

2 mm thick, with a gelatinous appendage at both ends.

*Anthurium llewelynii* is endemic to Peru, known principally from an area of tropical dry and tropical moist forest in the vicinity of Tarapoto, at 130 m, and also in the vicinity of Tingo Maria in the Department of Huánuco to 750 m. The species is terrestrial, usually growing in sandy soil along streams, on exposed roadbanks, in shrub forests, or on rocky cliffs above riverbanks.

This species is characterized by its creeping stem, its comparatively long, sharply D-shaped, erect petioles, the usually markedly arching-spreading, narrowly oblanceolate blades (2.2–3.5, averaging  $2.8 \times$  longer than the petioles) which are usually abruptly and narrowly rounded to shallowly cordate at the base, as well as by the more or less green, moderately short, bluntly tapered spadix and dark purple fruits.

*Anthurium llewelynii* is not easily confused with any other species growing in the same area and habitats in which it occurs. Only *A. plowmanii* shares similar dry forest habitats in this region, but that species differs in having a peduncle equal to or shorter than the spadix, and a deeply sulcate petiole.

*Anthurium tarapotense* also occurs in the region, but occurs at slightly higher elevations (360–530 m) in a premontane moist forest life zone. It differs in being less robust and having a generally broader, short-petiolate blade which is attenuate at the base.

It is of interest that individuals of *A. llewelynii* brought into cultivation and grown in more mesic and crowded conditions may develop blades that are narrowly acute at the base, rather than the more characteristic narrowly rounded to subcordate condition. Compare, for example, vouchers prepared in the field and vouchers made from greenhouse plants, respectively, of *Croat 51092*.

*Anthurium llewelynii* is named in honor of Llewelyn Williams, who collected extensively in the Tarapoto area for the Field Museum in December 1929.

**CULTIVATED.** Originally from Selby 81-76-1, *Croat 57212* (B, MO). PERU. HUÁNUCO: Prov. Leoncio Prado, Tingo Maria Region, Río Huallaga, 750 m, *Croat 21086* (MO); Río Huallaga, near bridge and road to Monzón, 675 m, 9°15'S, 75°59'W, *Croat 50981* (MO, NY, RSA, US). SAN MARTÍN: Juanjui–Tarapoto, 35 km S of Tarapoto, 130 m, 6°46'S, 76°21'W, *Croat 58082* (AAU, CAS, CM, GH, K, MO, NY, USM); El Abra, 29 km S of Tarapoto, 450–540 m, 6°40'S, 76°20'W, *Gentry & Smith 45014, 45091A* (MO); Morales, W of Tarapoto,

360–900 m, *Williams 5721* (F); Tarapoto, 350 m, *Williams 5737, 6625* (F); Tarapoto–Yurimaguas, Km 5, *Kennedy 3545A* (ex cult.; = *Plowman 13300*) (F); Río Mayo, 6 km S of Tarapoto–Moyobamba road at Km 15, Cunumbigue, 350 m, 6°23'S, 76°39'W, *Croat 51092* (AAU, B, CM, DUKE, ENCB, IBE, JBG, K, KYO, L, LE, M, MO, NY, RSA, SAR, SEL, TEX, US, USM); Puente Colombia–Shapaja, 280 m, *Plowman 6018* (GH); Río Shilcayo trail to Boca Toma del Shilcayo, N of Tarapoto, 400 m, 6°30'S, 76°22'W, *Knapp & Alcorn 7336* (K, MO); Dtto. Tarapoto, Tarapoto–Yurimaguas, km 13, 750–1,000 m, *Rimachi 5782* (MO).

***Anthurium loretense*** Croat, sp. nov. TYPE: Peru.

Loreto: Prov. Maynas, Dist. Iquitos, Río Momón and Quebrada Momoncillo, 1 km from the Río Nanay, 200 m, *Croat 51226* (holotype, MO 2813874-80; isotypes, B, CAS, DUKE, F, K, NY, US, USM, VEN). Figures 17, 182, 186.

Epiphytic; stem 15–50 cm long, (1)2.5–5 cm diam.; roots dense, spreading-ascending to spreading-descending, green-gray to whitish, puberulent to smooth, slender, ca. 1.5–7 cm long, 5–6 mm diam.; cataphylls subcoriaceous, sometimes coriaceous, 4–6 cm long, hook-shaped, sometimes cucullate at apex, green, drying brown (B & K yellow 4/5), persisting with apex remaining intact and as a reticulum of fibers at base. *Leaves* erect to spreading; petioles 2.5–10(16) cm long, 6–20 mm diam.,  $\pm$  D-shaped to quadrangular, flattened to sulcate with a medial rib and the margins sharply raised adaxially, 3–8-ribbed abaxially; geniculum slightly thicker than petiole, prominently fissured transversely with age, 0.7–3 cm long; sheath 2–8 cm long; blades coriaceous to subcoriaceous, obovate to oblanceolate to elliptic or sometimes spatulate, acute to obtuse at apex (the acumen apiculate), usually abruptly rounded to shallowly cordate, sometimes truncate or acute to attenuate at base, (36)56–120(168) cm long, 30–50(62) cm wide, broadest usually above the middle, the margins broadly undulate; upper surface semiglossy, dark to medium green (B & K yellow-green 4/7.5), lower surface semiglossy to sometimes matte, slightly paler; midrib flat to obtusely raised at base, becoming sharply acute toward the apex above, slightly paler than surface, acutely raised at base, becoming convexly raised toward the apex below; primary lateral veins 10–21 per side, departing midrib at (20)30–60° angle,  $\pm$  straight to the margin, prominently raised above, slightly paler than surface, becoming acutely raised toward the margin; interprimary veins obscure on both surfaces, promi-

nulous when dried; reticulate veins obscure above, darker than surface below; collective vein arising in the upper third of the blade or absent, flat to weakly sunken above, 4–10(15) mm from margin. *Inflorescences* spreading to spreading-pendent, shorter than leaves; peduncle 25–80 cm long, (2)4–7 mm diam., 4–12(20)× as long as petiole, green to green tinged with maroon or purple-violet, terete; spathe erect to spreading-reflexed to recurled, coriaceous, occasionally subcoriaceous, green heavily tinged with maroon (B & K red-purple 2/7.5), lanceolate to oblong-linear, 5.5–24(35) cm long, 1.2–3 m wide, broadest near the base, inserted at 75–80° angle on peduncle, obtuse to long-acuminate at apex, acute to weakly decurrent at base; stipe 3–11 mm long in front, ca. 1 mm long in back; spadix maroon to reddish violet (B & K red-purple 3/10), cylindroid, scarcely to long-tapered, weakly curved, 7.5–28 cm long, 6–11 mm diam. near base, 2–6 mm diam. near apex; flowers square or rhombic to 4-lobed, 1.3–2.1 mm long, 1.3–2.4 mm wide, the sides smoothly to jaggedly sigmoid; 7–13 flowers visible in principal spiral, 5–9 flowers visible in alternate spiral; tepals matte, densely and minutely papillate, with few droplets; lateral tepals 0.6–1 mm wide, the inner margins straight to broadly convex, the outer margins 2–4-sided; pistils emergent, not raised, purple to reddish; stigma linear, purplish violet, 0.3–0.7 mm long; stamens emerging in a regular sequence from the base, the laterals preceding the alternates by ca. 18 spirals; anthers pinkish to orange-purple, 0.3–0.5 mm long, 0.2–0.7 mm wide, inclined over and obscuring the pistil; thecae oblong-ellipsoid to obovoid, slightly or not divaricate; pollen yellow, fading to white, faintly yeasty-scented. *Infructescence* pendent; spathe deciduous or persisting; spadix 24–46 cm long, 1.5–2 cm diam.; berries purple-violet, oblong; mesocarp juicy; seeds white.

*Anthurium loretense* is currently known mainly from Peru in Loreto (hence the name) and Ucayali Departments at less than 350 m in a tropical moist forest life zone. A few collections are also known from Napo and from Morona–Santiago in Ecuador, Amazonas, Pasco, and San Martín in Peru, near Leticia in southernmost Colombia, and southwestern Amazonas in Brazil.

This species is characterized by its hook-shaped cataphylls, D-shaped petioles, large, broadly elliptic-oblancoolate blades drying greenish brown to brown, and by its long-pedunculate, mostly pendent inflorescence with the spathe usually  $\frac{3}{4}$  or up to  $\frac{3}{4}$  as long as the long-tapered, maroon to purplish violet spadix and often held parallel to it. Although

the base of the leaf blade is normally shallowly cordate with several congested primary lateral veins per side (appearing basal), leaf blades of younger plants are frequently acute to attenuate at the base.

*Anthurium loretense* is probably most closely related to (and perhaps only subspecifically distinct from) *A. cataniapoense* from southern Venezuela. That taxon shares many features, including similar petioles, cataphylls and inflorescences. *Anthurium cataniapoense* differs, however, in having a generally much smaller and more slender spadix and a more slender peduncle. *Anthurium loretense* is also similar to *A. harlingianum*, of Ecuador and Colombia, which differs in occurring at 450 to 1,800 m and in having a mostly erect inflorescence averaging about 6 cm shorter than that of *A. loretense*. See under *A. harlingianum* for details.

An interesting species also apparently closely related to *A. loretense* is *A. vaupesianum*, known only from Amazonian Colombia. It differs most markedly from *A. loretense* by its small size, more obovate leaf blades, and proportionally more slender spadix.

One collection from near Iquitos (Croat 19342) is noteworthy. Though closest to *A. loretense* among the species in the area, it appears closer still to *A. harlingianum* because of its erect inflorescence, moderately stubby spadix and leaves drying a very similar brown color. However, it differs from both of the above species in having the spathe longer than the spadix. It perhaps represents a new species; Williams 2465 from near Leticia, Colombia, appears to represent the same taxon.

Two further collections from Loreto (Vásquez *et al.* 4882 and Rimachi 5569) possibly belong here. The Vásquez collection has a leaf blade only 54–62 cm long and petioles 17–21 cm long, and the Rimachi collection has a spadix (at anthesis) reported as green. In addition, both collections have blades long-attenuate toward the base (ending abruptly acute at the base) and shortly stipitate spadices. Another collection (Smith 2881) from Oxapampa in Pasco Department, Peru, appears to belong here as well, although it is very far removed from the known range of *A. loretense*. Gentry *et al.* 29912 (perhaps a mixed collection) from near Iquitos, has leaf blades that are very long-attenuate in the lower third and narrowly acute at the base. It otherwise appears to belong here.

Mention should be made of several collections from the rather isolated valley of the Río Santiago and the adjacent Río Cenepa valley in Amazonas Department, Peru, the only ones known from this department. These differ in having more flowers per spiral (10–18 vs. 5–13) and relatively shorter



peduncles (1.5–2 vs. 4–12(20)× longer than the petioles). Local names for these plants include “uyuyugkunamu” and “kagkur nuka” (Huambisa tribe); “tukum” and “mun tukui” (Río Cenepa).

BRAZIL. AMAZONAS: Río Jutai, 5°12'S, 69°00'W, *Traill* 1138 (K). COLOMBIA. AMAZONAS: Quebrada Arara, 2 hr. N of Leticia near Río Amazonas, *Croat* 7536 (MO, F). Puerto Nariño, Parque Nacional Amacayacu, 100 m, 3°45'S, 70°15'W, *Vásquez et al.* 12504 (MO); Río Miritiparana, Caño Guacaya, 700 ft., 0°30'S, 70°40'W, *Schultes & Cabrera* 16239 (GH). ECUADOR. MORONA-SANTIAGO: 35 km NE of Montalvo, 260 m, 1°49'S, 76°42'W, *Zak & Espinoza* 4590, 4680 (MO). NAPO: Lago Agrio–Coca, ferry road 7.2 km S of Río Aguariño, 270 m, 0°02'N, 76°51'W, *Croat* 58643 (MO, QCA); Lago Agrio–Río San Miguel, 5 km N of Lago Agrio, 280 m, 0°05'N, 76°55'W, *Croat* 58689, 58691 (MO, QCA); 17.3 km N of Lago Agrio, *Croat* 50344 (MO); Lago Agrio–Río San Miguel, 3 km from San Miguel, 350 m, *Besse et al.* 1549 (SEL); Lago Agrio–Puerto El Carmen de Putumayo, vic. Tarapoa, 240 m, *Croat* 586324 (MO); Río Arájuño, Hacienda Agüinda, 450 m, 1°07'S, 77°36'W, *Marles EE* 13 (MO). NAPO: Puerto Napo–Misahuallí, junction of Río Misahuallí and Río Napo, Vereda Venecia, 3.8 km W of Misahuallí, 370 m, 1°02'S, 77°42'W, *Croat* 58895 (MO, QCA); Río Cuyabeno, 1.5 km upstream from Puerto Bolívar, 300 m, 0°06'S, 76°10'W, *Brandbyge et al.* 33700 (AAU, MO); N of Laguna Grande, 265 m, *Poulsen* 79710 (AAU); Parque Nacional Yasuni, 230 m, 0°52'S, 76°05'W, *Cerón* 3354 (MEXU, MO, QCNE); 200 m, *Cerón & Gallo* 4937 (MO, QCNE), 53396 (B, MO, QCNE); Äñangu, in NW corner of park, 300 m, 76°22–23'W, 0°32'S, *Korning* 47126 (AAU); Poso petrolero Daimi 2, 200 m, 0°55'S, 76°11'W, *Cerón & Hurtado* 4096 (MO). PERU. AMAZONAS: Quebrada Chigkishinuk, *Kayap* 282 (MO, US); Río Cenepa, Cenepa–Tuhushiku Creek, 700–800 ft., *Berlin* 1874 (MO); Quebrada Huampami, vic. Kachaim, vic. Huampami, 5 km E of Cháviz Valdivia, 200–250 m, 4°30'S, 78°30'W, *Kujikat* 398 (MO); Río Santiago, Quebrada Caterpiza, 2–3 km behind community of Caterpiza, 65 km N of Pinglo, 200 m, *Huashik* 1343, 1869, 2343 (MO); 800 m below community of Caterpiza, trail from Mitayar, W side of Q. Caterpiza, 200 m, *Huashik* 487 (MO). LORETO: Quebrada Nawampa, 150 m, 4°30'S, 44°10'W, *Croat* 17694 (MO); Quebrada Tahuayo, SSW of Tamshiyacu, *Croat* 19743 (MO); Río Aguaytia, Aguaytia, 9°02'S, 75°30'W, *Croat* 20947 (MO, USM); Río Nanay, Mishana, 120 m, *Solomon* 3518 (MO); Prov. Alto Amazonas, Río Pastaza, Andoas, 210 m, 2°48'S, 76°28'W, *Gentry et al.* 29672 (MO); Prov. Loreto, Río Tigre, Vista Alegre, 240 m, 2°40'S, 75°35'W, *Lewis et al.* 12841 (MO); Prov. Maynas, Alpahuayo (Estación IIP), *Vásquez et al.* 5981 (MO); Iquitos Region, Río Itaya, Palo Seco, *Revilla et al.* 2594 (F, MO); Iquitos–Nauta, 130 m, *Vásquez et al.* 10696 (AMAZ, MO); Caserio de Nuevo Esperanza, 110 m, *Rimachi* 5569 (IBE); Río Maniti, Recreo, NE of Iquitos, 115 m, 3°42'S, 72°50'W, *Vásquez & Jaramillo* 1128 (MO); Río Momón, rear of Fundo Bohallo, 1 hr. upriver from mouth, 130 m, *Díaz & Jaramillo* 78 (CM, K, M, MO); 1 km from the Río Nanay, Quebrada Mamoncillo, 220 m, 3°43'S, 73°20'W, *Croat* 51225 (CAS, DUKE, K, MO, US, USM), 51226 (AAU, B, CM, K, MO, RSA, US, USM); below Balcon, ca. 95 m, *McDaniel & Rimachi* 26283 (IBE);

Río Amazonas, S of Iquitos, *Croat* 19342 (MO, F); NE of Leticia (Colombia), Caballococha, 3°54'W, 70°32'W, *Williams* 2465 (F); Quebrada de Sinchiqui below Santa María de Ojeda, *McDaniel & Rimachi* 23873 (IBE); Dtto. Indiana, Explorama Inn, 220 m, 3°23'S, 73°02'W, *Croat* 61648 (AMAZ, MO); Río Amazonas, Quebrada del caserio de San Miguel, ca. 90 m, *Rimachi* 5055 (IBE); Dtto. Yanamono, Indiana–mouth of Río Napo, Explorama Tourist Camp, 120 m, 3°28'S, 72°48'W, *Gentry et al.* 29912 (CM, MO), 61651 (CM, MO), *Vásquez & Jaramillo* 6321 (MO); 3°24'S, 72°49'N, 150–180 m, *Croat* 61766, 61783 (AMAZ, MO), *Gentry et al.* 36577 (MO); across Río Amazonas from Isla Yanamono, 150 m, *Croat* 50126 (originally collected by Gentry, live at MO) (MO, U); Río Napo, Quebrada Sucusari, 130–140 m, 3°15'S, 72°55'W, *Gentry et al.* 42695, 54535 (MO); Explor. Napo Camp, 130 m, 3°20'S, 72°55'W, *Vásquez & Jaramillo* 11829 (MO, QCA), 11835 (MO); Quebrada Paparo, Río Manati, 110 m, 3°45'S, 72°55'W, *Vásquez & Jaramillo* 11654 (MO); Explorama Llachapa Camp, Quebrada Sucusari, below Mazán, 140 m, *Gentry et al.* 27737 (MO); Río Tamshiyacu, Caseria Alianza, 130 m, 4°05'S, 72°58'W, *Gentry et al.* 29233 (BM, MO), *Vásquez & Jaramillo* 4376 (MO); Puerto Alianza, 160 m, 4°08'S, 72°55'W, *Vásquez & Criollo* 1836 (MO); Prov. Requena, Río Tapiche, Yarina, 180 m, 5°05'S, 73°50'W, *Vásquez et al.* 4882 (MO); Jenaro Herrera, 140 m, *van der Werff et al.* 10061 (MO). PASCO: Prov. Oxapampa, Iscozán, 350 m, 10°11'S, 75°13'W, *Smith* 2881 (MO). SAN MARTÍN: Tarapoto–Yurimaguas, km 55, NE of Pongo de Canarachi, 230 m, 6°15'S, 76°15'W, *Gentry et al.* 52272 (MO).

***Anthurium luteynii*** Croat, Selbyana 5(3–4): 324. 1981. TYPE: Panama. Veraguas: Río Primero Brazo, 2.5 km beyond Escuela Agrícola Alto Piedra, beyond Santa Fe, 700–750 m, *Croat* 25521 (holotype, MO 2827506-08; isotypes, B, C, CAS, CM, CR, DUKE, F, K, M, MEXU, NY, PMA, SEL, UCLA, US, VEN). Figures 18, 187–189, 195.

Epiphytic or terrestrial; stem short; roots descending, whitish green, smooth to weakly pubescent, blunt at apex, 2–5 mm diam.; cataphylls subcoriaceous, elliptic, 10–28 cm long, minutely apiculate and inequilateral at apex, drying tan, persisting intact, soon dilacerating into reticulum of fibers. *Leaves* erect to spreading; petioles 9–50 cm long, 1.3–2.5 cm diam., ± trapezoidal to thicker than broad, flattened to weakly sulcate, sometimes with weak rib diminishing toward the base adaxially, the margins prominently and sharply raised, sharply and prominently 1–3-ribbed abaxially, the surface minutely pale-speckled; geniculum much thicker and paler than petiole, 1–3 cm long; blades thickly coriaceous, oblong-elliptic to oblong-oblancoleate, gradually to abruptly acuminate at apex (the acumen apiculate), acute to obtuse at base, 50–125 cm long, 9–33 cm wide, broadest near or above the middle; upper surface