

on the spadix (sometimes the 4th stamen appearing first); anthers white, 0.6 mm long, 0.7 mm wide, obscuring pistil; thecae ellipsoid, not divaricate; pollen drying white. *Infructescence* not seen.

Anthurium curtispadix is known only from a living collection made near Puyo in Pastaza Department, Ecuador, by Mickey Carmichael. It was probably collected in an area of premontane wet forest at ca. 1,000 m.

This species is distinguished by its short, spreading inflorescence with an erect, short, stubby spadix (hence the name) with many (9–15) flowers per spiral. It is probably most closely related to *A. ernestii*, which differs in having an erect inflorescence and cataphylls persisting as an intact network of fine, pale fibers.

ECUADOR. PASTAZA: Puyo, cult. at MO and originally collected by Mickey Carmichael, ca. 1,000 m, *Croat 55207* (AAU, B, K, M, MO, NY, RSA, U, US).

Anthurium dombeyanum Brongn. ex Schott, Prodr. 477–478. 1860. TYPE: Peru, without exact locality, *Dombey s.n.* (holotype, P). Figures 11, 13, 119–122, 127.

Anthurium cymatophyllum K. Koch & Sello in K. Koch, 1221 xi. 276. 1868. TYPE: destroyed, locality unknown, of cultivated origin said to be from Brazil (a tracing at Kew prepared by Masters from Koch's type specimen in Berlin serves as the type).

Anthurium agoyanense Sodiro, Anales Univ. Centr. Ecuador 19: 286. 1905. TYPE: Ecuador. Tungurahua: Agoyán waterfalls in Río Pastaza, slopes of Volcán Tungurahua, 1,550 m, *Sodiro s.n.* (holotype, B)

Anthurium agoyanense var. *eleutheroneuron* Sodiro, Anales Univ. Centr. Ecuador 19: 287, 1905. TYPE: Ecuador. Tungurahua: slopes of Volcán Tungurahua, vic. Machay, *Sodiro s.n.* (holotype, B).

Anthurium rigidissimum Engl., Pflanzenr. IV. 23B(Heft 21): 292. 1905. TYPE: Peru. Junín: Tarma, above Huacapistana, 1,900–2,000 m, *Weberbauer 2007* (holotype, B).

Anthurium rigidissimum var. *mutatum* Engl., Pflanzenr. IV. 23B(Heft 21): 292. 1905. TYPE: Peru. Junín: Tarma, above Huacapistana, 1,900–2,000 m, *Weberbauer 2158* (holotype, B).

Terrestrial or epilithic, rarely epiphytic; stem 20–30 cm long, 2–6 cm diam.; roots dense (the root mass to 20 cm wide), greenish to pale reddish, grayish when dried, sometimes with raphide cells on the surface, elongate, blunt at apex, to 40 cm long, 4–10 mm diam.; cataphylls subcoriaceous, lanceolate, 5–25 cm long, narrowly rounded to bluntly acute at apex, pale green, drying brown, persisting semi-intact at upper nodes, otherwise as coarse linear fibers, sometimes with the apex remaining intact. *Leaves* erect to spreading; petioles (3)10–30 cm long, 5–18 mm diam., erect to

spreading, D-shaped, slightly thicker than broad in juveniles and lacking the medial rib adaxially, sulcate in age with an obtuse to acute medial rib, rounded (rarely 1–2-ribbed) abaxially, the surface pale-speckled; geniculum slightly thicker and paler than petiole, 0.5–2.5 cm long; sheath 3–11 cm long, extending halfway or throughout the petiole in smaller leaves; blades subcoriaceous to thickly coriaceous, oblong-lanceolate to oblanceolate or narrowly obovate, often elliptic in smaller leaves, bluntly acute or acuminate at apex (the acumen minutely apiculate), long-attenuate to obtusely rounded or subcordate at base, (10)40–190 cm long, (2)10–35 cm wide, broadest above or near the middle, the margins flat in smaller leaves or markedly undulate especially in larger leaves; upper surface glossy to semiglossy, dark to medium green, occasionally developing a bluish, glaucous covering with age, lower surface usually semiglossy, rarely matte, concolorous or paler than upper surface; midrib above acutely raised, below obtusely ribbed at base, becoming acutely angled in upper $\frac{1}{3}$, and then convexly rounded toward the apex, paler than surface or concolorous with it; basal veins usually present and aggregated in subcordate leaves, arcuate-ascending, free to base; primary lateral veins (7)10–20(24) per side, departing midrib at (18)40–60(70) $^{\circ}$ angle, usually gently arcuate-ascending to within 1 cm of the margin, then abruptly ascending to the margin, convexly raised above; tertiary veins scarcely visible above, moderately to distinctly visible below, sometimes darker than surface, very weakly raised below or flat, drying raised and conspicuously visible; collective vein arising from near the base to near the apex, less prominent than primary lateral veins, sunken to weakly raised above, raised below, 2–10 mm from margin. *Inflorescences* erect-spreading to spreading-arching, shorter than or almost equaling leaves; peduncle (15)30–65(90) cm long, 2–11 mm diam., (2)3–7(10) \times as long as petiole, pale green, sometimes tinged with red-violet, green to dark brown when dried, subterete, sometimes 1-ribbed, flexible; spathe spreading to reflexed at anthesis, recurled, subcoriaceous to coriaceous, green, sometimes tinged with red-violet, speckled with raphide cells, linear-lanceolate, 7–20 cm long, 1–3.5 cm wide, broadest near base, acute at apex, decurrent at base; spadix olive-green to grayish, becoming dark pink or maroon (B & K red-purple 2/2.5) to purplish at anthesis (B & K blue-purple 4/10), weakly to moderately tapered, rarely cylindroid, sessile to stipitate to 2.5 cm, \pm erect, rigid, held at 130–180 $^{\circ}$ angle from peduncle, 4–28 cm long, 4–17 mm diam. near

base, 3–11 mm diam. near apex, broadest near the base; flowers squarish to 4-lobed, to 3 mm long when fresh, 1.6–2.6 mm long when dried, to 2.5 mm wide when fresh, 1.4–2.2 mm wide when dried, the sides \pm straight to smoothly sigmoid; 4–14 flowers visible in principal spiral, 3–8 in alternate spiral; tepals matte; lateral tepals 1–1.6 mm wide, the inner margins tinged with pink, becoming purplish, broadly convex, the outer margins 2–4-sided; pistils scarcely emergent, green, with raphide cells; stigma oblong, slitlike, 0.4–0.6(1.0) mm long; stamens emerging irregularly from the base of the spadix in a scattered pattern, slightly exerted, lateral stamens emerging to midway, the laterals preceding the alternates by 5–18 spirals, inclined over and obscuring pistil; filaments tan, with raphide cells, exerted ca. 0.5 mm, 1–2 mm long, 0.6–0.9 mm wide; anthers pinkish, 0.6–1.1 mm long, 0.5–1 mm wide, inclined over the pistil; thecae obovoid, scarcely or not divaricate; pollen pale orange to pale yellow fading to cream, yeasty scented. *Infructescence* semi-erect; spathe persisting; spadix 5–27 cm long, 1.5–2.5 cm diam., with berries scattered throughout; berries violet-purple to reddish violet (B & K purple 3/10), obovoid, bluntly rounded at apex, 6–8 mm long, 5–6 mm diam.; pericarp with raphide cells; mesocarp pulpy, white; seeds 1–2 per berry, green, oblong, 3.5–8 mm long, 2.5 mm diam., with a gelatinous appendage at apex.

Anthurium dombeyanum is an Andean species ranging from central Ecuador to southern Peru at 950 to 2,760 m. Collections from Ecuador are from the provinces of Tungurahua and Loja (a somewhat aberrant collection is known from Morona-Santiago; see below), while Peruvian collections are represented from Amazonas and Cajamarca to San Martín, Huánuco, Pasco, Junín, and Cuzco. Specimens from Ecuador ostensibly occur in lower montane moist forest to premontane moist forest life zones. In Peru, the species is present in lower montane and montane moist forest and premontane dry forest. The species occurs in seasonally dry habitats and often inhabits rocky or extremely precipitous sites, with low nighttime temperatures.

This species is recognized by its short-petiolate, coriaceous, usually markedly undulate blades, its long-pedunculate inflorescence with a moderately short-tapered, usually purple spadix, thick, green, lanceolate reflexed spathe and minutely papillate tepals with a more or less erose inner margin. Another feature common to most plants, despite their markedly variable blades (ranging from nar-

rowly obovate to oblong-oblongate) is the primary lateral veins, which frequently extend nearly to the margin in an almost straight line before turning markedly upward and extending along the margin and gradually merging with it.

The only species which might be confused with *A. dombeyanum* is *A. leonianum*, from northern Ecuador, but only two collections of *A. dombeyanum* are known from anywhere near this area and fall short of reaching the same province (Imbabura). *Anthurium leonianum* is most easily distinguished by its petioles, which are 5–8-ribbed, rather than rounded abaxially. See that species for further discussion.

Anthurium cymatophyllum is doubtfully placed here in synonymy. Typical material is no longer existent, and the species is represented by a tracing of the type done by Masters and deposited at Kew and by a photograph taken before the type was destroyed in World War II. The species was described from a plant of cultivated but unknown origin. There was speculation it originated in Brazil, but it is almost certainly not of Brazilian origin. It most clearly fits into *A. dombeyanum*, although the three-ribbed abaxial petiole surfaces are rare in that species.

The leaf of *Anthurium dombeyanum* demonstrates great morphological plasticity in size and shape. A common feature of many collections is an obtuse to rounded leaf base with an aggregation of many veins in the lower few centimeters of the base. Yet plants in the same population, or even on the same individual, may commonly exhibit acute leaf bases lacking such an aggregation of veins. Comparison of *Croat* 58323 and *Croat* 58324 demonstrates the range of leaf bases found within a population. Inspection of the various sheets of *Croat* 57707 or *Croat* 58323 demonstrates this tendency within one individual. The species is also tremendously variable in size, ranging from rather tiny plants collected in exposed areas (e.g., *Vargas* 3988) to huge plants growing in more mesic habitats (e.g., *Croat* 58323).

Several collections are worthy of special mention. Two individual collections, *Croat* 58366 and *Ellenberg* 3538, are from unusually low elevations, i.e., 630 m and 370 m, respectively. The *Croat* collection, from Cajamarca, Peru, is perhaps a distinct species, having blades that dry yellowish green rather than the more typical brown color, and a weakly glaucescent aspect to its mature leaves. The *Ellenberg* specimen, from Amazonas, Peru, on the road between Bagua and Nazareth, is not unusual in any manner other than its aberrant low elevational occurrence. *Sparre* 19272 was also

collected at a rather low elevation (700–800 m) and is the only collection known from Morona-Santiago Province in Ecuador; its leaf blade is also unusually broad. *Vargas 6209*, from Cadena in Cuzco, Peru, is aberrant in having the peduncle only $\frac{3}{4}$ the length of the petiole (vs. (2)7–10× longer in typical *A. dombeyanum*), although the spadix is rather immature. Two collections from near Quillabamba in Cuzco, Peru (*Croat 50962*, *50919*) differ in having the petioles 3-ribbed abaxially, whereas most, if not all, other material has petioles rounded abaxially. *Barbour 2583*, from Amazonas in Peru, is remarkable in having a spathe 4 cm broad near the base and a petiole recorded as terete. The spathe of *Croat 58192*, from San Martín, approaches the dimensions of the Barbour collection.

ECUADOR: LOJA: Cerro Campana, Vilcabamba-Yanagana, Km 7, 1,900 m, 79°16'W, 4°17'S, *Lojtnant & Molau 15002* (AAU, GB); Loja-San Lucas, 2,100 m, *Asplund 18056* (S); Km 25–32, 2,200 m, *Dodson & Thien 597* (MO), *659* (MO, US, WIS); 19 km N of Loja, 2,070 m, 4°10'S, 79°10'W, *Croat 50847* (AAU, B, CM, GB, K, M, MBM, MO, QCA, SEL, US); Mollococha, 10 km W of Vilcabamba, 1,600 m, *Harling & Andersson 21769* (GB). MORONA-SANTIAGO: Gualaquiza, Misión Bomboiza, Misión Salesiana, 700–800 m, *Sparre 19272* (S). TUNGURAHUA: *Sodiro s.n.* (B); Agoyan, *Sodiro s.n.* (B; photo, MO). PERU: Without locality, *Dombey s.n.* (P). AMAZONAS: Prov. Bagua, 15.6 km E of main plaza in Bagua, 5 km above La Peca, 1,050–1,160 m, 5°33'S, 78°21'W, *Croat 58358* (MO, USM); 12 km E of La Peca (by trail), 1,700 m, *Barbour 2583* (MO); Bagua Grande, Longa Grande, Buenos Aires (Calpon), 1,420 m, *Diaz & Campos 3427* (MO); Bagua-Nazareth, 370 m, *Ellenberg 3538* (MO); Prov. Bongara, Bongara, 8 km above Pedro Ruiz Gallo (Jazan), road to Pomacochas, 1,500–1,600 m, 5°55'S, 77°53'W, *Knapp & Alcorn 7538* (MO); Río Utcubamba, SE of Naranjitos, *Gentry et al. 61375* (MO); Suyobamba, 3 km NE of Pedro Ruiz Gallo, 1,400 m, 5°55'S, 77°58'W, *Gentry et al. 61290* (MO); Chiclayo-Río Utcubamba, trail above hwy., NW of Pedro Ruiz Gallo, 1,300–1,400 m, *Young & Eisenberg 289* (MO); Moyobamba-Bagua, NW of Pedro Ruiz Gallo, 1,820 m, 5°52'S, 77°56'W, *Croat 58314* (MO); at jct. of road to Chachapoyas, NW of Pedro Ruiz Gallo, 1,440 m, 5°56'S, 77°56'W, *Croat 58321*, *58324* (MO, USM, VBD), *58322* (CAS, CM, MO, NY, RSA, USM), *58323* (K, MO, RSA, SEL, US, USM); Lago Pomacocha, Moyobamba-Chachapoyas, Km 339–340, Pomacocha, 2,200–2,250 m, 5°47'S, 77°53–54'W, *Croat 58254* (MO, NY, USM), *58281* (MO); Prov. Chachapoyas, Hacienda Shani, Chachapoyas, *Cevasco s.n.* (USM). AYACUCHO: Valle de San Miguel, Media Naranja, 2,000 m, 13°13'S, 73°95'W, *Guerrera 2034* (F). CAJAMARCA: Prov. Cajamarca, Huambos, 2,200 m, *Ferreya 8409* (NY, USM); Prov. Jaén, Río Chamaya, Bagua-Olmos, 35 km E of Pucara, 70 km W of Río Marañón bridge, 630 m, 6°0'S, 78°52'W, *Croat 58366* (AAU, C, CAS, CM, GH, K, KYO, MO, NY, SEL, U, US, USM). CUZCO: Prov. Calca, Vilcabamba, 2,700 m, *Vargas 3988* (CUZ); Prov. Convención, Choquellwanca, 1,450 m, *Vargas*

12947 (CUZ); Cuzco-Kiteni, Cocalpampa, 150 km NW from Cuzco, 1,210–1,435 m, *Núñez et al. 6816* (MO); Rosario Mayo, 950–1,200 m, *Chávez 3334*, *3336* (MO), *Vargas 20674* (US); Quillabamba-Cuzco, just S of Quillabamba, 1,050–1,200 m, 12°20'S, 72°44–45'W, *Croat 50919* (CM, MO), *50962* (COL, M, MO, MY, USM); Santa Teresa-Chaullay, at Quellomayo, 139 km from Cuzco, 1,200–2,600 m, 13°08'S, 72°36'W, *Núñez & Motocanchi 8752* (MO); Urusayhua, 1,400 m, *Chávez 507* (MO); Río Mopillo, Yupanqui-Río Apurimac, Pomobamba, 2,000 m, *Davis et al. 1261* (F, SEL); Río Urubamba, Quillabamba, 1,100 m, *Solomon 3111* (MO, F); Prov. Quispicanchis, Cadena, 1,060 m, *Vargas 6209* (CUZ); Masca Pata, Hda. Itio, 2,000 m, *Vargas 3053* (CUZ); Prov. Urubamba, Km 88–92, 2,500 m, *Vargas 3396* (CUZ); km 110 Machupicchu-Cuzco, 2,000 m, 13°09'10"S, 72°31'W, *Núñez 8679* (MO); 2,900 m, *Núñez 8423* (MO); Machupicchu, *Jackson & Jackson P-1* (F); 2,000 m, *Bogner 904* (K); 2,300 m, *Vargas 21642* (CUZ, MO); 2,300 m, *Zahner s.n.* (M); railway, Km 96, 2,300 m, *Palmer 181* (K); Laderas, 2,100 m, *Vargas 2982* (CUZ); Papacahua, 4 stops on railroad above Machupicchu, 2,500 m, 13°11'S, 72°30'W, *Croat 50969* (MO); Tankarata, 2,650 m, *Vargas 13576* (CUZ, US). HUÁNUCO: Tingo María Region, Huaminica, 1,800 m, *Woytkowski 34220* (F, G, MO, UC); Prov. Huánuco, Acomayo, 2,300 m, *Woytkowski 34331* (F, MO, UC); Río Tuleca, Huánuco-Tingo María, km 443, 6 km N of Acomayo, 2,450 m, 9°04'S, 76°04'W, *Croat 57842* (CAS, CM, MO, NY, RSA, SEL, US, USM). JUNÍN: Prov. Acobamba, Acobamba-Oxapampa, Carretera 20B, 23 km NE of Acobamba, 2,170 m, *Jones 9138* (LAM, MO); Prov. Tarma, Tarma-Oxapampa, 38 km NE of Tarma, on Carretera 20B, 2,226 m, *Jones 9105* (LAM); Tarma-San Ramón, 1,000–3,000 m, 11°10'S, 75°20–45'W, *Sullivan et al. 1067* (F, MO, SEL); 2,400 m, 11°10'S, 75°33'W, *Smith & Canne 5931* (B, MO); Carpapata, 2,400–2,500 m, *Cerrate 2810* (USM); Huasahuasi, 2,760 m, *Hutchinson 4164* (UC, US); Huacapistana, rd. to Palca, *Weberbauer 1975*, *2007*, *2158* (B); Huacapistana, 1,800–2,400 m, *Killip & Smith 24328* (NY, US); Matichaca, near Huacapistana, 2,100–2,200 m, *Ferreya 11180* (NY); 28–34 km NE of Tarma, 2,400–2,500 m, *Dillon & Turner 1354* (F, MO), *Croat 57707* (AAU, B, BM, K, MO, RSA, U, USM), *Gentry & Tredwell 37285* (MO). LA LIBERTAD: Río Santo Domingo, Piedra Grande, 1,670 m, *Macbride 3668* (F). PASCO: Prov. Oxapampa, Palmazu, 2,100 m, 10°32'S, 75°23'W, *Smith et al. 8495* (MO). SAN MARTÍN: Rioja-Pomacocha, km 291, near Amazonas border, Venceremos, 1,850 m, 5°45'S, 77°40'W, *Gentry et al. 45343* (MO); Moyobamba-Chachapoyas, Km 400–404, 1,150–1,280 m, 5°45'S, 77°29'W, *Croat 58204* (MO, USM), *58192*, *58207* (MO).

Anthurium ernestii Engl., Pflanzenr., IV, 23B(Heft 21): 80. 1895.

a. **Anthurium ernestii** var. **ernestii**. TYPE: Peru. San Martín: Pongo de Cainarachi, *Ule 6325* (lectotype, B). Figures 124, 128–130.

Epiphytic; stem 6–20 cm long, 1–3 cm diam.; roots dense, green, whitish when dried, velutinous, 2–5 mm diam.; cataphylls subcoriaceous, 2-ribbed,