

mm long, 0.4–0.5 mm wide; thecae ovate, slightly or prominently divaricate.

*Anthurium asplundii* is endemic to coastal Ecuador in Esmeraldas, Los Ríos, and Pichincha provinces, where it occurs from near sea level to 400 m in tropical dry, tropical moist, and premontane wet forest life zones.

This species is distinguished by its short petioles, its large, oblanceolate leaf blades which are frequently rounded to subcordate at the base and often dry green (sometimes yellowish brown), and by its purple to maroon, often stipitate spadix.

Though sometimes terrestrial, this species is usually epiphytic and in coastal Ecuador can only be confused with *A. barclayanum*. The latter occurs further to the south in mostly drier life zones, and the more narrowly oblanceolate leaves are held in an open rosette, whereas in *A. asplundii* they may overlap in the lower portion and form a tight "bird's nest" rosette. In addition, the blades of *A. barclayanum* are usually strongly undulate, much more so than in the present species, and the cataphyll is cucullate (vs. lanceolate and straight or hooked in *A. asplundii*). The spadix color of *A. asplundii* is dark purple to maroon, and in *A. barclayanum* it is usually greenish.

A species which is remarkably similar in overall appearance to *A. asplundii* is *A. harlingianum*, from the eastern foothills of the Andes, mostly in Ecuador. It differs mainly in its spadix color (dark salmon-pink to pale violet-purple vs. maroon to dark purple in *A. asplundii*) and in having leaves that dry mostly dark brown rather than greenish. The disjunct distribution suggests that the two are remotely related.

An interesting collection is *Dodson & Embree 13097*, from Borbón in northern Esmeraldas, for which the spadix color is reported as "gray-white." In the dried state it is brown, not dark maroon as in other specimens. It otherwise agrees well with *A. asplundii*. Another somewhat aberrant plant is *Harling 4465*, from the Rio Blanco in Pichincha, with the geniculum 3 cm remote from the base of the leaf blade.

The species is named in honor of Erick Asplund, the first Swedish botanist to collect for the Flora of Ecuador project and the first to collect *A. asplundii*, in 1955.

ECUADOR. ESMERALDAS: without locality, less than 300 m, *Cobb 44* (MO); 20 km S of Esmeraldas, Hacienda Guayas, *Sparre 15366* (S); Esmeraldas airport–San Mateo, 4.1 km N of bridge over Rio Esmeraldas, near sea level, 0°54'N, 79°38'W, *Croat 55586* (CM, QCA, MO, US, NY); Esmeraldas–Sua, 6.4 km N of Rio Sua, 29.4 km SW of jct. with road to Esmeraldas, 40 m, 0°52'N,

79°52'W, *Croat 55598* (MO, QCA); Santo Domingo de los Colorados–Esmeraldas, 62 km N of Quinindé, 80 km SE of Atacames, 270 m, 0°35'N, 79°33'W, *Croat 55580* (MO, QCA, NY, RSA); 8.8 km NW of Quinindé, 270 m, 0°26'N, 79°03'W, *Croat 55554* (MO, QCA); 4.4 km SW of Sua, coastal road, 35.7 km SW of jct. with road to Esmeraldas, near sea level, 0°51'N, 79°53'W, *Croat 55608* (MO, QCA); Limones, sea level, *Christenson 1521* (MO); Rio Cayapas, Playa Grande, 2 km SE of San Francisco de Cayapas, *Sparre 18039* (S); Zapallo Grande, 150 m, 78°55'W, 0°49'N, *Kvist & Asanza 40886* (AAU); Rio Esmeraldas, opposite Quinindé (Rosa Zárate), *Asplund 16346* (S); Rio Santiago, Borbón, 30 m, *Dodson & Embree 13097* (SEL); Rio Verde, hill above Businga, 300 m, 1°00'N, 79°30'W, *Juncosa 801* (MO). LOS RÍOS: Rio Blanco, Santo Domingo de los Colorados–Esmeraldas, 3 km S of Km 24, across river from Villa Hermosa, 250 m, 0°05'S, 79°15'W, *Croat 50685* (K, MO), *50688* (MO, K, QCA, US), *50693* (B, MO). PICHINCHA: 10 km NW of Santo Domingo de los Colorados, road to Esmeraldas, Rancho Brahman, 400 m, *Sparre 15210* (S); below confluence with Rio Toachi, 200 m, *Harling 4465* (S); confluence of Rio Napo and Rio Pilaton, *Sodiño s.n.* (Q).

***Anthurium atropurpureum*** R. Schultes & Maguire, Bot. Mus. Leaflet. Harvard Univ. 16: 60. 1953.

**a. *Anthurium atropurpureum* var. *atropurpureum*.** TYPE: Colombia. Amazonas: Quebrada Agua Preta, *Black & Schultes 46-375* (holotype, GH). Figures 38, 44.

Terrestrial or rarely epiphytic; stem to 30 cm long, 1.5–2 cm diam.; roots mostly descending, 3–30 cm long, 2–4 mm diam.; cataphylls subcoriaceous to coriaceous, 1–7 cm long, narrowly acute at apex, drying pale brown (B & K yellow 5/2.5), persisting ± intact, sometimes as a reticulum of fibers with the apex remaining intact. *Leaves* ± erect; petioles 2–25 cm long, 2–8 mm diam., bluntly D-shaped or terete to subterete, obtusely or narrowly sulcate, sometimes weakly flattened adaxially, rounded abaxially, surface sometimes pale-speckled; geniculum thicker and paler than petiole, concolorous when dried, becoming fissured transversely with age, occasionally to 2.5 cm remote from the base of the blade, 0.5–1.5 cm long; blades subcoriaceous to coriaceous, mostly elliptic, often narrowly so, acuminate at apex (the acumen flat), attenuate or acute at base, 11–75 cm long, (3)5–14 cm wide, broadest at or near the middle, the margins flat to undulate; upper surface semiglossy to glossy, medium green, lower surface matte to semiglossy, sometimes paler, drying pale green; midrib convexly raised to angular at base, becoming narrowly raised toward the apex above, broadly acute at base below, becoming conspicuously and acutely raised to narrowly raised toward apex, paler than surface when dried; primary lateral veins 5–

11 per side, departing midrib at (30)50–60° angle, mostly arcuate-ascending, rarely straight to the collective vein, raised above, prominently convexly raised below; interprimary veins rarely present, etched above, flat below; tertiary veins visible, usually weakly etched above, prominulous and darker than surface below; collective vein arising from near the base or near the apex, sunken above, raised below, 5–10 mm from margin. *Inflorescences* erect, shorter than or equaling leaves; peduncle (8)15–47.5 cm long, 2–5 mm diam., 1.3–4× as long as petiole, terete; spathe spreading to reflexed, withering at anthesis, subcoriaceous, streaked with raphides when dried, green heavily tinged with purple at margins to purple-red throughout, lanceolate to linear-lanceolate, 2–15 cm long, 0.5–2.2 cm wide, broadest near base, inserted at 90° angle on peduncle, acute to narrowly acute at apex, acute at base; stipe 3–15 mm long in front, 2–8(12) mm long in back; spadix usually deep purple (B & K purple 2/7.5), sometimes maroon to brown, cylindroid to long-tapered, erect, 2–14 cm long, 3–8 mm diam. near base, 2–4 mm diam. near apex, broadest at the base; flowers rhombic or 4-lobed, 1.6–2.2 mm in both directions when fresh, 1.8–2.4 mm in both directions when dried, the sides ± straight or smoothly to jaggedly sigmoid, 4–8(10) flowers visible in either spiral; tepals matte, muricate, weakly to conspicuously and minutely papillate, the papillae maroon (B & K red-purple 2/2.5); tepal surface olive-green (B & K yellow 6/10); lateral tepals 0.6–1.5 mm wide, the inner margins straight to concave, the outer margins straight to weakly 4-sided; pistils emergent, raised, the exposed portion ± square, 0.6–0.7 mm in both directions, dark purple to green tinged with purple; stigma ellipsoid to oblong, 0.5–0.6 mm long, 0.2–0.3 mm wide, papillate, densely brushlike; stamens emerging rapidly from the base, in a ± scattered pattern, the laterals preceding the alternates by ca. 8 spirals, the 3rd stamen preceding the 4th by ca. 2 spirals, held against the pistil; anthers greenish yellow, 0.4–0.6 mm long, 0.5–0.8 mm wide; thecae ellipsoid, slightly divaricate; pollen yellow-orange, creamy when dried. *Infructescence* with spathe withered; spadix 4–13 cm long, the stipe 0–5 cm long; berries dark purple to deep red, globose to ellipsoid, 5–6 mm long, 4–6 mm diam.; pericarp dry, thickened with numerous raphide cells; seeds 2 or frequently 1 per berry, oblong-ellipsoid, 3.6–4.4 mm long, 1.8–2.4 mm diam., 1.2–1.4 mm thick, with a gelatinous appendage.

*Anthurium atropurpureum* ranges from southern Colombia to Brazil (Acre) and in western Bo-

livia, at low elevations (100 to 160 m) on white sand soils.

This species is distinguished by its leaf blades, with the tertiary veins conspicuously etched above (when fresh), by its adaxially sulcate petioles, and its purple, scarcely tapered spadix subtended by a purple-tinged spathe that withers at anthesis.

*Anthurium atropurpureum* is most easily confused with *Anthurium bonplandii*. A general distinction for dried material is the color of the leaf blades: yellowish/brownish and mostly concolorous for *A. bonplandii* (except subsp. *cuatrecasii*) vs. ± green and often bicolorous for *A. atropurpureum*. See further discussion under *A. bonplandii*.

*Anthurium atropurpureum* comprises three sympatric varieties. *Anthurium atropurpureum* var. *arenicola* is a forest epiphyte or an understory terrestrial herb and greatly exceeds the typical variety in size. Variety *thomasi* is endemic to the Serranía de Huanchaca in Bolivia (see that variety for differences). *Anthurium atropurpureum* var. *atropurpureum* ranges from southern Amazonas Dept. in Colombia to Maynas Province (Dept. Loreto) in Peru, as well as Acre and the eastern edge of Amazonas in Brazil, at low elevations in a tropical moist forest life zone. It is distinguished from var. *arenicola* by its much smaller leaves with the collective veins arising from near the base instead of from the upper ½ and to ⅓ of the blade. The varieties *atropurpureum* and *arenicola* share similar soil preference and geographical ranges, although the former is more often terrestrial.

BRAZIL. ACRE: Cruzeiro do Sul, near airport, *Ramos* 136 (INPA). AMAZONAS: Rio Tontantins at Villa Velha, near Rio Solimões, 2°53'S, 67°50'W, *Daly* et al. 4341 (INPA, MO, NY). COLOMBIA. AMAZONAS: Amazonas-Putumayo watersheds, above 100 m, *Schultes* 6905 (GH); Agua Preta, *Black & Schultes* 46-375 (GH); La Chorrera Rio Igará-Parana (affluent of Rio Putumayo), *Sastre* 3232 (COL). PERU. LORETO: Prov. Maynas, 140 m, *Rimachi* 7343 (IBE, MO), *Ruiz & Murphy* 188 (AAU, F, IBE, MEXU, MO, TEX); Alphahuayo, Estación IAP, *Vásquez & Criollo* 5759 (M, MO); 130 m, *van der Werff* et al. 10212 (MO); Iquitos-Nauta, Km 32, 150 m, 4°10'S, 73°30'W, *Vásquez & Jaramillo* 7847 (K, MO, US); 130 m, *Vásquez & Jaramillo* 10558 (KRAM, MO); Iquitos, Carretera Quisto Cocha-Varillal, ca. 160 m, *McDaniel* et al. 27447 (IBE, MO); Quisto Cocha road, near airport, 120 m, *Gentry & Daly* 19118 (F, MO); 12–25 km S of Iquitos, *Croat* 18279, 18405, 18183, 18665 (MO); Carretera Quisto Cocha-Nauta, 160–170 m, *McDaniel* et al. 27605 (IBE, MO); Iquitos at Peña Negra, *Davidson* 3659 (RSA); 100 m, *Ayala* 1821 (AMAZ); Iquitos-Santo Tomas, S of Iquitos, *Croat* 19104 (CAS, COL, F, MO, NY, RSA, SEL); Varillal, road to Nauta, 130 m, 3°45'S, 73°21'W, *Vásquez & Jaramillo* 1197 (K, MO), 1198 (MO, RSA); Roca Fuerte (Momón), 160 m, 3°40'S, 73°30'W, *Vásquez & Jaramillo* 5232 (MBM, MO); Carretera de Zungaro Cocha, near Shushana, 160 m, *Ri-*



*machi* 6566 (IBE, MO); near Villa Angel, 140 m, *Rimachi* 5888 (IBE); Iquitos Region, Iquitos, Mishuyacu, 120 m, *Killip & Smith* 29887 (NY, US), *Klug* 316, 207 (F, NY, US); ca. 120 m, *Revilla* 4295 (AMAZ); vic. Quista Cocha, 120–140 m, *Croat* 51180 (GH, M, RSA, MO), *Gentry* 20719 (MO), *Gentry & Ayala* 15510 (MO), *Gentry & Jaramillo* 22335 (MO), *McDaniel* 13604 (MO); Río Amazonas, Dpto. Yanamono, Quebrada Yanamono, Explorama Camp, 150–180 m, 3°24'S, 72°49'W, *Croat* 56927 (DUKE, MO, NY), 61761 (AMAZ, MO); Río Nanay, Picuruyacu, 160 m, *McDaniel & Rimachi* 26371 (IBE); 30 km SW of Iquitos, Mishana, Estación Biológica Callicebus, 150 m, *Gentry et al.* 15782 (B, MO, S); Mishana, *Rimachi* 1239 (IBE); 30 km SW of Iquitos, Mishana, 120–150 m, *Foster* 4217 (MO), *Gentry et al.* 31671 (BM, K, MO), 36536 (MO, RSA), *Solomon* 3548 (MO).

**b. *Anthurium atropurpureum* var. *arenicola*** Croat, var. nov. TYPE: Ecuador. Napo: road between Lago Agrio and Río San Miguel, 3 km N of Lago Agrio, 0°5'N, 76°50'W, 450 m, *Croat* 50303 (holotype, MO 2828986; isotypes, AAU, B, BM, CAS, CM, COL, G, GH, IBE, INPA, K, NPA, K, QCA, RSA, SEL, US, W). Figures 39, 40–42, 45.

Differt a var. *typica* pro ratione amplioris et distinctioris habitationibus suis; et nervo collective prope basim exorienti.

Terrestrial or epiphytic; stem to 30 cm long, 1–3.5 cm diam.; leaf scars obscured by root mass and cataphylls, 1.5–2 cm wide; roots numerous, dense, mostly descending, uppermost ascending, gray or green, smooth to densely pubescent, elongate, blunt, 5–30 cm long, 3–6 mm diam.; cataphylls moderately thin to subcoriaceous, bluntly 1-ribbed near the apex, 5–12 cm long, narrowly acute to acute at apex, tinged with red, drying tan (B & K yellow-red 7/2.5), persisting with apex remaining intact, eventually deciduous. *Leaves* erect-spreading, rosulate or scattered along stem; petioles 4–63 cm long, 3–12 mm diam., erect, slightly thicker than broad to D-shaped, shallowly sulcate adaxially, sometimes obtusely V-sulcate, the margins moderately sharp, rounded abaxially, the surface pale-speckled, tinged with red near the base; geniculum markedly thicker than petiole, slightly paler, 1–3 cm long; blades coriaceous to subcoriaceous, narrowly to broadly oblanceolate, less often elliptic, acute to abruptly acuminate, sometimes gradually acuminate at apex (the acuminate to 4 cm long, inrolled), long-attenuate or rarely acute at base, sometimes making geniculum seem remote, occasionally acute to obtuse, (16)45–80(100) cm long, 8–25(41) cm wide, broadest at or above the middle, the margins undulate; upper surface weakly glossy to glossy, medium green,

lower surface semiglossy to matte, only slightly paler and mostly eglandular, rarely weakly pustulate, both surfaces drying green and paler below, matte; midrib flat at base, becoming acute-raised to convexly raised toward the apex above, higher than broad to prominently acute-raised below; primary lateral veins 5–13 per side, departing midrib at (30)40–65(70)° angle, usually weakly arcuate-ascending to the collective vein, sunken to convexly raised above, prominently and convexly raised below, paler than surface; interprimary veins etched above, weakly raised below, prominulous when dried; tertiary veins conspicuously etched above, flat to prominulous below; collective vein arising from about the middle or in the upper 1/3 of blade, sometimes arising in lower 1/2, sunken above, raised below, flat above when dried; antimarginal vein visible on live plant, running close to margin from the base; 1st collective vein 9–12 mm from margin. *Inflorescences* erect to spreading, shorter than or equaling leaves (rarely longer than leaves); peduncle (12)20–73 cm long, 2–8 mm diam., 1–4× as long as petiole, green to green heavily tinged with purple, terete; spathe spreading to reflexed and recurled or twisted, withering at anthesis, subcoriaceous, matte on both surfaces, pale to medium green, heavily tinged with red-violet, sometimes maroon to purple, lanceolate to narrowly lanceolate, 4–22 cm long, 0.6–2.5 cm wide, broadest near the base, inserted at 45° angle on peduncle, long-acuminate at apex, broadly acute, decurrent to 2 cm at base, the margins meeting at ca. 45° angle; spadix green (B & K yellow 5/7.5) heavily tinged with violet-purple, to dark purple or maroon, cylindroid to tapered, sessile or stipitate to 16 mm, erect, 4–26 cm long, 3–8 mm diam. near base, 3–5 mm diam. near apex, broadest at the base; flowers square to rhombic, 1.5–2.6 mm long, 1–2.5 mm wide, the sides straight to sigmoid, 5–8 flowers visible in principal spiral, 5–10 in alternate spiral; tepals matte, weakly to densely and minutely papillate, muricate, lateral tepals (0.5)0.8–1 mm wide, the inner margins pale, thin, pinkish, straight to weakly convex, the outer margins 2–3-sided; pistils weakly emergent before stamens emerge, ± square, green, developing a maroon tinge, sometimes somewhat papillate; stigma ellipsoid, 0.2–0.6 mm long, depressed medially, lightly or densely papillate, droplets appearing 7–11 days before anthesis; stamens emerging in a regular sequence from the base, lateral stamens followed by alternates in rapid succession (7 days), the laterals preceding the alternates by 5–10 spirals, held over and obscuring pistil, 3rd barely preceding 4th; anthers yellow, 0.2–0.6 mm long, 0.8 mm wide, held

at edge of the pistil, only partially exerted; thecae oblong-ellipsoid, 0.2–0.4 mm wide, not divaricate or only slightly divaricate; pollen yellow fading to cream, faintly sweet- or yeasty-scented. *Infructescence* spreading to pendent; spathe withered or absent; spadix 14–35 cm long, 1–2.5 cm diam., bearing berries in the basal portion only, the stipe to 1.5 cm long.; berries white to greenish white basally, violet-purple in apical ½ (B & K purple 2/7.5), subglobose, rounded at apex, 6–8 mm long, 4–6 mm diam.; pericarp somewhat thickened, with raphide cells; mesocarp with raphides, thickly gelatinous; seeds 1–2 per berry, pale green becoming purple (B & K purple 3/2.5), oblong-ellipsoid, 3–6 mm long, 2–3 mm diam., 1.4–1.6 mm thick, with a basal mucilaginous appendage at radicle end.

*Anthurium atropurpureum* var. *arenicola* ranges from southern Colombia (Putumayo and Amazonas) to western Brazil (Amazonas, Acre, and western Rondônia), Ecuador (Morona Santiago, Napo, and Pastaza), Peru (Amazonas, Loreto, and Madre de Dios), and Bolivia (La Paz), at 100–560 m. It is principally found in tropical moist forest life zones, in mature forest on white sand soils (hence the name); the variety is both terrestrial and epiphytic.

*Anthurium atropurpureum* var. *arenicola* is distinguished vegetatively by its mostly oblanceolate leaf blades, which dry greenish and often bicolorous and are usually long-attenuate with straight margins toward the base and acuminate at the apex. The spadix may be violet-purple or maroon, or green tinged (usually heavily) with these colors, and the spathe is withered at anthesis.

This variety is distinguished from the typical variety by its larger size and occurrence in the forest understorey, commonly as an epiphyte, rather than as a terrestrial plant in open areas. It may be confused with the typical variety and var. *thomasi* (see discussion under both varieties). It may also be confused with *A. bonplandii* subsp. *bonplandii*; see discussion under that subspecies.

Variety *arenicola* is also similar to *A. fendleri*, but differs in having more coriaceous blades when dried, mostly long-attenuate leaf bases and long-acuminate apices, whereas *A. fendleri* is rounded or short-acuminate at the apex and mostly rounded to shortly cordate at the base.

BOLIVIA. LA PAZ: Prov. Iturralde. Río Beni, Luisita, 180 m, 13°05'S, 67°15'W, Haase 343 (MO). BRAZIL. ACRE: Cruzeiro do Sul, Estrada Alemã, Prance et al. 11819 (INPA, NY); near airport, Monteiro & Damião 315 (INPA); NW of Cruzeiro do Sul toward Barão do

Rio Branco, 4 km NW of São Francisco, 150 m, 7°36'S, 72°37'W, Croat & Rosas 62694 (AAU, BM, CM, INPA, MO, NY); Mutis 48 (US); Cruzeiro do Sul–Rio Branco, 44 km E of Cruzeiro do Sul, Fazenda da Dona Cabuca, 150 m, 7°38'S, 72°35'W, Croat 62330 (INPA, MO, NY); vic. airport, 150 m, 7°38'S, 72°36'W, Croat & Rosas 62642 (CM, INPA, MO, NY). AMAZONAS: Cassauri, NW of Rio Jurua, Silva et al. 392 (NY, US); Rio Aripuana, Nova Prainha, SB20-ZD Point 5, Mota s.n. (INPA); Rio Javari, Estirão de Equador, Lleras et al. 17265 (INPA, NY); Paumari, above Atalaia, Prance et al. 23788 (INPA); Rio Urubu, above Iracema, Prance et al. 4969 (INPA); Mpo. Humaitá, Humaitá–Porto Velho, Km 60, 08°05'S, 63°W, Texeira et al. 187 (INPA, NY); Rio Madeira, Tres Casas, Kruckhoff 6549 (NY); Mpo. Novo Aripuana, BR 230, Rodovia Transamazônica, at km 300 from Humaitá, 4°33'S, 60°40'W, Ferreira 5711 (INPA, NY); Rio Madeira basin, Rio Livramento, Livramento, Kruckhoff 6771 (NY). RIO DE JANEIRO: (cultivated by R. Burle-Marx) San Carlos, Croat 53698 (CM, MO, GUA, NY). RONDÔNIA: Porto Velho–Ariquemes, 4 km N of Ariquemes, Croat 53582 (MO); Serra dos Tres Irmãos, opposite Mutumparana, N bank of Rio Madeira, Prance et al. 5535 (COL, INPA, NY, US). COLOMBIA. AMAZONAS: Rio Igara–Paraná, Puerto Buenaventura, Sastre 2449 (US). PUTUMAYO: Río San Miguel and Sucumbios: Conejo, 300 m, Schultes 3535 (GH). ECUADOR. MORONA–SANTIAGO: El Centro Shuar Kanhaim, (Cangaimine), Rio Kankaim (Cangaimine), 20 km WNW of Taisha, 500 m, 77°41'W, 02°20'S, Shiki RB4E207 (NY). NAPO: Lago Agrio–Baeza, 43 km E of Lago Agrio, km 43, 560 m, 0°07'N, 77°15'W, Croat 50441 (MO); Lago Agrio–Coca, 69 km S of Lago Agrio ferry crossing over Río Coca, 200 m, Gentry 12558 (MO); Lago Agrio–Rio San Miguel, 3 km N of Lago Agrio, 450 m, 0°05'N, 76°50'W, Croat 50303 (AAU, B, BM, CAS, CM, COL, DUKE, F, G, GB, GH, IBE, INPA, K, LE, M, MO, NY, OOM, QCA, RSA, SAR, SEL, TEX, US, W); 21.2 km N of Lago Agrio, road near Río San Miguel, 470 m, 0°08'N, 76°50'W, Croat 50358 (AAU, B, CM, K, KYO, L, LE, MBM, MO, QCA, RSA, SEL, US); Puerto El Carmen de Putumayo–Lago Agrio, 76 km E of Lago Agrio, Tarapoa, 240 m, 0°07'N, 76°23'W, Croat 58630 (MO); Cantón Aguatico, Parque Nacional Yasuni, lagunas de Garza Cocha, 200 m, Cerón & Gallo 5006 (MO, QCNE); Río Aguatico–Coca, 8 km S of Río Aguatico, E of Lago Agrio, Croat 58514 (CM, MO, QCA); Río Aguatico, 300 m, 0°15'S, 76°21'W, Brandtge et al. 33207 (AAU); Cantón Putumayo, Dureño, 500 m, Plowman et al. 4048 (GH); Santa Cecilia, 220 m, 0°4'S, 76°58'W, Sparre 13022, 13128 (S); Río Aguatico–Coca, Lago Agrio, S side of lake, 5 km NW of town, 280 m, 0°05'N, 76°55'W, Croat 58683 (MO), 58687 (K, MO, QCA); Lagunas de Cuyabeno, 300 m, 0°01'S, 76°11'W, Brandtge et al. 33975, 36010 (MO, AAU); Reserva de Producción Faunística Cuyabeno, 265 m, Poulsen 78992 (AAU); S of Laguna Garzacocha, 76°11'W, 00°01'S, Balslev et al. 84689 (AAU); Laguna Cañangueno, 76°11'W, 00°01'S, Balslev et al. 84903 (AAU, MO); Río Napo, 20 km downstream from Coca, Laguna Taracocha, 250 m, Besse et al. 1962 (SEL); SW of Puerto Francisco de Orellana, 300 m, 0°32'S, 77°0'W, Balslev & Madsen 10621 (AAU); Lago Agrio–Coca, 15 km N of Coca (Francisco de Orellana), 350 m, Croat 50411 (IBE, MO, P, U); Río Suno, 1 mi. above confluence with Río Napo, 290 m, Whitmore 860 (K, NY); Coca, Texaco landing strip, 300 m, Foster 3557 (F, MO); Limoncocha, 240 m, Madison et al. 5330 (MO, SEL); Río Yasuni,



80 km upriver from Rocafuerte, 225 m, *Foster 3735* (F, MO, QCA); Lagunas Jatun-Cocha, 200 m, *Cerón & Gallo 5145* (MO, QCNE), Cantón Lago Agrio, Dureño, 350 m, 0°2'S, 76°42'W, *Cerón 346* (MO); Reserva Indígena Cofan-Dureño, *Cerón & Cerón 3152* (MO); Estación Biológica Jatun Sacha, Río Napo, 8 km E of Misahuallí, 01°4'S; 77°36'W, 450 m, *Cerón 1729* (MO, QCNE). PASTAZA: Laguna Garzayacu, 250 m, 1°29'S, 76°39'W, *Neill & Palacios 6707* (MO); Río Curaray, Llorocachi, 200 m, 1°38'S, 75°58'W, *Jaramillo et al. 31325* (AAU, MO). PERU. AMAZONAS: Río Santiago, 2–3 km from community of Caterpiza, 65 km N of Pinglo, Quebrada Caterpiza, 200 m, *Jaramillo et al. 31325* (AAU, MO). LORETO: Río Corrientes, upriver from Tnte. Lopez oil camp, almost at Ecuador border, 280–300 m, *Gentry et al. 18975* (MO); Dtto. Pebas, Río Yaguasyacu, Bora native community of Brillo Nuevo, 150 km ENE of Iquitos, 106 m, 3°0'S, 72°05'W, *Treacy & Alcorn 107* (WIS), 165 (F, WIS); Prov. Loreto, Nauta, 160 m, 4°32'S, 73°35'W, *Vásquez & Jaramillo 5092* (MO, RSA), 5095 (MO, VEN); Prov. Maynas, Dtto. Iquitos, road to Zungaro Cocha, 140–160 m, *Rimachi 5882*, 5905, 6352, 7172 (IBE); Carretera Peña Negra, 4 km beyond Quisto Cocha, ca. 150, *McDaniel & Rimachi 25741* (IBE), *Rimachi 6421* (IBE, MO); Nina Rumi, 130 m, *McDaniel et al. 27489* (IBE); Iquitos Region, 17 km SW of Iquitos, *Croat 18393*, 18506 (MO), 18460 (MO, USM); Quisto Cocha, 120 m, 3°47'S, 73°24'W, *Croat 51179* (C, K, MISSA, MO, SEL), 51180 (BM, GH, M, MO, US), 51182 (MO), *Rimachi 8086* (IBE); road to Picuruyacu, 160 m, *McDaniel et al. 24770* (MO), *Rimachi 5465* (IBE); Río Itaya, Cahuide, *Vásquez & Jaramillo 5644*, 5686 (MO), below mouth of Río Ucayali, 130 m, 4°20'S, 72°30'W, *Gentry et al. 30041* (MO); San Antonio, 150 m, 4°10'S, 73°20'W, *Vásquez & Jaramillo 3537* (MO); Puerto Almendras, 120 m, 3°48'S, 73°25'W, *Croat 19048* (MO), *Croat 51216* (BM, CM, MO, US, W); 12 km SW of Iquitos, *Croat 20093* (MO); 130 m, *van der Werff et al. 9778* (MO); 122 m, 3°48'S, 73°25'W, *Vásquez & Jaramillo 4595*, 4949, 6099, 6849, 11485 (MO); 5 km from Río Nanay, *Croat 18560* (F, MO, NY, USM); Iquitos-Nauta, Km 44, 150 m, 4°10'S, 73°20'W, *Vásquez et al. 1942* (MO); Mishana-Río Nanay, Estación Biológica Callicebus, 130 m, 3°55'S, 73°35'W, *Vásquez et al. 643* (MO), *Vásquez & Jaramillo 8934* (MO); Indiana-mouth of Río Napo, Explorama Tourist Camp, Yanamono, 130 m, 3°28'S, 72°48'W, *Croat 61761* (AMAZ, MO), *Gentry et al. 31422*, 39695 (MO), *Vásquez et al. 5170*, 5179 (MO); Río Momón, *Rimachi 5815* (IBE); Santa María de Nanay, Quebrada Yarina, 150 m, 3°55'S, 73°40'W, *Vásquez & Jaramillo 12221* (MO); Río Nanay, Iquitos-Sta. María de Nanay, Maynas, 140 m, 3°52'S, 73°30'W, *Gentry & Emmons 38783* (F, MO), *Gentry et al. 39345* (MO); Iquitos-Sta. María de Nanay, Mishana, *Gentry et al. 28857*, 28858, 31715, 26538 (MO), *Gentry & Aronson 25300* (MO); Río Napo, near Paco Cano, 120 m, *Diaz & Jaramillo 1547* (MO); Altura Tutapisco, 3°02'S, 73°15'W, *Croat 20310* (MO); Explorama Llachapa Camp, Quebrada Susuari, below Mazán, 140 m, *Gentry et al. 27731* (MO); Quebrada Paparo, 110 m, 3°45'S, 72°55'W, *Vásquez & Jaramillo 11689* (MO); Río Yaguasyacu, tributary of Río Ampiyacu, Brilla Nueva, *Gentry & Revilla 20433* (MO); Prov. Ramón Castilla, Río Ampiyacu, trail from Pucaurquillo, upriver from Pebas, 140 m, 3°15'S, 71°56'W, *Stein et al. 4006* (MO); Prov. Requena, Jenaro Herrera, 170 m, 4°50'S, 73°45'W, *Vásquez et al. 2154*, 11865

(MO); 140 m, *van der Werff et al. 10015* (MO). MADRE DE DIOS: serranía across Río Alto Madre de Dios, Pantia-colla, 480–840 m, *Gentry et al. 27357* (MO).

### *Anthurium atropurpureum* var. *thomasi*

Croat. var. nov. TYPE: Bolivia. Santa Cruz: Prov. Velasco, Serranía de Huanchaca, Parque Nacional "Prof. Noel Kempff Mercado," 13°59'S, 60°43'W, rocky hills E of airport, ca. 750 m, *Thomas et al. 5696* (holotype, MO 3583031; isotypes, K, LPB, NY, University G. N. Moreno, Santa Cruz), Figure 352.

Differs a var. typico lamina ovato-elliptica, rotundata ad basin.

Terrestrial; stem short; internodes short, to 2 cm diam.; roots densely compacted. *Leaves* erect-spreading; petioles 7–20 cm long, to 6 mm diam. (dried), subterete, sulcate adaxially, rounded abaxially; blades moderately coriaceous, ovate-elliptic, rounded to obtuse and apiculate at apex, rounded to broadly obtuse at base but sometimes ending abruptly on the petiole and weakly decurrent, 35–50 cm long, 15–27 cm wide, broadest at or below middle; both surfaces drying matte to weakly glossy, pale yellowish green to gray-green, inconspicuously pustular but not glandular; midrib convexly raised on both sides; primary lateral veins 6–10 per side, departing midrib at 35–70° angle, at least those near the base of the blade arising at an acute angle with the midrib, arcuate-ascending to margin in a broad curve, most of them merging with the margin above the middle of the blade; interprimary veins lacking; tertiary veins prominulous on both surfaces; collective vein usually lacking, sometimes arising from below the middle of the blade and loop-connecting the primary lateral veins, 12–20 mm from margin. *Inflorescences* ± erect, equaling or much longer than leaves; peduncle 52–73 cm long; spathe spreading to spreading-reflexed, thinly coriaceous, soon drying, green, linear-lanceolate, 6.5–11 cm long, (0.9)1.2–1.6 cm wide, broadest above point of attachment, inserted at ca. 70° angle on peduncle, acuminate at apex, acute at base and sometimes decurrent on the peduncle to 1.3 cm; spadix brownish purple, sessile to subsessile, moderately tapered, erect, 6.5–9.5 cm long, (drying) 5–6 mm diam. near base, 4 mm diam. near apex, broadest at the base; flowers square to rhombic, 1.7–2 mm long, 1.6–1.8 mm wide, the sides straight parallel to spiral, smoothly to jaggedly sigmoid perpendicular to spiral, 9–11 flowers visible in principal spiral; tepals matte, minutely papillate, densely covered with a frostlike grayish coating which

can be scraped off; lateral tepals 1–1.2 mm wide, the inner margins rounded, often turned up on drying, the outer margins 2-sided; pistils not at all emergent, obscured by anthers; stamens emerging in a regular sequence from the base, lateral stamens emerging up to 10 spirals before alternate stamens emerge, the 3rd stamen preceding the 4th by ca. 5 spirals; anthers 0.6 mm long, 0.7 mm wide, contiguous, inclined over pistil; thecae ovoid, moderately divaricate. *Infructescence* to 14 cm long, 1.5 cm diam., bearing berries in the basal portion only; berries purple on upper half, white below, obovoid-ellipsoid, rounded at apex, 6.5–8 mm long, 4–5 mm diam.; seeds 1 per berry, dark brown on rehydration, slightly flattened, 4.5–5 mm long, 3.5 mm diam., lacking any obvious appendage.

*Anthurium atropurpureum* var. *thomasi* is endemic to the Serranía de Huanchaca near the eastern border of Bolivia, known only from the type specimen collected in Santa Cruz Department in a region of tropical moist forest at ca. 750 m elevation. The type locality is an outlying upland area of the Brazilian shield with “cerrado” and “campo rupestre” vegetation, most closely related to that of adjacent Mato Grosso (W. Thomas, pers. comm.). The population of plants from which the type was collected was growing on steep, dry slopes in a relatively mesic area near a stream in both sunny areas and in partial shade (W. Thomas, pers. comm.).

The taxon is distinguished by its narrowly ovate-elliptic blades which dry pale green and are rounded basally. Also distinctive is the long-pedunculate inflorescence with a lanceolate spathe which is three or more times broader than the purplish spadix. The typical variety as well as the var. *arenicola* are both distinguished from var. *thomasi* by typically having attenuate to narrowly acute blade bases.

The new taxon is named in honor of Wayt Thomas, New York Botanical Garden, who made the only known collection of this taxon and who supplied valuable data on the ecology.

BOLIVIA. SANTA CRUZ: Velasco, Serranía de Huanchaca, Parque Nacional “Prof. Noel Kempff Mercado,” 750 m, 13°59'S, 60°43'W, *Thomas 5696* (K, LPB, MO, NY).

***Anthurium barclayanum*** Engl., Pflanzennr. IV 23B(Heft 21): 79. 1905. TYPE: Ecuador. Manabí: Isla Salango, *Barclay 646* (holotype, BM). Figures 14, 46–49, 59.

Terrestrial or epiphytic; stem to 40 cm long, 3–5 cm diam.; roots dense at the nodes, spreading-

ascending, green to greenish white, fuzzy, ca. 7 cm long, 4–8 mm diam.; cataphylls subcoriaceous, 3.5–4.5 cm long, cucullate, rounded at apex, drying tan to brown, persisting  $\pm$  intact or as fine linear fibers. *Leaves* erect-spreading; petioles 5–21 cm long, (5)7–15(20) mm diam.,  $\pm$  D-shaped, flattened or convex with sharp, erect margins and an acute or obtuse medial rib adaxially, obtusely angled, usually 1–4-ribbed abaxially; geniculum slightly paler and thicker than petiole, 1–7 cm long; blades subcoriaceous, narrowly oblong-oblan-ceolate to oblanceolate-elliptic, obtuse to acute and apiculate at apex, narrowly acute, sometimes abruptly obtuse, less often broadly rounded at base, (40)70–137 cm long, (7)11–32(48) cm wide, broadest above the middle, the margins strongly to moderately undulate; upper surface matte to semiglossy, medium green, lower surface matte to semiglossy, scarcely paler; midrib obtusely raised or flattened with a blunt medial rib at base, becoming acute toward the apex, same color as or paler than surface above, broadly and acutely raised at base, becoming convexly raised toward apex below; primary lateral veins 11–25 per side, departing midrib at 40–60° angle, straight- or arcuate-ascending to the margin, obtusely raised and nearly same color as surface above, convexly raised and paler than surface below; tertiary veins slightly raised, same color as surface above, slightly raised and darker than surface below; collective vein arising from near the apex, prominulous on both surfaces, ca. 5 mm from margin. *Inflorescences* spreading, sometimes erect; peduncle (20)40–80 cm long, (3)5–7 mm diam., 3.5–6(9)  $\times$  as long as petioles, green to green heavily tinged with maroon, terete; spathe spreading to reflexed-recurred, coriaceous to subcoriaceous, green (sometimes tinged with violet-purple) to dark violet-purple or maroon, narrowly ovate to oblong-lanceolate, (4)7–24 cm long, 0.6–4 cm wide, broadest near the base, inserted at 30–70° angle on peduncle, acuminate at apex (the acumen inrolled), acute to subcordate at base; spadix usually brownish or olive-green to greenish yellow, sometimes reddish to violet-purple, sessile, cylindroid, slightly tapered, erect, usually somewhat curved, held at 140° angle from peduncle, (5)8–18 cm long, 5–10 mm diam. midway, 3.5–5 mm diam. near apex, broadest at the base; flowers 4-lobed, 1.2–2.5 mm long, 1.6–2.5 mm wide, the sides straight to sigmoid, 7–11 flowers visible in principal spiral, 6–7 in alternate spiral; tepals matte, weakly to moderately papillate; lateral tepals 0.8–1.4 mm wide, the inner margins straight to broadly rounded, the outer margins irregularly 3–4-sided; pistils emergent or not, reddish violet