomic treatment

Begonia menchunaensis P.Gyeltshen & M.Hughes, sp. nov. [§ *Diploclidium*]

Begonia menchunaensis is similar to *B. picta* Sm. but is distinguished from it by its moniliform tubers (vs single globose tubers); longer petioles up to 10–55 cm (vs 5–12(–20) cm), which are glabrous (vs sparsely puberulous); outer tepals in male and female flowers with an acute apex (vs rounded); and immature ovaries with simple red setose hairs (vs white fimbriate villose hairs). – Type: Bhutan, Punakha District, Toedpisa Block, Menchuna, 2284 m, 24 ix 2021, *P. Gyeltshen* 067-068 (holotype THIM [THIM17728], isotype THIM [THIM18604]). **Figures 1, 2, 3, 4.**

Monoecious, tuberous herb, up to 25 cm tall. *Tuber* stout, moniliform, each section 1–3 cm in diameter, with numerous fibrous roots. *Stem* 1- or 2-branched, terete, glabrous, up to 20 cm long. *Leaves*: lamina symmetrical, broadly ovate to triangular-ovate, 15–35 × 10–26 cm, apex acuminate, base cordate, margin shallowly lobed, bidenticulate; adaxial surface green to olive green, white pilose, abaxial surface pale green to brownish green, venation palmate-pinnate, veins c.8, prominent beneath; petiole 10–55 cm long, up to 1.2 cm in diameter, fleshy, pale green to reddish brown, glabrous. *Inflorescence* terminal, a compressed cyme, appearing umbellate, bisexual, protandrous, 2- to 6-flowered; peduncle pilose when young, unbranched, 5–16 cm long, terete, pale green to lightly brownish red. *Staminate flower*: pedicels 2.5–4 cm long, erect or curved downwards, pilose, pale green to light brownish green; tepals 4, outer tepals broadly ovate to triangular-ovate, 1.7–2.1 × 1.5–2 cm, apex broadly acute, margin entire or serrate, outer surface sparsely red setose, inner surface glabrous, pale pink to white; inner tepals elliptic, 1.2–1.6 × 0.5–1 cm, apex acute, margin entire, outer surface glabrous or a few red setose, whitish pink to white; *androecium* symmetrical, > 60 stamens, bright yellow; filaments clustered at the base on a column, free, unequal, 0.5–2 mm long; anthers obovate, 1–1.6 mm long, connective rounded, apex obtuse or truncate, dehiscing through lateral slits. *Pistillate flower*: pedicels 1.5–3 cm long, pilose, pale green or greenish red; ovary green, with 3 unequal wings, with simple red setose hairs, denser on the locular portion; 3-locular, placentation axillary, 2

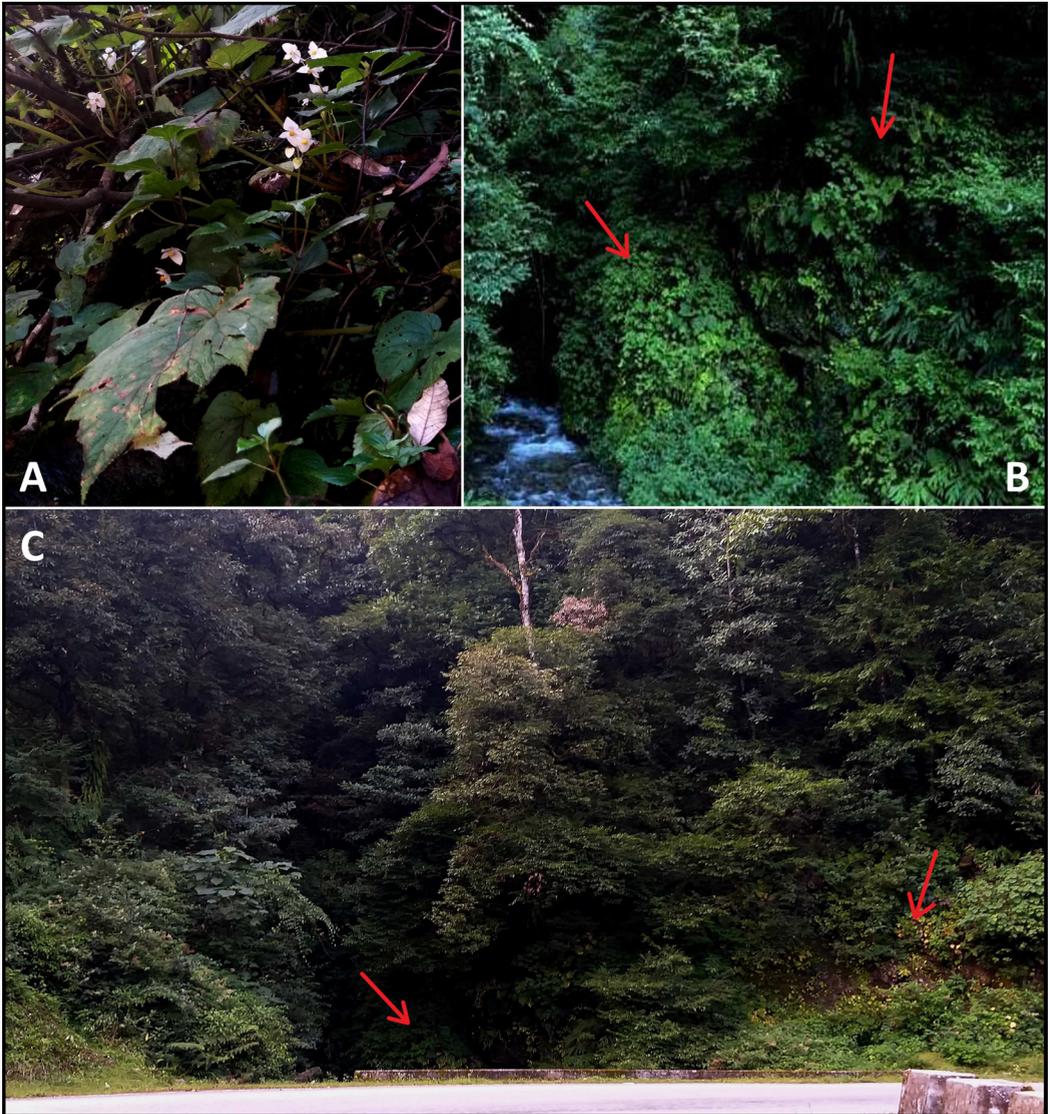


Figure 1. *Begonia menchunaensis* P.Gyeltshen & M.Hughes, sp. nov. A, Plants *in situ* at the type locality (Menchuna, Punakha District, Bhutan); B, plants *in situ*, in their streamside habitat; C, location of habitat, showing national highway. The red arrows in B and C indicate the plants. Photographs: P. Gyeltshen.

branches per locule; tepals 5 (or 6), unequal, outer 3 tepals ovate to elliptic-ovate, 1.5–1.8 × 1–1.3 cm, apex acute, margin serrate, outer surface red setose, inner tepals 2 or 3, unequal, elliptic, 1–1.5 × 0.5–0.8 cm, apex acute, margin entire, glabrous, same colour as staminate flower; styles 3, fused at the base, dark yellow, deeply forked once and twisted twice. Capsule oblong-ellipsoid, 1–1.5 × 0.5–0.7 cm, green, with red setose hairs, wings slightly

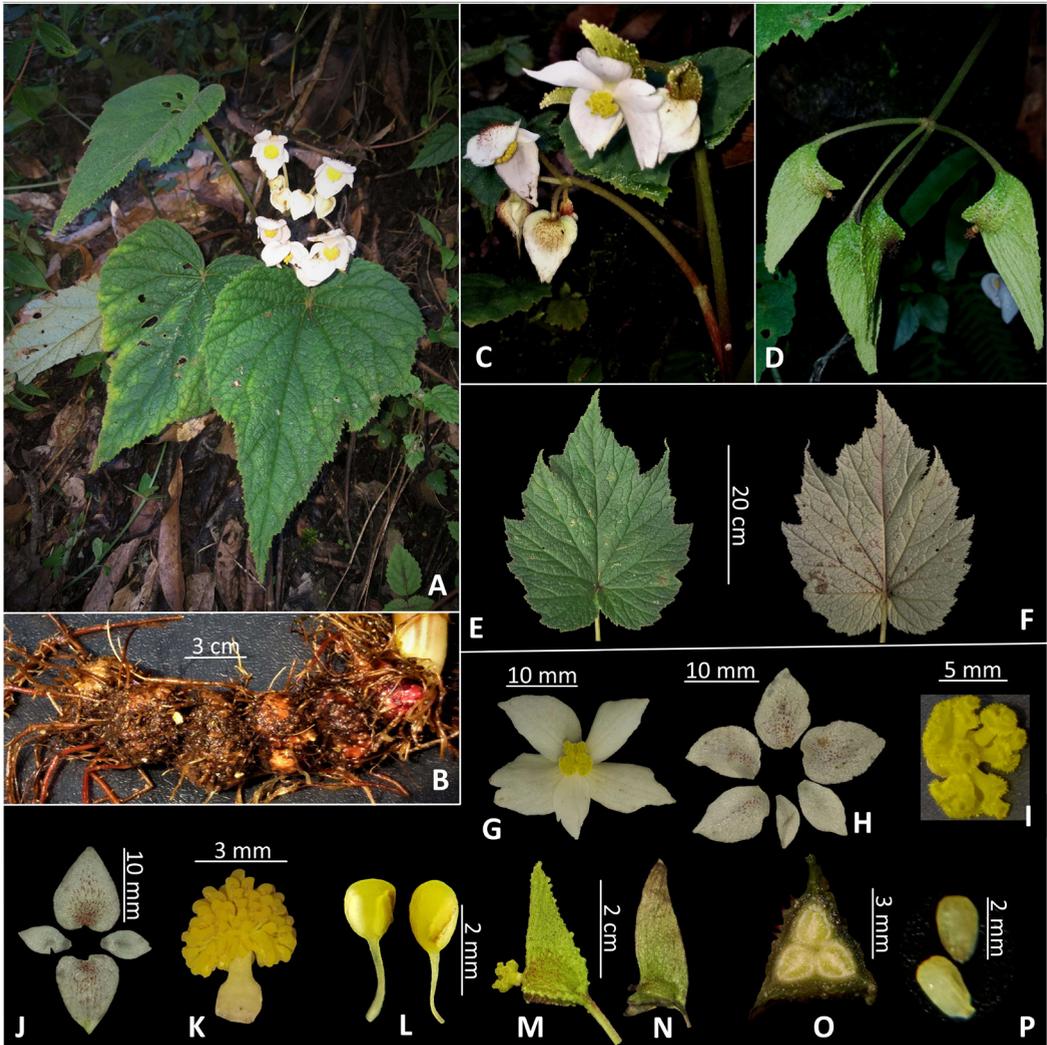


Figure 2. *Begonia menchunaensis* P.Gyeltshen & M.Hughes, sp. nov. A, Habit; B, tuber; C, inflorescence; D, infructescence; E and F, leaves (adaxial and abaxial surface, respectively); G, female flower; H, female tepals (abaxial surfaces); I, styles (top view); J, male tepals (abaxial surfaces); K, androecium (side view); L, stamens (back and front view); M and N, capsules; O, transverse section of ovary; P, seeds. Photographs of the type collection (P. Gyeltshen 067-068), taken by P. Gyeltshen.

extending along the pedicel, unequal; dorsal wing, narrowly triangular, 3.5–4.6 × 1–1.5 cm, lateral 2 wings short triangular, 8–12 × 2–9 mm, sparsely red setose, warty.

Altitudinal range. 2270–2300 m.

Phenology. Flowering in September, fruiting from September to October.



Figure 3. *Begonia menchunaensis* P.Gyeltshen & M.Hughes, sp. nov. Holotype: P. Gyeltshen 067-068 (THIM [THIM17728]).

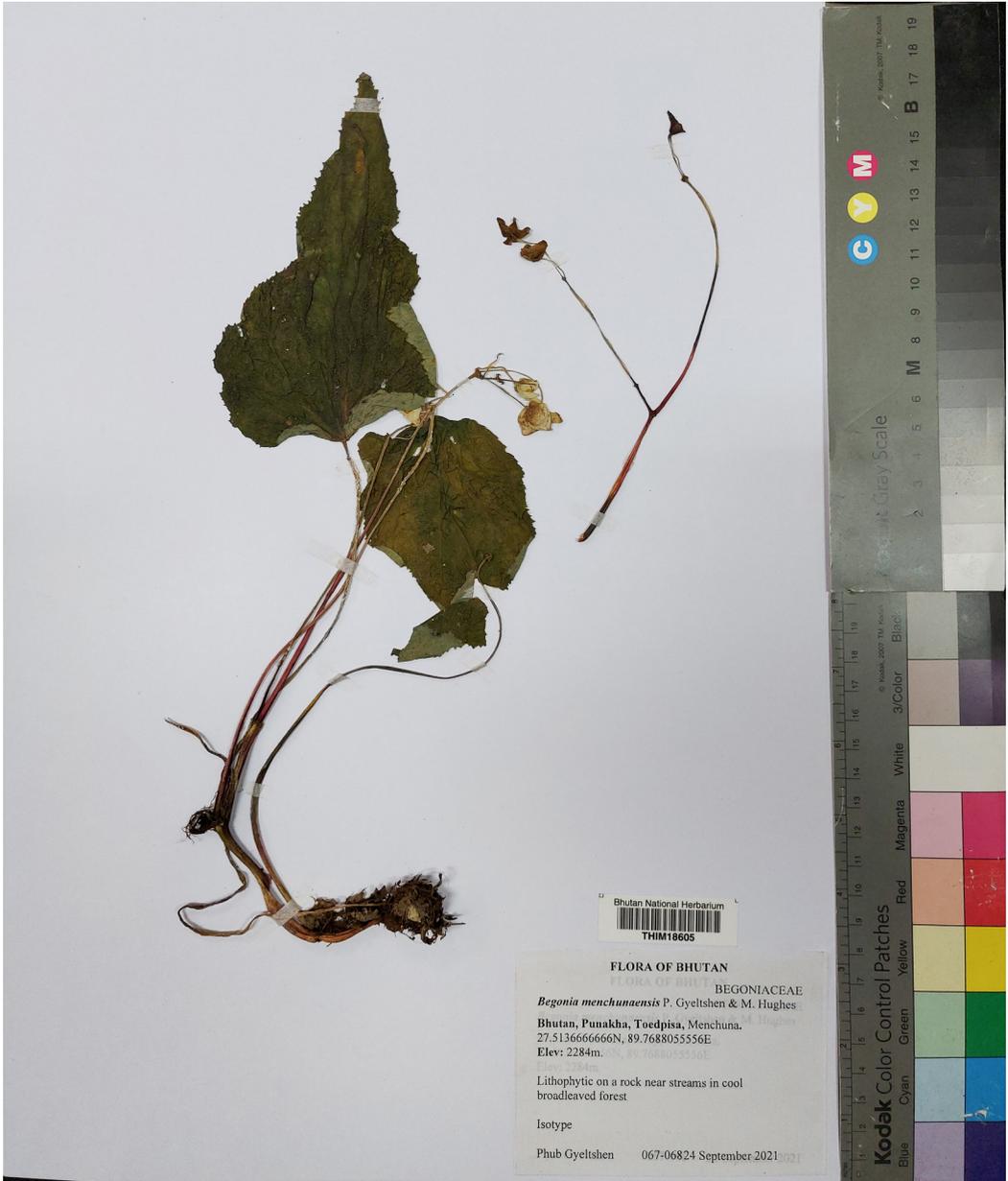


Figure 4. *Begonia menchunaensis* P.Gyeltshen & M.Hughes, sp. nov. Isotype: P. Gyeltshen 067-068 (THIM [THIM18604]).

Distribution. *Begonia menchunaensis* is endemic to Bhutan and currently known only from the type locality at Mechuna, Punakha District (Figure 5).

Habitat. Lithophytic on rocks near streams in cool broadleaved forest (see Figure 1). Associated species are *Ageratina adenophora* (Spreng.) R.M.King & H.Rob., *Anaphalis margaritacea* (L.) Benth. & Hook.f., *Astilbe rivularis* Buch.-Ham. ex D.Don, *Begonia josephi* A.DC., *Girardinia diversifolia* (Link) Friis, *Gonostegia triandra* (Blume) Miq., *Impatiens racemosa* DC., *Koenigia mollis* (D.Don) T.M.Schust. & Reveal and *Persicaria chinensis* (L.) H.Gross.

Etymology. The specific epithet is derived from the name of the type locality, Mechuna in Punakha District, Bhutan.

Proposed IUCN conservation category. *Begonia menchunaensis* is assessed as Critically Endangered (CR). We have explored the surrounding areas of the type locality and other places with similar habitat in search of this new species, but *Begonia menchunaensis* is

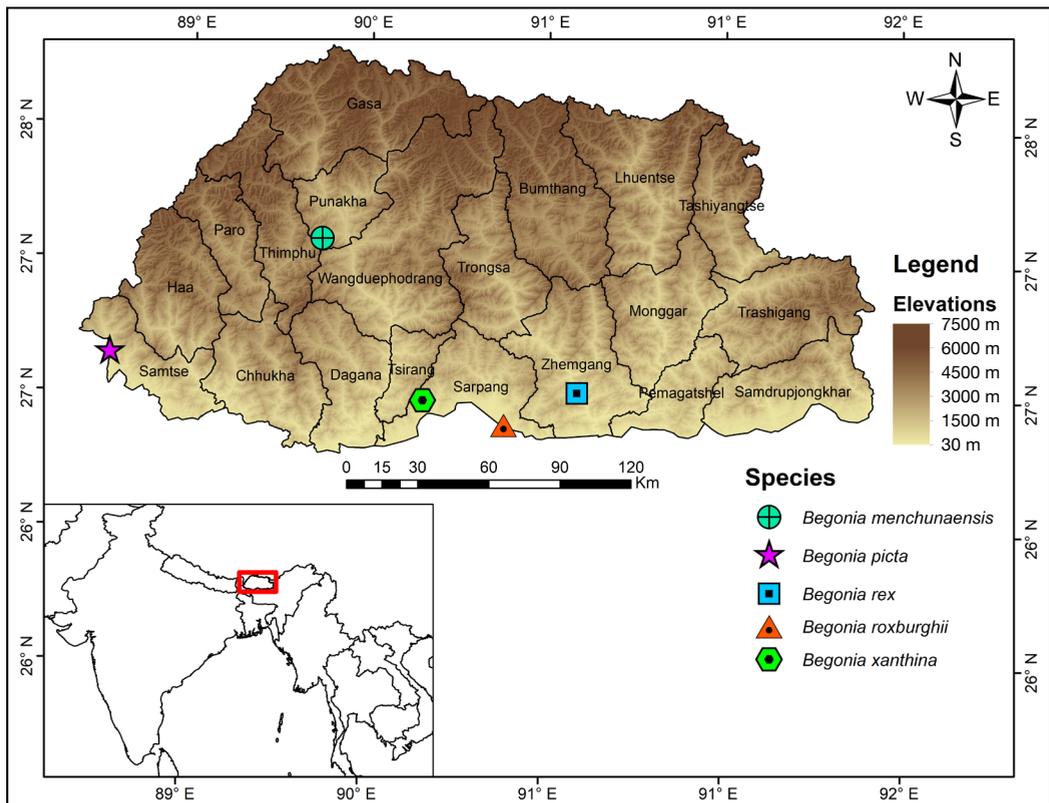


Figure 5. Distribution of *Begonia menchunaensis* (type locality), *B. picta*, *B. rex*, *B. roxburghii* and *B. xanthina* in Bhutan.

currently known from only one population consisting of c.100 mature individuals. The area of occupancy (AOO) of the species is estimated to be < 4 km², which meets criterion B2 under the Critically Endangered (CR) category of the *IUCN Red List Categories and Criteria* (IUCN, 2019). Because the species grows on rocks beside a national highway, it is threatened by the annual maintenance and cleaning of road buffers, and its habitat will probably be threatened by road extension in the future. Based on current information (one location with projected decline in extent and quality of habitat, and AOO < 4 km²), the new species is provisionally assessed as Critically Endangered B2ab(iii).

Additional specimen examined. BHUTAN. **Punakha:** Toedpisa, Menchuna, 2285 m, 27 ix 2020, P. Gyeltshen 065 (THIM).

New records for Bhutan

Begonia picta Sm. [§ *Diploclinium*], Exot. Bot. ii: 81, t. 101 (1805); Don, Prodr. Fl. Nepal 223 (1825); Hooker, Bot. Mag. 57: 2962 (1830); Clarke in Hooker, Fl. Brit. India 2: 638 (1879); Clarke, Bot. J. Linn. Soc. 18: 118 (1881); Grierson, Fl. Bhutan 2: 242 (1991); Gu, Peng & Turland in Wu, Raven & Hong, Fl. China 13: 192 (2007); Hughes, Gard. Bull. Singapore 61: 100 (2008); Camfield & Hughes, Eur. J. Taxon. 396: 78 (2018). – Type: Nepal, 21 vii 1802, *Buchanan-Hamilton* (lectotype BM [BM000043985], designated by Camfield & Hughes, 2018).

Begonia echinata Royle, Bot. Himal. Mts 313: 80 (1839). – Type: Royle t. 80 (illustration) (1839). [Figure 6](#).

Monoecious tuberous herb. *Stem* if present, slender, up to 21 cm long, puberulous, internodes 5–12 cm long. *Stipules* lanceolate, 1–4 × 1–1.2 mm, sparsely puberulous. *Leaves:* lamina slightly asymmetrical, ovate to broadly triangular, 3–18 × 2.5–15 cm, apex acute or acuminate, base shallowly cordate to subtruncate, margin double-dentate to denticulate, with hairs, sometimes weakly lobed, adaxial surface green or green with red around the veins, pale pilose all over, abaxial surface green or mottled with red, puberulous on veins only, venation palmate-pinnate, midrib 2.5–18 cm long; petiole 4–21 cm long, sparsely puberulous. *Inflorescence* terminal, cymose; peduncle pilose, branching twice, primary branch 3–15 cm, secondary branch 1–6 cm, with 2–4 female and 2–6 male flowers; bracts lanceolate, 3–4 × 1–2 mm, margin with dense hairs, entire. *Staminate flower:* pedicel 1–3 cm long, villose; tepals 4, outer tepals broadly elliptic, 5.5–15 × 5–10.5 mm, white or pink, pilose, margin serrate, with hairs; inner tepals elliptic, 4.5–10.5 × 3–8 mm, white or pink, glabrous, entire, apex rounded; *androecium* symmetrical, with 25–40 stamens; filaments 2 mm long, equal, slightly fused at base; anther oblong-elliptic, 1–2 mm long, hooded, connective rounded, dehiscing through lateral slits. *Pistillate flower:* pedicel 1.5–4 cm long, pilose; *ovary* 3-locular, with 3 unequal wings white fimbriate villose, placentation axillary, 2 branches per locule; *styles* 3, deeply forked once and twisted once;



Figure 6. *Begonia picta* Sm. A, Plant *in situ*; B, tuber; C and D, female flowers (front and side view, respectively); E, infructescence; F, capsule (side view); G, transverse section of the ovary. Photographs taken by C. La.

tepals (4 or) 5, equal, obovate-orbicular, outer tepals 4–6 × 3–4 mm, pink to white, glabrous or sparsely pilose on reverse, margin with hairs, inner tepals similar but smaller. *Capsule* oblong-ellipsoid, 8–13 × 5–9 mm, white fimbriate villose, with one long triangular wing, 1.7–2.6 × 0.9–1.7 cm, 2 short triangular wings, 7–13 × 6.5–11.5 mm.

Phenology. Flowering from July to September and fruiting from August to October.

Distribution and habitat. China, India, Myanmar, Nepal, and new to Bhutan (Samtse). Lithophytic in shaded areas on rocks in subtropical and warm broadleaved forests at (480–)1000–2150 m elevation. See [Figure 5](#).

Specimens examined. BHUTAN. Samtse: Pekarling, 485 m, 3 viii 2019, C. La 01 (THIM17726).

INDIA. Arunachal-Pradesh: Mariyang to Takekpong, Rao 17795 (ASSAM n.v.); Manipur, Karong, 30 ix 1950, Koelz 26363 (MICH); Meghalaya, Khasi Hills, Cherrapunji, 6 vii 1952, Koelz 30209A (MICH); *ibid.*, 29 vii 1946, Ward 16048 (BM); Nagaland, Naga Hills, Takubama, 24 viii 1950, Koelz 25892 (MICH).

Begonia picta is evaluated as Least Concern by Hughes (2008) and Camfield & Hughes (2018), because it is widely distributed in the Himalayas. Only a few mature individuals from one location have been observed in Bhutan by the authors. Further exploration and study are required to determine the regional conservation status and population trend of this species in the country. According to Camfield & Hughes (2018), *Begonia picta* is distributed between 1000 and 2150 m elevation, with our record reducing the lower limit to 480 m elevation.

Begonia rex Putz. [§ *Platycentrum*], J. Gén. Hort. ii: 141, t. 1255 (1857); Clarke in Hooker, Fl. Brit. India 2: 647 (1879); Clarke, Bot. J. Linn. Soc. 18: 119 (1881); Clarke, Bot. J. Linn. Soc. 25: 26 (1890); Gagnepain in Lecomte & Gagnepain, Fl. Indo-Chine 2: 1112 (1921); Kress *et al.*, Contr. U.S. Natl. Herb. 45: 171 (2003); Gu, Peng & Turland in Wu, Raven & Hong, Fl. China 13: 195 (2007); Hughes, Gard. Bull. Singapore 61: 107 (2008); Camfield & Hughes, Eur. J. Taxon. 396: 79 (2018).

Platycentrum rex (Putz.) Seem., Harting. Parad. 81 (1860). – Type: Fl. Serr. Jard. 12: 141 (illustration); India, Nagaland, Naga Hills, Digboi, i 1969, Yandall 109 (epitype K, designated by Camfield & Hughes, 2018). [Figure 7](#).

Monoecious, rhizomatous herb, up to 20 cm tall. *Rhizome* reddish brown, 8–15 mm wide, pilose. *Stipules* persistent, ovate to lanceolate, 8–14 × 4–7 mm, pale whitish pink, sparsely villous abaxially, apex broadly acute, margin entire, revolute. *Leaves*: lamina basifixed, asymmetrical, ovate to broadly ovate, 5–18 × 6–23 cm, apex acute to shortly acuminate, base oblique cordate with lobes not overlapping; margin toothed at the end of the veins with smaller teeth between, with sparse hairs, adaxial surface dark green with small pale white circular dots between the main veins, glabrous; abaxial surface purplish green, veins purple, red villose on veins; venation palmate, veins 8–10; midrib (4–)6.5–18 cm long, prominent underneath; petiole 10–18 cm long, light red, pale white linear dots, glabrous to sparsely puberulous. *Inflorescence* terminal, cymose, branching 1 or 2 times, up to 30 cm long, male flowers distal and female flowers basal, protandrous; peduncle terete, 8–25 cm long, light red, glabrous. *Bracts* ovate-lanceolate, 15–25 × 8–10 mm, apex narrowly acute margin entire, pale whitish yellow, glabrous, deciduous. *Staminate flower*: pedicel 10–25 mm long, light red, glabrous; tepals 4, white to the whitish-pink inner surface, pinkish outside;

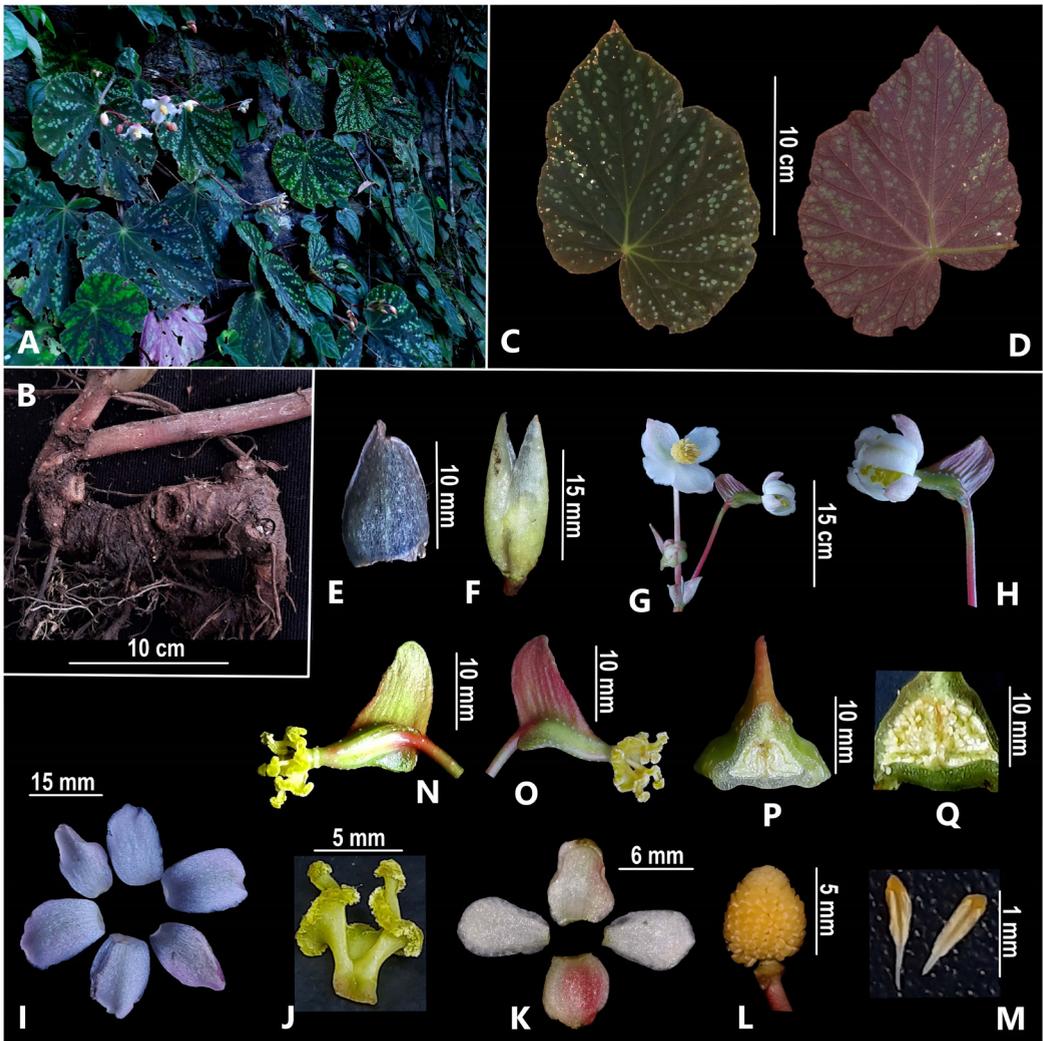


Figure 7. *Begonia rex* Putz. A, Plant *in situ*; B, rhizome; C and D, leaves (adaxial and abaxial surface, respectively); E, stipule (abaxial surface); F, floral bracts; G and H, inflorescences; I, female tepals; J, section of style; K, female tepals; L, immature androecium; M, stamens; N and O, capsules; P and Q, transverse section of ovary. Photographs taken by P. Zangpo.

outer tepals cucullate, broadly ovate to elliptic, 5–7 × 5–7 mm, apex rounded to obtuse, margin entire, outer surface sparsely villous at the base, inner surface glabrous; inner tepals obovate to elliptic-obovate, 5–6 × 2–3 mm, apex rounded to obtuse, margin entire, both surfaces glabrous; *androecium* symmetrical, numerous, c.> 60 stamens, light orange, filaments 0.4–0.5 mm long, unequal, fused at base into a long column; anther oblong to oblong-obovate, 0.5–1 mm long, connective extended, apex acute, dehiscing through lateral

slits. *Pistillate flower*: pedicel 20–50 mm long, light red, glabrous; tepals 6, outer surface light pinkish white, inner surface white, glabrous, outer tepals slightly smaller than inner tepals, oblong, oblong-ovate, 10–15 × 5–8 mm, apex rounded to obtuse margin entire; ovary green, glabrous, 2-locular, with one long oblong-ovate dorsal wing and two short wings, placentation axillary, 2 branches per locule, whitish circular dots on the surface; *styles* 2, yellow, connate near the base into a short stalk, deeply forked once and twisted twice, with minutely papillose, persistent. *Capsule* ovoid, 8–10 × 3–4 mm, glabrous, unequally 3-winged; dorsal wing oblong, 8–12 mm long, 3.5–5 mm wide; lateral wings, 2.5–4 mm long, 2–3 mm wide.

Phenology. Flowering in January and fruiting from January to February.

Distribution and habitat. China, Bangladesh, India, Myanmar, and new to Bhutan (Zhemgang). Lithophytic in shaded areas in subtropical forest at 450–1000 m elevation. Associated species include *Begonia josephi*, *Globba clarkei* Baker, *Persicaria chinensis* and *Sonerila khasiana* C.B. Clarke. See [Figure 5](#).

Specimens examined. BHUTAN. **Zhemgang**: Phangkhar, Litshang, 1090 m, 13 ix 2020, *P. Gyeltshen & P. Zangpo* 66 (THIM17727).

INDIA. Arunachal Pradesh: Bapu Mountain, Rotung, xi 1911 to iii 1912, *Burkill* 37374 (n.v.); Delei Valley, 14 viii 1928, *Ward* 8518 (K); Assam, *Griffith* 2588 (K); *ibid.*, *Griffith* 2589 (K); Nagaland, Naga Hills, Digboi, i 1969, *Yandell* 108 (K); Naga Hills, Mariani District, Lakhuni, 2 i 1949, *Ward* 18376 (BM) [cf. *B. rex*].

Begonia rex is designated as Least Concern (LC) due to its wide distribution with ample habitat in Arunachal-Pradesh, Myanmar and China (Camfield & Hughes, 2018). In Bhutan, the known sites for the species are located within road buffer areas and could be disturbed or changed due to road expansion and maintenance in the future. This species is known from two locations, each with a population of fewer than 10 individuals. Further study is recommended to understand its population trend and conservation status in Bhutan. The leaves of the type form have distinctive three-coloured variegation, with a darker margin and central area; in Bhutan the species has leaves with white dots between the veins on the adaxial surface.

Begonia roxburghii (Miq.) A.DC. [§ *Platycentrum*], *Prodr.* 15: 398 (1864); Clarke in Hooker, *Fl. Brit. India* 2: 635 (1879); Clarke, *Bot. J. Linn. Soc.* 18: 115 (1881); Grierson, *Fl. Bhutan* 2: 243 (1991); Kress *et al.*, *Contr. U.S. Natl. Herb.* 45: 172 (2003); Uddin, *J. Econ. Taxon. Bot.* 31: 594 (2007); Hughes, *Gard. Bull. Singapore* 61: 111 (2008); Camfield & Hughes, *Eur. J. Taxon.* 396: 81 (2018).

Diploclinium roxburghii Miq., *Fl. Ned. Ind.* 1: 692 (1856). – Type: Bangladesh, Chittagong, *Hooker & Thomson* 40 (lectotype K [K000634807]; isolectotype K, designated by Camfield & Hughes, 2018).

Casparya oligocarpa A.DC., *Ann. Sci. Nat., Bot. sér.* 4: 118 (1859). – Type: India, Meghalaya, Khasia, 610–1210 m, *Hooker & Thomson* 40 (lectotype K [K000761501]; isolectotypes BM, K, designated by Camfield & Hughes, 2018).

Casparya polycarpa A.DC., Ann. Sci. Nat., Bot. sér. 4: 118 (1859). – Type: India, Meghalaya, Assam, Assam Plains, *Griffith s.n.* (lectotype K; isolectotype K, designated by Camfield & Hughes, 2018). **Figure 8.**

Dioecious, caulescent, erect herb, 25–90 cm tall. *Stem* cylindrical, creeping at the base, slightly woody, stout, 6–15 mm wide, glabrous, internodes 4–12 cm long. *Stipules* lanceolate, 8–15 × 5–8 mm, glabrous, deciduous. *Leaves*: lamina asymmetrical, basifixed, ovate to broadly ovate, 5–22 × 4–15 cm, apex acuminate, base cordate with lobes not

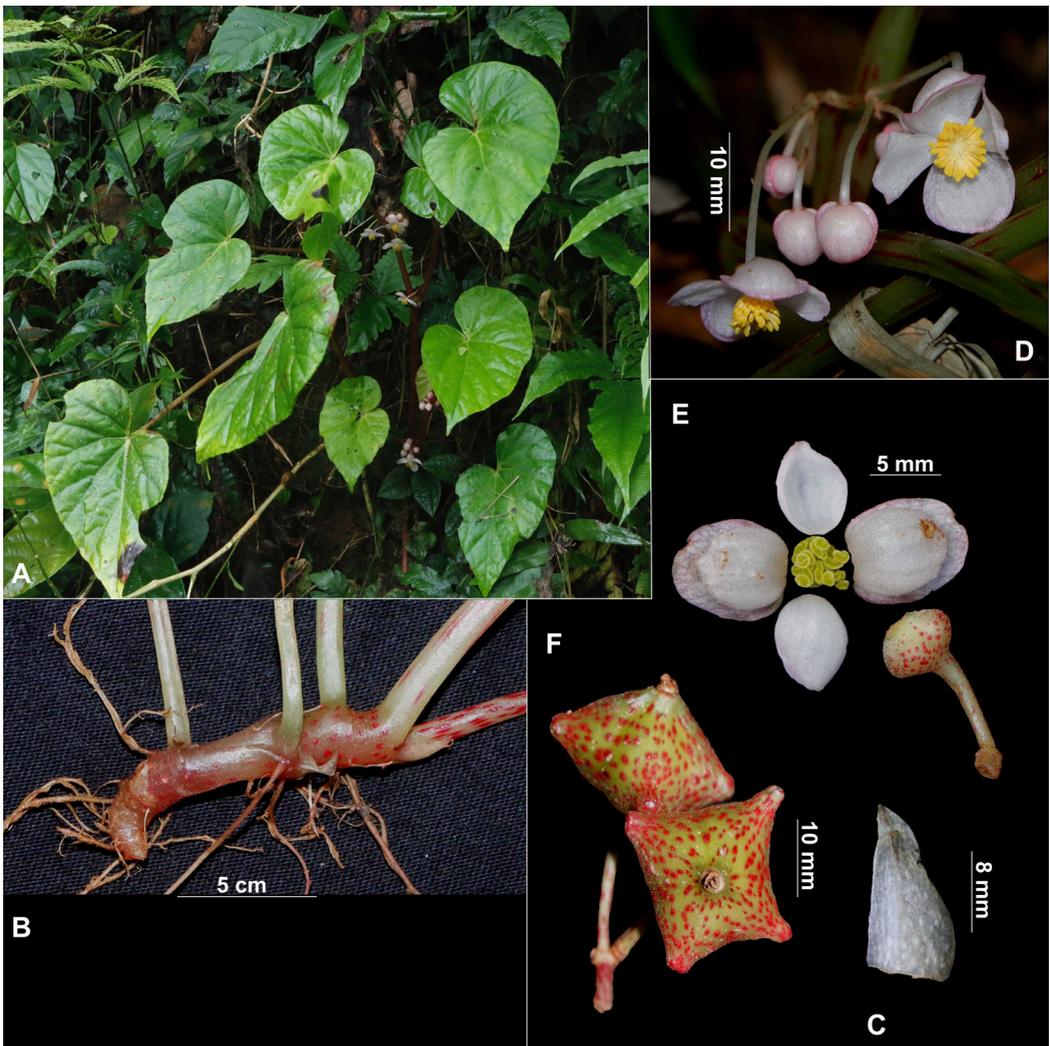


Figure 8. *Begonia roxburghii* Hook.f. & Thomson. A, Plant *in situ*; B, rhizome; C, stipule; D, inflorescence; E, female flower; F, capsules. Photographs taken by Sherab Jamtsho.

overlapping, margin entire to denticulate, upper surface green, glabrous, underside green, glabrous, venation palmate-pinnate, midrib 4–24 cm long, glabrous; petiole 8–20 cm long, glabrous. *Inflorescences* cymose, axillary, flowers numerous; peduncle puberulous; male branching 2 or 3 times, 6–8 flowers; female branching twice, 2–5 flowers; bracts ovate, 9–12 × 3–4 mm, glabrous, margin entire. *Male flower*: pedicel 10–20 mm long, glabrous; tepals 4; outer tepals ovate to oblong-elliptic, 10–13 × 5–8 mm, white to pink, glabrous, margin entire; inner tepals elliptic, 8–12 × 4–6 mm, white to pink, glabrous; *androecium* symmetrical; > 40 stamens, filaments 2 mm long, fused at base; anther oblong-elliptic, 1.5–2 mm long, not hooded, connective extended, apex obtuse, dehiscing through lateral slits. *Female flower*: pedicel 8–15 mm long, glabrous to puberulous; ovary 4-locular, placentation axillary, 2 branches per locule; *styles* 4, deeply forked once and twisted twice, persistent; tepals 4, outer tepals oblong-ovate, 10–15 × 8–12 mm, white to pale pink, glabrous, margin entire; inner tepals ovate to ovate-elliptic, 7–13 × 6–9 mm. *Capsule* pendulous, pyramidal-ovoid, 18 × 16 mm, glabrous to sparsely puberulous, without wings, with 4 horn-like projections, pale yellow-green with red dots.

Phenology. Flowering from February to October and fruiting from July to October.

Distribution and habitat. India, Nepal, Bangladesh, Myanmar, and new to Bhutan (Sarpang). Terrestrial in shaded areas with humus-rich soil in subtropical forest at 300–1850 m elevation. See [Figure 5](#).

Specimens examined. BHUTAN. **Sarpang**: Taraythang, 184 m, 3 viii 2019, *P. Gyeltshen & S. Jamtsho* 057 (THIM17726).

INDIA. **Arunachal-Pradesh**: Mishmi Hills, 22 iv 1949, *Ward* 18528 (BM); Assam, Upper Assam, 1841, *Hooker* 515 (K); Manipur, Koupru, *Deb* 2340 (CAL n.v.); Meghalaya, Garo Hills, Tura Mountain, 1929, *Parry* 866 (K); Jaintia Hills, iv 1968, *Yandell* 45 (K); Khasi Hills, Barapani, 16 vi 949, *Koelz* 22985 (MICH); Shillong, 1 viii 1886, *Clarke* 44383 (K). **Mizoram**: Hmuifang, viii 1929, *Parry* 264 (K); Lushai Hills, vii 1927, *Parry* 186 (K); Nagaland, Naga Hills, Digboi, 5 vi 1936, *Barnard* B1A3 (BM000017299); Naga Hills, Henima, 19 ix 1935, *Bon* 6477 (K).

Begonia roxburghii has been assigned to the Least Concern (LC) category (Camfield & Hughes, 2018) due to its wide distribution with abundant suitable habitat. In Bhutan, three individual plants in a single location have been observed in the field. Further study on its population trend and distribution is required to determine the conservation status of the species locally; however, no threats have been observed in the field.

Begonia xanthina Hook. [§ *Platycentrum*], *Bot. Mag.* 78: t. 4683 (1852); Clarke in Hooker, *Fl. Brit. India* 2: 644 (1879); Clarke, *Bot. J. Linn. Soc.* 18: 119 (1881); Grierson, *Fl. Bhutan* 2: 245 (1991); Gu, Peng & Turland in Wu, Raven & Hong, *Fl. China* 13: 204 (2007); Uddin, *J. Econ. Taxon. Bot.* 31: 595 (2007); Dash, *Bull. Arunachal Forest Res.* 26: 41 (2010); Camfield & Hughes, *Eur. J. Taxon.* 396: 102 (2018).

- Platycentrum xanthinum* (Hook.) Klotzsch, Abh. Königl. Akad. Wiss. Berlin 1854: 243 (1855).
 – Type: Cultivated collection, 1852, *Nuttall* s.n. (lectotype K [K000739937], designated by Camfield & Hughes, 2018). Cultivated at Rainhill, near Preston, from vegetative material collected in the wild from 'Bootan' (West Bengal, India) in 1850 by Booth.
- Begonia xanthina* var. *pictifolia* Hook., Bot. Mag. 85: t. 5102 (1859). – Type: Hooker, Bot. Mag. 85: t. 5102 (illustration) (1859).
- Begonia lazuli* Linden ex K.Koch, Wochenschr. Gärtnerei Pflanzenk. 1: 339 (1858). *Begonia xanthina* var. *lazuli* Hook., Bot. Mag. 85: t. 5107 (1859). – Type: Hooker, Bot. Mag. 85: t. 5107 (illustration) (1859).
- Begonia poecila* K.Koch, C.Koch & Fint., Wochenschr. Gärtnerei Pflanzenk. 1: 338 (1858). – Type: Unknown. [Figure 9](#).

Monoecious, rhizomatous herb up to 50 cm tall. *Rhizome* elongate creeping, 2–10 cm long, pilose, reddish brown. *Stipules* triangular-ovate, 10–20 × 15–18 mm, apex acute, margin entire, revolute, abaxially puberulent, sometimes pilose on midrib, pale whitish pink, caducous. *Leaves*: lamina basifixed, asymmetrical, ovate to broadly ovate, 4–25 × 5–23.5 cm, apex acute to shortly acuminate, base oblique cordate with lobes not overlapping, margin toothed at the end of the veins with smaller teeth between, with sparse hairs, adaxial surface dark green with silver-green variegation between the main veins, glabrous, abaxial surface purplish green, purple veins and nerves, red villose on veins; venation palmate, veins 6–10; midrib prominent underneath; petiole up to 22 cm long, light red, pale white linear dots, glabrous to sparsely puberulous. *Inflorescence* protandrous, cymose, terminal or axillary, up to 40 cm long, staminate flowers distal and pistillate flowers basal; peduncle terete, 8–25 cm long, reddish, glabrous or white tomentose. *Bracts* ovate-lanceolate, 15–25 × 8–10 mm. *Staminate flower*: pedicel light red, up to 26 mm long, glabrous; tepals 4, yellow to yellowish red; outer tepals ovate, 16–20 × 16–17 mm, apex rounded to obtuse, margin entire, outer surface sparsely villous at base, inner surface glabrous; inner tepals elliptic to elliptic-obovate, 16–19 × 9–12 mm, apex rounded to obtuse, margin entire or crenate, both surfaces glabrous; *androecium* symmetrical, up to 10 mm long; stamens c.60, yellow, filaments 1–3.5 mm long, unequal, fused at base; anther fusiform to oblong-obovate, 2.5–4.5 mm long, connective extended, apex acuminate, dehiscing through lateral slits. *Pistillate flower*: pedicel reddish, 1–2.5 cm long, light red, glabrous; *ovary* ellipsoid, reddish at anthesis, unequally 3-winged, glabrous, 2-locular; placentation axillary, 2 branches per locule; *styles* 2, yellow, connate near the base into a short stalk, up to 5 mm long; stigmas strongly spiralled, twisted twice, persistent; tepals 5, unequal, yellow to yellowish red, apex obtuse or retuse, glabrous; outer tepals larger than inner tepals, obovate or elliptic-obovate, 15–20 × 8–1.2 mm, margin entire or undulate; inner tepals obovate, 13–17 × 6–11 mm, apex obtuse to retuse or crenate. *Capsule* reddish, nodding, glabrous, unequally 3-winged; dorsal wing oblong,

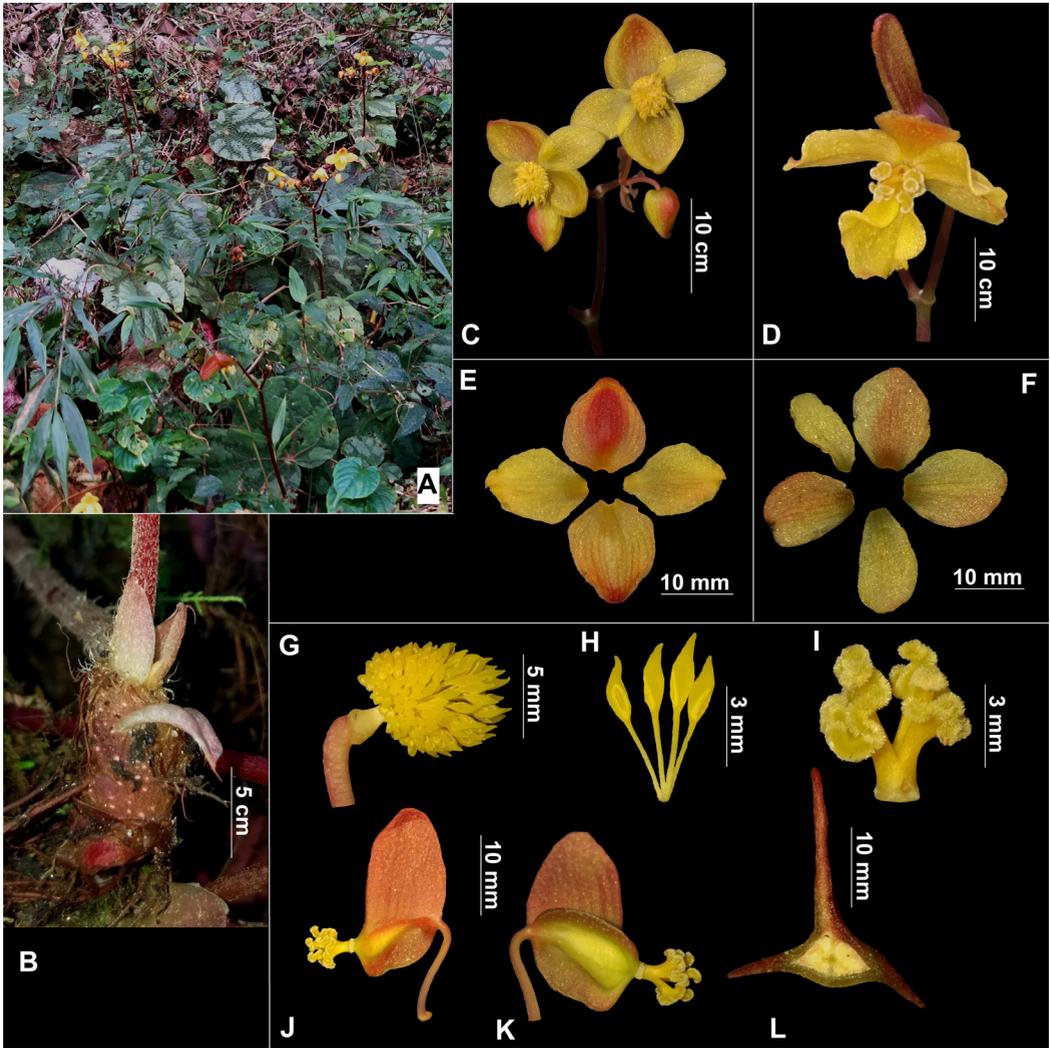


Figure 9. *Begonia xanthina* Hook.f. & Thomson. A, Plant *in situ*; B, rhizome with stipules; C and D, inflorescences (male and female, respectively); E, male tepals (back view); F, female tepals (front view); G, androecium (side view); H, stamens; I, styles; J and K, capsules (side and underside view, respectively); L, transverse section of ovary. Photographs taken by P. Gyeltshen.

18–23 × 11–18 mm, apex obtuse or rounded; lateral wings much narrower, 12–15 × 4–6 mm.

Phenology. Flowering from June to September, fruiting from June to October.

Distribution and habitat. China, India, Nepal, and new to Bhutan (Sarpang). The species

prefers rocky substrates in subtropical and warm broadleaved forests at 600–1800 m elevation. See [Figure 5](#).

Specimens examined. BHUTAN. **Sarpang**: Noonpani, 880 m, xi 2020, *P. Gyeltshen* 55 (THIM18825).

INDIA. **Arunachal-Pradesh**: Bhalukpong, vii 1970, *Yandell* 116 (K); Mishmi Hills, 1862–1863, *Griffith* 2591 (K); Meghalaya, Khasi Hills, xi 1886, *Mann s.n.* (K).

The two records of this species in Bhutan by Camfield & Hughes (2018) are in error. The type was collected by Booth in 1850 from in the wild, from ‘Bootan’, which was recorded in Camfield & Hughes (2018) as Bhutan. However, as ‘Bootan’ includes parts of India in Booth’s notes, it is difficult to conclude with certainty that the collection is made from Bhutan. The record from Pakke Tiger Reserve of Bhutan is erroneous because the reserve is in Arunachal Pradesh, India, not inside Bhutan. Camfield & Hughes (2018) assigned the conservation category as Least Concern (LC) due to the large distribution of the species and the amount of suitable habitat in Eastern Himalaya and China. The population found in Bhutan is stable and has a safe habitat for growth and reproduction.

Acknowledgements

The authors are thankful to the Director and staff of the Department of Forest and Park Services, Ministry of Agriculture and Forest, Bhutan, for encouragement and motivation. We thank Ngawang Namgyal, Ngawang Dorji and Sonam Zangpo, Forest Science students of the College of Natural Resources, Punakha, for their assistance during our fieldwork. We also extend our thanks to Mr Phuentsho, herbarium curator of the National Biodiversity Centre, Thimphu, for constructive suggestions regarding herbarium specimens.

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