

quadrangular petiole, a cylindroid-tapered spadix, and pale yellow or orange berries.

This species is also similar to, and may be most closely related to, *A. acutifolium*, which differs in being terrestrial or epilithic and in having a long-tapered spadix and greenish yellow berries.

COSTA RICA, WITHOUT LOCALITY: *Taylor* 11593 (NY). ALAJUELA: W of La Marina, *Molina et al.* 17329 (NY, US); between Naranjo and Aguas Zarcas, NE of Quesada, *Croat* 46949 (MO); Zapote, *Taylor* 18163 (NY); NW of Zarcerio, Finca Los Ensayos, *Croat* 43615 (MO); 22 km NE of Quesada by air, 4 km W of Muella San Carlos, 10°28'N, 84°30'W, *Liesner* 14173, 14174 (MO); 4 km SE of Fortuna, then 2.5 km SW on jeep road, 400–500 m, 20°29'N, 84°43'W, *Liesner et al.* 15203 (MO); San Carlos along Río Peñas Blancas, *Haber & Bello* 1754 (MO); Cañas-Upala Road, 2–4 km N of Bijagua, 400–600 m, *Almeda & Nakai* 4043 (MO), *Burger & Baker* 9857 (DUKE, F, MO, NY), *Croat* 36264 (MO), *Wilbur* 20094 (DUKE); 13.8 km N of Bijagua, 100–150 m, *Croat* 36423 (MO); Bijagua, *Uteley & Uteley* 3907 (DUKE, MO); Río Zapote, 1.8–2.7 km S of Río Canalete, 100 m, *Croat* 36383 (MO); Miravalle, above Bijagua, 850 m, *Gomez et al.* 19065 (MO). GUANACASTE: Río Las Flores, Quebrada Desprendimiento—Quebrada Sanguijuela, Hacienda Montezuma, 450 m, *Grayum et al.* 4878 (CM, CR, MO, NY); Santa María National Park, 600 m, 10°37'N, 85°17'W, *Liesner* 5072 (MO). HEREDIA: E of Río Sarapiquí, Tirimbina, 150–250 m, 10°24'N, 84°7'W, *Burger & Burger* 8090 (F, MO), *Proctor* 32168 (LL, MO); N of Quebrada Tigre, NE of Finca El Plástico, 8 km SW of Las Horquetas, 450–550 m, 10°18'N, 84°02'W, *Grayum & Sleeper* 6527 (MO); Río Peje—Río Sardinalito, Atlantic slope of Volcán Barva, 700–750 m, 10°17.5'N, 84°04.5'W, *Grayum & Jermy* 6786 (MO); Finca La Selva, OTS Field Station on Río Puerto Viejo, just E of its junction with Río Sarapiquí, 100 m, *Almeda et al.* 5101 (CAS), *Croat* 44304 (MO), *Hammel* 11627 (MO), *Jacobs* 2087, 2337, 2469 (DUKE); 50 m, *Lesica & Antibus* 4134 (MO), *Dowell* 132, 399 (MO), 750 (DUKE, MO), *Sperry* 622 (MO), *Wilbur* 37240, 37624, 37730 (DUKE), *Wilbur & Jacobs* 34205, 34963 (DUKE); Puerto Viejo Region, Río Sucio, 20 m, *Croat* 35671, 35695 (MO); Puerto Viejo, *Burger & Stolze* 5934 (PMA), *Garwood et al.* 883 (BM, MO), *Taylor* 4571 (NY); 4.5 km SE of bridge at Puerto Viejo, 50 m, 10°26'N, 83°58'W, *Stevens* 13494 (MO); San José-Puerto Viejo, vic. Chilamente, 11.6 mi. N of Cariblanco, 10°27'N, 84°05'W, 100 m, *Croat* 68360 (MO). LIMÓN: Cahuita-Limón, 0–10 m, 9°44'N, 83°2'W, *Baker & Burger* 151 (BM, CAS, CM, F, MO, US); Finca Castilla, 30 m, *Dodge & Goerger s.n.* (MO); 29 air km W of Tortuguero, Hacienda Tapezco and Hacienda La Suerte, 40 m, 10°30'N, 83°47'W, *Davidson et al.* 6723, 6768 (MO), *Davidson & Donahue* 8413, 8461, 8733 (MO); Parque Tortuguero, 40 m, 10°10'N, 83°34'W, *Robles* 1159, 1233 (MO); 10–80 m, 10°31'N, 83°01'W, 1518 (MO); between Barra del Colorado and ocean beach, 0–2 m, 10°47'N, 83°35'W, *Stevens* 24138A (MO); hills 2 air km SSE of Islas Buena Vista in Río Colorado, 14 air km SW of Barra del Colorado, 10–120 m, 10°40'N, 83°40'W, *Davide & Herrera* 31058 (MO, U); Cerro Coronel, E of Laguna Danto, 20–170 m, 10°41'N, 83°38'W, *Stevens* 23654 (MO); Río Colorado, 2 km upstream from downstream branch of Caño Bravo, 5 m,

10°43'N, 83°40'W, *Stevens* 24032 (MO). NICARAGUA: CHONTALES: 4 km NW of Santo Domingo, 280 m, 12°17'N, 85°6'N, *Grijalva et al.* 3811 (MO). GRANADA: N of Mombacho, San José, 700–800 m, 11°49'N, 85°58'W, *Sandino* 2508 (MO). MATAGALPA: NE side of Cerro Peñas Blancas, Matagalpa—Waslala, *Grijalva & Moreno* 3461 (MO). RÍO SAN JUAN: 20 km NE of El Castillo, Río Indio watershed, 200 m, *Neill* 3421 (MO); 3 km from confluence of Río San Juan and Río Sábalos, Sábalos, 40–50 m, *Araguistain* 3229 (MO); 2 km NW of Sábalos, 70 m, 11°2'N, 84°29'W, *Moreno* 23281 (MO); 2 km W of Santa Edulviges, Río Sábalos, 70–80 m, 11°3'N, 84°29'W, *Moreno* 23017, 23037 (MO); Caño Chontaleño, 20 km NE of El Castillo, 200 m, *Neill* 3332, 3376, 3420 (MO), *Neill & Vincelli* 3488 (MO, TEX), 3622 (MO); Cerro El Gigante, Castillito—Caño de Oro, 10 m, 10°43–44'N, 84°54'30" W, *Martínez* 2167 (MEXU); Río Santa Cruz at confluence with Río San Juan, 42 m, 11°2'N, 84°24'W, *Moreno* 25532 (MO). ZELAYA: 6.3 km S of bridge at Colonia Yolaina, SW of Colonia Naciones Unidas, 200–300 m, 11°36'N, 84°22'W, *Miller & Sandino* 1100 (MO); *Stevens* 4819, 4826, 6411, 6412 (MO); 1.3 km SE of intersection with road Nueva Guinea—Colonia Verdún, road to Colonia Yolaina, Colonia La Esperanza, 180–200 m, 11°40'N, 84°26'W, *Stevens* 6308 (MO); road to Colonia Yolaina and Colonia La Esperanza, 180–200 m, *Vincelli* 166, 168 (MO); 1.5 km SE of Estación Experimental "El Recreo," *Soza et al.* 448 (MO); Colonia Yolaina, Nueva Guinea, 300 m, 11°38'N, 84°21'W, *Araguistain* 3126 (MO); 1 km N of El Zapote, 6 km S of Colonia Verdún, 250–300 m, 11°34'N, 84°24'W, *Nee & Vega* 27907 (MO); Bluefields, N of Base Camp, *Proctor et al.* 26913, 27010 (LL, MICH, NY, US); Caño Costa Riquita, 1.8 km SW of Colonia Naciones Unidas, 150–180 m, 11°43'N, 84°18'W, *Stevens* 4966, 5058 (MO); Caño Monte Cristo, 10 m, 11°33'N, 87°48'W, *Moreno & Sandino* 14704 (MO); Cerro Las Nubes, 10–60 m, 11°37'N, 83°52'W, *Moreno* 14975 (MO); Las Faldas, 40–60 m, 11°36'N, 83°51'W, *Moreno* 14811 (MO); German Pomares—Las Benitas, 100 m, 11°36'N, 83°51'W, *Moreno & Sandino* 14878, 14923 (MO); 1 km before German Pomares, 10 m, 11°35'N, 83°51'W, *Moreno* 14840 (MO); Caño Monte Cristo and Caño El Consuelo confluence, 10 m, 11°35'N, 83°51'W, *Moreno* 15033 (MO); Quebrada La Talolina, 170 m, 11°51–52'N, 84°26–27'W, *Miller & Sandino* 1176, 1178 (MO); Río Punta Gorda, Atlanta, "La Richard," 20–30 m, 11°32'N, 84°5'W, *Moreno & Sandino* 12967, 13008, 13114 (MO); Atlanta, "La Richard," Loma San Jorge, 150–160 m, 11°31'N, 84°4'W, *Moreno & Sandino* 13041 (MO); Río Rama, Caño Zamora, 10 m, 11°57'N, 84°16'W, *Stevens* 8861 (MO); Salto La Oropendola, 15–25 m, 11°57'N, 84°17'W, *Stevens* 8954 (MO). PANAMA: COLÓN: between Portobelo and Madre de Dios, 1.2 mi. beyond junction to Isla Grande, 9°40'N, 79°35'W, *Croat* 49812 (MO). VERAGUAS: Santa Fe Region, Cerro Tute, vic. Escuela Agrícola Alto Piedra, 600–1,400 m, 8°30–32'N, 81°07'W, *Knapp & Kress* 4357 (B, MO), *Knapp & Dressler* 5435 (B, MO), *McPherson* 10722 (MO).

#### *Anthurium coriaceum* G. Don in Sweet, Hort. Brit. ed. 3. 633. 1839. Figures 97, 98, 102.

*Pothos coriacea* Graham, Edinb. Phil. J. 14: 353. 1826, non Salisb. (1796). TYPE: Brazil. Río de Janeiro: *Harris s.n.* (cult. Kew).

*Anthurium coriaceum* [Endlicher, Gen. Pl. 240. 1837, comb. not made under ICBN Art. 33.1] G. Don in Sweet, Hort. Brit. ed. 3. 633. 1839.

*Anthurium glaucum* Schott, Wiener Z. Kunst 1829(3): 828. 1829, nomen nudum.

*Anthurium glaucescens* Kunth, Enum. Pl. 3: 73. 1841. TYPE: Origin unknown (type not designated).

*Pothos glaucus* Schott ex Kunth, Enum. Pl. 3: 73. 1841, invalidly published in synonymy.

*Pothos subcaulescens* Vell. Conc., Fl. Flum. Archivos do Mus. Nac. 390. 1881. TYPE: Brazil. exact location unknown. Plate 122 in Flora Fluminensis 1825 [1829] serves as the type.

*Anthurium rubriflorum* Engl., Bot. Jahrb. Syst. 25: 399. 1898. TYPE: Brazil. Rio de Janeiro: Gavea, Glaziou 71 (cult. Berlin) (holotype, B).

*Anthurium subcaulescens* (Vell. Conc.) Stelfeld, Arq. Mus. Paran. 8: 177. 1950.

Terrestrial or epilithic, sometimes epiphytic; stem less than 20 cm long, 1.5–3.5 cm diam.; roots mostly descending, to 5 mm diam.; cataphylls coriaceous, unribbed, broadly lanceolate, 12–14 cm long, acute to obtuse at apex, drying straw-colored, becoming brown toward base, persisting semi-intact. Leaves erect-spreading; petioles (3)19–60 cm long, (4)10–15 mm diam., terete, sometimes obtusely flattened adaxially, the surface sometimes pale-speckled; geniculum moderately thicker and paler than petiole, 1–2.5 cm long; sheath 4–5.5 cm long; blades coriaceous, broadly elliptic to somewhat oblong, sometimes somewhat lanceolate or oblanceolate, acute to rounded and minutely apiculate at apex, acute to obtuse or rounded (rarely shallowly cordate) at base, (35)60–110 cm long, (6)15–28(39) cm wide, broadest usually above the middle, the margins moderately undulate; upper surface matte to weakly glossy, medium green, lower surface semiglossy, slightly paler; midrib above flat to broadly convex at base, becoming convexly to acutely raised toward apex, prominently convex below; primary lateral veins numerous, departing midrib at (40)50–70(80)° angle, straight to slightly arcuate to the collective vein, weakly sunken to weakly raised and obscure above, similar but more visible below, raised above and below when dried; interprimary veins almost as conspicuous as primary lateral veins; tertiary veins prominent above and below on drying; collective vein arising near the base, equally as prominent as primary lateral veins, 5–20(30) mm from margin. Inflorescences erect; peduncle 11–44 cm long, (3)5–9 mm diam., (0.2)0.5–1.7(3.6)× as long as petiole, terete; spathe erect, coriaceous, green, broadly lanceolate-elliptic, (7.5)10–24 cm long, (1.7)2.5–4.3 cm wide, broadest near the base, acute to acuminate at apex, acute at base; spadix pale purplish to maroon, sessile, tapered, erect, straight to slightly curved,

10–31 cm long, 8–12 mm diam. midway, 4–5 mm diam. near apex; flowers rhombic, 2.5–3.1 mm long, 1.8–2 mm wide, the sides straight to weakly sigmoid; 13–23 flowers visible in principal spiral, 8–14 in alternate spiral; tepals matte, smooth; lateral tepals 1.6–2 mm wide, the outer margins 2-sided, the inner margins rounded; stigma oblong-ellipsoid, 0.5 mm long, depressed medially; anthers 0.5–0.7 mm long, 0.6–0.7 mm wide, inclined over and obscuring pistil; thecae ovoid-oblong, slightly or not divaricate; pollen pale yellow on drying. Inflorescence erect; spathe persisting; spadix to 18 cm long, 2 cm diam., with the berries scattered throughout; berries dirty white to pale lavender, greenish at apex, obovoid-oblong, truncate at apex, 7 mm long, 5 mm diam., the pericarp with raphide cells; seeds 2 per berry, ovoid-ellipsoid, 4.5–5 mm long, 3–3.5 mm wide, 1.7–2 mm thick, flattened on one side, oblique and with a short, hooked appendage at apex.

*Anthurium coriaceum* is endemic to coastal southeastern Brazil, ranging from central Espírito Santo to Guanabara with a single outlying collection on Dos Corais Islands off the coast of Paraná State. It is expected in some of the few remaining natural areas along the coast between Rio de Janeiro and Paraná states. The species occurs terrestrially, or on rocks, less often epiphytically, in dry areas on windward slopes below 500 m.

This species is readily distinguished by its large, coriaceous, green-drying, more or less matte leaf blades with numerous primary lateral veins that are as conspicuous as the interprimary veins, and a collective vein which arises from near the base and is remote from the margin. The peduncle may be shorter or slightly longer than the petioles.

*Anthurium coriaceum* is not closely related to or confused with any other species. In some respects (especially venation), it is like members of sect. *Urospadix*, which are especially common in this part of Brazil, but has involute vernation and thus shows its affinity with sect. *Pachyneurium*.

BRAZIL, WITHOUT LOCALITY: Glaziou 71 (B (cult. Berlin)), 15575, 16519 (C), s.n. (F, US), Warming s.n. (C), Widgren 1081 (S), Lassen s.n. (C). ESPÍRITO SANTO: along Hwy. BR-259 between Colatina and Vitória, at km 38.5 from junction of BR-259 and BR-101, 14.2 km E of Colatina, 19°33'S, 40°36'W, 160 m, Croat 61907 (MO, R); Domingos Martins, Fazenda Kautsky, 550–860 m, Croat 61815 (R). GUANABARA: Barra da Tijuca, Pabst & Klein 5228 (B); Gavea, Ule 4872 (HBG). PARANÁ: Ilha dos Corais, Hatschbach 32538 (MO, NY). RIO DE JANEIRO: without locality, Glaziou 17335 (K); Pão de Açúcar, Costão, 200 m, Caraúta 429 (GUA), Casari & Vilaca 105 (GUA); Leme, Morro do Leme, Kennedy 838 (F); Mpo. Niteroi, Alto Moinas, Praia de Itaipucu, 100–250

m, 22°53'S, 43°07'W, Croat 53757 (CM, K, MO, NY, RSA), 53781 (MO); Itaipu, Morro das Andorinhas, *Arraújo & Vilaca* 3847 (GUA); Represa do Camorim, *Arraújo* 3751 (GUA); road to Represa do Camorim, Estrada da Boca do Mato, Vergem Grande, *Rocha* 151 (GUA); Cabo Frio, Arraial do Cabo, Pontal beach, *Segadas-Viana et al.* 665 (NY). SÃO PAULO: cultivated at Floricultura Campina Hda., *Hutchison* 8850 (MO).

**Anthurium cotobrusii** Croat & R. A. Baker, *Brenesia* 16(Suppl. 1): 43. 1979. TYPE: Panama. Chiriquí: above San Félix, along mining road, 18–27 mi off Pan-Am Hwy., 1,200–1,500 m, Croat 33058 (holotype, MO 2381190-91; isotypes, AAU, B, CAS, CM, COL, CR, DUKE, F, GH, K, L, M, MBM, MEXU, NY, P, PMA, RSA, SEL, US, W). Figures 107, 108.

Terrestrial or often epilithic; stem usually less than 15 cm long, 1–3 cm diam.; roots descending, greenish or grayish brown, smooth to weakly pubescent, moderately thick and elongate, to 6 mm diam.; cataphylls subcoriaceous, lanceolate, 4.5–11 cm long, acute at apex, green, sometimes tinged with purplish, drying light brown, persisting semi-intact, eventually as fine linear fibers. Leaves erect to spreading; petioles 15–65 cm long, 4–7 mm diam., ± terete, weakly sulcate to flattened adaxially, rounded abaxially; geniculum thicker than petiole, (1)3–5 cm long; blades subcoriaceous, narrowly ovate to triangular, long-acuminate at apex (the acumen downturned, weakly apiculate), shallowly and broadly cordate at base, 16–65 cm long, 9.5–33 cm wide, broadest at base, the margins weakly undulate; anterior lobe (13)18–30(37) cm long, the posterior lobes (5)7–13(15) cm long, directed upward and slightly inward, narrowly rounded at apex; sinus arcuate to broadly parabolic when flattened, hippocrepiform when not, (4)7–9 cm deep; upper surface semiglossy, dark to medium green, lower surface glossy to semiglossy, conspicuously paler, both drying matte to weakly glossy, yellowish green; midrib obtusely raised at base, becoming more sharply raised and then sunken at apex above, obtusely to convexly raised and more prominent below; basal veins 3–5 pairs, all free to base or 3rd–4th coalesced 4–6 cm, weakly raised to flat above, weakly raised and darker than surface below; posterior rib naked, gradually curved to almost straight, turned up on outer margin; primary lateral veins 4–8 per side, departing midrib at 50–60° angle, broadly arcuate, sharply to weakly raised or weakly sunken above, weakly raised to flat and darker than surface below; interprimary veins obscure above, flat and darker than surface

below; tertiary veins obscure above, weakly visible below; reticulate veins obscure above and below; collective vein arising from one of the uppermost basal veins or one of the lowermost primary lateral veins, sunken above, slightly raised and darker than surface below, almost as prominent as primary lateral veins, 3–8 mm from margin. Inflorescences erect-spreading; peduncle (4)20–60 cm long, 4–10 mm diam., (0.7)1–1.7× as long as petiole, terete; spathe reflexed, subcoriaceous, green to pale green or green with purplish veins or heavily suffused with purple on inner surface, sometimes tinged with purple only at base, ovate to narrowly ovate, weakly boat-shaped to flat, (2.5)5–15 cm long, (1.7)2.7–4.5 cm wide, inserted at 60–90° angle on peduncle, acuminate at apex (the acumen inrolled), acute to rounded or shallowly cordate at base; stipe 1–2 cm long in front, 2–6 mm long in back; spadix green to brownish green to dark purple-violet, cylindroid to weakly tapered, erect to curved, (2.5)5–25 cm long, 7–15 mm diam. near base, 3–7 mm diam. near apex; flowers ± 4-lobed, 3.5–5 mm long, 3.5–4 mm wide; 3–6 flowers visible in principal spiral, 7–10 in alternate spiral; tepals sparsely punctate, more densely so near the margins, semiglossy to matte, the inner margins broadly convex; pistils emergent, matte, green; stigma linear, purple-violet or green, ca. 0.6 mm long, with brushlike papillae; droplets appearing 1–3 weeks before stamens emerge, sometimes persisting when 1st and 2nd stamens are opening; stamens weakly exserted, in a tight cluster above pistil; filaments whitish, soon retracting, 0.4 mm long, 1 mm wide; anthers orange to yellowish, 0.6–0.9 mm long, 1 mm wide; pollen pale orange fading to white, yeasty-scented. Inflorescence erect spreading; spathe persisting; spadix 12–18 cm long, 1.5–2 cm diam.; berries pale orange (B & K yellow-red 8/7.5), obovoid, darker and rounded at apex with radial ridges, 12–15 mm long, 8–11 mm diam.; mesocarp juicy, orange; seeds usually 2 per berry, oblong-ellipsoid, 6.5–7.5 mm long, 2.5–4 mm diam., encased in flattened, translucent envelope that projects up to 3 mm beyond the apex of the seed and up to 1 mm beyond the lateral margins.

*Anthurium cotobrusii* is found in Costa Rica and Panama, in premontane wet forest at elevations of 600 to 1,850 m.

This species is most easily distinguished by its subcoriaceous leaves which have more or less obscure reticulate veins when dried, and by its prominently tapered, violet-purple spadix with stamens in tight clusters. In the dried state the flowers have