

1.4–2.3 cm diam.; berries orange, oblong-ovoid, slightly beaked, 6.5–7.4 mm long, 4–4.5 mm diam.; pericarp somewhat thickened, with linear raphide cells; mesocarp transparent, gelatinous; seeds 1–2 per berry, yellowish brown when dried, oblong, sometimes ovoid, 3.5–4.7 mm long, 2.3–2.7 mm diam., 1.6–2 mm thick, with a gelatinous, sticky appendage at both ends.

A member of series *Multinervia*, *Anthurium holmnielsenii* is known only from Ecuador in the provinces of Los Ríos, Imbabura, Pichincha, and Cotopaxi at 250 to 1,500 m in tropical moist and premontane wet forest, where it grows either terrestrially or as an epiphyte.

This species is distinguished by its concolorous, green-drying leaf blades with numerous primary lateral veins and a collective vein arising from near the base, sharply D-shaped petioles, long-tapered, green spadix, and orange berries.

Anthurium holmnielsenii is closely allied to *A. acutissimum*, and differs in having petioles with sharply raised margins and spreading-pendent to more or less erect leaves with broader blades (3.3–6.5(7) vs. (6.7)7.5–10(11) times longer than broad).

This species is named in honor of Lauritz B. Holm-Nielsen, who has coordinated much of the botanical activity in Ecuador by the University of Aarhus, Denmark.

ECUADOR. COTOPAXI: Río Guapara, 20 km NW of El Corazón, 250 m, *Sparre 17113 bis* (S). IMBABURA: Colloapi, 840 m, *Solis 12889* (F). LOS RÍOS: Río Blanco, Santo Domingo-Esmeraldas, 3 km S of Km 24, 250 m, 0°5'S, 79°15'W, *Croat 50689* (K, MO, QCA). PICHINCHA: El Paraiso-Saguangal, 3 km from El Paraiso, 1,500 m, 0°10'N, 78°46'W, *Oellgaard et al. 37773* (AAU); Pacto-Nuevo Azuay, 5 km N of La Esperanza, 1,300 m, *Holm-Nielsen et al. 24542* (AAU, MO); 15.3 km N of Pacto, road, 2.3 km N of Paraiso, 1,320 m, 0°11'N, 78°04'W, *Croat 61640* (B, K, MO).

Anthurium iramirezae Bunting, Ann. Missouri Bot. Gard. 76: 917–918, 1989. TYPE: Venezuela. Amazonas: Dpt. Río Negro, Serranía de Tapirapeco, outcrop of granitic rocks, 1,350 m, 1°20'N, 64°55'W, *I. Ramirez & Laskowsky 310* (holotype, VEN). Figure 353.

Epilithic; stem thick, reclining horizontally; internodes short; cataphylls persisting. *Leaves* few; petioles 19–40 cm long, subterete, sulcate adaxially, the margins rounded; geniculum 1.7–2.3 cm long, 1–1.2 cm thick; blades held erect on petioles, ovate, obtuse to short-acuminate at apex (the acuminate with a cusp to 1.3 cm long), cordate at base, 30–37 cm long (equaling or twice as long as petioles), 19–24 cm wide (1.5–1.7 × longer than wide);

sinus arcuate; upper surface glossy, lower surface slightly paler and brown glandular-punctate; major veins prominently raised on upper surface; basal veins 2 pairs, free to base (not naked at the sinus); primary lateral veins 7(8) per side, departing midrib at 45–55° angle, almost straight or weakly arcuate-ascending to the margin; tertiary veins prominent on both surfaces. *Inflorescences* longer than leaves; peduncle 45–71 cm long; spathe recurved or reflexed, persistent, green, narrowly oblong-ovate, 11 cm long, 0.8 cm wide, decurrent at base for 8 mm; spadix dark purple, becoming green with age, slightly tapered, sessile, 13.3–15.3 cm long, 7.5 mm diam.; 6–8 flowers visible in principal spiral. *Infructescence* to 1.5 cm diam.; berries unknown.

Anthurium iramirezae is endemic to Venezuela, known only from the type locality in an area of premontane rainforest, at 1,250 m.

The description given here is based only on the original type description and the species is therefore imperfectly known.

This species is distinguished by its broadly ovate, subcordate, glandular-punctate blades and narrowly oblong-ovate spathe.

It is most closely related to *A. guanchezii*, but that species differs in having the geniculum remote from the base of the leafy portion of the blade, as well as by having naked basal veins and a narrowly ovate spathe which is 3.6 × longer than broad.

Anthurium iramirezae is perhaps most easily confused with *A. wurdackii*, but that species has proportionally narrower (about 1.9 × longer than broad) blades with angular rather than acute sinus and epunctate lower surface, and its spathe decurrent for 3.5 to 7.5 cm.

VENEZUELA. AMAZONAS: Río Negro, Serranía de Tapirapeco, outcrops of granitic rocks, 1,350 m, 1°20'N, 64°55'W, *Ramirez & Laskowsky 310, 318* (VEN).

Anthurium jenmanii Engl., Pflanzenz. IV. 23B(Heft 21): 72. 1905. TYPE: Guyana. Essequibo, *Jenman 5760* (lectotype, K; isolecotypes, BRG, NY).

Anthurium englerianum Bunting, Acta Bot. Venez. 10: 270. 1975. TYPE: Venezuela. Monagas: between Guácharo & Cueva del Guácharo, 1 km above El Guácharo, *Bunting 2653* (holotype, MY).

Anthurium trinitatis Engl., Pflanzenz. IV. 23B(Heft 21): 73. 1905. TYPE: Trinidad, *Fendler 741* (holotype, K; isotype, NY).

Epiphytic, epilithic or terrestrial; stem short, (1)1.5–3 cm diam.; roots dense, spreading to ascending, pale green to brownish, thick and blunt, ca. 5–10 cm long, 3–6 mm diam.; cataphylls

broadly lanceolate, subcoriaceous to coriaceous, (3)5–7 cm long, acute at apex, drying dark brown, persisting semi-intact or as a reticulum of fibers. *Leaves* erect to erect-spreading; petioles (3)7–20(38) cm long, 6–15 mm diam., bluntly to sharply D-shaped, flattened to weakly convex adaxially, rounded abaxially, the surface pale-speckled; geniculum slightly paler and moderately thicker than petiole, 0.5–2.5 cm long; sheath 1–6 cm long; blades coriaceous, broadly oblanceolate to elliptic (rarely ovate-elliptic), shortly and abruptly acute (rarely long-acuminate or obtuse-rounded) at apex, narrowly acute to obtuse to broadly truncate to sometimes weakly subcordate at base, (22)40–103 cm long, (8)11–52 cm wide, broadest near the middle or in the upper fourth, the margins moderately and broadly undulate; upper surface semiglossy to glossy, yellowish green, lower surface matte to weakly glossy, moderately paler, drying yellow-green, matte; midrib flat at base, soon becoming bluntly acute above and conspicuously paler than surface, prominently convex to higher than broad at base, becoming obtuse-rounded toward the apex below, slightly paler than surface; primary lateral veins 5–13 per side, departing midrib at 30–60° angle, broadly arcuate-ascending to the margin, the uppermost merging into a collective vein, raised near midrib, sunken at margin, moderately paler than surface above and below; interprimary veins absent except near the base, less conspicuous than primary lateral veins; tertiary veins sunken above, raised below, raised when dried; reticulate veins prominulous above and below when dried; collective vein arising in the upper third of blade or absent, equally as prominent as primary lateral veins, 6–15 mm from margin. *Inflorescences* spreading-erect to spreading-pendent, equaling or longer than leaves; peduncle 26–86 cm long, 5–9(15) mm diam., 3.4–6× as long as petiole, pale-speckled, colored like petiole, sometimes ringed with purple, terete to elliptic; spathe reflexed, usually soon withering and becoming twisted, subcoriaceous, pale green tinged with purple, becoming purple at anthesis, oblong to lanceolate, 11–50 cm long, 1.5–4.5 cm wide, broadest near the base, inserted at 30–60° angle on peduncle, acuminate at apex (the acumen 8 mm long), narrowly acute to obtuse, sometimes decurrent for 3–4 cm at base; stipe absent or to 4–5 cm long in front, to 1 cm long in back; spadix dark maroon to dark purple, sometimes bluish pre-anthesis, tapered to cylindroid, usually sessile to weakly stipitate, nearly straight to slightly curved, 10.4–47 cm long, 6–9(12) mm diam. near base, ca. 4 mm diam. near apex, broadest at the base; flowers

rhombic, 1.8–2.7 mm long, (1.3)1.7–2.2 mm wide, the sides straight to slightly sigmoid; 6–14 flowers visible in principal spiral, 6–10 in alternate spiral; tepals matte to semiglossy, minutely papillate; lateral tepals 1–1.2 mm wide, slightly convex, arose, the outer margins 2-sided; pistils not emergent, whitish; stigma slitlike, colored like tepals, 0.5 mm long; stamens emerging in a slow, regular sequence from the base, the laterals preceding the alternates by 7–12 spirals, the 3rd stamen preceding the 4th by 1–8 spirals, held against the pistil and obscuring it; anthers pale yellow to orange, 0.4–0.5 mm long, 0.5–0.7 mm wide; thecae ovoid, divaricate; pollen yellow, fading to whitish, moderately sweet-scented. *Infructescence* pendent; berries pale reddish purple to purple or white tinged with violet apically, obovoid, rounded at apex, to 10 mm long, 7 mm diam.; seeds 2 per berry, oblong to obovoid, 8 mm long, 3 mm diam.

Anthurium jenmanii ranges from Trinidad and Tobago and Venezuela (Sucre and Monagas; one collection from northeastern Bolívar) to Guyana, Surinam, French Guiana, and Amapá in Brazil. It is the only species, besides *A. fendleri*, which is extra-Amazonian in northern South America and which also occurs in lowland Amazonia. Instead of achieving this via the Guianas, *A. fendleri* ranges south to the departments of southern Colombia. *Anthurium jenmanii* occurs mostly below 500 m in moist forest as well as in dry open woodlands and granite outcrops, where it may be terrestrial, epiphytic, or epilithic.

This species is recognized by its large, coriaceous blades with impressed tertiary veins on the upper surface (when fresh), which usually dry yellow-green. Also characteristic are its purple spadix and spathe, the latter usually withering early, and by its reddish purple berries. The leaf bases are highly variable, ranging from acute to somewhat subcordate (see below). Staminal progression is markedly slow, the spadix requiring over one month under office conditions (room temperature) to complete anthesis throughout its length of 14 cm.

Specimens from throughout the range of *A. jenmanii* may have basally obtuse-rounded or even subcordate leaf blades; *Sheffer* 265, originally collected in Trinidad and cultivated at the University of Hawaii, and *Sastre* 1665, from the Tumuc-Humac Mountains in Brazil, are examples of the latter end of the spectrum. One collection, *Geyskes* 16, from the Tumuc-Humac Mountains along the Brazilian border in Surinam, is noteworthy in having leaf blades conspicuously pustular on the lower surface. This character is typical for *Anthurium*

bonplandii subsp. *guayanum*, but that subspecies typically has often dark, plate-shaped glands in addition and occurs at higher elevations; no collections of the latter are known from the Tumuc-Humac Mountains. *Sastre* 1665 and *Granville* 1179, also from these mountains, are more typical of *A. jenmanii* and have no pustules on the leaf blades. This region is in general poorly known, and further collections would greatly help to understand the geographical distribution and variation of *A. bonplandii* and *A. jenmanii*, and also *A. cataniapoense*. Another noteworthy collection is *Cremers* 7405, from north-central French Guiana, which is aberrant in having a leaf blade so attenuate at the base that the geniculum appears remote from the blade by up to 4.5 cm.

In 1975, Bunting described *A. englerianum*, based on material collected in Sucre in the Coastal Cordillera of Venezuela, 1 km above Guácharo. Examination of the type and material collected at the same site (*Croat* 54389) revealed no characters that can be used to separate *A. englerianum* from *A. jenmanii*, despite the fact that the type locality of *A. englerianum* is at 970 m elevation. It is here synonymized for the first time.

WITHOUT LOCALITY. *Potter* 5299 (NY); cultivated, *Croat* 45053 (MO). BAHAMAS. Cultivated, Nassau, New Providencia, *Moore* 7023 (BH). BRAZIL: Serra Tumucumaque, Massif du Mitaraka, 500 m, *Sastre* 1665 (CAY, US). AMAPÁ: Roche, Cachoeira Grande, *Irwin* et al. 47417 (IAN, NY); Cachoeira Utussansain, island in Cachoeira, *Irwin* et al. 48000 (NY, US); Rio Araguari, downriver from Porto Platon, *Pires* et al. 51152 (NY); Rio Jari, Cochoeiras das Aurucupatari, 120 m, 0°28'N, 53°7'W, *Egler* & *Irwin* 46468 (NY, US, MG); Rio Maraca, Magaão, *Rabelo* et al. 2200, 2210 (NY); Rio Oipoque, near Mt. Carupina, 10–80 m, 3°33'N, 51°37'W, *Pires* & *Westra* 48823 (US); Cachoeira Grande Roche, *Froes* 26695 (IAN, RB), *Luetzelburg* 20265 (M); AMAPÁ-PARÁ: Serra Tumucumaque, via Rio Cumina, *Sampaio* 5267, 5424 (RB). FRENCH GUIANA. WITHOUT LOCALITY: *Hay* 2827: cultivated at M (#84/3632) (MO); W Bas Oyapock, Haut de la Cirque Armontabo, *Cremers* 7047 (CAY, K); Bassin du Ha, Akouba Booka go Soula, 160 m, *Granville* et al. 9779 (CAY, P, US); Bassin du Haut-Marouini, 230 m, *Granville* et al. 9908 (CAY), 200 m, 9291 (CAY); Bassin de l'Oyapock, 10 m, *Cremers* 9936 (CAY); Camopi River above its mouth at Tamouri River, *Granville* 2097 (CAY, US); Grand Canori, *Oldeman* 1979 (CAY); Montagne Maripa, *Granville* 2870 (CAY, P); Pedra Alice, *Irwin* et al. 47566 (NY); opposite Pedra Alice, *Irwin* et al. 47604 (NY); Savanes-Roches, Fleuve Oyapock, *Oldeman* 2575 (MO); St. Elie, *Prevost* 740 (CAY); NW of Sinnamary, W of Orstom "Ecrec" Project, St. Elie Track, 250 m, *Croat* 53848 (MO); Brazilian border, Trois Sauts, 300–350 m, *Grenand* 1091 (CAY, P); Massif des Emerillons, 450 m, *Cremers* 6594 (CAY, K); 300–350 m, *Cremers* 6639 (CAY); Montagne des Trois Pitons, second peak, *Oldeman* 2609 (CAY, US);

Monts de la Trinité, Inselberg NW of Monts de la Trinité, *Cremers* 7405 (K); Mt. St. Marcel, Haut Oyapock, 300–450 m, *Sastre* 4412 (P); Haut Tampoc, S of Pier Kourou, *Cremers* 4517 (CAY); Tumuc-Humac, *Granville* 1179 (CAY, P); Brazil and Surinam border, summit of Palou-louimeenpu, 707 m, *Granville* 1103 (CAY, K, MO). GUYANA: Cayenne, *Feville* 1126 (U); Tumatumari, *Gleason* 172 (NY); Rockstone, *Gleason* 617 (GH, NY); Mazaruni station, *Forestry* Dept. 2939 (K); Quebrada Camonnie, *Jenman* 2026 (K); Demerara River, Christianburg, *Bartlett* s.n. (BRG); Rio Essequibo, Morabilli Creek, near Bartica, 0 m, *Sandwith* 427 (K); Mazaruni River, upper part, *Leng* 355 (NY); Potaro-Siparuni Region. Chenapou, Amerindian village (Patumona), 50 km upstream from Kaieteur Falls, 450 m, 5°00'N, 59°34'W, *Kuist* et al. 302 (US). ESSEQUIBO: *Jenman* 5760 (BRG, K, NY); Bo River, Kurihi Falls, *Forestry* Dept. 7060 (K, NY). HAWAII. Cultivated at Pacific Tropical Bot. Gard. *Croat* 44872 (MO, SEL). SURINAM. Cultivated, originally collected by Dodson, Paramaribo, *Madison* 1927 (SEL); Nassau Mts., Marowijne River, 550 m, *Cowan* & *Lindeman* 39100 (F, NY, US, U); Palomeu River, Palaimée Savannah, *Geyskes* s.n. (U); Tumuc-Humac Mts., Temomaiem, 200 m, 3°00'N, 55°23'W, *Geyskes* 16 (U, NY); Wosuna Falls, 300 m, *Daniels* & *Jonker* 833 (NY, U). SARAMACCA: Wilhelmina Gebergte, WSW of Juli Anatrof, *Werkhoven* 16712 (BBS, SEL). TOBAGO. Great Dog River, *Eggers* 5802 (US); Little Tobago, *Broadway* 4909 (US), *Dinsmore* 38 (WIS), *Purseglove* 6325 (K, US); Mason Hall, *Broadway* 4832 (US). TRINIDAD: *Broadway* 4106 (BM), *Fendler* s.n. (BM), *Fendler* 741 (BM), *Hart* s.n. (TRIN); Cultivated, *Bailey* & *Bailey* s.n. (BH); Tabaquite, Monserratt Hills, *Jermy* 2543 (cult. at Kew) (K); Arima-Blanchisseuse, milepost 18.75, 30–60 m, *Simmonds* 126 (K); Caspar Grande, Pt. Baleine, 30 m, *Simmonds* 82, 116 (K, TRIN); Cumaca road, turnoff 2 mi. E of Valencia, 200 m, *Croat* 53918 (MO); Hart's Cut to Belle View, *Britton* & *Bailey* 2236 (K, NY); Matura-Valencia, Mi. 8, E of Valencia, less than 150 m, *Croat* 53915 (MO); Moruga, *Broadway* 7621 (TRIN); Pointe Gourde, overlooking Telephone Bay, *Philcox* 8084 (K, NY); Port of Spain, *Broadway* 4176 (K), *Elmore* R9 (LAM); Rapsey, *Sheffer* 265 (MO); Teteron Bay, *Broadway* 6886 (BM, MO); Valencia, *Britton* & *Britton* 2101 (K, NY); Gasparee Island, *Britton* & *Coker* 554 (NY, US); Guaico-Manzanilla Reserve 30–60 m, *Philcox* et al. 8034 (K); Matura Forest Reserve, Toco Road, 50 m, *Philcox* et al. 8075 (K); Monos Island, *Williams* s.n. (TRIN); en route to Huevos Island, Gulf of Paria, *Ewan* 17050 (BM, GH). VENEZUELA. BOLÍVAR: Altiplanicie de Nuria, E of Miamo, 500–600 m, *Steyermark* 88526 (NY, US); Rio Toro (Rio Grande) Rio La Reforma-Puerto Rico, N of El Palmar, 200–250 m, *Steyermark* 88110 (F, NY, US, VEN). MONAGAS: El Guácharo-La Cueva del Guácharo, *Bunting* 2653 (MY, NY), 4351 (NY); 1.5 km above Guácharo, 1.5 km below Cuevas del Guácharo, 970 m, 10°10'N, 63°31'W, *Croat* 54389 (B, MO, VEN). SUCRE: El Pilar-Guariguen, 4–10 km S of El Pilar, 10°31'N, 63°06'W, *Croat* 54382 (F, IBE, K, M, MO, SEL, US); Quebrada del Purgatorio, E of Grapa, *Lasser* & *Vareschi* 3851 (VEN); Península de Paria, Cerro Patato, 300 m, 10°41'N, 62°3'W, *Milliken* et al. 38 (MO); Cristóbal Colón, *Broadway* 170 (GH, NY, US); Cumanacoa-Caripae, La Cuestra, 6 km NW of Las Piedras, 760 m, *Bunting* 2697, 2697S (NY); Lago de Guanoco, *Lasser* & *Vareschi* 3906 (VEN); Dto. Cajigal, Santa Isabel, *Fernandez* 3349 (MY).