

83°38'W, *Stevens* 23726 (MO); Cordillera de Talamanca, Reserva Biol. Hitoy Cerere, Cerro Bitarkara, 800 m, 09°38'25"N, 83°08'15"W, *Herrera & Solís* 2493 (CR, MO); Tsaki, *Pittier* 9509 (BR), *Tonduz* 9507 (BR, CR); Parque Tortuguero, 4 m, 10°31'N, 83°30'W, *Robles* 1331 (F, L, MO), 1332 (MO); Forests of Shiroses, Talamanca, *Tonduz* 9228 (BR); Quebrada Mata de Limón headwaters, Finca Anai, Sixaola, 25–40 m, 9°35'N, 82°39'W, *Grayum* 4501 (MO); Río Catarata, Bribri, 50 m, *Croat* 43221 (F, K, MBM, MO, NY, RSA, SEL); Río Madre, 11 mi SW of Limón, Hwy. 32, 10 m, *Croat* 43305 (AAU, CR, G, GH, K, LE, MO, NY, P, RSA, UCLA, W, WIS); Río Reventazón, Cairo, Hamburg Finca, *Standley & Valerio* 48869 (US). PUNTARENAS: Cantón de Coto Brus, Las Cruces Tropical Botanical Garden, 6 km W of San Vito de Java, 1,200 m, *Croat* 57257 (CR, MO). NICARAGUA. CHONTALES: 4 km NW of Santo Domingo, 250 m, 12°18'N, 85°7'W, *Grijalva & Soza* 3749 (MO); N of Cuapa, 700 m, *Atwood & Neill* AN35 (MO); confluence of Río El Jordan and Río La Pradera, Hacienda San Martín, 390 m, 12°17'N, 85°15'W, *Stevens* 21826 (MO); Cerro Oluma, NE side, above Hacienda San Pedro Oluma, 600–700 m, 12°18'N, 85°23'W, *See* 28359 (MO). JINOTEGA: Río Coco, Rapido Plis, 200 m, 14°0'–10'N, 85°20'–30'W, *Stevens* et al. 16823 (MO). MATAGALPA: above Matagalpa–Siuna road, La Gloria, 78 km from Matagalpa, 600 m, 13°15'N, 85°35'W, *Moreno* 17218 (MO); Cerro Musun, Río Bilampi, 500–800 m, *Neill* 1782 (MO); Wanawas, 200–500 m, *Araquistain & Moreno* 2739 (BM, LE, MBM, MO), 2744 (MO); 4 km SW of Wanawas, 200–500 m, 13°0'–1'N, 85°14'W, *Araquistain & Moreno* 2658 (MO, NY); Quebrada Las Carpas, El Limón, 580 m, 13°15'N, 85°34'W, *Stevens & Moreno* 19715 (MO). RÍO SAN JUAN: Río Santa Cruz-Caño Santa Crucita, La Palma, 40–60 m, 11°2'–4'N, 84°24'–26'W, *Stevens* 23437 (MO), *Neill* 1552 (MO); 1 km W of San Juan del Norte, 0–2 m, 10°55'N, 83°43'W, *Rivière* 222 (MO); Río San Juan, San Juan del Norte, Caño la Barca, 0–10 m, *Araquistain* 3283, 3302, 3401 (MO), *Martinez & Rivière* 1952 (MEXU), 1957 (MEXU, MO). ZELAYA: Waslaya–Siuna, 6 km W of La Cuesta El Balsamo, Rosa Grande, 260–300 m, 13°38'N, 85°2'W, *Moreno* 19190 (MO); Río Blanco–Río Copalar, 29–31 km E of Río Blanco, 200–400 m, 12°50'–55'N, 85°0'–5'W, *Stevens* 12143, 12182, 12206 (MO); El Recreo, *Atwood & Neill* AN233 (MO); stream 1 km N of Las Mercedes, 160–180 m, *Vincelli* 3284 (MO); Monkey Point, 3 km above Caño El Pato, 10 m, 11°35'N, 83°42'W, *Moreno* 12466 (MO); Siuna–Matagalpa, 31.4 km beyond Río Uli, 8.9 km beyond Rosa Grande La Balsamo, 200 m, *Stevens* 7524 (MO); Caño Monte Cristo, La Gruperia, 10 m, 11°33'N, 84°48'W, *Moreno & Sandino* 14688, 14655 (MO); village of Germán Pomares, Las Benitas, 100 m, 11°36'N, 83°51'W, *Moreno & Sandino* 14933 (MO); Cerro Waylawas (Peñas Blancas), 5 k S of Wany, 13°30'20"N, 84°45'25"W, *Grijalva & Burgos* 1685 (MO); Río Punta Gorda, Atlanta, 10 m, 11°34'N, 84°1'W, *Moreno & Sandino* 12755 (MO); Río Sucio, 0.5 km E of 1st suspension bridge E of Bonanza, 140 m, 14°1'N, 84°34'W, *Stevens* 12317 (MO).

above El Boquete, 1,200–1,300 m, *Pittier* 3052 (holotype, US). Figures 322, 325–327, 231, 232.

Epiphytic; stem to 16 cm long; leaf scars 2.5 cm wide; roots numerous, descending, green, smooth, 5–15 mm diam.; cataphylls moderately coriaceous, 20–30 cm long, long-acuminate at apex, medium green, sparsely pale-speckled, matte, drying tan (B & K yellow-red 9/10), persisting ± intact. *Leaves* erect-spreading; petioles 20–27 cm long, 7–10 mm diam., quadrangular to bluntly D-shaped, flattened to broadly and shallowly sulcate adaxially, rounded abaxially, surface pale-speckled; geniculum thicker and slightly paler than petiole, becoming fissured transversely with age, 3–4.5 cm long; blades coriaceous, oblong to oblong-oblancoleate or lanceolate, acute at apex (the acumen apiculate), acute and decurrent to rounded at base, 47–69 cm long, 10–19 cm wide, broadest at or near the middle, the margins broadly undulate; both surfaces matte, dark green above, paler below; midrib flat at base, becoming obtusely angular and narrowly raised at apex above, bluntly 2-ribbed and higher than broad at base, becoming prominently and convexly raised toward the apex below; primary lateral veins numerous, departing midrib at 60°–70° angle, ± straight, arcuate near the margin, sunken in grooves above, raised below, paler than surfaces; interprimary veins obscure above, darker than surface below; tertiary veins obscure above, darker than surface below; collective vein arising in the upper third of the blade, weakly sunken above, raised below, less prominent than primary lateral veins, 5–6 mm from margin. *Inflorescences* spreading, shorter than leaves; peduncle 33–39 cm long, 9–12 mm diam., 2× as long as petiole, subterete; spathe reflexed, coriaceous, dark green (B & K yellow-green 5/10), ovate-lanceolate, 16–17 cm long, ca. 4 cm wide, inserted at 45° angle on peduncle, acuminate at apex, rounded at base; stipe 7–13 mm long in front, ca. 3 mm long in back; spadix pale lavender to violet-purple (B & K purple 6/5 to 5/2.5), tapered, 15–23 cm long, (4)6–12 mm diam. near base, 2–5 mm diam. near apex; flowers rhombic, 3–3.5 mm long, 3.1–3.6 mm wide, the sides straight to weakly sigmoid; 7–8 flowers visible in principal spiral, 8–10 in alternate spiral; tepals matte; lateral tepals 1.5–1.8 mm wide, the inner margins broadly convex; pistils scarcely emergent, green; stigma ellipsoid, ca. 0.6 mm long, droplets appearing for ca. 1 week before stamens emerge; stamens emerging rapidly from near the base or sometimes from

***Anthurium validifolium*** K. Krause, Notizbl. Bot. Gart. Berlin-Dahlem 11: 607. 1932. TYPE: Panama. Chiriquí: forests along Río Ladrillo,

near the middle, lateral stamens emerging to midway before alternates appear; anthers yellow-orange, ca. 1 mm long, 1.2 mm wide, inclined over the pistil; thecae oblong-ellipsoid, scarcely divaricate; pollen yellow-orange (B & K yellow-red 8/5). *Infructescence* pendent; spathe twisted; spadix 24–26 cm long, 2.3–2.5 cm diam.; berries bright orange, obovoid, flattened at apex, 0.8–1.5 mm long; pericarp thin,  $\pm$  transparent; mesocarp fleshy, orange, with minute raphide cells; seeds 1–2 per berry, pale yellow, ovoid, with a somewhat flattened appendage at both ends, enveloped by somewhat dry, sac-like structure.

*Anthurium validifolium* is known from Chiriquí Province in Panama and adjacent Puntarenas Province in Costa Rica. Most collections have been made in lower montane rain forest, from 1,200 to 2,300 m.

This species is characterized by its large, moderately thick, lanceolate leaf blades, lavender to purple spadix, and bright orange, obovoid berries.

*Anthurium validifolium* is probably most closely related to *A. seibertii* and *A. protensum*, which share a similar inflorescence and orange berries. It differs from both in having broader and thicker leaf blades. Its subquadrangular petiole is somewhat intermediate between the terete petiole of *A. protensum* and the sharply quadrangular petiole of *A. seibertii*. Although this suggests *A. validifolium* may be a hybrid between *A. protensum* and *A. seibertii*, its thicker, proportionately shorter blades are not a feature of those species.

The specimen from Puntarenas was cultivated at Las Cruces Tropical Botanical Garden, but was reported to have been collected locally by Robert Wilson, founder of the garden.

COSTA RICA. PUNTARENAS: Cantón of Coto Brus, Las Cruces Tropical Botanical Garden, 6 km W of San Vito de Java, *Croat* 44445, 57258, 57279 (MO). PANAMA. CHIRIQUÍ: 2 mi. N of El Hato del Volcán, *Croat* 10667 (B, F, GH, K, MO, NY, PMA, RSA, US); Cerro Pelota, 2,300 m, 8°54'N, 82°43'W, *Knapp* 1513 (F, MO); Cerro Pelota, lower slopes, 1,800–2,000 m, 8°53'N, 82°43'W, *Knapp* 1497 (K, MO); ridge S of Cerro Pelota, 1,700–2,200 m, 8°53'N, 82°43'W, *Knapp* 1522, 1523, 1526, 1528, 1529 (MO); Cerro Punta, 4.7 mi. E of Volcán, 1,600 m, 8°49'N, 82°38'W, *Croat* 66204 (MO); Volcán-Río Sereno, 1,520 m, *Croat* 66321 (MO); Bambito-Cerro Punta, *Croat* 10553 (MO); *Croat* 10554 (F, MO); Boquete Region, 9 km WNW of Boquete, 1,870 m, *Davidse & D'Arcy* 10309 (MO, PMA); Cerro Pando, NW side, *Croat* 15971 (MO, NY); Río Colorado, 1,200–1,400 m, 8°50'N, 82°43'W, *Hamilton & Stockwell* 3532 (MO); Río Ladrillo, El Boquete, 1,200–1,300 m, *Pittier* 3052 (US).

***Anthurium vaupesianum* Croat, sp. nov. TYPE:**

Colombia. Vaupés: vic. Mitú, 2–3 km below Urania, Río Vaupés, *Zarucchi & McElroy* 1172 (holotype, GH; isotype, COL). Figures 329, 330.

Planta epiphytica; internodia brevia, 1–2 cm diam.; cataphyllum lanceolatum; petiolus 4–9 cm longus, 3–5 mm diam., complanatus et obtuse costatus adaxile, abaxile rotundatum ad trinervis; lamina coriacea-subcoriacea, oblanceolata-obovata, abrupte attenuate in dimidio inferiore, 20–62 cm longa, 9–26 cm lata; nervis primariis lateralibus 6–12 utroque; pedunculus (16)36–70 cm longus; spatha oblonga-linearis, viridis-olivacea, 9–20 cm longa, 0.6–1.5 cm lata; spadix brunneo-rubellus aut virellus, sessilis vel stipitatus, ad 3.5 cm, longe contractus, 20–35 cm longus, 3–4 mm diam.; baccae violaceae.

Epiphytic; stem to 9 cm long, 1–2 cm diam.; roots dense, ascending, fuzzy, soon glabrous, 3–4 mm diam.; cataphylls subcoriaceous, lanceolate, 3–5 cm long, acuminate at apex, drying dark reddish brown, semi-intact, persisting briefly. *Leaves* erect-spreading; petioles 4–9 cm long, 3–7 mm diam., D-shaped, flattened and conspicuously and obtusely ribbed adaxially, rounded to weakly angulate or weakly 3-ribbed abaxially; geniculum thicker than petiole, 0.5–1 cm long; sheath 3–7 cm long; blades coriaceous to subcoriaceous, oblanceolate-obovate, acute at apex, narrowly attenuate, ending narrowly acute to obtuse at base, 20–62 cm long, 9–26 cm wide, broadest above the middle, the margins usually flat, sometimes weakly and broadly undulate; upper surface semiglossy, medium green, lower surface weakly glossy, paler; both surfaces drying grayish to grayish brown; midrib convexly raised at base, becoming sharply raised (knifelike) toward the apex above, acutely raised at base, becoming convex toward the apex below; primary lateral veins 6–12 per side, departing midrib at 30–50° angle, straight to arcuate-ascending to the margin, raised in shallow grooves above; tertiary veins conspicuously sunken above, conspicuously raised below; collective vein arising from near the apex or absent, sunken above, raised below, 6–12 mm from margin. *Inflorescences* erect to pendent,  $\pm$  equaling leaves; peduncle (16)36–70 cm long, (1)3–4 mm diam., (2.7)4–7.7  $\times$  as long as petiole, terete; spathe spreading to reflexed, subcoriaceous, green to brownish green, sometimes mottled purple, oblong-linear, 9–20 cm long, 0.6–1.5 cm wide, inserted at 40° angle on peduncle, acute at apex, attenuate at base; spadix brown to reddish to greenish or gray-brown (once reported as white), long-tapered, sessile or stipitate to 3.5 cm, somewhat curved, 20–38 cm long, drying 3–4 mm diam.