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Taxonomic studies on *Amomum* Roxburgh s.l. (Zingiberaceae) in Myanmar Ⅰ: Two new species and two new records for the flora of Myanmar

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Abstract

Two taxa of *Amomum* (Zingiberaceae), *Amomum erythranthum* and *Amomum ampliflorum*, from Putao, Kachin State of Northern Myanmar are described and illustrated as new to science. *Amomum erythranthum* is morphologically similar to *A. subulatum* and *A. nimkeyense* in having similar yellow flowers, but can be distinguished by its reddish floral tube, red anther connective, red and pubescent fruit. *Amomum ampliflorum* is similar to *A. maximum*, *A. dealbatum* and *A. odontocarpum* in white flower, but differs in its longer inflorescence and much larger flower. Two species, *Amomum pauciflorum* and *Wurfbainia microcarpum* are recorded for the flora of Myanmar for the first time. Data on ecology, phenology, distribution, conservation status, similarities to the related taxa, as well as colour photographs and line drawings of the type, and voucher specimens are provided for all reported taxa.

Keywords: *Amomum*, Myanmar, Taxonomy, new records, Zingiberaceae

Introduction

The pantropical Zingiberaceae is the largest family in the monophyletic order Zingiberales with 53 genera and more than 1377 species (Kress *et al.* 2002, Pederson 2004, Kong *et al.* 2010). *Amomum* Roxburgh s.l. (1820: 75) is the second largest genus in the family Zingiberaceae with about 150–180 species (Xia *et al.* 2004, Thomas *et al.* 2016). It is distributed from the Himalayas throughout Southeast Asia to northern Australia and extends into the central Pacific (Tripathi & Prakash 1999, Xia *et al.* 2004, Kaewsri & Paisooksantivatana 2007), the centre of endemism being the forests of Southeast Asia (Droop & Newman 2014). Based on molecular phylogenetic analyses by de Boer *et al.* (2018), *Amomum* Roxburgh s.l. are now categorised into seven monophyletic genera namely *Amomum* s.s., *Conamomum* Ridley (1899: 121), *Meistera* Giseke (1792: 205), *Wurfbainia* Giseke (1792: 206), *Epiamomum* A.D. Poulsen & Škorničková (2018: 22), *Lanxangia* M.F. Newman & Škorničková (2018: 23) and *Sundamomum* A.D. Poulsen & M.F. Newman (2018: 27).

Myanmar constitutes a significant component of the Indo-Myanmar biodiversity hotspot with elements of the India, the Indochina, and the Sino-Japanese floristic regions (Van Dijk *et al.* 2004, Tanaka 2010, Ito & Tanaka 2014). Considering the richness of *Amomum* Roxburgh s.l. species of adjacent countries (i.e. China: ca. 39 species (Wu & Larsen 2000), India: ca. 32 species (Thomas & Sabu 2012, Thomas *et al.* 2010, 2012a, 2012b, 2013a, 2013b, 2014, 2015, 2016, 2019, Hareesh & Sabu 2018, Sabu *et al.* 2018; Sarma *et al.* 2019), Thailand: ca. 31 species (Kaewsri & Paisooksantivatana 2007, Kaewsri *et al.* 2009), Laos: ca. 28 species (Lamxay & Newman 2012), Vietnam: ca. 24 species (Lamxay & Newman 2012; Droop & Newman 2014; Lý & Leong-Škorničková, 2018), so far there are only 10 species of *Amomum* Roxburgh s.l. recorded in Myanmar (Kress *et al.* 2003).

During floristic surveys of northern Myanmar 2016–2018, a team from Xishuangbanna Tropical Botanical Garden (XTBG) in collaboration with the Forest Research Institute of Myanmar (FRI) conducted field work in northern Myanmar to survey plant diversity. During the field work, some interesting specimens of *Amomum* Roxburgh s.l. were

found in Putao, Kachin state. Based on detailed examination of the morphological characters of our materials and possible closely similar species, we draw a conclusion that those specimens of *Amomum* Roxburgh s.l. collected in Myanmar belong to species new to science and two newly records, which we hereby describe and illustrate.

Taxonomic treatments

Amomum erythranthum Y.H. Tan & H.B. Ding, *sp. nov.* (Figure 1–2)

Diagnosis:—*Amomum erythranthum* Y.H. Tan & H.B. Ding is morphologically similar to *A. subulatum* Roxburgh (1820: 75, t. 277) in having similar yellow flowers and subulate calyx lobes, but can be distinguished by its bracteoles open to base and not tubular, long calyx tube, long filament, obovate labellum with dentate apex, red anther connective and semi-lunar anther crest with dentate apex. This new species also shows some morphological affinities with *A. nimkeyense* Sabu, Hareesh, Tatum & Das (2018: 197), but can be distinguished by its 2–4 mm long ligule (vs. 8–9 mm long), the calyx with horns 12–16 mm (vs. ca. 7 mm), ovate central corolla lobe (vs. oblong), red anther connective (vs. cream) and filiform lateral staminodes (vs. absent).

Type:—MYANMAR. Kachin State: Putao, Upper Shankhaung to Wasandum. 97°14’51” E, 27°27’12” N. Understory herbs in tropical mountain forest, 1030 m elev., 28 April 2016, flowering, *Y.H. Tan & S.S. Zhou 201629* (holotype HITBC!).

Clump-forming herb, to 3 m tall, ca. 9 pseudostems per clump. Ligule 2–4 mm, membranous, outer surface tomentose, bi-lobed, apex rounded; petiole absent to 11 cm long, tomentose; leaf blade oblong-lanceolate, 45–60 × 9–11 cm, dark green, plicate, tomentose beneath, base attenuate, apex long caudate, 2–2.5 cm. Inflorescence arising near base, 1–3 inflorescences per shoot; flowering part broadly ellipsoid, 5–7 × 3.5–6.5 cm, 1–3 flowers open at once; peduncle ca. 3 × 1 cm, reddish, tomentose; peduncular bract broadly ovate or almost orbicular at base, 3–3.5 × 2.5–3 cm, to lanceolate above, ca. 4 × 1 cm, red then dark brown, membranous, outer surface tomentose, inner surface glabrescent, apex dentate, acute with long spur 2–4 mm. Bracts dark brown, lanceolate, ca. 4 × 1 cm, membranous, striate, subtending a single flower, outer surface tomentose at apex, inner surface glabrescent, apex acute with dentate; bracteole open to base, unidentate, 3.0–3.4 × ca. 0.5 cm, dark brown towards the apex, reddish towards the base, membranous, outer surface tomentose, inner surface glabrescent. Flowers yellow, ca. 6.5 cm long. Calyx tubular, 4.8–5.0 cm long, 3-lobed, reddish-white, membranous, outer surface villous; calyx tube 3.2–3.4 cm long, lobes subulate, 1.2–1.6 cm. Floral tube 2.7–3.3 × 0.5–0.7 cm, reddish, coriaceous, tomentose; lateral corolla lobes lanceolate, 3.5–3.7 × 0.8–0.9 cm, yellow, membranous, glabrous; central corolla lobe ovate, 3.3–3.4 × 1.2–1.3 cm, yellow, membranous, outer surface tomentose, hooded at apex, apical cusp 4–5 mm long; labellum spreading, with dark yellow midvein, obovate, ca. 3.0 × 1.8 cm, margin plicate, rounded, dentate, glabrous, adaxial surface pilose at base; lateral staminodes subulate, 1–2 mm long, yellow, glabrous. Filament ca. 1.0 × 0.4 cm, creamy-white, glabrous; connective red, ca. 1.3 × 0.5 cm, glabrous; anther thecae oblong, ca. 1.2 cm long, orange yellow, glabrous, dehiscing throughout their length; anther crest semi-lunar, 7–9 × 5–6 mm, yellow, membranous, margin dentate. Stigma rounded, abruptly widening, ciliate, apex entire; style glabrous, 4.4–4.8 cm long; epigynous glands ovate, ca. 4 × 3 mm, glabrous; ovary ca. 7 × 5 mm, glabrous. Capsule red, 2.7–3.0 × 3.0–3.7 cm, obovoid, tuberculate, pubescent, irregularly winged, margin serrate, apex with persistent calyx.

Phenology:—Flowering in April–May and fruiting in June.

Distribution:—Known only from the type locality, Upper Shankhaung to Wasandum, from Putao, Kachin State of Myanmar.

Ecology:—In shaded places at an elevation of 900–1100 m in tropical montane forest.

Etymlogy:—The specific epithet ‘*erythranthum*’ refers to the red anther connective.

Conservation status:—DD. Based on the present knowledge and available data, conservation status is assessed as Data Deficient (IUCN 2017).

Affinities:—*Amomum erythranthum* Y.H. Tan & H.B. Ding shares similar characters with *A. subulatum* and *A. nimkeyense* but differs in many characters (see Table 1).

Additional specimens examined (paratypes):—MYANMAR. Kachin State: Putao, Upper Shankhaung to Wasandum. 97°14’50” E, 27°27’11” N. Understory herbs in tropical montane forest, 1000 m elev., 17 June 2018, fruiting, *Y.H. Tan & H.B. Ding M4627* (HITBC!, RAF!).

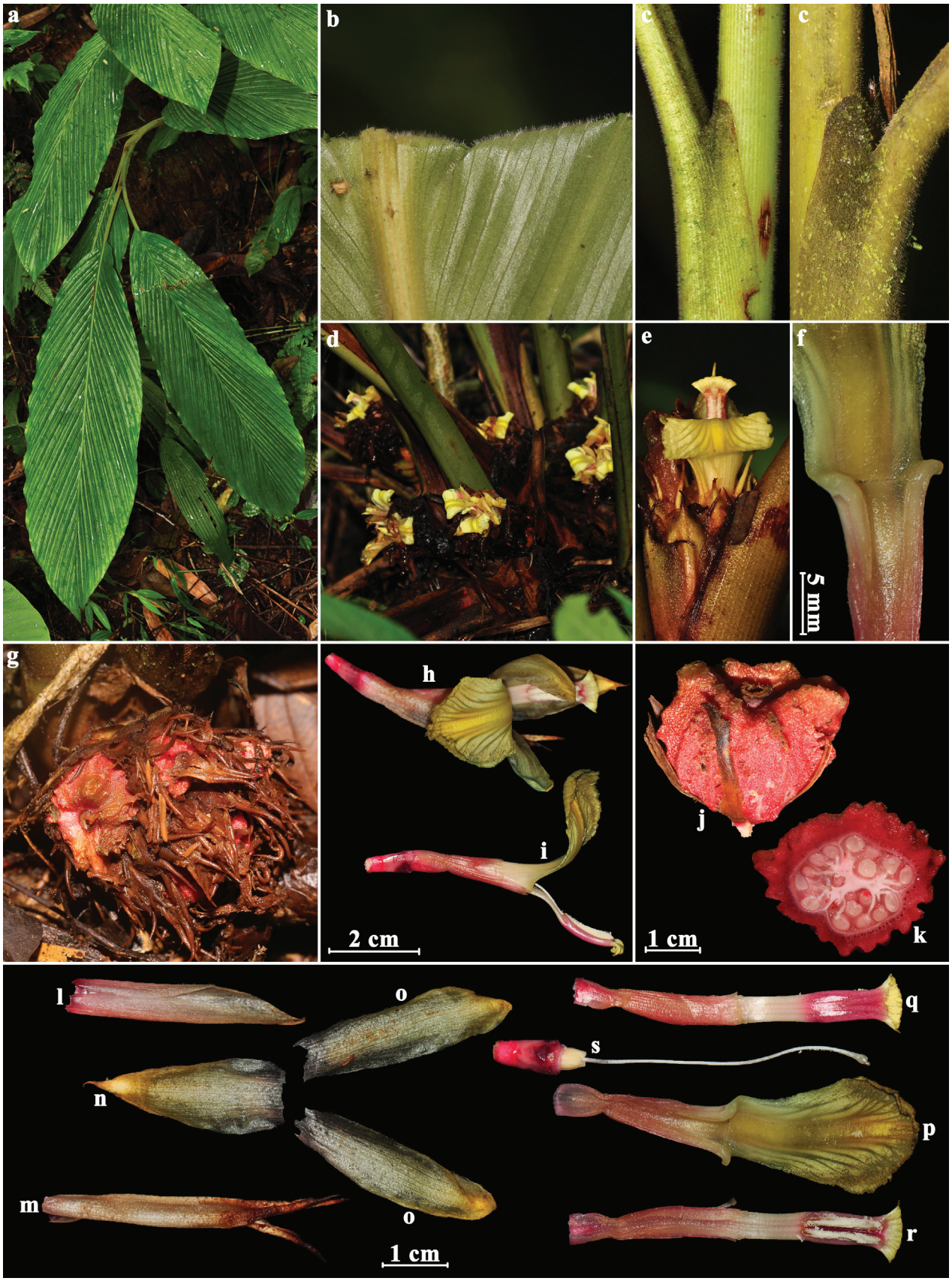

FIGURE 1. ***Amomum erythranthum***. **a.** habit. **b.** leaf blade abaxially. **c.** ligule. **d.** basal part of plant showing inflorescences. **e.** flower. **f.** lateral staminodes. **g.** infructescence. **h.** single flower **i.** single flower (side view) exclude calyx and corolla lobes. **j.** fruit (side view). **k.** cross section of fruit. **l.** bracteole. **m.** calyx. **n.** central corolla lobe. **o.** lateral corolla lobes. **p.** labellum with floral tube and lateral staminodes. **q.** stamen with floral tube (back view). **r.** stamen with floral tube (front view). **s.** ovary with epigynous glands and style. Photographed by Y.H. Tan and H.B. Ding.

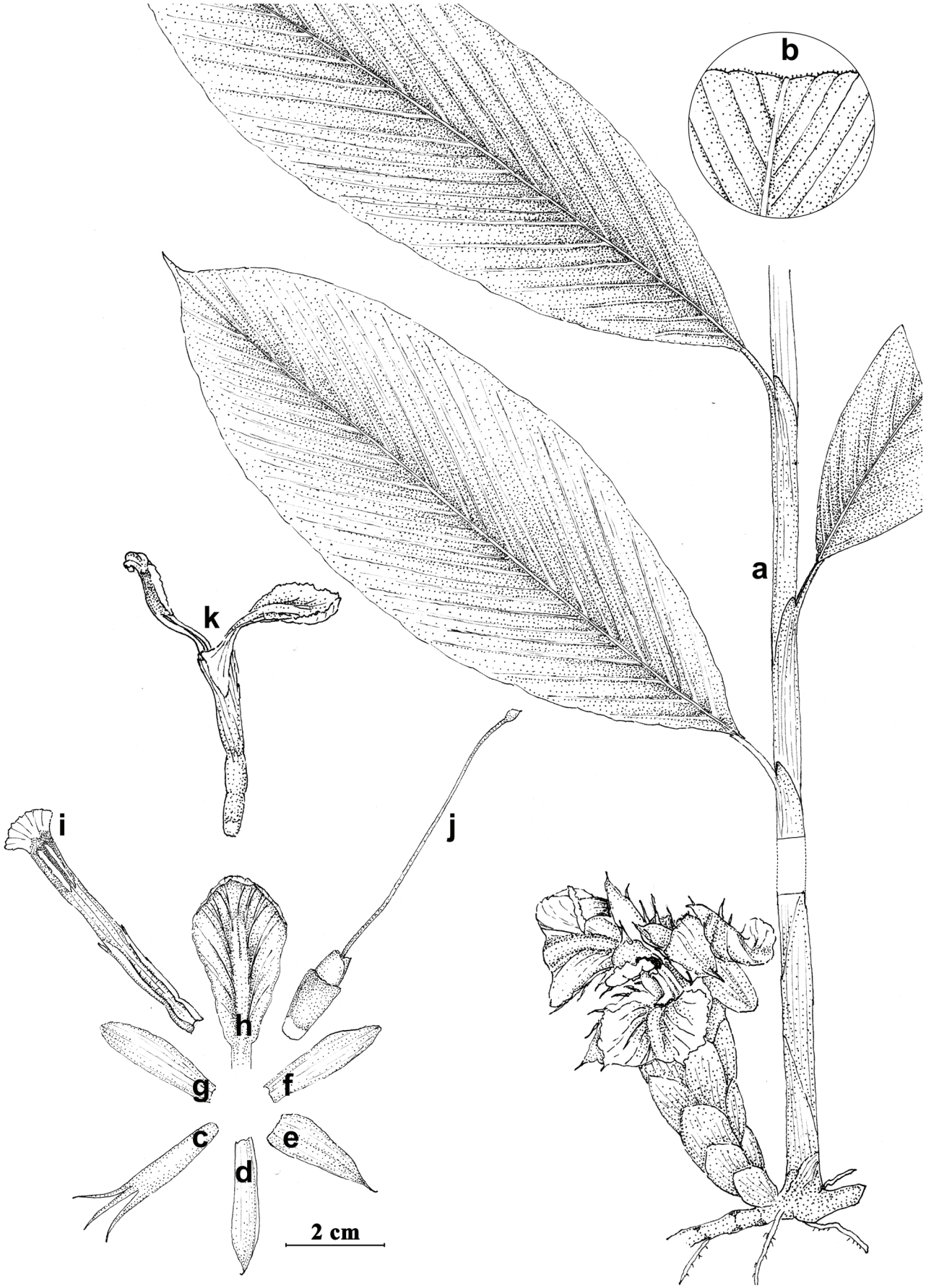

FIGURE 2. ***Amomum erythranthum***. **a.** habit. **b.** leaf blade abaxially. **c.** calyx. **d.** bracteole. **e.** central corolla lobe. **f.** lateral corolla lobe. **g.** lateral corolla lobe. **h.** labellum. **i.** stamen (front view) with floral tube and lateral staminodes. **j.** ovary with epigynous glands and style. **k.** single flower (side view) exclude corolla lobes. (scale 2 cm). Illustrated by Zheng-Meng Yang

TABLE 1. Comparison among *Amomum erythranthum*, *A. subulatum* and *A. nimkeyense*

Characters	*A. erythranthum*	*A. subulatum*	*A. nimkeyense*
Ligule	2−4 mm, outer surface tomentose, bi-lobed	3−4 mm, glabrous, emarginate	8−9 mm, densely pubescent externally, bi-lobed
Petiole	absent to 11 cm long, tomentose	absent or 1−3 cm on diatal ones, glabrous	2−9 cm pubescent
Bracteole	non-tubular, reddish and upper half with dark brown, cusp 1−2 mm, dark brown	tubular, pale green, cusp 2−4 mm, yellow	non-tubular, pale yellowish brown with a median red band, cusp ca. 2 mm, dark brown
Calyx	3-lobed with subulate horns horns 12−16 mm, reddish-white outer surface villous	3-lobed with subulate horns, horns 15−17 mm, white, glabrous	3-lobed with subulate horns, horns up to 7 mm, white-pink, pubescent
Floral tube	reddish, tomentose	wihite, glabrous	white tinged with pink, pubescent
Central corolla lobe	ovate, yellowish, apical cusp 4−5 mm	oblong, yellowish, apical cusp 5−6 mm	oblong, cream, apical cusp 6−7 mm
Labellum	obovate, ca. 3.0 × 1.8 cm, glabrous, adaxial surface pilose at base	oblong, ca. 2.6 × 1.0 cm, white pubescent	obovate, 2.8−3 × 2.2−2.4 cm, pubescent towards base internally
Lateral staminodes	filiform, yellow, 1−2 mm long	red, subulate ca. 2 mm	absent
Anther connective	red, ca. 13 mm	creamy-white, ca. 1.2 cm	cream, ca. 10 mm
Anther crest	semi-lunar, yellow 7−9 × 5−6 mm	elliptic, yellow ca. 4 × 2.5 mm	semi-lunar, yellow 10−11 × 4−5 mm
Fruit	Red, obovoid, tuberculate, pubescent, irregularly winged	Purple or red-brown, globose winged, wings irregularly lobed	Ovate, glabrous, minutely winged at the apex

Amomum ampliflorum Y.H. Tan & H.B. Ding, *sp. nov.* (Figure 3–4)

Diagnosis:—*Amomum ampliflorum* Y.H. Tan & H.B. Ding shows similarity with *A. maximum* Roxb. (1810: 344), but can be distinguished by its entire ligule, larger flower (ca. 9.0 cm long vs. ca. 6.0 cm long), longer calyx (ca. 4.0 cm long vs. ca. 2.3 cm long), longer filament (ca. 6 mm long vs. ca. 2 mm long) and truncate anther crest (vs. crescent-shaped). This new species is also morphologically similar to *A. dealbatum* Roxb. (1820: 42) in having white flower, obovate labellum, but differs in entire ligule, larger flower (ca. 9.0 cm long vs. ca. 5.0 cm long), longer calyx (ca. 4.0 cm long vs. ca. 2.5 cm long), lateral staminodes absent (vs. subulate, ca. 2 mm) and larger abellum (ca. 5.0 × 3.0 cm vs. ca. 2.5 × 1.5−2 cm).

Type:—MYANMAR. Kachin State: Putao, Wasandum to Awadum. 97°09’47” E, 27°30’40” N. Gorwing in understory along the tream in tropical montane forests, 927 m elev., 12 May 2016, flowering, *Y.H. Tan & S.S. Zhou 2016306* (holotype HITBC!).

Clump-forming herb, up to 3 m tall. Ligule 1.5–1.9 cm, ovate, entire, easily damaged after drying, membranous, sparsely white pubescent, apex rounded or acute; petiole 0.8–1.5 cm long, tomentose; leaf blade oblong-lanceolate, 45–90 × 7–13 cm, dark green, plicate, adaxially sparsely pubescent, abaxially villous, base attenuate, apex long caudate, to 3 cm. Inflorescence arising near base of leafy shoot, 1–3 inflorescences per shoot; (including peduncle) to 20 cm long, with up to 20 flowers, flowers open 1–4 at a time, peduncle 7–15 × 0.5–0.8 cm, reddish, glabrescent; peduncular bract broadly ovate at base, 3.5–5.5 × 1.5–2.0, to elliptic above, 5–6 × 2.5–4 cm, red then dark brown, membranous, glabrescent, apex rounded or acute. Bracts reddish brown, lanceolate, ca. 6.5 × 1.5 cm, membranous, striate, subtending a single flower, pubescent or glabrescent, apex rounded or acute; bracteole open to base, unidentate, lanceolate, ca. 5.5 × 0.8 cm, brown, membranous, pubescent or glabrescent. Flowers white, ca. 9 cm long. Calyx tubular, 3-toothed, teeth equal, ca. 4.0 cm long, white, membranous, outer surface pubescent; calyx tube ca. 2.9 cm long, lobes lanceolate, ca. 1.1 cm. Floral tube ca. 3.5 × 0.3 cm, reddish-white, coriaceous; lateral corolla lobes oblong, ca. 3.7 × 1.5 cm, white, membranous, glabrous, apex cucullate; central corolla lobe oblong, 3.7 × 1.5 cm, white, membranous, glabrous, apex cucullate; labellum spreading, with orange yellow midvein, obovate, ca. 5.0 × 3.0 cm, margin plicate, rounded, entire, glabrous; lateral staminodes absent. Filament ca. 6 mm long, white, glabrous; anther oblong, ca. 1.5 cm long, white, glabrous; anther crest truncate, ca. 1.1 × 0.6 cm, white, membranous, entire. Stigma rounded, abruptly widening, glabrous, apex entire; style glabrous, ca. 5.5 cm long. Infructescence peduncle 0.8–1.9 × ca. 0.4 cm, white, glabrous; fruits (only very young fruits have been seen) ovoid, ca. 1.6 × 1.0 cm, reddish, 9-winged.

FIGURE 3. ***Amomum ampliflorum***. **a.** habit. **b.** leaf blade adaxially. **c.** leaf blade abaxially. **d.** ligule. **e.** basal part of plant showing inflorescences. **f.** inflorescence. **g.** single inflorescence. **h.** infructescence (young fruit). **i.** flowers **j.** bract. **k.** bracteole. **l.** calyx with ovary and peduncular. **m.** central corolla lobe. **n.** lateral corolla lobes. **o.** labellum with calyx, ovary and peduncular. **p.** stamen (front view). **q.** stamen (back view). **r.** young fruit. **s.** cross section of young fruit. Photographed by Y.H. Tan.

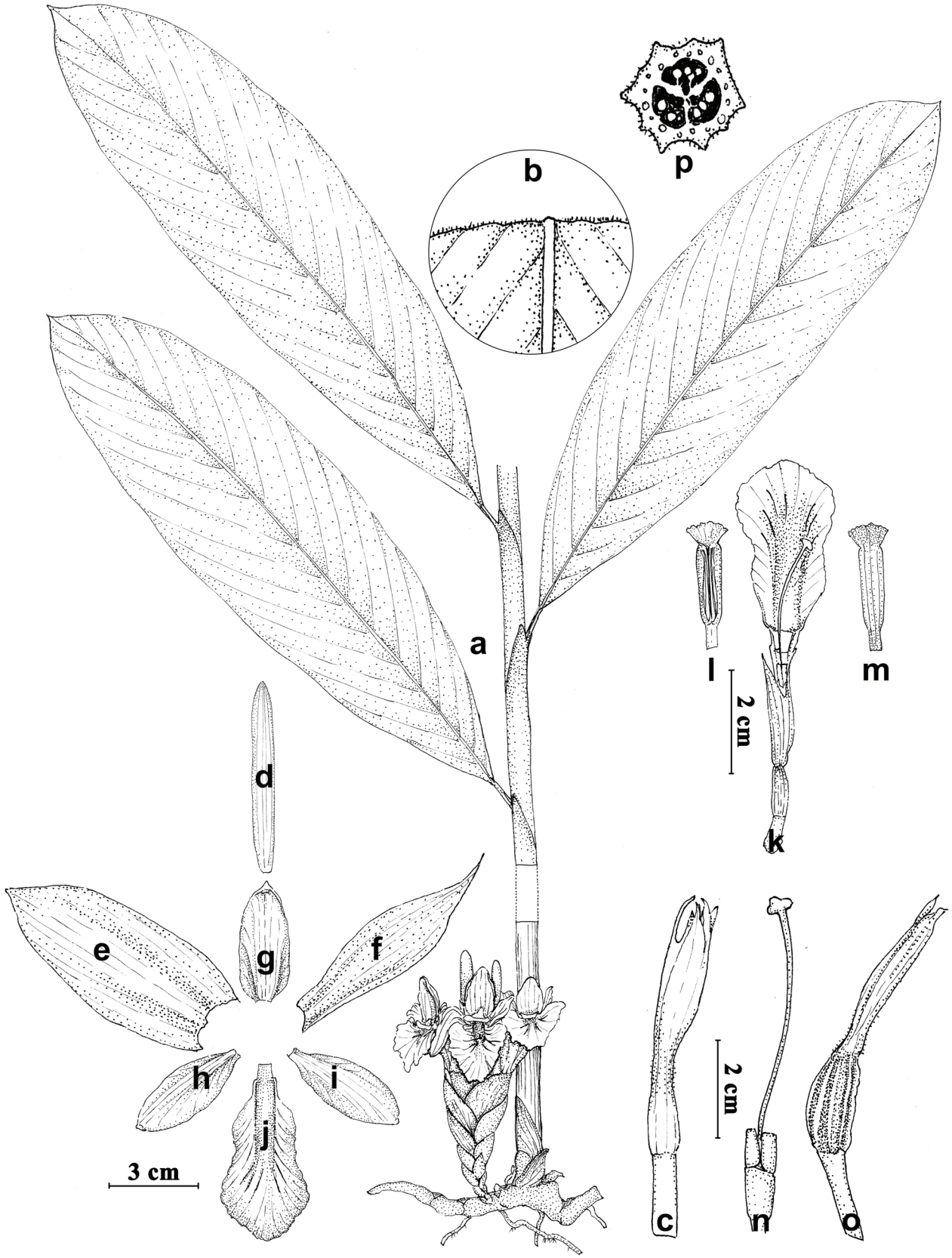

FIGURE 4. ***Amomum ampliflorum***. **a.** habit. **b.** leaf blade abaxially. **c.** calyx with peduncle (scale 2 cm). **d.** bracteole (scale 3 cm). **e.** peduncular bract (scale 3 cm). **f.** bract (scale 3 cm). **g.** central corolla lobe (scale 3 cm). **h.** lateral corolla lobe (scale 3 cm). **i.** lateral corolla lobe (scale 3 cm). **j.** labellum (scale 3 cm). **k.** single flower (front view) exclude corolla lobes and stamen (scale 2 cm). **l.** stamen (front view) (scale 2 cm). **m.** stamen (back view) (scale 2 cm). **n.** ovary with epigynous glands and style (scale 2 cm). **o.** young fruit (scale 2 cm). **p.** cross section of young fruit. Illustrated by Zheng-Meng Yang

Phenology:—Flowering in May.

Distribution:—Known only from the type locality, Wasandum to Awadum, from Putao, Kachin State of Myanmar.

Ecology:—In shaded places at an elevation of 850–1000 m in tropical montane forest.

Etymlogy:—The specific epithet '*ampliflorum*' indicates having a larger flower.

Conservation status:—DD. Based on the present knowledge and available data, conservation status is assessed as Data Deficient (IUCN 2017).

Affinities:—*Amomum ampliflorum* Y.H.Tan & H.B. Ding is similar to *A. maximum* and *A. dealbatum*, but differs in many characters (see Table 2). This new species also shows some morphological affinities with *A. odontocarpum* Fang (1980: 224), but can be distinguished by its leaf blade abaxially villous (vs. glabrous), ca. 4 cm long calyx (vs. ca. 2.5 cm long), labellum ca. 5.0 × 3.0 cm (vs. 3−3.5 × 2.5−3.0 cm) and lateral staminodes absent (vs. oblong, 2 mm long) (see Table 2).

TABLE 2. Morphological character comparison among superficial similar species, *Amomum ampliflorum*, *A. maximum*, *A. dealbatum* and *A. odontocarpum*

Characters	*A. ampliflorum*	*A. maximum*	*A. dealbatum*	*A. odontocarpum*
Indumentum of the lamina	villous below	villous below	brownish pubescent below	glabrous below
Ligule	ovate, entire 1.5−1.9 cm	oblong, 2-cleft 1.2−2.0 cm	lanceolate, 2-cleft 0.4−1.6 cm	ovate, 2-cleft 1.5−3.0 cm
Flowers	white, ca. 9.0 cm long	white, ca. 6.0 cm long	white, ca. 5.0 cm long	white, 5.5−6.0 cm long
Calyx	ca. 4.0 cm long	ca. 2.3 cm long	ca. 2.5 cm long	ca. 2.5 cm long
Calyx tube	ca. 2.9 cm long	ca. 1.8 cm long	1.5−1.6 cm long	1.5−1.6 cm long
Floral tube	ca. 3.5 cm long	ca. 2.5 cm long	2−2.5 cm long	2.5−3.0 cm long
Labellum	obovate, apex undulate ca. 5.0 × 3.0 cm	obovate, apex undulate ca. 3.5 cm long	obovate, apex emarginate ca. 2.5 × 1.5−2 cm	obovate, apex rounded 3−3.5 × 2.5−3.0 cm
Lateral staminodes	absent	absent or very short	subulate, 2 mm long	oblong, 2 mm long
Filament	ca. 6 mm long	ca. 2 mm long	ca. 5 mm long	ca. 5 mm long
Anther crest	truncate, white ca. 1.1 × 0.6 cm	crescent-shaped, white ca. 1.1 × 0.3 cm	truncate, white ca. 1.0 × 0.3 cm	truncate, white ca. 0.6 × 0.2 cm

Amomum pauciflorum Baker in Hook. f., Fl. Brit. India 6(18): 238. 1892.

Lectotype. India, Khasia Hills, near Nunklow, 21 July 1850, *Hooker, f. & Thoms. 1,* (K000815720 K!). **Epitype.** Myanmar. Kachin State: Putao, Machanbaw to Alagur, 97°43'19.06" E, 27°16'58.49" N. Understory herbs in tropical rain forest, 640 m elev., 15 June 2018, *Y.H. Tan, B. Yang, H.B. Ding, X.D. Zeng, M.B. Maw & H.L. Naing M4535* (HITBC!, RAF!). (Figure 5). Designated here.

Rhizome slender, many stoloniferous, red, creeping, thick, sometimes sheathed with scales. Pseudostem with 2–14 leaves per pseudostem, slightly swollen at base, reddish-green; ligule ovate, bilobed, 3–5 mm long, reddish-green, membranous, pubescent, apex acute; petiole 0.5–3.0 cm; leaf blade adaxially green, abaxially silvery, elliptic to oblong-lanceolate, 17–50 × 4–7 cm, adaxially glabrous, abaxially densely appressed silvery pubescent, base attenuate, apex caudate. Inflorescence radical, 7.5–11 cm, arising from the rhizome, 1–3 flowered, peduncle short, 1.5–2.0 cm. Outer bract ovate, ca. 0.8 × 0.9 cm, sterile, inner bract, oblong, 4.0–6.0 × 1.5–2.0 cm, 3–5 per inflorescence, pinkish, membranous, prominently veined, pubescent, apex acute. Bracteole non-tubular, 1.5–3.5 × 0.5 cm. Flower 6–9 cm, white. Calyx tubular, 3.2–3.5 × 0.5 cm, calyx tube ca. 2.0 cm, apex 3-toothed, membranous, white tinged with pink. Floral tube ca. 4.0 cm long, ca. 0.4 cm wide at mouth, white, pubescent; dorsal corolla lobe oblong, 3.5–4.0 × 1.0–1.3 cm, white towards base and greenish yellow at apex, apex cucullate with cusp 1–2 mm long, glabrous; lateral corolla lobes oblong, 3.0–3.6 × 1.0–1.2 cm, white towards base and greenish yellow at apex, apex cucullate, rounded. Labellum spreading, with red at claw, yellowish at middle, white at apex and margin, crisped flabellate, 4.0–5.5 × 2.5–3.0 cm, margin dentate, prominently veined. Lateral staminodes absent or very short, red, 1–2 mm. Stamen 2.5–3.0 cm long, filament 1.0–1.2 × 0.2–0.3 cm, red at base, white at apex, pubescent; connective pubescent, creamy-white; crest entire, creamy-white, ca. 7 × 4 mm, glabrous; anther-cells pubescent, parallel, oblong, 1.3–1.5 cm long, creamy-white, dehiscing longitudinally. Epigynous glands 2, obclavate, 1.0–1.1 cm long, creamy, glabrous. Ovary oblong, ca. 6 × 3 mm, villous; style ca. 7.0 cm long, puberulous towards tip; stigma cup-shaped, white, mouth ciliate. Capsule not seen.

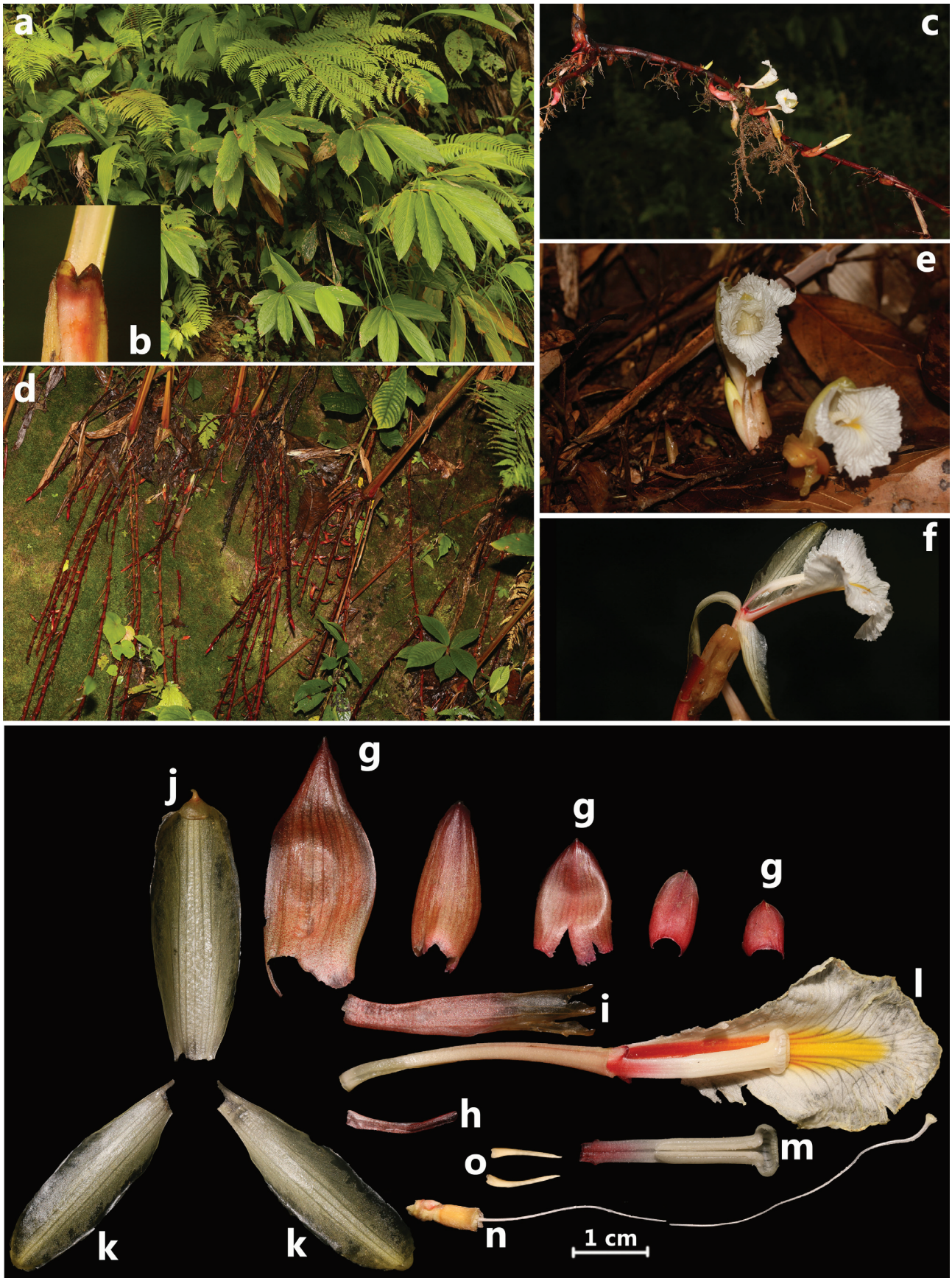

FIGURE 5. ***Amomum pauciflorum*****. a.** habit. **b.** ligule. **c.** basal part of plant showing inflorescences. **d.** rhizom with inflorescences. **e.** flowers. **f.** flower (side view). **g.** bracts. **h.** bracteole. **i.** calyx. **j.** central corolla lobe. **k.** lateral corolla lobe. **l.** labellum with Floral tube, stamen and lateral staminodes. **m.** stamen (front view). **n.** ovary with style. **o.** epigynous glands. Photographed by H.B. Ding.

Phenology:—Flowering in May–June.

Myanmar:—Kachin State, Putao, from Namti to Nahsihbo, 97°35’13.98” E, 27°23’27.09” N. Understory herbs in tropical rain forest, 660 m elev., 16 May 2017, *Y.H. Tan, B. Yang, H.B. Ding, M.B. Maw & T.S. Tin M1848* (HITBC!); Kachin State, Putao, Upper Shankhaung, 97°14’48.30” E, 27°26’23.32” N. Understory herbs in tropical rain forest, 720 m elev., 17 June 2018, *Y.H. Tan, B. Yang, H.B. Ding, S.N. Dee M4613* (HITBC!, RAF!).

Distribution:—India, Myanmar.

Ecology:—In the forest edge or roadside at an elevation of 500–900 m in tropical rain forests and tropical mountain forests.

Conservation status:—LC. This species has a very large extent of occurrence and is common, with no significant threats and is therefore assessed as Least Concern (IUCN 2017).

Wurfbainia microcarpa (C.F. Liang & D. Fang) Škorničk. & A.D. Poulsen in de Boer *et al.*, Taxon 67(1): 30. 2018.—*Amomum microcarpum* C. F. Liang & D. Fang in D. Fang, Acta Phytotax. Sin. 16(3): 49. 1978. Type: China, Guangxi, Fangchenggang City, 1975-04-29, D. Fang *76564* (holotype: GXMI051018!). (Figure 6)

Creeping herb, 1–2 m tall; rhizome ca. 5 mm diameter, brown; interval between pseudostems ca. 6 cm, scales ovate, 0.7–1.5 cm long, brown, striate, shiny, sparsely pilose, membranous. Pseudostem with 8–12 leaves per pseudostem; ligule 1–2 mm long, coriaceous, outer surface tomentose, apex rounded, emarginate, margin ciliate; petiole very short, 1–2 mm long, tomentose; leaf blade oblong-lanceolate, 20–30 × 3.5–6.0 cm, dark green, plicate, adaxially glabrescent, abaxially pubescent, base attenuate, apex with caudate tip to 3.5 cm. Inflorescence arising near base, 1–2 inflorescences per pseudostem; flowering part pyramidal, lax with rachis visible between bracts, 4–6 × 4–5 cm, 1–2 flowers open at once; peduncle 3–6 cm long, red, tomentose; peduncular bract tubular at base, ovate to oblong above, 0.5–1.7 × 0.4–0.6 cm, reddish-brown, membranous or papery, apex acute to cucullate with spur ca. 1 mm. Bracts brown, lanceolate, ca. 2.0 × 0.5 cm, dark brown, papery, striate then soon rotting, subtending a single flower, tomentose at base, apex acute; bracteole tubular, 2-toothed, 10–13 × 2 mm, reddish then dark brown, membranous, bracteole tube 5–7 mm long, tomentose at base. Calyx tubular, 3-toothed, teeth unequal, 12–14 × 2 mm, white to light pink, coriaceous, outer surface tomentose at base, inner surface glabrous; calyx tube 7–8 mm long; teeth 2–7 mm long, apex acute. Corolla white, 2.5–3.0 cm long, floral tube ca. 1.0 × 0.15 cm, coriaceous, tomentose at base; central corolla lobe ovate, ca. 1.0 × 0.4 cm, apex rounded; lateral corolla lobes narrower than central one, 1.3–1.4 × 0.2–0.3 cm, membranous, glabrous; labellum saccate, clawed, white with yellow midvein and red dots, trilobed, 1.7–2.0 × 1.5–1.8 cm, membranous, glabrous, adaxial surface pilose at base and centre; lateral staminodes filiform, 1–2 mm long, red, glabrous. Filament ca. 5 mm long, white, glabrous; anther oblong, ca. 4–5 mm long, white, glabrous; anther crest trilobed, lateral lobes ca. 2 × 2 mm; central lobe rounded, ca. 4 × 2 mm, emarginated, white, glabrous. Stigma rounded, abruptly widening, glabrous, apex entire; style glabrous, ca. 1.9 cm; epigynous glands oblong, ca. 4 × 1.5 mm, glabrous; ovary 4–5 × 2–3 mm, appressed villous. Capsule globose, 1.3–1.7 cm in diam., deep purple red to dark red, prickly, hairy.

Phenology:—Flowering in May and fruiting in June.

Myanmar:—NORTHERN: Kachin State, Putao, Maza, 97°45’26.25” E, 27°30’07.77” N. Understory herbs in tropical rain forest, 570 m elev., 13 May 2017, *Y.H. Tan, B. Yang, H.B. Ding, M.B. Maw & T.S. Tin M1741* (HITBC!); Kachin State, Putao, Ghattu, 97°57’04.25” E, 27°28’17.53” N. Understory herbs in tropical rain forest, 590 m elev., 3 June 2018, *Y.H. Tan, B. Yang, H.B. Ding, X.D. Zeng, M.B. Maw & H.L. Naing M3992* (HITBC!, RAF!).

Distribution:—China (Guangxi), Vietnam (Lamxay & Newman 2012), Laos (Lamxay & Newman 2012), Myanmar.

Ecology:—In the forest edge or roadside at an elevation of 500–800 m in tropical rain forests and tropical mountain forests.

Conservation status:—LC. This species has a very large extent of occurrence and is common, with no significant threats and is therefore assessed as Least Concern (IUCN 2017).

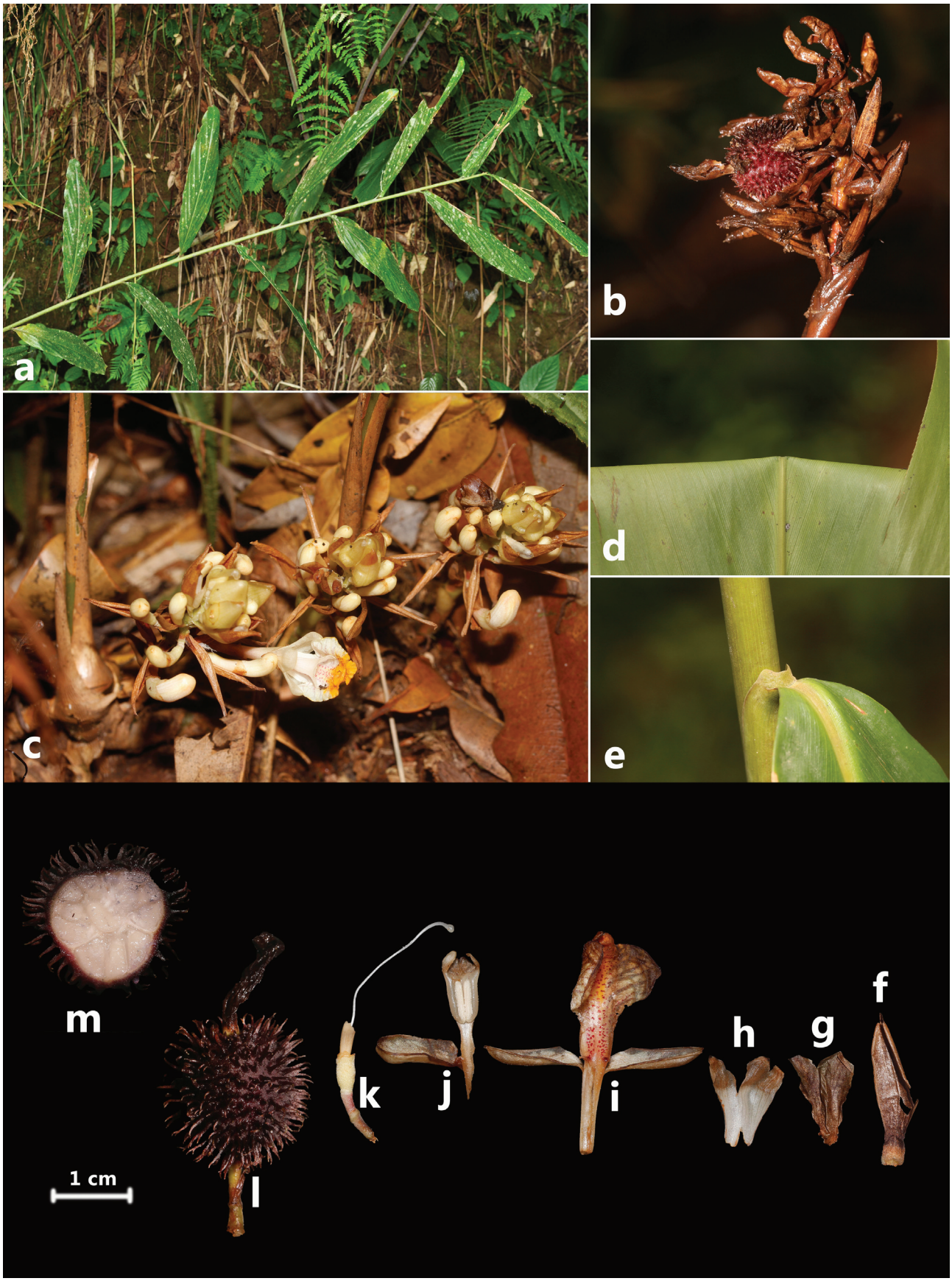

FIGURE 6. ***Wurfbainia microcarpa*****. a.** leaf blade. **b.** infructescence. **c.** basal part of plant showing inflorescences. **d.** leaf blade abaxially. **e.** ligule. **f.** bracteole. **g.** calyx (outer view). **h.** calyx (inner view). **i.** labellum with Floral tube, lateral corolla lobes and lateral staminodes. **j.** stamen (front view) with central corolla lobe. **k.** ovary with epigynous glands and style. **l.** fruit (side view). **m.** cross section of fruit. Photographed by H.B. Ding and Y.H. Tan.

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