

TWO NEW ENDEMIC COSTA RICAN SPECIES OF CALATHEA
(MARANTACEAE): CALATHEA HAMMELII AND C. GLORIANA

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ABSTRACT. *Calathea hammelii* and *C. gloriana* are described as new. They are known only from the La Selva Biological Station, Heredia Province, in the Atlantic lowlands of Costa Rica. Both species belong to *Calathea* section *Breviscopis* Benth. *Calathea hammelii* is most similar in flower color and morphology to *C. nitidifolia* from the Pacific lowlands of Costa Rica and to *C. cuneata* from Costa Rica and Panamá. Two morphs of *C. hammelii* are recognizable, differing in the sheen of the upper leaf surface. *Calathea gloriana* is most closely related to *C. elegans* from Panamá and Colombia.

***Calathea hammelii* Kennedy, sp. nov.**

FIGURES 1-4.

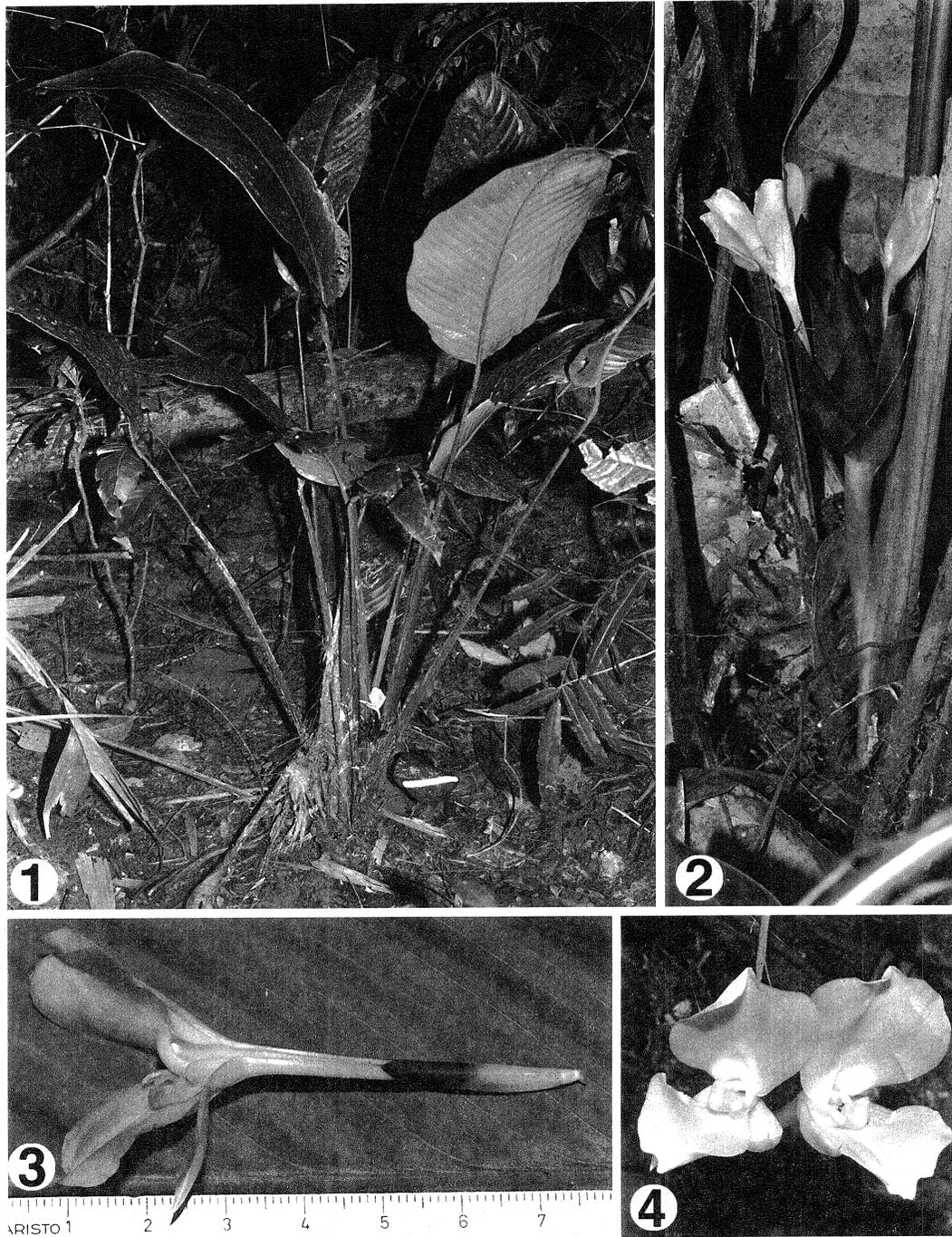
Planta 80-130 cm alta. Folia basilica 3 ad 5, lamina foliorum herbacea elliptica, acuminata, basi obtusa, supra smaragdina glabra, costa minute tomentosa, subtus viridi-grisea, secus costam et venas minute tomentosa; pulvinus supra tomentosus ceterum glaber, 2.8-4.6 cm longus, petiolus compressus sulcatus viridis minute tomentosus; vagina viridis vel purpureo-tincta adpresse tomentosa. Spica 1, obovoidea ad 6 × 3 cm, pedunculo 9-33 cm longo; bracteae 7 ad 14, spirally dispositae, anguste ovatae, apice acuminatae, obscure purpureae dense tomentosae; bracteolis 2, membranaceis; sepala anguste ovata vel elliptica, obtusa, ad apicem obscure purpurea; corollae glabrae, tubus albus ad 46 mm longus, lobis ovatis acutis, flavidis; staminodium exterius obovatum, ad apicem albidum, ad medium citreum, ad basin fladium, ad 27 × 22 mm, staminodium callosum huic simile, staminodium cucullatum ad apicem aurantium; ovarium glabrum.

Rhizomatous herb, 0.8-1.3 m high, bearing (2)3 to 5 basal leaves. Cataphylls herbaceous but thickened basally, narrowly ovate, apiculate, dark green or tinged purple, appressed tomentose, sericeous at base, hairs pale golden; innermost cataphyll 24-33 cm long. Leaf blade herbaceous, elliptic, apex acuminate, base obtuse to 90°; 30-50 × 9.5-15.5 cm. Leaf blade above semi-shiny grass-green, glabrous except minutely sparsely tomentose along margin of broader side, hairs <0.5 mm long, midrib grass-green, minutely tomentose except at base; leaf surface below grey-green with slight metallic sheen, minutely appressed tomentose on veins, minor veins glabrous toward margin, minutely tomentose along very margin of narrower side, midrib olive-green, minutely tomentose throughout apically, only on sides basally. Pulvinus elliptic in cross-section, olive-green, yellowish at junction with petiole, minutely tomentose along upper side, the rest gla-

brous, articulate, thicker than petiole, (2.1)2.8-4.6 cm long. Petiole laterally flattened, nearly 2 times as deep as wide, green, minutely tomentose, bearing a groove, (0)15-53 cm long. Leaf sheath not auriculate, green or faintly tinged purple, appressed tomentose, hairs longer basally, base of leaf sheath slightly swollen, pale pinkish, sericeous, hairs golden; sheath of innermost leaf 11-30 cm long, others 18-53 cm long.

Inflorescence terminal, 1 per shoot, basal, imbricate, obovoid, 4.5-6 × 2.5-3 cm. Peduncle pale olive-green tinged with purple, where covered by leaf sheaths, white, minutely tomentose apically, subglabrous below, except pilose at very base, (1.8)9-33 cm long. Bracts 7 to 14, spirally arranged, herbaceous, narrowly ovate, apex acuminate, (2.3)2.8-5.3 × 1.5-2.3 cm, the lowermost the longest; each subtending up to 4 or more flower pairs. Outer surface of bracts dark purple, densely velvety tomentose, hairs ca. 0.5 mm; inner surface pale green, the margins and apex purple, tomentose except at base. Bicarinate prophyll membranous, ovate, apex acute, translucent white, carina and apex tinged purple, upper ¼ minutely tomentose abaxially, including carina and the area between the carina, 2.1-2.8 × 1.2-1.9 cm, 0.9-1.3 cm wide, carina to carina. Secondary bract membranous, ovate, apex acute to 90°, translucent white tinged purple apically, minutely tomentose above, basal 1/3 glabrous, 2.1-2.9 × 1.2-1.9 cm. Bracteoles 2 per flower pair, membranous, medial, one carinate, one channeled, translucent white tinged purple apically, upper ⅔ minutely tomentose, 0.8-1.7(1.9) × 0.3-0.6 cm long.

Sepals herbaceous, narrowly ovate to narrowly elliptic, obtuse, apical ½ dark purple, white below, minutely tomentose, 20-29 × 5-8 mm. Corolla 65-71 mm long, tube white, glabrous, 41-46 mm long; corolla lobes subequal, ovate, acute, pale yellow, glabrous, 19-25 × 6-7.5 mm. Outer staminode obovate, emarginate, apical 1/3 white, central 1/3 bright lemon yellow,



FIGURES 1-4. *Calathea hammelii*. 1. Habit. 2. Inflorescence. 3. Flower on upper leaf surface, measurement in cm. 4. Flower pair, face view.

basal 1/3 pale yellow, 22–27 × 14–22 mm. Callose staminode similar in shape and color, petaloid apically, 27–30 × 15–22 mm. Cucullate staminode bright yellow-orange at apex, yellow below, 8–10 × 6–7 mm. Stamen with lateral petaloid yellow appendage to 2.5 mm wide; anther yellow, 3–4 mm long. Style and stigma light yellow. Ovary smooth, white, glabrous, 2–3 × 2.5 mm. Capsule unknown.

TYPE: COSTA RICA. Prov. Heredia: Finca La Selva, the OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Southwest Trail, about 1500 m S, about 100 m, 28 Aug 1980, B. Hammel 9615 (holotype DUKE).

PARATYPES: COSTA RICA. Prov. Heredia: Estación Biológica La Selva, Sendero Ribereño a Río Peje, en la fila "Bosque Nublado", 150 m, 4 Jun 1989, B. Hammel 17437 (CR); La Selva Biological Station, junction of Near Loop and Southwest Trail, 75 m, 10°25'10" N, 84°00'50" W, 19 Sep 1990, H. Kennedy, B. Hammel and J. Le Corff 4662 (UBC).

Calathea hammelii is readily distinguished from other Costa Rican species by the 3–5 basal leaves, obtuse leaf base, few (7 to 14) spirally arranged, densely tomentose bracts, light yellow glabrous corolla lobes, the large ($\geq 22 \times 14$ mm) outer and callose staminodes which are similar in size, shape and color (white apically, bright yellow centrally and pale yellow toward the base). *Calathea hammelii* is closely related to *C. cuneata* H. Kenn. and *C. nitidifolia* H. Kenn., all having a similar floral structure with relatively large outer and callose staminodes similar in shape and color. *Calathea cuneata* is distinguished from *C. hammelii* by the narrowly cuneate ($\leq 35^\circ$ vs. $\geq 90^\circ$) leaf base, the longer (5.3–7 mm vs. 2.8–5.3 mm), and longer sepals (32–37 mm vs. 20–29 mm). *Calathea nitidifolia* is readily distinguished from *C. hammelii* by its smaller stature (40–70 vs. 80–130 cm high), and shorter pulvinus (0.9–2.3 vs. 2.8–4.6 cm long) and corolla tube (35–38 vs. 41–46 mm long). In Hammel's (1986, p. 236) publication of Marantaceae for the Vascular Flora of La Selva Biological Station, he treats it under the name, *C. cuneata*, but points out the notable differences in size, leaf shape and habitat between the La Selva taxon and "*Calathea cuneata* s. str.". In addition to the "typical" morph, there is another population (Kennedy et al. 4662) of *C. hammelii* at La Selva which is vegetatively distinct. Here, the upper leaf surface is not shiny, nor can be rubbed to yield a shiny surface; but is a matte green with the surface rather like a finely beaded projection screen. The floral features are the same as in other populations of *C. hammelii*.

This species is named in honor of Dr. Barry Hammel of the Missouri Botanical Garden who, because of his extensive exploration and documentation of the La Selva Flora, first collected it and realized it was undescribed.

Calathea gloriana Kennedy, sp. nov.

FIGURES 5–7

Planta 1–1.9 m alta. Folia basilica 3 ad 8, ovata vel elliptica, obtusa cum acumine vel acuminata, basi acuta interdum rotundata, supra obscure viridia glabra, costa tomentosa, subtus viridi-grisea vel obscure purpurea, glabra vel prope costam venas principales minute tomentosa, costa tomentosa; pulvinus supra tomentosus ceterum glaber 3–7.5 cm, petiolus viridis vel purpureo-tinctus, ad apicem minute tomentosus, prope basin subvillosus; vagina villosa vel lanata, 10.5–60 cm longa. Spica 1, ellipsoidea 4.3–5 × 1.5–2.5 cm; bracteae 6–9, spiraliter dispositae, transverse ellipticae vel obovatae, apice obtusae, obscure purpureae villosae, 2–3 × 2–3.5 cm; bracteolis 1, raro 2, linearibus apice indurato-claviculata; ovarium album, glabrum; sepala herbaea, obovata, obtusa, ad apicem purpurea, 24–27 mm longa; corollae albae, tubus ad 33 mm longus, lobis ellipticis vel obovatis obtusis, 14–16 mm longis; staminodium exterius obovatum, albidum, ad 9 × 6 mm, staminodium callosum rectangularum, 10–12 mm longum., staminodium cucullatum 8–9 mm longum.

Rhizomatous herb, 1–1.9 m high, bearing 3 to 8 basal leaves. Rhizome, thin, elongate, 0.5–0.8 cm in diameter, internodes 5–7 cm. Cataphylls coriaceous, narrowly ovate, apex apiculate, purple, tomentose above, lanate to sericeous at base; innermost cataphyll 25–55 cm long. Leaf blade herbaceous, ovate to narrowly elliptic, apex obtuse with acumen to acuminate, base acute, occasionally rounded and shortly, abruptly attenuate; 28–53 × 6–21 cm, the innermost one the smallest. Leaf blade above semi-shiny deep green, glabrous except minutely tomentose at apical margin, and occasionally along veins at apex, midrib dark olive-green, minutely tomentose, densely so at apex; leaf surface below semi-shiny grey-green or purple, glabrous or densely minutely tomentose along major veins near midrib, subglabrous to glabrous toward margin with minor lateral veins sparsely tomentose, midrib yellow-green or maroon, minutely tomentose, hairs tan to golden. Pulvinus broadly elliptic in cross-section, light to dark olive-green or brownish purple with a row of hairs along the front, the rest glabrous, articulate, thicker than petiole, acuminate extended in front, 3–7.5 cm long. Petiole deep olive-green or tinged purple, minutely tomentose apically to subvillos basal-ly, 11–95 cm long, shortest in the outermost leaf.



FIGURES 5-7. *Calathea gloriana*. 5. Habit. 6. Inflorescence with flower 7. Flower on upper leaf surface, measurement in cm.

Leaf sheath not auriculate, olive-green or tinged purplish, appressed villous above, lanate basally, hairs to 5 mm long, 10.5-60 cm long, shortest in the innermost leaf. Base of leaf sheath swollen, pale tan to whitish, lanate.

Inflorescence terminal, 1 per shoot, basal, im-

bricate, ellipsoid, 4.3-5 × 1.5-2.5 cm. Peduncle purple apically, light green basally where covered by leaf sheaths, densely villous above with straw-colored hairs 1.5-2.5 mm long, lanate at base, 14-28 cm long. Bracts 6 to 9, spirally arranged, margins herbaceous, firmer toward base,

lowermost transverse elliptic to broadly obovate, apex obtuse with acumen to obtuse, upper ones obovate to obtrullate, $2-3 \times (1.6)2-3.5(4)$ cm; each bract subtending 4 or more flower pairs. Outer surface of bracts dark purple (where exposed to sun) or dark green, villous to lanate, the lowermost bracts the most densely pubescent, the hairs obscuring the bract surface; inner surface green basally purple near margin, apical $\frac{1}{3}$ sparsely villous, glabrous below. Bicarinate prophyll membranaceous, ovate to elliptic, apex obtuse, translucent cream-colored, tinged purple apically, glabrous, or bearing a few hairs at the apical margin, $1.9-2.5 \times 1-1.7$ cm, $0.6-1$ cm wide, carina to carina. Secondary bract membranaceous, ovate, apex obtuse, translucent cream-colored, glabrous below, apical $\frac{1}{3}$ with scattered long hairs, easily rubbed off, $2.1-2.5 \times 1-1.4$ cm. Bracteoles 1 (rarely 2) per flower pair, claviculate, medial, cream-colored occasionally faintly tinged purple, $(1.6)2.1-2.5$ cm long.

Sepals herbaceous, obovate, obtuse (c. 90°), white below, apical $\frac{1}{3}$ tinged purple, glabrous, $24-27 \times 5-7$ mm. Corolla $45-50$ mm long, glabrous, tube white, $30-33$ mm long; corolla lobes subequal, elliptic to obovate, obtuse to rounded, faint cream-color, $14-16 \times 7-9$ mm. Outer staminode obovate, emarginate, occasionally irregularly rounded, white, $8-9 \times 4.5-6$ mm. Callose staminode totally callose, rectangular, apex broadly obtuse, white tinged purple $10-12$ mm long. Cucullate staminode faint cream-colored, $8-9 \times 4-5$ mm. Stamen with cream-colored lateral petaloid appendage. Style and stigma golden orange. Ovary smooth, white, glabrous, c. 2×1.5 mm. Capsule unknown.

TYPE: COSTA RICA. Prov. Heredia: Estación Biológica La Selva, Lindero Sur por las cabeceras de La Quebrada Surá, bosque secundario viejo, ca. 100 m, $10^\circ25'30''N$, $84^\circ01'30''W$, 19 Jul 1990, *H. Kennedy & B. Hammel 4545* (holotype CR; isotypes BM, MO, U, UBC, US).

PARATYPES: COSTA RICA. Prov. Heredia: Finca La Selva, the OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, along Vargas property S boundary, near SE corner, in small patch of forest, ca. 100 m, 28 Jul 1981, *B. Hammel 11063* (DUKE); Finca La Selva, the OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, on ridge just W of Holdridge trail at 2000 m S, above Quebrada Pantano, ca. 100 m, 10 Aug 1981, *B. Hammel 11122* (CR, DUKE, F, MO); Estación Biológica La Selva, Sendero Ribereño a Río Peje, al lado del camino, bordeando la cima de la ladera, 150 m, 4 Jun 1989, *B. Hammel 17436* (CR); Finca La Selva, near

end of Sendero Sarapiquí on trail to Río Peje, 8 Jul 1984, *W. J. Kress et al. 84-6156* (UBC).

Calathea gloriana is distinguished from other Costa Rican species by the several strictly basal leaves; the densely villous to lanate peduncle with hairs to 2.5 mm long; the spirally arranged, villous bracts whose surface may be completely obscured by hairs; the clavicate bracteoles and the callose staminode, totally callose. *Calathea gloriana* is closely related to *C. elegans* H. Kenn., from Panamá and Colombia, both having narrowly elliptic leaf blades, relatively few (5 to 14), spirally arranged, pubescent bracts, clavicate bracteoles and white flowers. *Calathea gloriana* is distinguished from *C. elegans* by the single vs. 1 to 3 inflorescences per shoot, the densely villous to lanate bracts and peduncle vs. tomentose bracts and peduncle where the density of hairs is not sufficient to obscure the surface, the obtuse vs. acute to acuminate bract apex, the shorter ($1.6-2.5$ vs. $2.4-4$ cm long) clavicate bracteoles, and the totally callose vs. petaloid callose staminode. The description given under *C. elegans* in Hammel's (1986, p. 236) publication of Marantaceae for La Selva is of *C. gloriana* and he notes the differences in bract shape and number of inflorescences per shoot between the La Selva taxon and "typical" *C. elegans*. The leaf color is polymorphic. In some populations the lower surface of the leaf is grey-green (*Kress et al. 84-1656, Kennedy & Hammel 4545*), in others, purple (*Hammel 11063*); but within a single population it is uniform. The epithet *gloriana* was suggested by Dr. Hammel.

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LITERATURE CITED

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