

20 per side, departing midrib at (45)70–90° angle, \pm straight, convexly raised above, more prominently so below; interprimary veins few, almost as conspicuous as primary lateral veins; tertiary veins flat to sunken above, weakly raised below; collective vein arising from near the apex, occasionally in the lower third or near the base, flat to scarcely sunken above, weakly raised below, 3–5 mm from margin. *Inflorescences* erect to spreading or pendent; peduncle 23–53(83) cm long, 4–6 mm diam., 1–2(5) \times as long as petiole, green often tinged with maroon, terete; spathe spreading to reflexed, subcoriaceous, olive-green tinged with maroon, oblong-lanceolate, (8)10–26 cm long, (1)1.5–2 cm wide, acuminate at apex (the acumen 5–10 mm long), acute to obtuse at base; spadix violet-purple or green tinged with gray-purple, tapered, sessile or stipitate to 7 mm long in back, (3.7)8–24 cm long, 5–10 mm diam. near base, 3–5 mm diam. near apex; flowers square to 4-lobed, 2–2.7 mm in both directions, the sides straight to jaggedly sigmoid; 5–8 flowers visible in principal spiral, 13–14 in alternate spiral; tepals matte, conspicuously papillate and with droplets; lateral tepals 0.7–1.3 mm wide, the inner margins broadly convex, the outer margins 2–3-sided; pistils emergent at anthesis, densely papillate, green; stigma slitlike to ellipsoid, 0.3–0.4 mm long; stamens emerging in a regular sequence from the base, the laterals preceding the alternates by 3–12 spirals, the 3rd stamen preceding the 4th by 1–3 spirals, held above tepals in a circle around the pistil, sometimes partially inclined over and obscuring it; anthers white tinged with maroon, 0.6–0.8 mm long, 0.5–0.8 mm wide; thecae oblong, 0.3–0.4 mm wide, not at all or somewhat divaricate; pollen purplish violet fading to yellowish cream, sometimes faintly cinnamon-scented. *Infructescence* sessile with spathe persisting; to 41 cm long; spadix 20–25(44) cm long, 2.0–4.5 cm diam., with the berries scattered throughout; berries violet-purple, obovoid, truncate at apex, 4–6 mm long, 3–4 mm diam.; mesocarp mealy; seeds (rehydrated) oblong, ca. 5 mm long, 2 mm diam., adhering very closely to carpel wall throughout adaxial length.

Anthurium caucavallense is known only from the Cauca River Valley (hence the name) or its vicinity in the departments of Antioquia and Valle in Colombia, from 900 to 1,920 m. Terrestrial or epiphytic, it occurs in steep, dry, more or less exposed areas or in the understorey of disturbed forest in the premontane wet forest life zone.

This species is distinguished by its hooked cataphylls, a more or less D-shaped petiole that is

usually 3–5-ribbed abaxially, its primary lateral veins which often spread at a broad angle, by its violet-purple, cylindroid and weakly tapered spadix, and its violet-purple berries.

Anthurium caucavallense is most similar to *A. glaucospadix* in its leaf and petiole shape and habitat. The latter species, however, has straight cataphylls and bluish green, glaucous spadix. Other distinctive differences of *A. glaucospadix* are its obtuse to emarginate leaf apices and its primary lateral veins which always arise at a more acute angle.

Anthurium caucavallense may also be confused with *A. fendleri*, a species widespread in Colombia, but that species differs in its promptly withering spathe, thinner leaves, and early-emergent fruits.

COLOMBIA. Bogotá–San Agustín, *Bogner s.n.* (cultivated) (M). ANTIOQUIA: Mpo. Venecia, 4.2 km E of Bolobolo, road to Venecia, Hacienda La Plata, 920 m, 6°1'N, 75°48'W, *Zarucchi & Echeverry 4656* (B, M, MO); along road between Jerico and Tamesis, ca. 5 mi. NW of Tamesis, 05°42'N, 75°44'W, 1,920 m, *Croat 70035* (MO); along road from Salgar to El Dauró near border with Chocó, 05°59'N, 76°07'W, 1,830 m, *Croat 69896* (MO). VALLE: Calcedonia (bought; said to have been collected locally), *Croat 51984* (COL, DUKE, F, MO, NY, PMA, TEX); Cali–Buenaventura, Km 24, 1,750 m, *Escobar 2770* (HUA); between Loboguerrero and Cisneros, along Quebrada de Los Indios, 3°46'30"N, 76°42'W, 500 m, *Croat 62804* (K, M, MO, NY, US); Cartago–San José del Palmar, 10–15 km W of Ansermanuevo, 900 m, 4°49'N, 76°02'W, *Croat 56729* (CAS, COL, JAUM, K, MO, NY, QCA, US).

***Anthurium colonicum* K. Krause, Bot. Jahrb.**

Syst. 54(Beibl. 118): 123. 1916. TYPE: Panama. Colón: forest around Portobelo, 5–200 m, *Maxon 5801* (holotype, US). Figures 88, 89, 93.

Epiphytic; stem short, 5–7 cm diam.; leaf scars obscured by root mass and cataphylls, 1.5–1.8 cm high, 3.5–4 cm wide; roots moderately numerous, descending, green, smooth, slightly tapered; cataphylls coriaceous, erect, lanceolate, 20–36 cm long, acute to obtuse at apex with a subapical apiculum which appears hooked, green, drying tan (B & K yellow-red 9/10), persisting intact eventually as linear fibers or deciduous. *Leaves* spreading; petioles 26–90 cm long, subterete, narrowly to broadly and bluntly sulcate adaxially, the margins blunt, not raised, rounded abaxially, the surface pale-speckled; geniculum 2–6 cm long; blades coriaceous, ovate-triangular to oblong-ovate, short-acuminate at apex (the acumen to 30 mm long), broadly to deeply subcordate at base, 39–83 cm long,

(9)13–44 cm wide, broadest below the middle, the margins undulate; anterior lobe 38–76 cm long, the posterior lobes (5.5)8–17 cm long, about as broad as long; sinus arcuate, arcuate with blade decurrent on petiole or hippocrepiform in large blades; upper surface weakly glossy to semiglossy, dark green, lower surface semiglossy to glossy, paler; midrib flat to slightly angular-raised at base, gradually becoming acutely to obtusely angular toward the apex above, prominently and convexly raised below; basal veins 2–4 pairs, usually free to base, sometimes coalesced for 1–2.5 cm; posterior rib naked, sharply turned upward on outer margin; primary lateral veins 11–17 per side, departing midrib at 50–65° angle, straight to weakly arcuate, convexly raised near the midrib, becoming sunken toward the margin above, prominently and narrowly raised and paler than surface below; interprimary veins few, weakly sunken to raised above, raised below; tertiary veins obscure or weakly sunken above, weakly raised, darker than surface below; collective vein arising from one of the lowermost primary lateral veins or 1st basal vein, sunken above, raised and darker than surface below, 3–5 mm from margin. *Inflorescences* spreading to pendent; peduncle 15–48 cm long, 6–13 mm diam., 0.5 as long as petiole, terete; spathe strongly reflexed and recurled, markedly undulate, coriaceous, dark green heavily tinged with violet-purple, lanceolate to broadly lanceolate, 10–18.5 cm long, 2.5–6 cm wide, broadest just above the base, inserted at 60–65° angle on peduncle, acuminate at apex (the acumen cuspidate), acute to obtuse at base; stipe to 1 cm long; spadix green tinged with violet-purple, sessile or sometimes stipitate, tapered, (5)15.5–28 cm long, 1.2–3 cm diam., near base, 0.7–1.7 cm diam. near apex; flowers 4-lobed, 2.3–3 mm long, 2.8–3 mm wide, the sides sigmoid; 6–11 flowers visible in principal spiral; tepals matte, punctate; lateral tepals 1.4–1.9 mm wide, the inner margins broadly convex, turned up against pistil; pistils emergent to 1–3 mm, pale green, longer than the stamens at anthesis; stigma linear, ca. 0.5 mm long, droplets appearing ca. 1 week before stamens emerge; stamens emerging from the base, lateral stamens quickly followed by alternates in rapid succession, held above tepals and against pistil; filaments fleshy, transparent, 2–2.5 mm long; anthers 0.9–1.2 mm long; thecae ovoid-ellipsoid, slightly divaricate; pollen white. *Infructescence* pendent; berries orange (B & K yellow-red 8/7.5), narrowly ovoid-ellipsoid, acute at apex, ca. 10 mm long; seeds 2 per berry, pale yellow-green, brownish at apex and base, 4–4.8 mm long, 2.3–2.5 mm diam., enveloped by sticky, amber substance.

Anthurium colonicum is endemic to Panama and ranges from Veraguas to Coclé, Panamá, and Colón provinces (also in San Blas) from near sea level to 1,150 m in tropical wet and premontane rain forest.

This species is distinguished by its relatively elongate, generally subcordate leaf blades and its frequently stubby spadix with exerted stamens, but especially by its sharply pointed, early-emergent pistils, its wavy-margined spathe, and its elongate, sharply pointed, orange berries.

Anthurium colonicum is most closely related to *A. nervatum*, which has similarly veiny leaf blades, a reflexed purplish spathe, and moderately acute orange berries. The latter differs in generally having more numerous (12–30 vs. 7–12) primary lateral veins, but especially by its straight to merely twisted (but not markedly undulate marginally) spathe and its blunt pistils, emerging with the anthers, and moderately flat tepals at anthesis. In addition, the stamens of *A. colonicum* are white to yellowish when fresh, whereas those of *A. nervatum* are orange at anthesis.

PANAMA. COCLÉ: La Pintada–Cocleito, 600 m, 8°45'N, 80°30'W, *Hamilton & Davidge 2854* (MO); Llano Grande–Cocleito: S of Cascajal, Continental Divide, 800–900 m, 8°45'N, 80°25'W, *Knapp 1946* (MO); road to Cocleito, 12 mi. from Llano Grande, 200 m, 8°47'N, 80°28'W, *Churchill et al. 4169* (MO); El Copé Region, Alto Calvario, El Potroso, *Folsom & Collins 1541* (MO); Alto Calvario, 900 m, *Folsom 2493* (MO); N of Alto Calvario, N of El Copé, Limón, 800–1,000 m, *Folsom 5820* (MO); El Valle Region, Cerro Gaital, N of El Valle, La Mesa, 800–900 m, 8°40'N, 80°7'W, *Knapp & Dressler 4912* (MO); El Valle de Antón, N of Cerro Gaital, La Mesa, 800 m, *Hammel 3868* (MO); 900–1,000 m, *Croat 67235* (MO). COLÓN: Portobelo Region, 5–200 m, *Maxon 5801* (US); Río Guaniche, above bridge on Portobelo Road, 3–7 km above bridge, 50–230 m, *Croat 36943* (MO); *Davide & D'Arcy 10077* (MO); *Hammel et al. 4901*, 4925 (MO); 2 mi. E of Portobelo, Nuevo Tonosí, 100 m, *Croat 33519* (B, K, MO, NY, PMA, RSA, US); Portobelo–Nombre de Dios, Río Cascajal, 0–50 m, 9°33'N, 79°38'W, *Croat 49786* (MO); 1.2 mi. beyond junction of road to Isla Grande, 9°40'N, 79°35'W, *Croat 49812* (MO); Portobelo–Nombre de Dios, Río Indio, 50 m, *Croat 33602* (B, BM, F, M, MO, PMA, US), *Croat 33640* (MO). PANAMA: Cerro Jefe, Campo Tres, 700 m, *Croat 27096* (MO); El Llano–Cartí Road, 6.8–12 km from Pan-Am Hwy., 330–450 m, *Croat 25096A* (B, F, K, MO, NY, PMA, S, SEL, TEX, US, VEN), 25174, 33760, 49114 (CAS, MO), 67344 (MO), *Mori & Kallunki 2285* (MO), *Nee et al. 8757* (MO), *Sytma 1724* (MO, PMA); 10 mi. from Interamerican Hwy., 350 m, *Croat 33822* (MO, PMA); San Blas, 19.1 km from Interamerican Hwy., 350 m, 9°19'N, 78°55'W, *de Nevers 4976* (MO, PMA). VERAGUAS: Santa Fe Region, Cerro Tute, near Escuela Agrícola Alto Piedra, 1,070 m, *Antonio 1984* (MO); Río Santa María, N of school, 600–750 m, *Knapp & Dressler 5388* (MO); 15 km past school, Río Caloveborita headwaters, 500 m, *Sytma & Andersson 4762* (MO); Río

Tercero Brazo, 11 km beyond Santa Fe, 650 m, *Croat* 25613 (MO); Río Dos Bocas, 11 km from school, 450 m, *Croat* 27544 (F, MO).

***Anthurium concolor* K. Krause, Notizbl. Bot.**

Gart. Berlin-Dahlem 11: 606. 1932. TYPE: Panama. Colón: Río Indio de Gatun, 0–300 m, *Pittier* 2798 (holotype, US). Figures 90, 94–96.

Epiphytic or epilithic; stem to ca. 25 cm long, ca. 2.5 cm diam.; roots dense, spreading to erect-ascending, pale greenish white, ca. 4 cm long, 3–5 mm diam.; cataphylls narrowly coriaceous to subcoriaceous to nearly membranous, lanceolate, sometimes hooked in the upper part, weakly 1-ribbed near apex, 11–18 cm long, acuminate at apex with a subapical apiculum ca. 6 mm long at apex, drying dark brown to reddish brown (B & K yellow-red 3/10), persisting \pm intact, ultimately deciduous. *Leaves* erect; petioles (2)8–16 cm long, 10–15 mm diam., erect, D-shaped to \pm quadrangular, shallowly sulcate adaxially, with thin, erect margins, prominently and unevenly 3–8-ribbed abaxially; geniculum somewhat thicker and slightly paler than petiole, 1–2 cm long; blades coriaceous to subcoriaceous, usually oblanceolate to \pm elliptic, sometimes narrowly obovate, acute at apex, narrowly acute to narrowly rounded (less often rounded-subtruncate) at base, (30)40–110 cm long, (13)18–36 cm wide, broadest above the middle, the margins moderately undulate; both surfaces semiglossy, upper surface medium green (B & K yellow-green 6/7.5), drying greenish to grayish brown; lower surface moderately to conspicuously paler greenish to reddish brown (B & K yellow-green 7/10); midrib flat with medial rib at base, becoming broadly acute toward the apex below, drying reddish brown; primary lateral veins 10–17 per side, departing midrib at 50–65° angle, ascending \pm straight or slightly arcuate to near the margin, prominently and convexly raised above, less so below; tertiary veins scarcely visible above, slightly darker than surface below, prominulous and raised on both surfaces when dried; reticulate veins not visible below when fresh, weakly visible when dried; collective vein arising from near the apex, less prominent than primary lateral veins, 5–10 mm from margin. *Inflorescences* arching-erect to spreading; peduncle 30–75 cm long, 5–9 mm diam., 2–4.4(11) \times as long as petiole, green, sometimes purple-speckled, usually subterete, sometimes 1-ribbed; spathe reflexed, subcoriaceous, green tinged with violet-purple, narrowly oblong-ovate or oblong-elliptic 5.5–14 cm long,

1.4–3.5 cm wide, inserted at 10–70° angle on peduncle, gradually to abruptly acuminate at apex, acute to obtuse at base; spadix dark purple-violet (B & K red-purple 2/5), sometimes green tinged purple-violet, sessile or subsessile, subcylindroid or weakly tapered, 5.5–16 cm long, 7–9(12) mm diam. near base, 5–7(9) mm diam. near apex; flowers rhombic, 2–3.3 mm long, 2.4–3.5 mm wide, the sides \pm straight parallel to spiral, sigmoid perpendicular to spiral; 5–9 flowers visible in principal spiral, (3)6–10 in alternate spiral; tepals matte to semiglossy weakly to conspicuously and densely punctate, forming large nectar droplets on surface at anthesis; lateral tepals 2–2.3 mm wide, the inner margins straight; pistils weakly emergent, green tinged with violet-purple; stigma broadly ellipsoid, 0.5–0.6 mm long, brushlike, droplets appearing 5–8 days before stamens emerge; stamens emerging rapidly in a scattered pattern throughout, sometimes those at apex emerging first, held barely above level of the tepals, sometimes erect when dried; anthers purplish brown to purple-violet, 0.8–1 mm long, 0.8–1.1 mm wide, in a tight cluster obscuring pistil; thecae oblong-ellipsoid, \pm divaricate; pollen purplish (B & K purple 6/10). *Inflorescence* pendent; spathe persisting at least in early fruit; spadix to 30 cm long, 2.5 cm diam.; berries red, obovoid, 7–8 mm long, ca. 5 mm diam.; pericarp with numerous raphide cells; mesocarp transparent, gelatinous; seeds 2 per berry, white, oblong-ellipsoid, ca. 4 mm long, ca. 1.3 mm diam.

Anthurium concolor ranges from central Panama on the Atlantic slope to northern Colombia (Chocó) from sea level to 100 m in tropical wet forest and wetter parts of tropical moist forest. It is to be expected in Costa Rica in Limón Province.

This species is distinguished by its short, cylindrical, violet-purple spadix held erect at anthesis, by its tendency to form globular droplets on the tepals, by its purplish pollen, its bright red berries, and by the petioles, which are broadly sulcate adaxially and usually prominently several-ribbed abaxially.

Anthurium concolor is apparently not closely related to any other species, but has been confused with *A. salviniae* due to similarities in leaves and habit. *Anthurium salviniae* can be readily distinguished by its long-tapered, pale lavender spadix. Because of its similar leaf and petiole shape, *A. concolor* might also be confused with *A. upalaense*, but that species has a long-tapered, green spadix, a longer, recurled spathe, and orange rather than purple anthers.