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Caption: Stripe-backed Weasel *Mustela strigidorsa*. Medium—digital, Software—procreate, Device—iPad + Apple pencil © Dhanush Shetty.



New distribution records of *Begonia* L., *B. murina* Craib and *B. poilanei* Kiew (Begoniaceae: Cucurbitales) for Laos

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Abstract: *Begonia murina* Craib from central and *B. poilanei* Kiew from southern of Laos, are newly recorded in Laos. Based on Lao materials, detailed description, photographs, and notes on habitat, ecology, & taxonomic discussion of these two species compared with the Chinese, Thai, & Vietnamese types are provided.

Keyword: Bolaven plateau, description, flora of Laos, limestone karst, new record, taxonomic discussion.

Begonia L. (Begoniaceae) is one of the largest genera of angiosperms, comprising 1,989 accepted species (Hughes et al. 2015–). In Laos, 28 species have been recorded, nine of which are endemic (Ding et al. 2020; Lanorsavanh et al. 2020; Souvannakhoummane et al. 2020). The limestone karst in Laos is interesting for plant diversity, and several new species of *Begonia* were described, including *B. cladotricha* M. Hughes (Hughes

2007); *B. viscosa* Aver. & H.Q. Nguyen (Averyanov & Nguyen 2012); *B. khammouanensis* Souvann. & Lamxay; *B. hinnamnoensis* Souvann. & Lanors. (Souvannakhoummane et al. 2018); *B. tatianae* Aver; *B. quadripetiolata* Aver. & H.Q. Nguyen (Averyanov et al. 2019).

During our field surveys in Khammouan and Bolikhamxay provinces, central Laos in June–August 2019 & July–August 2020, and Champasak province, southern Laos in September 2020, we found two species of *Begonia* that morphologically placed in sect. *Diploclinium* (Lindl.) A.DC. after carefully checking relevant literature and comparing with herbarium specimens: FOF, HNL and KAG, as well as online specimen data and images of type available at Begonia Resource Centre (Hughes et al. 2015–). The first species

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was identified as *Begonia murina* Craib, which can be recognized by small globose tuber and glandular hairs indumentum in all parts, red striation on ovary and fruit, these features had been known only in Thailand (Phutthai et al. 2019). The second species is *B. poilanei* Kiew which is characterized by elongated cylindric tuber and known from southern Vietnam and China (Kiew 2007; Tian 2014; Peng et al. 2014). We here report these two taxa as new to the flora of Laos, along with their description based on Lao materials, photographs, distribution map. Consequently, the diversity of *Begonia* in Laos is increased to 30 species. The descriptions were made based on the living plants, alcohol preserved and herbarium specimens. The terminology follows Phutthai et al. (2019).

Begonia murina Craib

(Figure 1, Image 1)

in Gard. Chron. ser. 3, 83: 66. 1928; Hughes & Peng, 300 Spec. Port. Asian *Begonia*: 216. 2018; Phutthai et al., Fl. Thailand 14(3): 401. 2019.

Monoecious rhizomatous lithophytic herb, up to 15 cm tall. Rhizome tuber, small globose, smooth, light red to reddish brown, 3–5 mm in diameter, with many additional fibrous roots. Stemless or very short to 1 cm long, reddish, pilose. Leaves 3–5 per plant; petiole 5–9 cm long, 2–3 mm in diam., reddish, puberulous; blade asymmetric, ovate to lanceolate, 5–6 × 8–9 cm, apex acute, base cordate, margin dentate, covered with sparse short hairs, veins 4–5 per side, puberulous on both sides, adaxial surface green, abaxial surface paler. Inflorescence axillary near terminal cyme; peduncle erect, 6–10 cm long, puberulent, branched 2 times, with 2–4 male flowers and 1–2 female flowers per branch; bracts narrowly lanceolate, ca. 7 × 3 mm, membranous, reddish, slightly glandular hairy, margin fringed by glandular hairs. Staminate flower: pedicel 1.5–2.5 cm long, covered with glandular hairs, tepals 4, white, unequal, outer 2, broadly ovate, 10–12 × 14–15 mm, glandular hairy on the outer surface, margin entire covered with glandular hairs, inner 2, much smaller, elliptic to oblanceolate, white, 5–8 × 1.5–2 mm, glabrous inside, puberulous outside, margin entire, ciliate with glandular hairs; stamens bright yellow, 40–56, anther obovate, ca. 2 mm long. Pistillate flower: pedicel 1–1.2 cm long, glandular hairy, tepals 2 or 3, white, equal, outer 2, broadly ovate, 6–10 × 10–12 mm, covered with glandular hairs on the outer surface; inner 1 narrowly elliptic, ca. 6 × 2 mm. Ovary 3-locular, pale green with red striations, placentae axial, placentae 2 per locule, styles 3, stigmas bifid with twisted bands, golden yellow.

Capsule green with reddish line reticulate, brown when dry, with 3 subequal wings, abaxial wing 7–8 mm long, lateral wings shorter, 6–7 mm long. Seeds numerous, ellipsoid, ca. 0.3 mm long, light brown.

Distribution: Laos (Bolikhamxay, Khammouan), Thailand.

Ecology and Phenology: In Laos, this species was found on wet rock with mosses near streams in dry evergreen forest at elevation 1,034 m (Bolikhamxay Province) and on shade cliffs of limestone karst, associated with *Paraboea* sp. (Gesneriaceae), *Amorphophalus* sp. (Araceae) and some species of limestone ferns at elevation ca. 210 m (Khammouan Province). Flowering from August to September and fruiting from August to September.

Specimens examined: SL 1708 (FOF!, HNL!, Biology Herbarium of National University of Laos!), 28.vii.2020, in dry evergreen forest, Phou Khao Khouay National Protected Area, Thaphabath district, Bolikhamxay province, Laos, 18.496N, 103.313E, 1,034 m elevation, coll. Lanorsavanh S., Souvannakhoummane K. & Khane; P002 (FOF!), 30.vii.2020, Pha Kataiy, Limestone Hill, Gnommarath District, Khammouan Province, Laos, 17.552N, 105.164E, 210 m elevation, coll. Phonepaseuth P.; 884, 26.ix.2020, ibid., coll. Souladeth P., Insisiengmai O., Sengthong A., Phengmala K., Phanpadith P.

Type: 113 (holo ABD digital image!, iso ABD digital image!), 11.xi.1927, Cult. Hort. Bot. Aberb., Thailand, coll. Kerr A.F.G.

Vernacular: ສີມກັງຂົນ [(Somkoung Khon) meaning hairy begonia]

Note: *Begonia murina* Craib was originally described based on the plants collected from Kanchanaburi provinces, Thailand by Craib (1928), and formerly believed to be endemic to Thailand, being found in Sukhothai and Kanchanaburi (Phutthai et al. 2019). In Laos, it is known from Bolikhamxay and Khammouan provinces between 210–1,034 m elevations. Though Lao plants shows slight differences in leaf shape (oblique-cordiform vs. usually reniform) and colour of veins (usually green vs. reddish green), we consider these are included within the infraspecific variation of this species.

Begonia poilanei Kiew

(Figure 1, Image 2)

Adansonia 29(2): 235. (-238; fig. 2). 2007. *Begonia intermedia* D.K.Tian & Y.H.Yan, Phytotaxa 166(2): 116 (2014), nom. illeg.; Tian, Phytotaxa 172(1): 59. 2014. *Begonia wuzhishanensis* C.-I Peng, X.H. Jin & S.M. Ku, Bot. Stud. (Taipei) 55-24:: 3. 2014; Tian, Phytotaxa 172(1): 59. 2014.



Figure 1. Distribution of *Begonia murina* Craib: (▲) in Thailand, and (△) in Bolikhambay and Khammouan provinces, Laos. *Begonia poilanei* Kiew.: (○) in Vietnam, (○) in Bolaven plateau, Laos and (●) in Hainan, China.

Monoecious rhizomatous lithophytic herb, 5–15 cm tall. Rhizome tuber, cylindrical, smooth, light brown, 2–4 cm long, 5–8 mm in diameter. Stem short, 0.5–3 cm long, reddish green, pilose; branched from lower nodes. Stipule narrowly triangular, ca. 5 mm long, covered with white hairs. Leaves 2(–5) per plant; petiole 5–6(–10) cm long, 2–3 mm in diameter, reddish green, puberulous; blade obliquely cordate, 6–7 × 7–9 cm, apex acute-lanceolate or aristate, tip 1–1.5 cm long, base cordate, margin serrate with ciliate, puberulous on both sides, adaxial surface green, except venation which is dark

green and impressed, leaf abaxial surface paler, and reddish-green or red in veins, veins 3–4 pair per side, prominent on abaxial side. Inflorescence axillary and terminal cyme; peduncle erect, 6–15 cm long, 2–3 mm in diameter, covered with short hairs, usually with 2 branches, with female flower more than male flowers per branch, floral bracts hirsute, ovate, 4–6 × ca. 3 mm, membranous, reddish-green. Staminate flower: pedicel red to pinkish-red, 1–1.8 cm long, ca. 1 mm in diameter, pubescent; tepals 4, pink or bright pink, outer 2 larger, broadly ovate, 7–8 × 9–10 mm, with 9 distinct radial

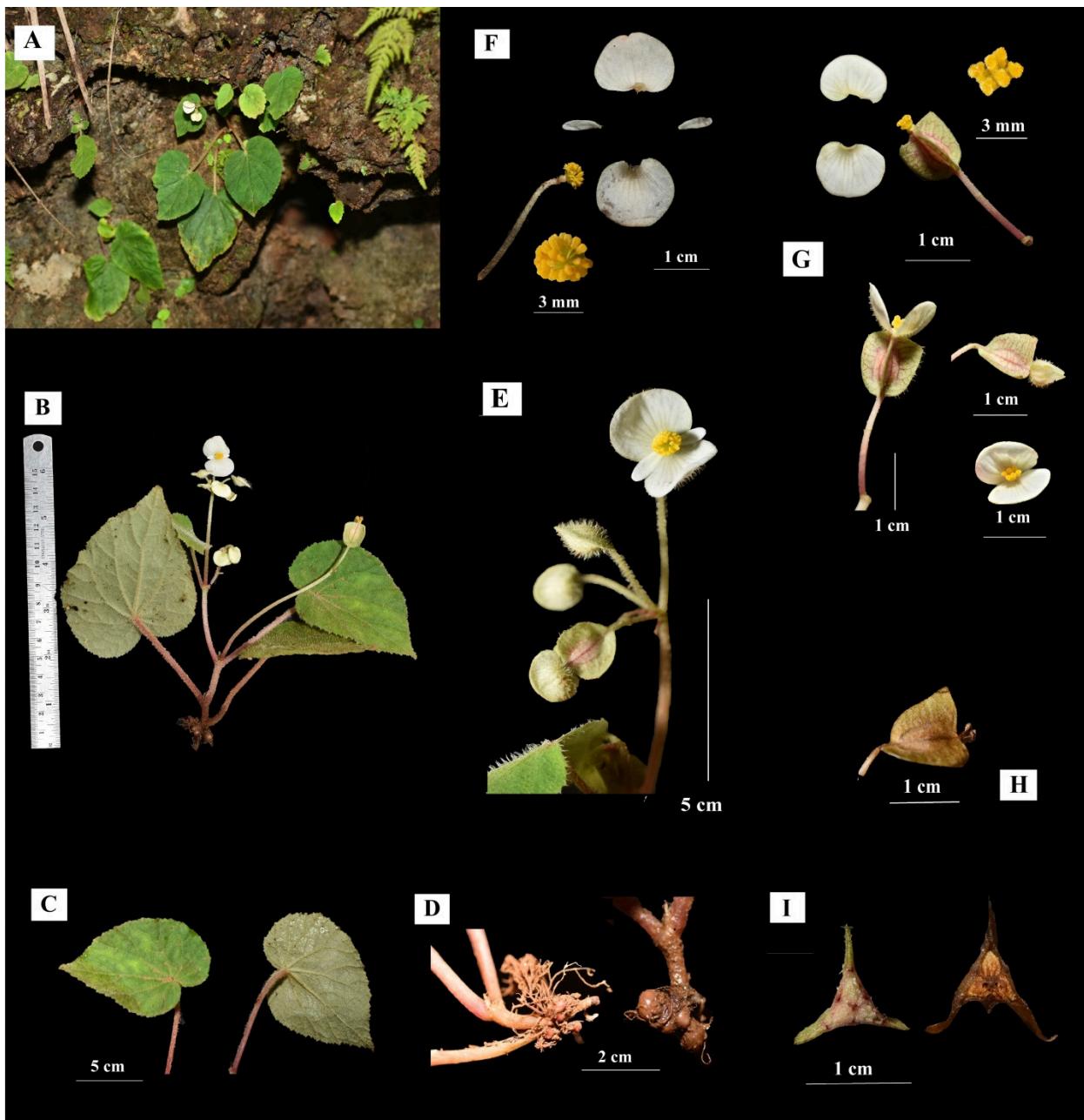


Image 1. *Begonia murina* Craib: A and B—Habit and habit | C—Leaf adaxial surface (left) and leaf abaxial surface (right) | D—Tubers | E—Inflorescence | F—Staminate flower and stamens | G—Pistillate flowers and pistil | H—Mature fruit | I—Cross-sections of capsule. © P. Phonepaseuth from P002 (FOF).

stripes on adaxial surface with glandular hairy on the outer surface especially on margin entire, inner 2, much smaller, elliptic to oblanceolate, lighter in color, 5–8 × 2–3 mm, stamens bright yellow, 28–36, anther obovate, ca. 2 mm long. Pistillate flower: pedicel pink or pinkish red, 1–1.2 cm long, globous, tepals 3, pink, unequal, outer 2, broadly ovate, 7–8 × 8–10 mm, with 9 distinct radial stripes on adaxial surface, covered with glandular hairs on the midrib of outer surface, inner 1, elliptic,

ca. 1.5 × 3 mm, ovary 3-locular, pinkish green, shiny, placentae axial, placentae 2 per locule, styles 3, stigmas bifid, golden yellow. Capsule unequally 3-winged, abaxial wing oblong, 7–8 mm long, lateral wings shorter, 4–5 mm long. Seeds not seen.

Distribution: China, Laos (Bolaven Plateau), Vietnam.

Ecology and Phenology: In Laos, this species is known only from on top of the Bolaven Plateau, Paksong District, Champasak Province at 1,270 m elevation.

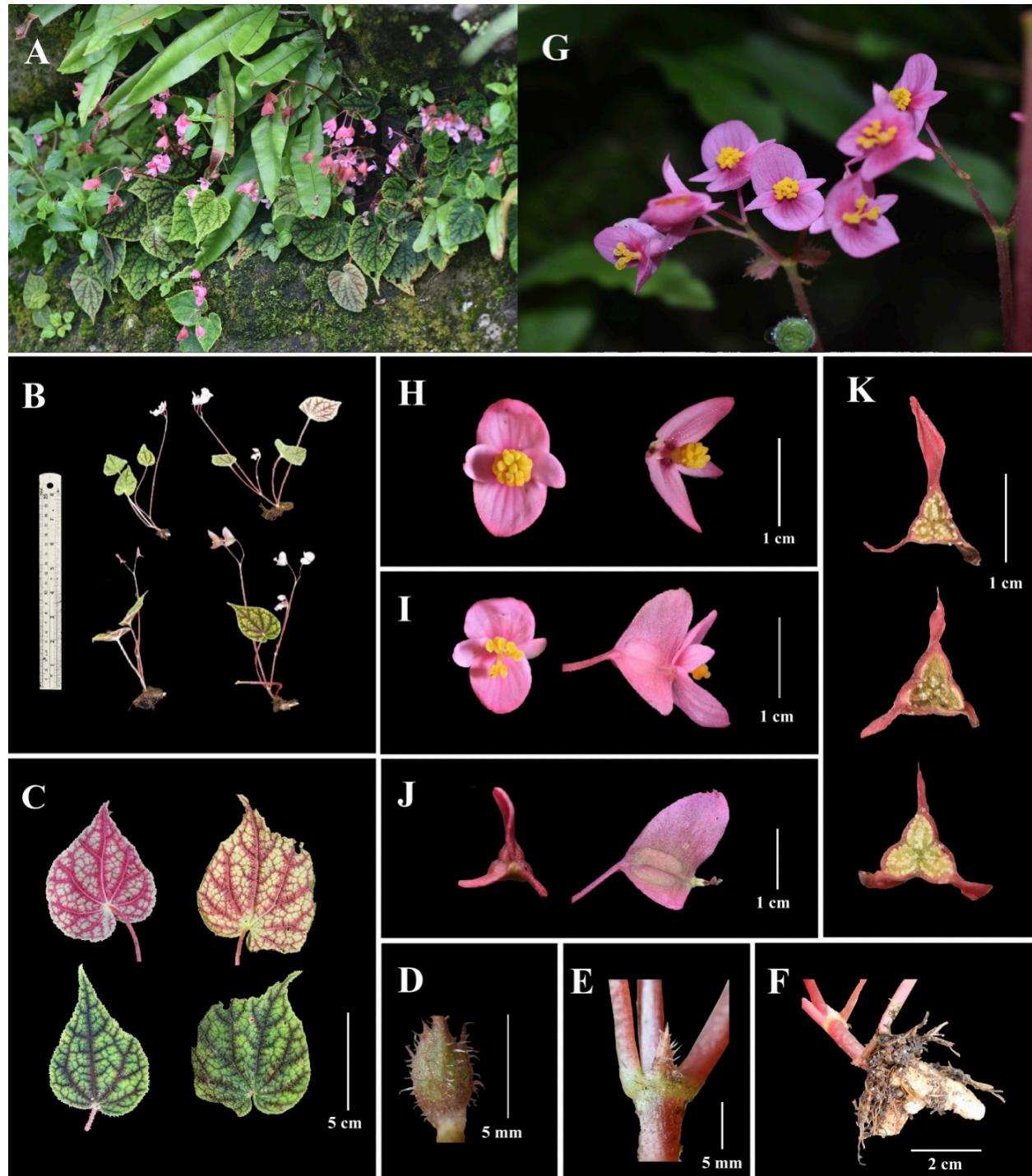


Image 2. *Begonia poilanei* Kiew: A and B—Habitat and habit | C—Leaf adaxial surface (below) and leaf abaxial surface (upper) | D—Floral bract | E—Stipule | F—Tuber | G—Inflorescences | H—Staminate flowers frontal and lateral view | I—Pistillate flowers frontal and lateral view | J—Mature fruits | K—Cross-sections of capsule. © P. Phonepaseuth (A, C, D, E, G–K), K. Souvannakhoummane (B & F) from L3949 (FOF).

Flowering and fruiting in September.

Specimens examined: L3949 (BKF, FOF!, KAG), 17.ix.2020, 15.060N, 106.208E, 1,277 m elevation, Dong Hua Sao National Protected Area, Bolaven Plateau, Paksong District, Champasak Province, Laos, coll.

Souladeth P., Phonepaseuth P., Souvannakhoummane K., & Vongthavone T.

Type: 19824 (holo P [P00539147], digital image!, iso [P00539160, P00539161], digital image!), 21.x.1931, Djijuuh Haut Donai District, Vietnam, Poilane E.; TDK710,

holo CSH n.v., iso CSH n.v., 28.ix.2012, Yinggeling National Natural Reserve, Qiongzong, Hainan, China, 19.020N, 109.573E; 2,093 m, holo HAST n.v., iso PE n.v., 3.xii.2013, on wet, mossy rocky slope by a stream in forest, Nanyi village, Fanyang township, Wuzhishan city, Hainan province, China, 18.881N, 109.342E, elevation ca. 180 m, coll. Shin-Ming Ku & Xiao-Hua Jin.

Vernacular: ສິມກູງກໍາມະຈອນ (Somkoung Kammajon [meaning blood veins])

Note: *Begonia poilanei* Kiew was first described from Vietnam, Haut Donai District, Djijuuh (Dalat) by Kiew in 2007, and named in honor of E. Poilane, who first discovered and collected this species in 1931. Formerly this species was stated as endemic to Vietnam. Peng et al. (2014) described *Begonia wuzhishanensis* C.-I Peng, X.H. Jin & S.M. Ku from Wuzhishan City, Hainan Province, China, and Tian et al. (2014) also described *B. intermedia* D.K. Tian & Y.H. Yan, from another city in Hainan Province in the same year, but both of them are now treated as a synonym of *Begonia poilanei* Kiew in Nomenclature of *Begonia* (Hughes et al. 2015–). In Laos, thus far this species is known only in one locality on the top plateau of Bolaven Plateau in Champasak Province. Lao plants have minor different from Vietnamese type specimen in its leaf apex: tip aristate (vs. acute).

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