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Strobilanthes bolavenensis, a new species of Acanthaceae from Bolaven Plateau, southern Laos

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Abstract

A new species of *Strobilanthes* (Acanthaceae), *S. bolavenensis*, is described from Bolaven Plateau, southern Laos. Photos and illustration are given together with information of habitat, ecology, vernacular name and preliminary conservation assessment based on IUCN criteria.

Keywords: Flora of Laos, Indochina, Lamiales, Lao PDR, taxonomy

Introduction

The genus *Strobilanthes* Blume (1826: 796) consisting of approximate 450 species is the second largest genus in the family Acanthaceae (Wood & Scotland 2009, Hu *et al.* 2011, POWO 2019, Chen *et al.* 2020). It is characterized by homomorphic calyx lobes (sometimes partially fused to form a bipartite or tripartite calyx), 4 monadelphous stamens in which usually 2 filaments are distinctly longer than the other 2, 2-locular ovary with 2(–8) ovules per locule, bifurcurate stigma with unequal branches, and seeds borne on hooklike retinacula (Hu *et al.* 2011). The genus is widely distributed in tropical and subtropical Asia to Pacific (Wood *et al.* 2017, POWO 2019). In Laos, 27 species have been recorded previously (Benoist 1935, Deng *et al.* 2007, Wood & Scotland 2009, Hu *et al.* 2011, Pooma & Suddee 2014, Newman *et al.* 2017 onwards, Souladeth *et al.* 2017, Nguyen *et al.* 2018).

During a field survey by the second and third authors in Bolaven Plateau, southern Laos (Fig. 1), an unknown species of *Strobilanthes* was collected. Study of this material revealed that it is most similar to *S. guangxiensis* S. Z. Huang (1986: 179) but distinct from it and all other known species of the genus. We herein describe it as *Strobilanthes bolavenensis* K. Yamaz., Tagane & Soulad., and provide its photos, illustration, vernacular name and preliminary conservation assessment.

Material & methods

Morphological observations

The new taxa was recognized by detailed comparisons with morphologically similar species through literature review (Benoist 1935, Hô 2000, Wood & Scotland 2009, Hu *et al.* 2011), dry specimens from the herbaria FOF, HNL and KAG, and digitized plant specimens available on the web, e.g. JSTOR Global Plants (https://plants.jstor.org/), Chinese Virtual Herbarium (http://www.cvh.ac.cn/), K (https://apps.kew.org/herbcat/navigator.do), L (https://bioportal.naturalis.nl/) and P (https://science.mnhn.fr/).

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The measurements of the description of the new species below are based on the herbarium materials we collected. For detail comparison, the measurements of *S. guangxiensis* are based on the published protologues (Huang 1986, Hu *et al.* 2011) and digitized herbarium specimens available on the web [*Wei J.F. 8668* (IBK00191708, IBK00191709, GXMI050904)]. Conservation status was determined according to IUCN standards (IUCN 2012) based on information from our seven field surveys from 2018 to 2020.

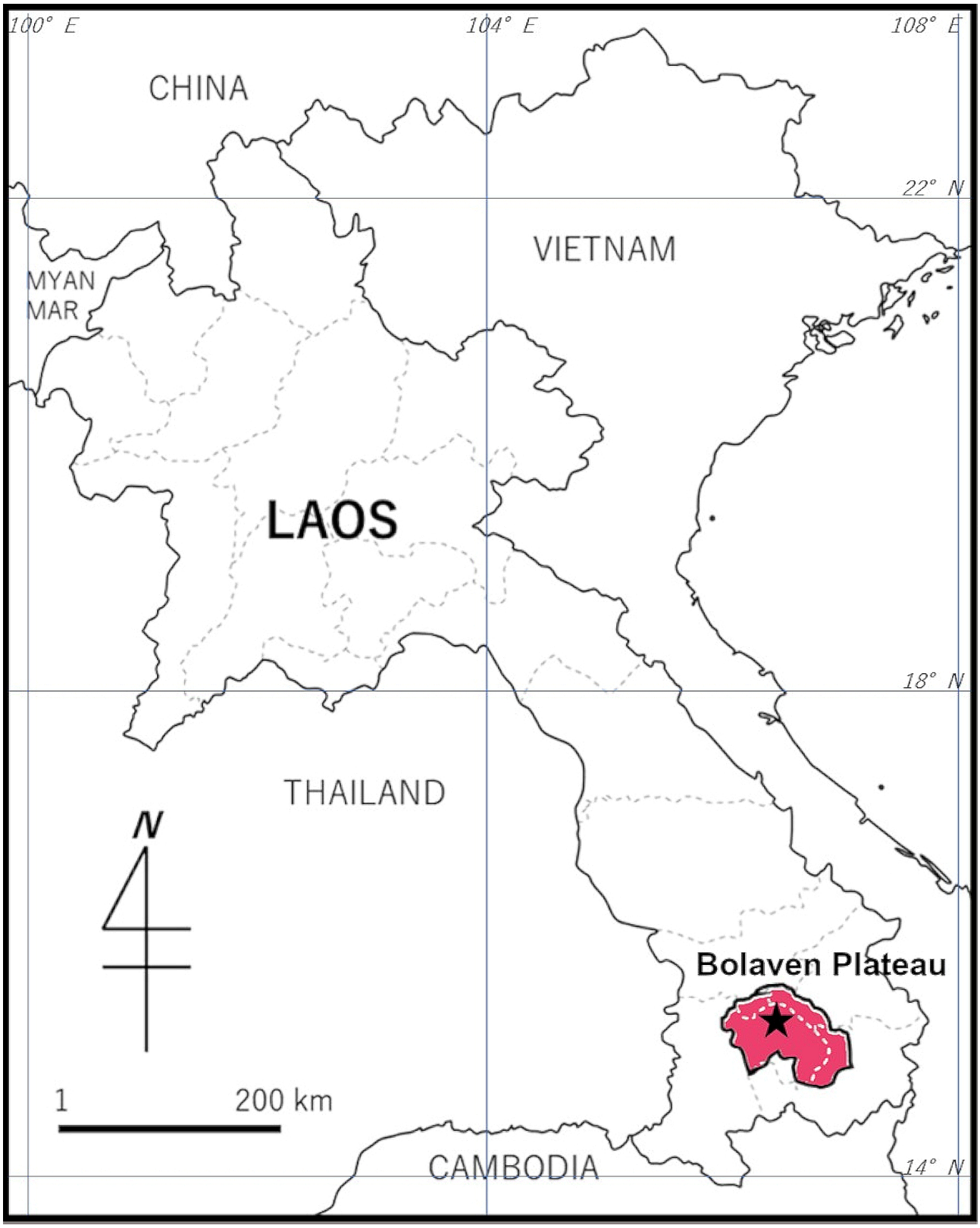

FIGURE 1. Locality of Bolaven Plateau (pink area) and collection site of *Strobilanthes bolavenensis* (black star) in southern Laos.

Taxonomy

Strobilanthes bolavenensis K. Yamaz., Tagane & Soulad., *sp. nov*. Figs. 2 & 3.

Type:—LAOS. Champasak Province, Dong Hua Sao National Protected Area [Bolaven Plateau], Paksong District, near Nong Luang Village; in lower montane forest, 15°04′22.14″N, 106°12′20.71″E, 1167 m, 18 December 2019, *Souladeth P., Tagane S., Kongxaysavath D., Rueangruea S., Somran S., Suyama Y., Suzuki E. L3452* [fl. & young fr.] (holotype FOF!, isotype: KAG [KAG155816!]).

Strobilanthes bolavenensis is most similar to *S. guangxiensis* endemic to Guangxi, China in having purple corolla and hairy simple spike inflorescence but distinguished by its smaller plant height up to 30 cm tall (vs. ca. 1 m tall), rachis of inflorescence sparsely puberulent (vs. densely pubescent), bracts and bracteoles covered with short appressed yellowish brown hairs near apex adaxially (vs. glabrous), larger calyx length 1.4–1.6 cm long (vs. 1 cm long), and calyx acute at apex (vs. acuminate).

Perennial herb, 30 cm tall. Stems erect, terete, ca 5 mm in diam. at base, dull brownish yellow to dark yellow-green, densely covered with short appressed brown hairs when young, glabrescent, lenticellate. Leaves opposite, subequal or sometimes slightly anisophyllous; blades papery, lanceolate to ovate, or narrowly elliptic, (1.3–)3.8–13 × (0.7–)2–4 cm, length/width ratio (1.9–)2.4–2.9, apex acute to acuminate, margin subentire to slightly crenate, recurved when dry, base cuneate, symmetric, adaxially dark green, glabrous, with linear cystoliths 0.1–0.2 mm long (visible under stereoscopic microscope), abaxially light pale green, covered with short brown hairs, especially denser on midrib and secondary veins, midrib prominent abaxially, secondary veins 4–9 pairs, prominent abaxially, tertiary veins scalariform-reticulate; petioles (0.2–)0.4–1.6 cm long, covered with short appressed brown hairs. Inflorescence spike, on terminal and on old stems behind leaves, 3.4–8.9 cm long, 4–10-flowered, peduncle subsessile, rachis sparsely puberulent, internode 0.8–1 cm long; inflorescence bracts oblong-lanceolate, ca. 1 × 0.4 cm, apex acuminate, margin ciliate, adaxially covered with short appressed yellowish brown hairs near apex, covered with linear cystoliths, abaxially covered with dark brown glands and 2 types yellowish brown hairs, the longer hairs ca. 0.6 mm long, the shorter ones ca. 0.1 mm long; bracts persistent, spathulate-lanceolate to elliptic-lanceolate, 1–1.5 × 0.2–0.4 cm, apex acuminate, margin ciliate, adaxially covered with short appressed yellowish brown hairs near apex, covered with linear cystoliths, abaxially covered with glands and 2 types of yellowish brown hairs; bracteole 2, oblong-lanceolate, 1–1.5 × 0.2–0.3 cm, margin ciliate, adaxially covered with linear cystoliths, near apex part with short appressed yellowish brown hairs, abaxially densely covered with glands and 2 types yellowish brown hairs. Calyx 1.4–1.6 cm long, 5-lobed almost to base, outside covered with 2 types of yellowish-brown hairs, glabrous inside; tube 2–3 mm long; lobes subequal, linear, 1.2–1.3 cm, accrescent in fruit, up to 1.9 cm long, apex acute. Corolla purple, funnel-shaped, ca. 4.1 cm long, ca. 0.9 cm in diam., membranous, glabrous outside, pilose to throat inside, 5-lobed; lobes broadly elliptic, ca. 6 mm long, apex emarginate. Stamens 4, didynamous; the shorter pairs of filaments ca. 2 mm long, glabrous; the longer pairs ca. 5 mm long, glabrous inner side and pilose only outer side, anthers ca. 2.8–3 mm long, dorsifixed, attached at lower 1/3. Ovary narrowly obovoid, 3.7–4 mm long, ca. 0.9 mm in diam., densely hairy at apex, style 2.5 cm long, pilose except near base, stigma, ca. 1 mm long, glabrous. Capsule (immature) narrowly ellipsoid-ovoid, 10 mm long, ca. 2.5 mm in diam., sparsely covered with glangular hairs. Seeds (immature) 4, suborbicular, 1.5–2 mm in diam., strongly fattened, light yellow brown, pubescent.

Distribution and habitat:—LAOS, known only from the type locality. *Strobilanthes bolavenensis* was found in hill evergreen forests at 1167 m elevation, where it grows with *Hymenasplenium excisum* (C. Presl) S. Linds. (Aspleniaceae), *Cornopteris opaca* (D. Don) Tagawa (Athyriaceae), *Cyclosorus ciliatus* (Wall. ex Benth.) Panigrahi (Thelypteridaceae), *Canscora andrographioides* Griff. ex C. B. Clarke (Gesneriaceae), *Sonerila yunnanensis* Jeffrey ex W. W. Sm. (Melastomataceae).

Etymology:—This specific epithet "*bolavenensis*" refers to the type locality of this species.

Vernacular name:—Hom Bolaven [ຫອ້ມບໍລະເວນ].

Phenology:—Flowering specimens were collected in December.

Preliminary conservation assessment:—Critically Endangered (CR). *Strobilanthes bolavenensis* is known only from a single population with ca. 10 mature individuals in Bolaven Plateau, at elevation of 1167 m, though we had intensive floristic inventories in the area seven times in 2018–2020 (e.g. Nagahama *et al*. 2019, Souladeth *et al.* 2020, Suddee *et al.* 2020, Tagane *et al.* 2021a, b, Yamazaki *et al.* 2021). This situation satisfies the CR (critically endangered) status in criterion D of IUCN Red List Categories (IUCN 2012).

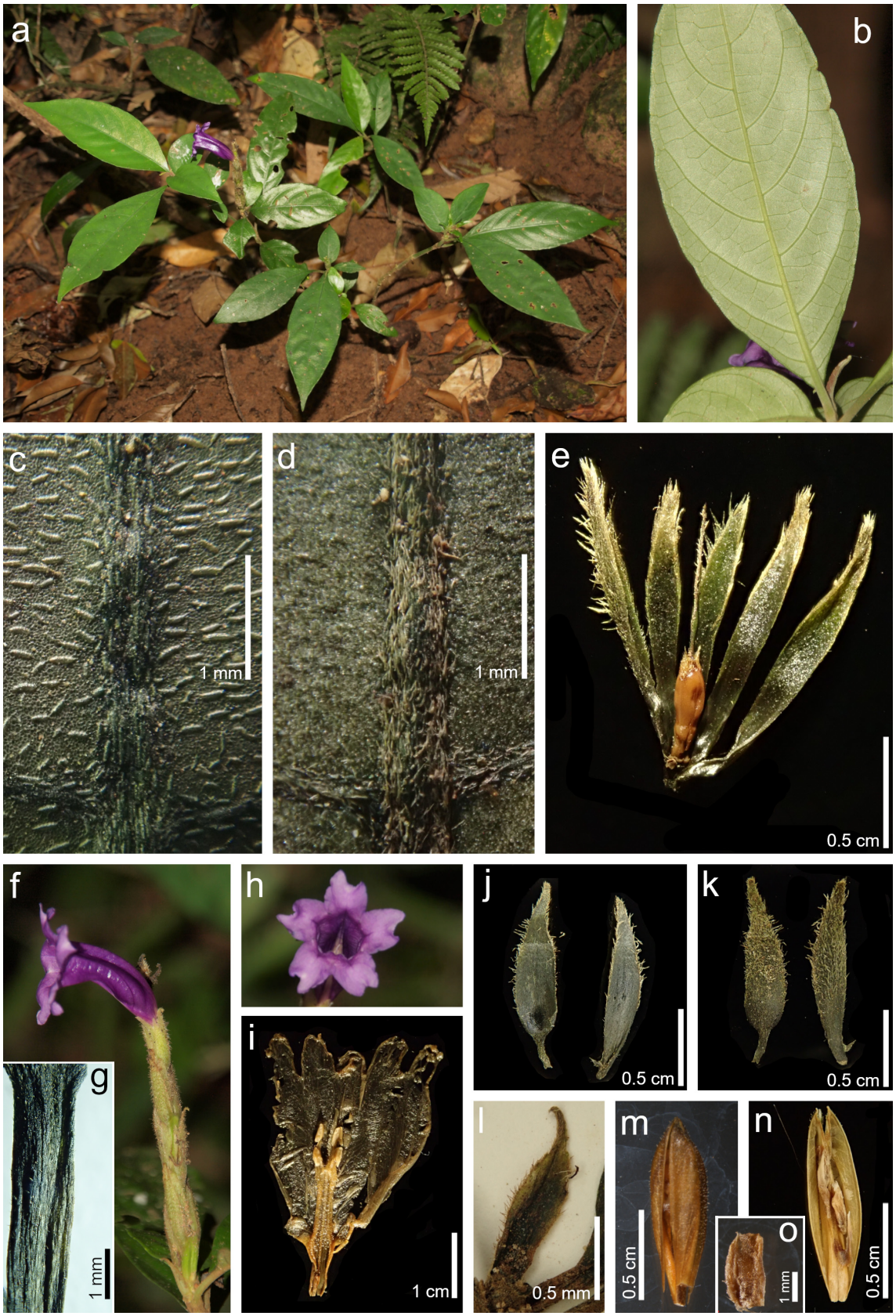

FIGURE 2. *Strobilanthes bolavenensis*. a. habit; b. portion of abaxial leaf surface; c. adaxial leaf surface enlarged; d. abaxial leaf surface enlarged; e. calyx opened out showing pistil; f. inflorescence with one flower (lateral view); g. rachis of inflorescence; h. flower (front view); i. corolla opened out; j. adaxial surface of bract (left) and bracteole (right); k. abaxial surface of bract (left) and bracteole (right); l. adaxial surface of inflorescence bract; m. immature capsule; n. immature capsule opened out; o. immature seed. Photographs a, b, f and h were taken by S. Tagane on 18 Dec. 2019; c–e, g, i–o from *Souladeth et al. L3452* (KAG).

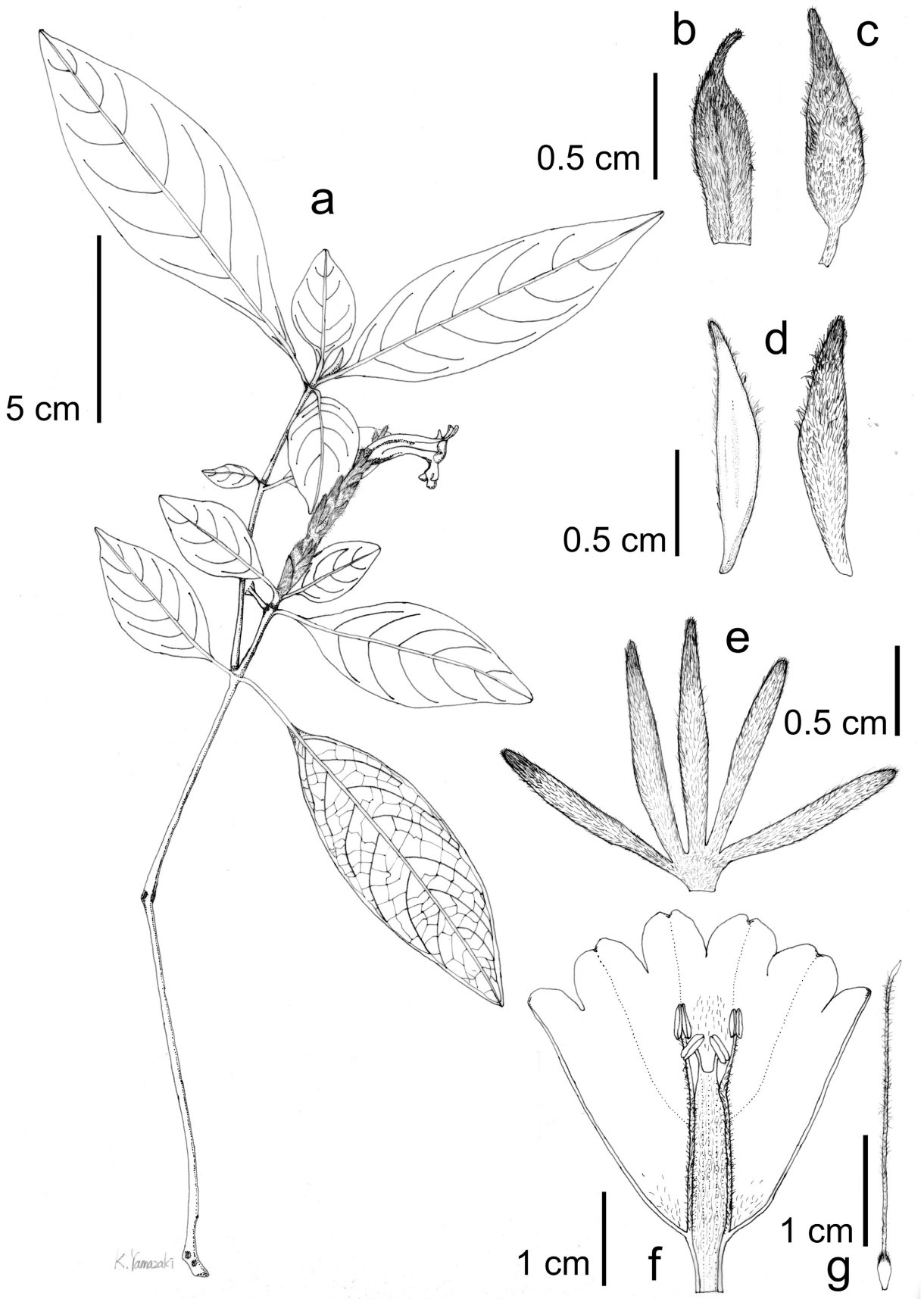

FIGURE 3. *Strobilanthes bolavenensis*. a. flowering plant; b. abaxial surface of inflorescence bract; c. adaxial surface of bract; d. bracteoles (left: abaxial surface, right: adaxial surface); e, calyx opened out (outside); f, corolla opened out showing stamens; g, pistil. Materials: a–g from *Souladeth et al. L3452* (KAG). Drawn by K. Yamazaki.

Note:—In Laos, 27 species of *Strobilanthes* have been known, among which *S. bolavenensis* is easily distinguished from them by a combination of small plant habit (30 cm tall), abbreviated simple spike inflorescence 3.4–8.9 cm long, bracts adjacent to rachis, and bracts and bracteoles densely covered with yellowish brown hairs abaxially.

Strobilanthes bolavenensis is phenotypically most similar to *S. guangxiensis* in having lenticellate twigs, purple corolla, simple spike inflorescence with flowers paired and on two sides of spike, and bracts imbricate in spike. However, it is clearly distinguished from *S. guangxiensis* by the diagnosis mentioned above. In addition, *S. bolavenensis* is different from *S. guangxiensis* in having smaller cystoliths on adaxial side of lamina (0.1–0.2 mm long vs. 0.2–0.5 mm long in *S. guangxiensis*), inflorescence on terminal or on old stem behind leaves (vs. terminal and in axils of leaf base), and larger ovary 3.7–4 mm long (vs. ca. 3 mm long). For detail comparison, see Table 1.

TABLE 1. Morphological comparison between *Strobilanthes bolavenensis* and *S. guangxiensis*.

Characters	***S. bolavenensis***	***S. guangxiensis***
Plant height	ca. 30 cm tall	ca. 100 cm tall
Petiole length	(0.2–)0.4–1.6 cm long	0.3–3.5 cm long
Cystoliths length on adaxial side of lamina	0.1–0.2 mm long	0.2–0.5 mm long
Inflorescence position	on terminal and on old stems behind leaves	on terminal and on axillary with leaves
Hairiness of inflorescence rachis	sparsely puberulent	densely pubescent
Hairiness on adaxial side of bracts and bracteoles	short appressed yellowish brown hairy near apex	glabrous
Calyx length	1.4–1.6 cm long	1 cm long
Calyx apex	acute	acuminate
Ovary length	3.7–4 mm long	ca. 3 mm long

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