

lateral veins; tertiary veins obscure above and below; collective vein arising from near the base, weakly sunken or weakly raised above, weakly raised or flat below, prominulous when dried, equally as prominent as primary lateral veins, 5–18 mm from margin. *Inflorescences* erect to slightly spreading or  $\pm$  pendent, shorter than leaves; peduncle 10–60 cm long, 2–10 mm diam., 0.3–3  $\times$  as long as petiole, green to dark purple or heavily tinged-mottled with red-purple (B & K red-purple 2/2.5),  $\pm$  quadrangular or with 2–4 irregular ribs and convex sides; spathe spreading and weakly twisted or reflexed, membranous to subcoriaceous, green tinged maroon at margins and along main nerves (B & K red-purple 2/10), minutely pale-speckled (at least abaxially), narrowly lanceolate to oblong-lanceolate, 3–12 cm long, 0.5–2.5 cm wide, broadest near base, inserted at 30–90° angle on peduncle, acuminate at apex (the acumen in-rolled, (2)5–15 mm long), acute to decurrent at base; stipe 3–15 mm long in front, 1–5 mm long in back; spadix yellow-green tinged with purple, becoming purple-violet or dark green tinged purplish at anthesis, cylindroid, sometimes weakly tapered, erect to curved, (2)4–12 cm long, 3–5 mm diam. near base, 3–4 mm diam. near apex; flowers with a faint, sweet, fruity scent, square to rhombic, 2–3.8 mm long, 1–3.8 mm wide, the sides straight to gradually sigmoid; 2–5 flowers visible in principal spiral, 2–6 in alternate spiral; tepals matte to semiglossy, minutely papillate and weakly punctate; lateral tepals 1.4–2.6 mm wide, the inner margins broadly convex, turned up against pistil, the outer margins 2-sided; pistils exserted 0.4–1.5 mm, glossy, green, sometimes tinged with purple around the stigma; stigma ellipsoid, greenish, 0.4–0.8 mm long, 0.25–0.4 mm wide, brushlike with blunt papillae, droplets appearing 1 week before stamens emerge; stamens emerging rapidly in a regular sequence from the base, the laterals preceding the alternates by 5–28 spirals (by ca.  $\frac{3}{4}$  the length of the spadix), held erect above tepals and pistil; filaments translucent, exserted, 0.6–1 mm long, 0.4 mm wide; anthers orange (B & K yellow-red 7/10), 0.4–0.6 mm long, 0.5–0.7 mm wide, not obscuring pistil; thecae ellipsoid, 0.25 mm wide, weakly divaricate; pollen orange to yellow fading to cream-white (B & K yellow-red 7/2.5). *Infructescence* with spathe persisting; spadix 5–15 cm long, 0.5–1.5 cm diam.; berries dark purple, ovoid, acute at apex, 5–11 mm long, 5–6 mm diam.; pericarp thickened, with numerous raphide cells; seeds 1–2 per berry, with numerous raphide cells, rounded to ovoid, usually flattened on one side, 4–5.6 mm long, 3.2–3.8 mm diam.,

1–2.8 mm thick, with a translucent gelatinous appendage at both ends.

A member of series *Multinervia*, *Anthurium palenquense* occurs in Ecuador in Esmeraldas, Cotopaxi, Los Ríos, and Pichincha provinces, at 80 to 400 m, typically in mature forest or in disturbed primary forest in tropical moist and premontane wet forest life zones. Most collections were made at the Río Palenque Biological Station in Los Ríos, hence the name.

*Anthurium palenquense* is distinguished by its terrestrial habit, coarse cataphyll fibers, triangular-winged petioles and closely veined, bicolorous blades which are attenuate at the base and matte to semi-velvety on the upper surface. In addition, the long-exserted stamens and the brushlike stigma are characteristic. An unusual feature is the pale raphide cells speckling the petioles, spathe, tepals, and even the filaments, as well as the pericarp and seed coat. This species (erroneously reported as *A. buenaventurae* Engl.) is pollinated by *Eulaema bomboide* (Dodson & Gentry, 1978).

Two collections of *Anthurium palenquense* from Esmeraldas and Cotopaxi (*Asplund 16306* and *Sparre 17214*), do not display the brushlike stigma (typical of the species), but agree in other characters with the present overall concept of *A. palenquense*.

*Anthurium palenquense* is most closely related to *A. napaeum*, which differs in having the leaf blades mostly acute at the base with convex to more or less straight (rather than concave) margins.

ECUADOR, COTOPAXI: Quevedo–Latacunga, 44.7 km E of Quevedo, 400 m, 0°51'S, 79°12'W, *Croat 55862* (AAU, CAS, DUKE, GB, JBGp, MO, OOM, QCA, RSA, SAR, TEX, US); Río Guapara, 20 km NW El Corazón, 250 m, *Sparre 17214*, 17465, 17466 (S). ESMERALDAS: Quinindé, Rosa Zarate, *Asplund 16306* (S); Río Esmeraldas, Río Mutil, 6.6 km beyond Univ. Techn. Luis Vargas Torres–Est. Exp. Mutil, 80 m, 0°52'N, 79°33'W, *Croat 55610* (MO, QCA, U). LOS RÍOS: Quevedo–Santo Domingo de Los Colorados, Río Palenque Biological Station, 150–250 m, 0°35'S, 79°25'W, *Croat 38670* (AAU, B, K, MO, NY, QCA, PMA, RSA, US), 38688 (AAU, MBM, MO, NY, QCA, RSA), 49739 (MO), 50659 (CM, MICH, MO, SAR), *Dodson 5173* (MO, QCA, SEL, US), *Dodson & Gentry 12830* (SEL), *Dodson & McMahon 5059* (MO, SEL, US), *Gentry & Dodson 41298* (MO), *Lojtnant & Molau 15766* (AAU), *Madison 3742* (cult. at SEL) (MO), *Schupp 83* (SEL), *Watson 267* (NY). PICHINCHA: Santo Domingo–Quinindé, 300 m, *Solís 13952* (F).

*Anthurium pallatangense* Engl., Bot. Jahrb. Syst. 25: 385. 1898. TYPE: Ecuador. Cotopaxi: vic. Angamarca, *Sodiño s.n.* (holotype, B). Figures 222, 225.

*Anthurium rumicifolium* Sodiro, Anales Univ. Centr. Ecuador 15: 5. 1901. TYPE: Ecuador. Cotopaxi: Angamarca, 3,000 m, *Sodiro s.n.* (holotype, B).

*Anthurium albopunctatum* Sodiro, Anales Univ. Centr. Ecuador 22 (156): 22. 1906. TYPE: Ecuador. Pichincha: Nanegal, *Sodiro s.n.* (holotype, B).

Terrestrial or epiphytic; stem ca. 30–50 cm long, 1.5–2 cm diam.; leaf scars obscured by root mass, 0.5 cm high, 1 cm wide; roots dense, descending, greenish, drying tan to grayish, smooth to somewhat pubescent, slender and elongate, tapered at apex, ca. 4–26 cm long, 1–4 mm diam.; cataphylls lanceolate, 4–11 cm long, acuminate at apex, drying reddish brown, persisting as pale, fine, linear fibers. *Leaves* spreading-erect; petioles 10–33 cm long, 3–8 mm diam., terete to subterete, sometimes obtusely flattened adaxially, rounded abaxially; geniculum obscurely flattened, scarcely darker than petiole, 0.6–2 cm long; blades subcoriaceous, narrowly to broadly elliptic, occasionally oblanceolate, gradually acuminate at apex, slightly attenuate to narrowly acute to obtuse to subtruncate at base, 20–56 cm long, 4–15 cm wide, broadest at or near the middle; upper surface matte to semiglossy, dark to medium green, lower surface glossy to semiglossy, much paler; both surfaces drying matte to semiglossy, bright green to yellowish; midrib round-raised at base, becoming very narrowly and sharply raised (knife-like) toward the apex above, prominently and convexly raised with a sharp rib below; primary lateral veins 12–35 per side, departing midrib at 45–55° angle,  $\pm$  straight to the collective vein, prominently and sharply raised above, flat to raised below, very sharply raised above when dried; interprimary veins drying almost as conspicuous as primary lateral veins, sharply raised above; tertiary veins obscure, drying prominulous; collective vein arising from the base, scarcely visible above, flat below, less prominent than primary lateral veins when dried, 3–11 mm from margin. *Inflorescences* spreading-erect, shorter than leaves; peduncle 6.2–29(38) cm long, 2–6 mm diam., (0.9)1.9–2.7 $\times$  as long as petiole, pale green, tinged with violet-purple, subterete to angulate; spathe spreading to reflexed and recurled, subcoriaceous, green to green tinged with purple at margins and on veins, oblong-lanceolate, 2.5–7 cm long, 7–10 mm wide, broadest near the base, inserted at 65° angle on peduncle, acute to shortly acuminate at apex (the acumen apiculate), acute at base; stipe 7–10 mm long in front, 3–6 mm long in back; spadix maroon to purple, becoming brown (B & K red-purple 2/7.5), cylindroid, sometimes slightly tapered at apex, 3–8 cm long, 3–6 mm diam. midway; flowers 4-lobed,

2.1–2.4 mm in both directions, the sides jaggedly sigmoid; 3–5 flowers visible in principal spiral, 6–8 in alternate spiral; tepals matte, weakly papillate, with droplets; lateral tepals 1–1.3 mm wide, the inner margins straight to convex, slightly turned up against the pistil, the outer margins irregularly 3–4-sided; pistils raised, green; stigma ellipsoid; stamens emerging in a scattered pattern from the base of the spadix; filaments transparent, thick, exerted, soon retracting, holding anthers at level of the tepals, ca. 0.3 mm long, 0.4 mm wide; anthers yellowish heavily tinged with maroon, 0.6 mm long, 0.9 mm wide, inclined over and obscuring the pistil; thecae oblong, not divaricate; pollen orange, fading to tan. *Infructescence* with spathe persisting; spadix 6 cm long, 1.3 cm diam.; berries purple, obovoid, truncate at base, rounded and somewhat mammilliform at apex, 6–6.8 mm long, 3.7–4.5 mm diam.; seeds 2 per berry, brownish, oblong, flattened, rounded at both ends, 3.2–3.5 mm long, 2.2–2.5 mm diam., 1.5–1.7 mm thick, enveloped by gelatinous, translucent, amber substance.

A member of series *Multinervia*, *Anthurium pallatangense* is endemic to Ecuador in Carchi, Pichincha, Cotopaxi, and Chimborazo provinces at (1,710) 2,000 to 3,000 m. It occurs in lower montane dry, premontane dry, and montane moist forest life zones.

This species is distinguished by its broadly elliptic leaf blades with the primary lateral veins drying sharply raised (knife-edge-like) and a collective vein arising more or less from the base. In these characteristics it is very similar to *A. penningtonii*, probably its closest ally. Were it not for their geographical separation (either side of the Andes), *A. penningtonii* might be relegated to subspecific or varietal status. *Anthurium penningtonii* differs, however, in its green spadix (sometimes tinged purple or brown), and occurs in wetter life zones as well.

ECUADOR. CARCHI: 7.8 mi. SE of Maldonado, rd. to Tulcán, 2,400 m, 0°53'N, 78°5'W, *Thompson & Rawlins 888* (CM); Maldonado-Tulcán, Km 205, 2,400–2,600 m, *Werling & Leth-Nissen 362* (QCA). CHIMBORAZO: Pallatanga, *Sodiro 24* (B). COTOPAXI: Angamarca, ca. 3,000 m, *Sodiro s.n.* (B). PICHINCHA: Aloag-Santo Domingo, San Ignacio, 2,000 m, *Sparre 14687, 17742* (S); Machachi-Santo Domingo, 40.8 km E of Alluriquín, 2,050 m, 0°26' S, 78°40' W, *Thompson & Rawlins 1094* (CM); Tandayapa-Mindo, 15.1 km beyond Tandayapa, 2,400 m, *Croat 49374* (MO, QCA); Nono-Nanegal, NW of Quito, 11–12 km NW of Nono, 2,200–2,270 m, *Croat 38837* (MO); Nanegal, *Sodiro s.n.* (B); Mindo-Tandayapa, 10 km SW of Tandayapa, 2,200 m, 0°00'N, 78°32'40"W, *Croat & Rodríguez 61545* (MO); Chiri-



boga Road, Chiriboga-Santo Domingo de Los Colorados, El Volante, 1,900 m, *Asplund 17418* (S); Quito-Santo Domingo de Los Colorados, 19 km S of San Juan, 15 km NE of Chiriboga, 1,710 m, 0°17'S, 78°43'W, *Croat 50621* (MO); Río Alambi, Nono-Tandayapa, km 43-45, 2,000-2,500 m, *Sparre 17016* (S); Quito-Puerto Quito, 13 km NW of Nono, 2,225 m, *Luteyn & Lebrón-Luteyn 6523* (NY); Volcán Pichincha, W side, Tandayapa-Mindo, 2,300 m, 0°2'S, 78°42'W, *Croat 50256* (MO, RSA, USM).

***Anthurium paraguayense*** Engl., Bot. Jahrb. Syst. 25: 361. 1898.

**a. *Anthurium paraguayense* var. *paraguayense*.** TYPE: Paraguay. Central: Asunción, Colonia Elisa, *Lindman A1823* (holotype, B; isotype, S). Figures 226, 227, 231.

*Anthurium rodrigoii* A. Hawkes, Phytologia 3: 27. 1948. TYPE: Argentina. Chaco: Tapenaga, Enrique Urien, *Rodrigo 2690* (holotype, NY).

*Anthurium rusticum* N. E. Br. ex Engl., Pflanzenr. IV. 23B(Heft 21): 82. 1905. TYPE: Bolivia. La Paz: Yungas, Coroico, *Bang 2479* (holotype, NY; isotypes, GH, MO).

Terrestrial or epiphytic; stem to 40 cm long, (1)5-6 cm diam.; roots numerous, dense, descending or ascending, green or tan, smooth to pubescent, blunt, longitudinally fissured when dried, 3-10 cm long, 2-5 mm diam.; cataphylls membranous to subcoriaceous, 3-9.5 cm long, acute and sharply 1-ribbed at apex (apiculate to 1 mm), pale green, drying dark brown to tan (B & K yellow 6/5), persisting as a reticulum of fibers at base. *Leaves* erect to spreading; petioles 3-28.5 cm long, 6-10 mm diam., D-shaped to sometimes nearly quadrangular, shallowly sulcate with a medial rib adaxially, the margins acutely raised, bluntly to sharply 1-3-ribbed abaxially, the surface green sometimes pale-speckled; geniculum thicker and paler than petiole, 0.7-2.5 cm long; sheath 0.9-2.5 cm long; blades subcoriaceous, oblanceolate to oblong-oblanceolate, long-acuminate at apex (the acumen inrolled to flat), acute to obtuse to rounded or truncate at base, 22-100 cm long, 5-19.5 cm wide, broadest above the middle, the margins prominently undulate; both surfaces semiglossy to matte, dark to medium green above, paler or concolorous below; both surfaces drying usually greenish; midrib broadly raised at base with an acute medial rib, diminishing and becoming sunken toward the apex above, slightly raised when dried, convexly raised at base, becoming acute and then narrowly raised toward the apex above, slightly raised when dried; primary lateral veins 4-10 per side, departing midrib at (25)30-70° angle, arcuate-ascending to the

margin or loop-connecting to the primary lateral vein above it, raised above near the midrib, weakly sunken at the margin, raised below; interprimary veins obscure above, visible below; collective vein arising from near the apex, weakly sunken above, bluntly raised below, prominent when dried, 5-9 mm from margin. *Inflorescences* erect or spreading, shorter than leaves; peduncle 14-65 cm long, 8-9 mm diam., ca. 2-6× as long as petiole, dark green, terete to subterete; spathe spreading to reflexed with the margins rolled under, coriaceous, dark green tinged with purple (B & K yellow-green 4/7.5), lanceolate to ovate-lanceolate, (2)6-15 cm long, (0.7)1.7-3 cm wide, broadest in the lower third, inserted at 40-50° angle on peduncle, acute to acuminate at apex (the acumen inrolled), acute to decurrent at base, minutely verruculose on inner surface; spadix green tinged with purple or gray-brown (B & K yellow 5/7.5), tapered, (2.4)5-15 cm long, 4-15 mm diam. near base, ca. 3-8 mm diam. near apex; flowers 4-lobed to rhombic, (1.7)2.5-4 mm long, (2.2)2-4 mm wide, the sides jaggedly sigmoid; 5-8 flowers visible in principal spiral, 7-10 in alternate spiral; tepals matte, sometimes appearing punctate and papillate; lateral tepals 0.9-1.5 mm wide, the inner margins convex or straight, the outer margins smoothly 3-4-sided; pistils not emergent or scarcely emergent, green tinged with purple; stigma ellipsoid to slit-like, 0.2-0.5 mm long; stamens emerging in a regular sequence, emerging shortly above the tepals, the laterals preceding the alternates by 10-12(21) spirals, the 3rd stamen preceding the 4th by 3-4 spirals; filaments translucent, with raphides, 1-1.5 mm long; anthers yellowish to red-purple (B & K red-purple 7/5), 0.5-0.7 mm long, 0.8-0.9 mm wide, inclined over and obscuring the pistil; thecae oblong-obovoid to oblong-ellipsoid, slightly or not at all divaricate; pollen pale yellow to cream, scented like grass. *Infructescence* spreading-pendent; spathe persisting; spadix 17.5-20 cm long, to 3.5 cm diam.; berries reddish to maroon (B & K red-purple 2/7.5), obovoid, rounded at apex, 5-10 mm long, 3-6 mm diam.; pericarp moderately thickened, with raphide cells at base; mesocarp translucent to milky, thick-gelatinous; seeds 2 per berry, white, streaked with reddish or maroon, ovoid, flattened, 5-6.2 mm long, 2.5-3.4 mm diam., 1-2 mm thick, with a gelatinous appendage at both ends.

*Anthurium paraguayense* is a common terrestrial, occasionally epiphytic species of southern Brazil (Mato Grosso Sul), Bolivia, Paraguay, and northern Argentina. It is mostly reported from dry