

to weakly tapered, somewhat curved, 2.5–11 cm long, 7–12 mm diam. near base, 4–7 mm diam. near apex; flowers \pm irregularly 4-lobed, 2–3.3 mm long, 2.5–3.6 mm wide, the sides prominently jaggedly sigmoid; 6–8(10) flowers visible in principal spiral, 9–12 in alternate spiral; tepals smooth, matte; lateral tepals 1.4–1.7 mm wide, the inner margins rounded, somewhat erose, sometimes turned up against pistil, the outer margins irregularly 2–4-sided; pistils weakly emergent, prominently raised before stamens emerge, dark green; stigma circular to ellipsoid, 0.3–0.4 mm long, erect and brushlike, droplets appearing 2–4 days before stamens emerge, stamens emerging rapidly in a complete sequence from the base, lateral stamens almost to apex before stamens emerge; anthers pale green, 0.8–1.2 mm long, 0.7–1.3 mm wide, contiguous, inclined over pistil; thecae weakly divaricate; pollen pale yellow, soon fading to white, sweetly fruit-scented. *Inflorescence* spreading; spathe persisting and erect; spadix 6.5–10.5 cm long, ca. 2 cm diam.; berries orange-red (B & K yellow-red 5/2.5 to red 4/10), broadly obovoid, rounded to flat or weakly indented at apex, 5.5–9 mm long, 4–9 mm diam.; pericarp moderately thickened, with numerous punctiform raphide cells especially in the apical half; mesocarp pulpy or mealy, with numerous raphide cells; seeds 1 or 2, yellowish white to tan, obovoid to broadly obovoid, 6–6.5 mm long, 5–5.8 mm diam., 3 mm thick, densely covered with punctiform raphide cells.

Anthurium salvadorens is known only from El Salvador and Guatemala at 500 to 800 m. It was first collected by Sixto Alberto Padilla in 1922 in the Department of Ahuacapán in El Salvador. The species was later collected by Paul C. Standley in the adjacent Department of Jutiapa in Guatemala.

This species is a typical member of the section, and earlier collections were confused with *A. schlechtendalii*, to which it is related. *Anthurium salvadorens* differs in being a usually well-rooted plant with fewer, very large fleshy roots and a usually almost elliptic blade, but especially by its inflorescence, which has a pale green, ovate-lanceolate spathe that is weakly convolute at the base and erect, enshrouding the usually short, pale green spadix. *Anthurium schlechtendalii* differs in having usually oblanceolate blades, a coriaceous, more lanceolate, prominently reflexed, usually purplish spathe, and a more elongate, purplish spadix.

EL SALVADOR. AHUACAPÁN: San Francisco Menéndez-Tacuba, El Imposible, 500 m, *Bernhardt s.n.* (MO), *Croat 42092* (B, BM, MO, RSA, U, W); Río Chokama, 1.5 mi. S of Tacuba, 700 m, *Croat 42169* (CAS, F, ITIC, K,

LE, M, MEXU, MO, RSA, SEL, TEX, US). GUATEMALA. JUTIAPA: Jutiapa, *Standley 76313* (F, US); SW of San Cristóbal, *Dunn et al. 23222* (UMO); Monjoy Canyon, 8 mi. W of San Cristóbal, 530 m, *Dunn et al. 19* (MO).

Anthurium salviniae Hemsley, *Diagn. Pl. Nov. Mexic.* 36. 1878. TYPE: Guatemala. Volcán de Fuego, *Salvin s.n.* (holotype, K). Figures 15, 20, 270, 274, 276.

Anthurium giganteum Matuda, *Madroño* 10: 169. 1950. non Engl. 1898. TYPE: Mexico. Chiapas: Escuintla, Salto de Agua, *Matuda 18043* (holotype, MEXU; isotype, UC).

Anthurium enornispadix Matuda, *Revista Soc. Mex. Hist. Nat.* 11: 94. Dec. 1950. TYPE: Same as *Anthurium giganteum* Matuda.

Epiphytic, rarely epilithic; stem to 6 cm diam.; roots dense, usually ascending, some descending, moderately numerous, greenish to white, pubescent, moderately short and tapered, 3–6 mm diam.; cataphylls thick, fistlike, cucullate, rounded at apex, drying brown, persisting intact, ultimately becoming fibrous at base. *Leaves* erect to spreading; petioles (3)5–23 cm long, 10–20 mm diam., \pm D-shaped to terete, flattened to sulcate adaxially, the margins not prominent, rounded abaxially (once reported as prominently 5–7-ribbed), the surface pale-speckled; geniculum paler and thicker than petiole, 0.7–2 cm long; blades moderately coriaceous, obovate to oblanceolate to broadly elliptic, acuminate to obtuse at apex, attenuate to rounded or truncate (rare subcordate) at base, (32)39–180 cm long, (9)13–50 cm wide, broadest usually above (sometimes at or near the middle), the margins slightly undulate; both surfaces semiglossy, medium green (B & K yellow-green 4/7.5) above, slightly paler below; both surfaces drying greenish to brownish green; midrib convexly raised at base, becoming acute toward the apex above, convexly raised at base, becoming obtusely raised toward the apex below; primary lateral veins 9–24 per side, convexly raised above and below; interprimary veins rarely present; tertiary veins weakly raised to obscure above, weakly raised to flat and darker than surface below; collective vein arising from near the apex or absent (often from below the middle in small plants), weakly raised, 3–5 mm from margin. *Inflorescences* spreading to usually pendent, shorter than leaves; peduncle 16–80 cm long, 2–5 mm diam., 3.1–10.3 \times as long as petiole, terete; spathe spreading to recurved, coriaceous to subcoriaceous, purple or sometimes green tinged with red or purple (B & K yellow-green 6/5), lanceolate-linear, (4)10.5–40(50) cm long, 1–2.5 cm wide, inserted at 45–90° angle on peduncle,

gradually acuminate at apex (the acumen cuspidate, inrolled), rounded to truncate or acute at base; spadix pale green when immature, soon lavender to dull violet-purple to purple-maroon, glaucous, long-tapered, slightly curved, (6)10–34(47) cm long, 4–15 mm diam. near base, 2–7 mm diam. near apex; flowers rhombic, 2.4–2.5 mm in both directions, the sides straight to sigmoid; 6–8 flowers visible in principal spiral, 4–12 in alternate spiral; tepals matte; lateral tepals 1.2–1.3 mm wide, the inner margins broadly rounded; pistils emergent but not raised, green; stigma linear to oblong-ellipsoid, 0.6–0.9 mm long; stamens emerging from the base in a slow, regular progression; anthers orange to pale yellow to creamy white, ca. 1 mm long, 0.9 mm wide, held at edge of tepals and inclined over pistil; thecae ellipsoid; pollen pale yellow-orange fading to white. *Infructescence* with spadix to 60 cm long; berries red, oblong-ellipsoid, rounded at apex, 10–15 mm long; mesocarp transparent, gelatinous; seeds 2 per berry, oblong, flattened, ca. 3–5 mm long.

Anthurium salviniae ranges from western Mexico (Chiapas), along the Pacific slope of Guatemala, and along the Atlantic and Pacific slopes from Nicaragua to Panama. There is also a single collection from Honduras (Atlantic slope) that appears to belong to this species. The species also occurs in Colombia, where it has been collected from Chigorodo and Dabeiba in Antioquia and Chocó departments. *Anthurium salviniae* occurs from near sea level to 1,600 m in wetter parts of tropical moist forest, in premontane wet, tropical wet, and also, rarely, in premontane rain forest.

This species is characterized by its cucullate cataphylls, large, mostly oblanceolate leaves with circinate vernation, usually pendant inflorescence with a slender peduncle and slender, long-tapered, pale lavender spadix and red berries.

Anthurium salviniae has long been called *A. tetragonum*, but that name is a synonym of *A. schlechtendalii*, a species ranging from Mexico to Honduras or Nicaragua on the Atlantic slope. Although leaves of the two species are very similar, *A. salviniae* can be distinguished by its long-tapered, pale lavender, glaucous spadix, long-tapered, spreading spathe, and by its fist-shaped, cucullate cataphylls. In addition, the leaves of *A. salviniae* usually dry darker and thinner. *Anthurium schlechtendalii* usually has a shorter, blunter spadix and a short, thick spathe that is usually reflexed and often twisted. The spadix is darker violet-purple, and is not at all glaucous at anthesis.

A collection in cultivation at the Missouri Bo-

tanical Garden from the Río Majé region of Panama, in Panamá Province, is unusual in having dark violet-purple rather than red berries.

COLOMBIA. ANTIOQUIA: Quebrada La Puerca-Malagon, 10 m, *Rentería et al.* 4776 (MO); Río Claro, Pto. Triunfo-Medellín, S of Hwy., 5°54'N, 74°51'W, *Croat* 56579 (MO); Río Sucio, Dabeiba, *Gutiérrez & Barkley* 1822 (COL, US), *Johnson & Barkley* 18C411 (US); Dabeiba-Chigorodó, 4 km NW of Dabeiba, 180–400 m, *Callejas et al.* 4783 (MO); Mpo. Chigorodo, *Plowman* 3175 (GH). CHOCÓ: Quebrada Resaquito, Mecana, 50 m, 6°16'N, 77°21'W, *Juncosa* 1879 (MO). QUINDIO: Mpo. Montenegro, Río La Vieja, La María, 1,000 m, *Arbeláez et al.* 333 (MO); Mpo. Turbo; Km 11 on Carretera Tapón del Darién, Leon-Lomas Aisladas area, 10–20 m, *Brand & Escobar* 727 (MO). COSTA RICA. ALAJUELA: N of Zarcero, *Croat* 43640 (MO); Naranjo-Quesada, Hwy. 15, 3.2 mi. N of Zapote, 1,560 m, *Croat* 46916 (MO); Cañas-Upala Road, N of Bijagua, *Croat* 36480 (COL, MO, NY); Río Cacao, 800 m, *Gómez* 19568 (MO). Buena Vista de Zarcero, Finca Los Ensayos, 900–1,000 m, 10°16'N, 84°27'W, *Judziewicz* 4404 (WIS). CARTAGO: SE of Plantanillo, *Croat* 36808 (MO); NE of Tapanú, *Lint* 1034 (GH). GUANACASTE: Tilarán, *Standley & Valerio* 44445 (US); Cerro Nubes, W slope, 2 km E of Silencio de Tilarán, 900 m, 10°28'N, 84°53'W, *Grayum et al.* 4999 (MO); Lake Arenal, Río Chiquito-Río Caño Negro, 550–850 m, 10°27'N, 84°50'W, *Hammel et al.* 15146 (MO); Parque Nacional Rincón de la Vieja, SE slopes of Volcán Santa María, above Estación Hacienda Santa María, 900–1,200 m, 10°47'N, 85°18'W, *Davidse et al.* 23335 (CR, K, MO); on path from Puesta Santa María toward hot springs, *Garwood et al.* 7466 (BM). PUNTARENAS: San Vito de Java, *Croat* 32898 (MO); Cordillera de Talamanca, Río Guineal, Helechales, 1,100–1,200 m, 9°04'30"N, 85°05'W, *Davidse & Herrera* 26240 (MO); Monteverde, Río Guacimál, Lechería, 1,500 m, 10°17'N, 84°48'W, *Hammel & Trainer* 13830 (MO). GUATEMALA. ESCUINTLA: Escuintla-Sta. Lucía Cotz, *Standley* 63469 (F). RETALHULEU: Ajaxa, *Standley* 88227 (F); W of Retalhuleu, *Standley* 87499, 88391 (F). SACATEPÉQUEZ: Las Lajas, *Standley* 58294 (F). SAN MARCOS: La Trinidad, *Croat* 40902 (CM, K, MEXU, MO, USCG), 40903 (MO). SANTA ROSA: Cuilapilla, *Standley* 78060 (F); Naranjo, 1,200 m, *Hyde & Lux* 4278 (G, K, NY, US). SUCHITEPÉQUEZ: E of Mazatenango, *Croat* 32786 (MO). HONDURAS. ATLANTIDA: Lancetilla Valley, near Tela, *Standley* 53228 (US). MEXICO. CHIAPAS: Escuintla, *Croat* 43845, 43877 (MO), *Matuda s.n.* (MEXU), 16377 (F, MEXU, MO), 16776 (F, MEXU), 18043 (MEXU, UCLA), 18381 (DS, MEXU, PMA), 18519 (DS, MEXU, UCLA); Finca California—summit of Monte Ovando, *Croat* 47572, 47573 (MO); Guatimoc, *Miranda* 1763 (MEXU). NICARAGUA. JINOTEGA: Las Camelias-La Salvadorá, rd. from Hwy. 3 through La Fundadora, 1,100–1,150 m, 13°05'–06'N, 85°53'–54'W, *Stevens & Grijalva* 15326 (MO); La Palestrina-La Fundadora, rd. from Hwy. 3 through La Fundadora, 1,150–1,250 m, 13°03'–04'N, 85°54'W, *Stevens & Grijalva* 15325 (MO). MATAGALPA: Quebrada El Quebradón, Macizos de Peñas Blancas, WNW of Hacienda San Martín, 1,400–1,600 m, 13°15'N, 85°39'W, *Stevens et al.* 21219 (MO). MATAGALPA-JINOTEGA: Quebrada El Quebradón, Macizos de Peñas Blancas, N of Hacienda San Martín, 950–1,400 m, 13°14'–15'N, 85°39'W, *Stevens & Riviere* 20892-b, 21035 (MO). RÍO

SAN JUAN: San Juan del Norte, *Smith 87* (MO). ZELAYA: Cerro El Inocente, S slope, *Stevens 6793* (MO). PANAMA: WITHOUT LOCALITY: *Duke 11427* (OS). CANAL AREA: Balboa, *Standley 28564* (MO); Gatún, hills W of Canal, *Standley 27210* (US); Culebra, *Gaillard 2698* (US); Frijoles, *Pittier 2679* (US); Gorgona-Gatún, *Pittier 2278* (US); Las Cascadas, *Dodge & Hunter 8651*, *8659a*, *8662* (MO); Obispo, *Standley 31719* (US); Salamanca Hydrographic Station, *Dodge et al. s.n.* (MO); Summit Gardens, *Croat 10281* (MO), *32983* (M, MICH, MO, RSA, TEX); Ancón Hill, Orchid Garden, *Bartlett & Lasser 16609* (MICH, MO); Barro Colorado Island, *Bailey & Bailey 72* (BH), *Croat 4231*, *4554*, *6511*, *7292*, *8495*, *8512*, *9534*, *11325* (MO), *7920*, *10195* (MO, PMA), *Ebinger 181* (MO), *Shattuck 638* (MO); Gatún Lake, *Standley 31343* (US); Madden Dam, Azote Caballo Road, *Dodge 16579* (MO); Quebrada Ancha, *Steyermark & Allen s.n.* (MO); Río Casaya headwaters, E of Gamboa, *Nee 9024* (MO); Río Indio de Gatún, *Pittier 2801* (US). CHIRIQUÍ: SW of Portobelo, *Liesner 1075* (MO, US); mining rd. above San Félix, 18–27 mi. off Panamerican Hwy. (above Chami), 1,200–1,500 m, *Croat 33085* (B, C, K, MBM, MO, US); Cerro Colorado, *Antonio 1527* (MO), *Croat 33498* (MO, UCLA); Puerto Armuelles region, W of Puerto Armuelles, San Bartolo Limite, *Busey 593* (MO). COLÓN: Portobelo Region, Río Guanche, 1–4 km S of Portobelo hwy., 0–50 m, 9°30'N, 79°40'W, *Knapp & Schmalzer 3598* (MO), *Knapp et al. 4609* (MO); Río Boquerón, E of Salamanca, 50 m, 9°35'N, 79°32'W, *Knapp et al. 5826* (MO, B). DARIÉN: line CC, *Duke 5235* (MO); NE of Jaqué, *Sytso & D'Arcy 3433* (K, MO); Cerro Sapo, Río San Antonio at base of cerro, 5 km S of Garachiné, 130 m, 7°59'N, 78°25'W, *Hammel et al. 14802* (MO), *14811* (M, MO); Cerro Tacarcuna, S slope, *Gentry & Mori 13892* (MO); Serranía de Pirre, *Croat 37751* (MO). PANAMÁ: S of Alcalde Díaz, *Nee 8566* (MO); Alajuela, *Pittier 2344* (US); Torti Arriba, *Folsom et al. 6584* (MO); Cerro Brewster, SW of mountain, *Lewis et al. 3475* (MO); Río Majé, *Croat 34441* (MO), *34600* (F, K, MO, US); Serranía de Majé, *Folsom & Collins 1701* (MO); confluence of Río Ambroino and Río Ipeti, 100 m, 8°57'N, 79°32'W, *Churchill & de Nevers 4479* (MO); Parque Nacional del Darién, ridge between Río Topalisa and Río Pucuro, ca. 13 km E of Pucuro, 8°03'N, 77°20'W, 450–600 m, *Hammel et al. 16193* (MO).

Anthurium santiagoense Croat, sp. nov. TYPE:

Ecuador. Morona-Santiago: Proveduria, confluence of Río Bomboiza and Río Zamora, 600 m, 3°25'S, 78°27'W, *Palacios 1492* (holotype, MO 3420759; isotypes, NY, QAME). Figure 283.

Planta terrestris; internodia brevia, 1.5–2 cm diam.; cataphyllum findens in fibras lineares tenues; petiolus 24.5–27 cm longus, 1–1.2 cm diam., triangularis; lamina late elliptica ad oblongo-elliptica, 75–97 cm longa, 21.5–29 cm lata; pedunculus 20–48 cm longus, 5–11 mm diam., stipes 1–3 mm longus; spadix atropurpureus, cylindricus, 6.5–7 cm longus, 5–6 mm diam.

Description based on dried material only. Terrestrial; stem 1.5–2 cm diam.; roots few, pale grayish, pubescent, elongate, to 4 mm diam.; cataphylls probably coriaceous, 10–13.5 cm long,

acute at apex, yellow-green, persisting as fine, pale, linear fibers; petioles 24.5–27 cm long, 1–1.2 mm diam., triangular, flattened to broadly sulcate adaxially, the margins acute, acutely angled abaxially; blades subcoriaceous, ± broadly elliptic to oblongo-elliptic, abruptly acuminate to long-acuminate at apex (the acumen 15–20 mm long), narrowly acute at base, 75–97 cm long, 21.5–29 cm wide, broadest just above the middle, matte to weakly glossy, greenish; midrib prominently raised above, higher than broad and paler than surface below; primary lateral veins 25–33 per side, departing midrib at 60–75° angle, straight-ascending to the collective vein, slightly raised above and below, slightly paler than surface below; interprimary veins almost as conspicuous as primary lateral veins, drying raised above and below; tertiary veins visible when dried, raised; collective vein arising from near the base, drying raised above and below, equally as prominent as primary lateral veins, 7–20 mm from margin. *Inflorescences* with peduncle 20–48 cm long, 5–11 mm diam., drying greenish; spathe reflexed, subcoriaceous, green, broadly lanceolate, 7–8 cm long, 1.8–2.6 cm wide, broadest near the base, abruptly acuminate at apex, 4 mm long; stipe 7–17 mm long in front, 1–3 mm long in back; spadix deep purple, cylindroid, erect, sometimes slightly curved, 6.5–7 cm long, 5–6 mm diam. midway; flowers ± square, 1.5–2.1 mm in both directions; 7–10 flowers visible in principal spiral, 6–7 in alternate spiral; lateral tepals 0.9–1.2 mm wide, the inner margins ± straight, the outer margins 2-sided; pistils somewhat exserted; stigma ellipsoid, 0.3 mm long, droplets drying as abundant crystals and persisting; stamens emerging well above tepals; filaments translucent, flattened, 0.7 mm wide; anthers yellow, 0.4–0.5 mm long, 0.6 mm wide; thecae oblong, 0.2–0.3 mm wide, slightly divaricate; pollen fading to tan. *Infructescence* not seen.

A member of series *Multinervia*, *Anthurium santiagoense* is endemic to Ecuador, where it is known from the Río Santiago watershed (hence the name) in the Serranía de Cutucú and in Morona-Santiago Province at 600 to 1,830 m, in premontane moist and tropical moist forest life zones.

This species is characterized by its large, unusually broadly elliptic leaf blades which dry green and have numerous primary lateral veins, its relatively long, more or less triangular petioles, and its deep purple, cylindroid spadix. Characteristic also are the exserted stamens and yellow anthers.

Anthurium santiagoense is readily recognizable and not likely to be confused with any other species. The only other member of series *Multinervia* on