New species of Anthurium (Araceae) from the Cordillera del Cóndor, Ecuador

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New species of *Anthurium (Araceae)* from the Cordillera del Cóndor, Ecuador

Abstract

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Seven new species of *Anthurium, A. achupallense, A. bogneri, A. clarkei, A. collettianum, A. miaziense, A. nangaritense* and *A. patens,* and one new variety, *A. versicolor* var. *azuayense,* are described as new to science from the Cordillera del Cóndor, an isolated mountain range in SE Ecuador along the border of Peru.

Additional key words: aroids, Morona-Santiago Province, Zamora-Chinchipe Province, taxonomy

Introduction

The Cordillera del Cóndor is a massive outcrop of limestone overtopped by sandstone, which lies along the Peruvian border in SE Ecuador and is isolated from the remainder of the Ecuadorian Cordillera Oriental and the Andes. It is bordered on the west and the north by the Río Nangaritza, which flows into the Río Santiago. The latter river system borders the Cordillera del Cóndor to the east. The elevation ranges from 1000 to 2500 m. This isolated region has been shown to have many endemic species, especially on the upper nutrient-poor sandstone cap, which lies roughly between 1500 and 2000 m and overlays a thick layer of karst limestone. It has been poorly explored due to the incredible difficulty in reaching the summit owing to the nearly perpendicular sides of the massif.

The senior author has collected eight times in the vicinity of the Cordillera del Cóndor, with the last five trips involving penetration into the lower slopes of the massif. The first trip to the region was in May 1980, followed by trips in March 1992, August 1999, September 2002, May 2003 (taken with student Mark Menke), July 2004 (taken with Lynn Hannon, Greg Walhert and Tuntiak Kua), April 2006 and in September 2007 (with Geneviève Ferry, Chris Davidson and Sharon Christoph). This paper is the first of several describing new species from the Cordillera del Cóndor region and adjacent areas in SE Ecuador.

Classification of the forest vegetation in the habitat notes of the new species follows Holdridge & al. (1971).

Anthurium achupallense Croat, **sp. nov.**
Holotype: Ecuador, Morona-Santiago, Campamento Achupalla, Cordillera del Cóndor, 15 km E of Gualaquiza, 2090 m, 3°27'S, 78°22'W, 21.7.1993, *A. Gentry 80287* (MO 04631347; isotypes: F, K, QCNE) – Fig. 1A–B.

Internodia 2.1–5.5 cm longa, 1.5–2.6 cm diam.; cataphylla 5.7–9.5 cm longa; folia petiolo 4.4–20.7 cm longo, lamina oblonga, 18.6–25.4 cm longa, 2.5–5.1 cm lata, nervis primariis lateralibus 8–9 utroque; pedunculus

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Unfortunately Alana Jackson passed away shortly after finishing this work. Alana was a very astute volunteer dedicated to her research project and we will miss her extraordinary service to the Garden.

Fig. 1. A–B: *Anthurium achupallense* – holotype specimen at MO, *Gentry 80287* (A), isotype specimen at QCNE (B); C: *A. bogneri* – holotype specimen at MO, *Croat & Menke 89485;* D: *A. clarkei* – isotype specimen at QCNE, *Palacios 6632*.

27.5–32.3 cm longus; spatha 3.7–5.4 cm longa, 1–1.7 cm lata, marroninus; spadix 3.3–9.7 cm longus, 5–8 mm diam., marroninus.

Terrestrial, *stem* to 30 cm or more, elongate and shortly erect; *roots* lax; *internodes* 2.1–5.5 cm long, 1.5–2.6 cm diam. (averaging 3.9 × 2 cm), variable in length, drying light brown to dark brown-black, matte, prominently ribbed (sometimes closely and regularly ridged on lower internodes); *cataphylls* 5.7–9.5 cm long, drying intact, tan to dark reddish brown, matte to semiglossy, weathering toward base. *Leaves* scattered along stem, ± erect, *petiole* 4.4–20.7 cm long (averaging 12.4 cm) and 0.2–0.4 cm diam., cross section terete, obtusely sulcate, slightly ribbed, drying light brown to reddish brown, upper surface sulcate and lower surface rounded, petiole margins obtusely raised; *geniculum* 5–10 mm long, 3–5 mm diam., prominent, slightly wider than petiole, acutely sulcate, drying dark reddish brown to dark brown; *blade* oblong, 18.6–25.4 cm long, 2.5–5.1 cm wide (averaging 22.1 × 3.2 cm), 4.9–9.2 × longer than wide, 1.1–4.3 × longer than petiole, acute at apex with a short protruding nipple, apex gradually acuminate and weakly emarginate, acute at base, coriaceous, somewhat bicolorous, matte, drying yellowish brown to light brown or dark brown and matte above, brown to dark reddish brown and matte below; upper surface longitudinally irregularly short-ridged; lower surface densely dark speckled with warty bumps and pale granulations along and on major veins; margins prominently revolute; major veins sometimes purplish below, blade margins convex, glands absent; *midrib* narrowly raised and concolorous on upper surface, forming deep valley upon drying, lower surface narrowly raised and paler, rounded, drying longitudinally ridged, light brown; *primary lateral veins* 8–9 pairs, departing midrib at a 30–35° angle, drying concolorous and weakly raised on upper surface, weakly raised and concolorous on lower surface; *collective veins* arising from base, 3–5 mm from margin, drying sunken above, bluntly raised below, antimarginal veins present, not visible above, bluntly raised below, much more prominent than primary lateral veins, basal veins 1–2 pair, both free to base, collective vein arising from the primary or uppermost basal vein. *Inflorescences* erect; *peduncle* 27.5–32.3 cm long (averaging 29.2 cm), drying dark brown to reddish brown, matte, with deep folds, slender with irregular ridging; *spathe* reflexed-spreading, ovate-lanceolate, 3 dimensional shape fully expanded (as opposed to boat shape), 3.7–5.4 cm long, 1–1.7 cm wide (averaging 4.6 × 1.4 cm), maroon; *spadix* 0.25-0.75 cm stipitate, 3.3–9.7 cm long, 5–8 mm diam. (averaging 5.8 × 0.63 cm), cylindroid, maroon. *Flowers* 5–6 visible per spiral, 1.8–2 mm long and wide, tepals matte, minutely granular, 1.4–1.8 mm wide, outer margin 2–3-sided, inner margin broadly rounded, stamens emerging just above tepals, 0.4 mm long, 0.6 mm wide, promptly retracting beneath tepals. *Berry* colour and seed number not known.

Anthurium achupallense is endemic to the Cordillera del Cóndor, known only from Morona-Santiago and Zamora-Chinchipe at 2090 m in a Premontane wet forest life zone on exposed ridges in nearly level sandstone with very dense, dwarf montane forest and low dense montane scrub.

The species is a member of what is probably an undescribed section but is closest to *Anthurium* sect. *Decurrentia*. The species is characterised by its terrestrial habit, internodes longer than broad, its coriaceous, erect-spreading, short-petiolate leaves, oblong, epuncate blades with blunt apex with a short nipple as well as by its maroon spathe and ± cylindroid maroon spadix. The species is reminiscent of *A. ottonis* K. Krause from Bolivia and southern Peru by virtue of its elongated blade, intact cataphylls and maroon spadix, but that species differs in having blades 12.6–17.6 × longer than the petioles instead of 1.1–4.3 × so in *A. achupallense*. In addition, *A. achupallense* has the major veins sunken on the dried blades, but those of *A. ottonis* are raised; the entire dried upper surface of the blades is irregularly and closely ridged in *A. achupallense,* whereas smooth in *A. ottonis*.

The species is named after the type locality at Campamento Achupalla in the Cordillera del Cóndor.

Paratypes. — Ecuador: Zamora-Chinchipe: Centinela del Cóndor, Cordillera del Cóndor, Machinaza plateau summit area, adjacent to obelisk-shaped border marker, at end of trail from upper Río Paquisha military post, precisely at Ecuador-Peru border, 3°53'50"S, 78°28'40"W, 2420 m, 15.3.2008, *D. Neill & N. Quizhpe 16173* (MO, NY, QCNE, US); Palanada, Tapichalaca Reserve, south of *Podocarpus* National Park, east of road between Yangana and Valladolid, upper Río Chinchipe watershed, near beginning of mule trail to Quebrada Honda, 4°29'23"S, 79°08'11"W, 2500 m, 25.9.2007, *D. Neill, C. Davidson & S. Christoph 15984* (MO, QCNE).

Anthurium bogneri Croat, **sp. nov.**

Holotype: Ecuador, Zamora-Chinchipe, Cordillera del Cóndor, along road from Los Encuentros to El Sarsa, 14.4 km SE of Los Encuentros, 3°47'44"S, 78°37'01"W, 1188 m, 26.5.2003, *T. B. Croat & M. Menke 89485* (MO 5715065; isotypes: AAU, B, COL, F, G, HUA, K, M, NY, PSO, QCNE, S, SEL, US, USM, VEN). – Fig. 1C.

Internodia 1.5–15.2 cm longa, 3–4 mm diam.; cataphylla 2.9–8.5 cm longa; folia petiolo 1.8–10.3 cm longo, lamina 5.5–17.3 cm longa, 2.5–9.1 cm lata, anguste ovata vel anguste elliptica vel ovato-elliptica, nervis primariis lateralibus 6–8 utroque; pedunculus 3.7–12.4 longus; spatha 0.9–2.1 cm longa, 0.7–1.1 cm lata, plus minusve viridis; spadix stipitatus 3–8 mm vel interdum sessilis, 1.9–3.9 cm longus, 4–6 mm diam., atropurpureo-violaceus.

Terrestrial or epiphytic vine, sprawling or erect, *stem* to 1 m long; *internodes* 1.5–15.2 cm long (averaging 10.7 cm), 3–4 mm diam., medium green to yellow-brown or light brown, matte to semiglossy, drying mostly dark red-brown, sometimes drying light greyish brown; *cataphylls* 2.9–8.5 cm long (averaging 4.3 cm), marcescent, persisting semi-intact at upper nodes, fibrous with fibres parallel, drying light greyish red brown or reddish brown to dark red-brown, rarely very light tan. *Leaves* scattered along stem, erect-spreading, *petiole* 1.8–10.3 cm long, medium green, semiglossy, subterete or obtusely to acutely flattened, weakly and narrowly sulcate, margins bluntly acute, sometimes entirely geniculate, drying greyish olive-green-brown, or brown to dark brown, rarely light tan; *geniculum* 0.6–1.7 cm long (averaging 1 cm), sometimes running from base of blade to sheath, drying greenish brown to brown or dark brown to almost black, rarely concolorous with petiole; *blade* 5.5–17.3 cm long, 2.5–9.1 cm wide (averaging 10.8 × 5.3 cm), 1.3–2.7× longer than broad, narrowly ovate to narrowly elliptic or ovate-elliptic, moderately coriaceous, moderately bicolorous, dark green and semiglossy to weakly glossy above, moderately paler and weakly glossy below, drying light greyish green to medium olive-green or greyish red-brown to medium reddish brown, rarely light greyish tan; *midrib* bluntly acute to narrowly raised and concolorous above, narrowly rounded and paler below, drying concolorous above and below, rarely paler; both surfaces conspicuously glandular-punctate; *primary lateral veins* 6–8 pairs, arising from midrib at a 50–55° angle, etched and concolorous above, weakly raised and slightly darker below; *tertiary veins* weakly developed with only a few raised; *collective veins* arising from base, 4–10 mm from margin. *Inflorescence* erect; *peduncle* 3.7–12.4 cm long (averaging 7.5 cm), light maroon, drying reddish brown to dark brown; *spathe* 0.9–2.1 cm long, 0.7–1.1 cm wide (averaging 1.5 × 0.88 cm), green to reddish green, recurled-reflexed to reflexed, drying light reddish brown to dark reddish brown; *spadix* stipitate 3–8 mm (averaging 6 mm), sometimes sessile, 1.9–3.9 cm long (averaging 2.9 cm), 4–6 mm diam., dark purple-violet. *Flowers* 6 per spiral, 2.6–2.8 mm long, 2–2.3 mm wide; tepals finely granular, semiglossy, lateral tepals 1.5 mm wide, the outer margins 2-sided; stamens held briefly above tepals; anthers 0.3 mm long, 0.5 mm wide; thecae broadly divaricate. *Berries* dark violet-purple.

Anthurium bogneri is endemic to the Cordillera del Cóndor region in SE Ecuador (Morona-Santiago and Zamora-Chinchipe provinces) and N Peru (Amazonas) in Tropical moist forest, Montane moist forest and Premontane wet forest life zones.

The species is a member of *Anthurium* sect. *Tetraspermium* and is characterised by its scandent habit, elongated internodes, weakly and narrowly sulcate petioles, more or less ovate-elliptic glandular-punctate leaf blades, the reflexed, usually green spathe and especially by the usually stipitate purple-violet spadix.

The species is similar to other Ecuadorian species of *Anthurium* sect. *Tetraspermium* including *A. citrifolium* Sodiro, *A. laciniosum* Sodiro and *A. scandens* (Aubl.) Engl. *A. citrifolium* differs by having matte-subvelvety to velvety blades with a yellow-green spadix. *A. laciniosum* differs because the internodes are shorter, 1.2–6.7 cm long, the cataphylls form a basket around the stem, the blades are subelliptic-lanceolate and the spadix is longer (4.3–16.7 cm) and more slender (3–5 mm wide). *A. scandens* differs by the blades that are narrowly lanceolate to lanceolate-ovate or oval as well as by the short peduncle (3–5 cm long) with a white to greenish or reddish spadix.

Overall the drying colours of the cultivated specimens were lighter and this may have been due to the drying temperature. For example, in the cultivated specimens the cataphylls dried very light tan, whereas in the other collections they dried light greyish red-brown or reddish brown to dark red-brown. The petioles of the cultivated collections dried very light tan, compared to greyish olive-green-brown or brown to dark brown in the other collections. The blade of the cultivated plants dried light greyish tan with a midrib that was paler than the blade and light tan, while in other collections the blades dried light greyish green to medium olive-green or greyish red-brown to medium reddish brown with a midrib concolorous with the blade above and below.

The species is named in honour of the aroid taxonomist and a close friend of many years, Dr Josef Bogner, of the Munich Botanical Garden, Germany, who made one of the first collections of the species in 1974 (the first by W. H. Camp in 1944). Although Bogner's field work has largely concentrated on Asia and Africa, especially Madagascar, he has made a number of important expeditions to South America and as always found many new species. Josef Bogner is the world's most knowledgeable aroid specialist at the generic level and I am especially pleased to be able to name this species in his honour.

Paratypes. — Ecuador: Morona-Santiago: Near junction of Río Negro-Río Pailas, trail to Mendes, 1829–2286 m, 20.8.1945, *W. H. Camp E-4929* (MO, NY); along road from Macas to Guamote and Riobamba, 17.3 km north of Macas, 2°14'12"S, 78°12'50"W, 1200 m, 13.8.2002, *Croat, L. Hannon & P. Schmidt 86567* (MO); Cantón Morona, Cordillera Cutucú, E-trending slope from top of ridge down toward the Itzintza, 2°40'S, 78°00'W, 1463–1768 m, 17.11.–5.12.1944, *W. H. Camp E-1373* (NY); Cantón Limon Indanza, Limón-Santa Susanna de Chiviaza, 2°54'20"S, 78°19'41"W, 1300 m, 12.1.2001, *J. L. Clark 5983* (MO, QCNE, US); Plan de Milagro to 15 km S of San Juan de Bosco, c. 78°50'W, 3°0–10'S, 1470 m, 1.6.1989, *J. F. Smith 2083* (WISC). —

Zamora-Chinchipe: El Pangui-Zamora, 2 km S of San Roque, 10 km S of El Pangui, 3°42'11"S, 78°35'59"W, 900 m, 7.9.2002, *Croat 87210* (MO); along road from Zamora to Romerillos, 13.3 km E of bridge over Río Bombuscaro at Zamora, 0.4 km N of Pituca along river, 4°08'02"S, 78°56'31"W, 975 m, 30.5.2003, *Croat & M. Menke 89801* (MO); Estación Científica San Francisco, 16.9 km E of Loja border on Loja to Zamora hwy, on slopes across river from scientific station, 3°58'21"S, 79°04'36"W, 1908 m, 24.7.2004, *Croat 92107* (MO); area of Estación Cientifica San Francisco, Loja–Zamora, c. 35 km from Loja above Sabanilla, plot 4, 3°58'S, 79°04'W, 2000 m, 22.9.2003, *F. A. Werner 472* (MO, QCNE); Cantón El Pangui, Cordillera del Cóndor, vicinity of Ecua-Corrientes copper mine region, valley of Río Waiwaime, 5.9 km above gate near copper mine camp near Río Quimi, 3°34'54"S, 78°26'06"W, 1331 m, 5.4.2006, *Croat 96661* (CAS, F, GB, K, MO, QCNE, VEN); Condor Mirado, old botanical garden near road, along trail to summit, 3°38'12"S, 78°25'49"W, 1400 m, *Croat & Ferry 99120* (MO, QCNE); crest of Cordillera on Ecuador-Perú border, 1 km S of Destacamento military, Cóndor Mirador, Hito de la Paz, 13, 3°37'26"S, 78°23'35"W, 1800 m, 15.12.000, *M. Cuascota & Grupo Post-Grado MO-QCNE 333* (QCNE, MO); vicinity of Ecua-Corriente copper mine development, valley of Rio Waiwaime, along road to mine site, 9.5 km from mine headquarters, 6.5 km S of locked gate, 3°35'07"S, 78°26'05"W, 1280–1530 m, 10.4.2006, *Croat 96881* (MO).

Peru: Amazonas: Bagua, c. 12–18 trail km E of La Peca in Serrania de Bagua, 5°36'45'S, 78°21'30"W, 1800–1950 m, 14.6.1978, *A. Gentry, M. Dillon, C. Diaz & P. Barbour 22894* (F, MO); Rio Cenepa, La Peca, 12 km (by trail) east of Le Peca, 1700 m, 28.6.1978, *P. J. Barbour 2542* (MO); Condorcanqui, Puesto de Vigilancia 'Alfonso Ugarte' (PV3), headwaters of Río Comainas, tributary E of Río Cenepa, ridge behind the camp, 3°53'35"S, 78°25'30"W, 1200 m, 15.7.1994, *H. Beltrán & R. Foster 818* (MO, USM); Río Cenepa, Distrito El Cenepa, Región Nororiental del Marañon, communidad Tutino, 4°33'S, 78°10'W, 750 m, 22.11.993, *R. Vasquez, C. Diaz, J. Mostacero, F. Mejia, J. Ampam 18536* (CM, MO, NY).

Cultivated: From Ecuador, without exact locality, 1974, *Bogner 1580* (M).

Anthurium clarkei Croat, **sp. nov.**

Holotype: Ecuador, Zamora-Chinchipe, Cantón Nangaritza, Miazi, margin of Río Nangaritza, primary forest with outcrops of calcareous rocks, canopy at 30 m, "suelos entisoles", 78°42'W, 4°16'W, 930 m, 26.10.1991, *W. Palacios, I. Vargas & M. M. Ruíz 8601* (MO 4312399; isotypes: K, QCNE, S, US). – Fig. 1D.

Internodia 2.7–10.2 cm longa, 3–7 mm diam.; cataphylla 5.3–8 cm longa, decidua; folia petiolo 6.2–8.3 cm longo, lamina ovata, 11.2–15 cm longa, 6.7–10.2 cm lata, nervis basalibus 3–4 utroque, nervis primariis lateralibus 5–8 utroque; pedunculus 7.7–21 cm longus; spatha viridis, 2.5–4.5 cm longa, 6–7 mm lata; spadix anguste cylindroideus, 3–5.5 cm longus, purpureus.

Terrestrial and hemiepiphytic vine, sprawling; *stem* elongated, arising up to 1.5 m, shortly erect and scandent; *internodes* 2.7–10.2 cm long, 3–7 mm diam., medium green, weakly glossy, drying pale brown; *roots* lax, long and slender, drying dark brown, loose and spreading; *cataphylls* 5.3–8 cm long, drying mostly intact to semi-intact, light greenish brown to light brown, deciduous, with only a few pale, loose fibres persisting at base. *Leaves* widely scattered on stem, *petiole* 6.2–8.3 cm long (averaging 7.2 cm) and 0.5–1.5 cm diam., medium green, semiglossy, terete, narrowly and weakly sulcate, drying greenish brown to light brown; *geniculum* 0.5–1 cm long; *blade* ovate, 11.2–15 cm long, 6.7–10.2 cm wide (averaging 13.7 × 8.2 cm), 1.5–2 × longer than broad, 1.5–2.3 × longer than petiole, acute at apex and abruptly acuminate, rounded at base, subcoriaceous, dark green, matte-subvelvety above, moderately paler and matte below, drying greyish green above, light yellowish green below; *midrib* acute and ± concolorous above, narrowly rounded and darker below, drying concolorous above, concolorous to slightly paler below; *basal veins* 3–4 pairs free to base, 1st and 2nd continuing to apex, 3rd and 4th continuing $^{2}/_{5}$ of blade and merging with margin; *primary lateral veins* obscure, 5–8 pairs, arising at 40–50° angle, weakly sunken and concolorous above, weakly raised and concolorous below, drying concolorous to slightly paler above and below; *collective veins* arising from 1st basal vein, 9–15 mm from margin near base, 3–6 mm from margin at 2nd and 3rd primary lateral veins, gradually closer to margin near apex. *Inflorescence* with *peduncle* 7.7–21 cm long (averaging 14.4 cm); *spathe* linear to lanceolate**,** green, 2.5–4.5 cm long, 6–7 mm wide (averaging 3.6 cm × 7 mm), 3 dimensional shape fully expanded and at anthesis reflexed; *spadix* stipitate 0.1–0.25 cm, narrowly cylindroid, slender, 3–5.5 cm long (averaging 4.4 cm) and 0.2–0.3 cm diam., purple. *Flowers* 5–6 visible per spiral, 1.4–1.6 mm long, 2.4–2.6 mm wide, tepals minutely granular, lateral tepals 0.6–0.7 mm wide, 2–3-sided, usually ± shield-shaped. *Berry* colour and seed number unknown.

Anthurium clarkei is known only from SE Ecuador and adjacent Peru in the Cordillera del Cóndor in Zamora-Chinchipe Province and adjacent Amazonas Department in a Premontane wet forest life zone at 930–1130 m.

The species is a member of *Anthurium* sect. *Xialophyllium* and is distinguished by its long, pale brown internodes, the cataphylls soon deciduous, the terete, weakly sulcate petioles and ovate, matte-subvelvety greyish green-drying blades, the long-pedunculate, slender in-

florescence, green spathe and purple, short-pedunculate narrowly cylindroid spadix.

The species should be compared with *Anthurium patens*, another member of *A.* sect. *Xialophyllium* from the same region (described below). That species differs by ovate to narrowly elliptic blades 1.9–3.5 × longer than broad, tapering from the middle to the cordulate lobes, as well as in a pale green to dark green spadix, whereas the blades of *A. clarkei* are ovate, 1.5–2 × longer than broad, acute to abruptly acuminate at apex and rounded at base, while the spadix is purple.

The species is named after Dr John Clark, the prodigious collector of *Gesneriaceae* in Ecuador. Clark has been literally all over Ecuador and does the senior author the favour of collecting *Araceae* on nearly all of his trips. He has collected many new species of *Araceae* including this one that bears his name.

Paratypes. — Ecuador: Zamora-Chinchipe: Pachicutza, trail toward El Hito, the canopy 12–18 m, 4°09'S, 78°38'W, 900–1200 m, 17.10.1991, *J. Jaramillo 13975* (QCA); Nangaritza, Parroquia, Zurmi, Comunidad Centro Shaime (along Río Nangaritza), 2–4 km NW of Centro Shaime, forest on limestone outcrops with sinkholes, rocks, and caves, 4°04'S, 78°54'W, 1000 m, 13.12.2001, *J. L. Clark, K. Elmers, A. Lucia & M. Terry 6470* (QCA, QCNE, US); Río Nangaritza, Shaime, 4°20'S, 78°40'W, 1000 m, 8.12.1990, *W. Palacios 6632* (MO, QCNE); Parroquia Zurmi, vicinity Las Orquideas, forest near Cabañas Yancuam, c. 3 km S of Las Orquideas, slopes W of Río Nangaritza, 4°15'01"S, 78°39'33"W, 1130–1250 m, 17.4.2006, *Croat 97137* (MO, QCNE).
Peru: Amazonas: Bagua, Dtto., Imaza, Comunidad Aguaruna de Kusú-Listra, Cerro Apág, margen derecha Quebrada Kusú, 600–700 m, 17.9.1996, *C. Díaz, A. Peña, R. Tiwi& D. Shuwin 8258* (MO).

Anthurium collettianum Croat, **sp. nov.**
Holotype: Ecuador, Morona-Santiago, along road between Santiago and Río Morona, between Yaupi–Morona, 26.7 km E of Santiago, 2°58"43'S, 77°49'56"W, 550 m, 11.9.2002, *T. B. Croat 87475* (MO 6089590; isotypes: AAU, B, CAS, COL, F, G, GB, HUA, K, M, NY, QCA, QCNE, S, SEL, UB, US, VEN). – Fig. 2A–B.

Internodia brevia, 1.5 cm diam.; cataphylla 10–12.5 cm longa; folia petiolo 13.2–22.6 cm longo, lamina oblongo-oblanceolata, 27.6–46.4 cm longa, 6.9–9.9 cm lata, nervis primariis lateralibus 8–10 utroque; pedunculus 33–56.8 cm longus; spatha 11.8–14.7 cm longa, 1–1.9 cm lata; spadix 9.4–18.8 cm longus, 3.5–4 mm diam.

Epiphyte; *internodes* short, 1.5 cm diam.; *cataphylls* 10–12.5 cm long, fibres pale to reddish brown, persisting in part intact, more loosely fibrous toward the base. *Leaves* with *petiole* 13.2–22.6 cm long, 0.2-0.4 cm diam., narrowly sulcate, subterete (margins moderately acute), dark green, weakly glossy; *geniculum* 2–5 cm long; *blade* oblong-elliptic to weakly oblong-oblanceolate, 27.6–46.4 cm long, 6.9–9.9 cm wide, 3.18–5.16 × longer than wide, 1.33–2.16 × longer than petioles, gradually and narrowly long-acuminate at apex, acute at base, moderately coriaceous, dark green and weakly glossy above, moderately paler and weakly glossy below, drying grey-green or greyish yellow-green above, sparsely short-pale-lineate and lacking glandular punctations above but densely dark granular at high magnification above, drying brownish olive-green to dark brown and dark glandular-punctate, densely pale-speckled below; *midrib* narrowly raised and slightly paler above, bluntly acute and paler below, drying acutely, closely and irregularly ribbed and paler above and below; *primary lateral veins* 8–10 pairs, arising at a 40–55° angle, etched and concolorous above, weakly bluntly acute and concolorous below, drying concolorous on both surfaces, drying narrowly rounded to moderately thicker than broad, minutely granular above, sparsely glandular-punctate below; basal veins 1–2 pairs, both free to base; *collective veins* 1 pair, arising from the base or very near the base from the uppermost basal vein, 4–8(–11) mm from the margins, weakly loop-connecting the primary lateral veins, sunken above, narrowly raised below. *Inflorescence* erect; *peduncle* purplish violet, several-ribbed, 33–56.8 cm long, 4–5 mm diam., sharply 10–14-ridged, sometimes somewhat flattened on one side, weakly glossy, yellow-green, densely short-purplish-lineate throughout; *spathe* 11.8–14.7 cm long, 1–1.9 cm wide, narrowly lanceolate-triangular, reflexed-spreading, recurled, medium green, weakly glossy inside, semiglossy and tinged purplish outside, inserted at a c. 30° angle; *spadix* sessile, shape tapered, 9.4–18.8 cm long, 3.5–4 mm diam., dark violet-purple, matte. *Flowers* rhombic, 1.8–2.5 mm long, 1.3–2.2 mm wide; 8–9 flowers visible per spiral; tepals 1 mm wide, semiglossy, outer margins 2-sided, sometimes 3-sided, inner margins broadly rounded; exposed portions of pistil 0.6–0.8 mm wide; stamens displayed in a well-spaced pattern on all 4 sides of pistil, held just above tepals and persistent; anther 1.3 mm long, 1.8 mm wide, pollen pale orange, oxidising to white. *Berries* and seed number unknown.

Anthurium collettianum is known only from the type locality on the Río Morona near the Ecuadorian-Peruvian border in a Tropical moist forest life zone at 550 m elevation.

The species is a member of *Anthurium* sect. *Porphyrochitonium,* a group that is very rare in the region of the Río Morona. *A. collettianum* is recognised by its moderately intact persistent cataphylls, sharply sulcate petioles, the arching blade with one pair of collective veins and weak glandular punctations on the lower surface only, by the many-ribbed peduncle and the long-tapered purplish violet spadix.

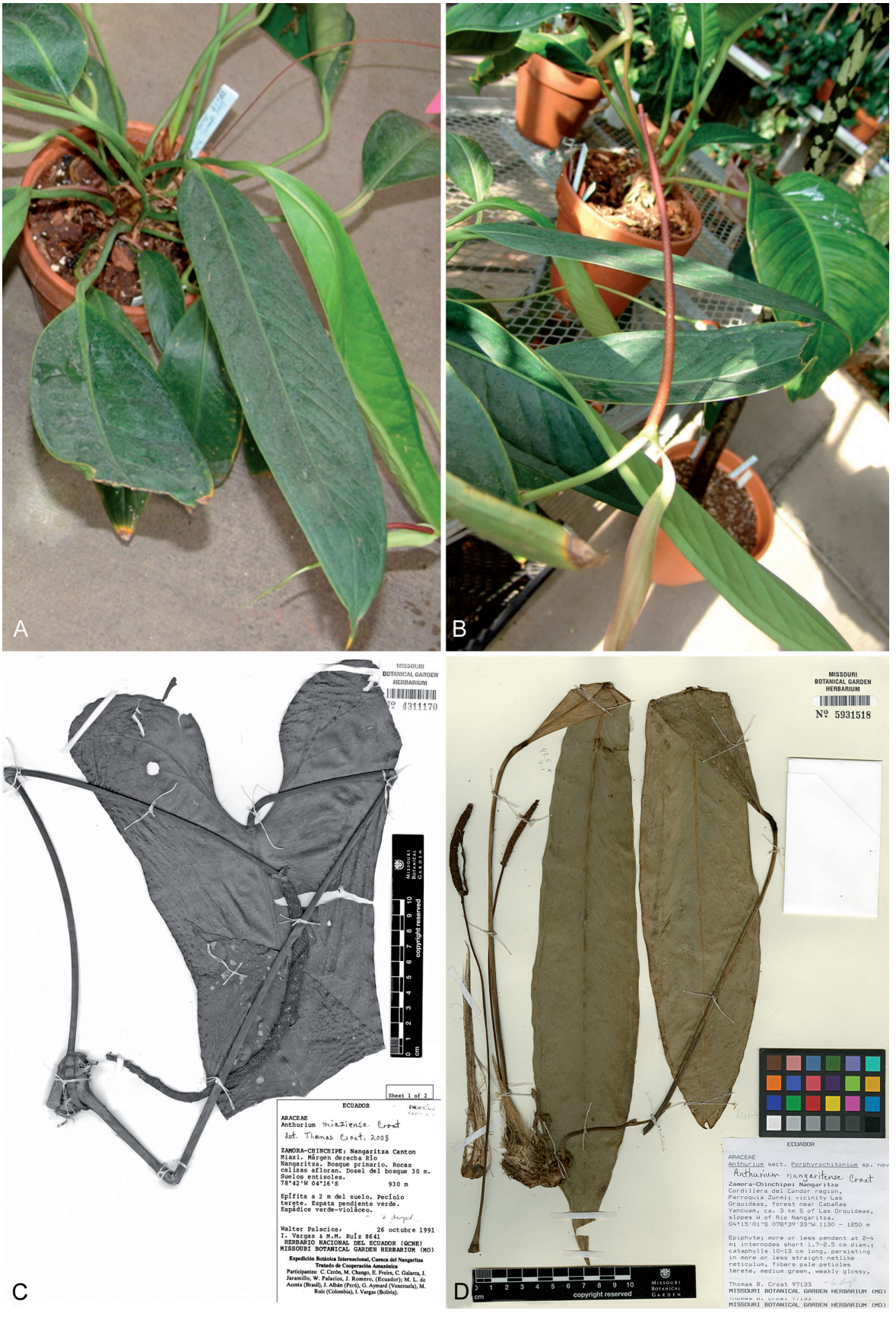

Fig. 2. A–B: *Anthurium collettianum* – habit of potted plant, petioles, cataphylls and inflorescence, *Croat 87475* (A), inflorescence (B); C: *A. miaziense* – holotype specimen at MO, *Palacios & al. 8641;* D: *A. nangaritense* – holotype specimen at MO, *Croat 97133*.

Anthurium collettianum is seemingly close to *A. fusco-punctatum* Sodiro from the Lita-San Lorenzo region at more than 700 m elevation. Both have leaves of similar size and shape with long peduncles, but the latter species differs in having the spadix yellowish at anthesis rather than dark violet-purple (though even *A. fusco-punctatum* turns purple in age). No known species of *Anthurium* is shared between these two regions. Although there are a number of species of *A.* sect. *Porphyrochitonium* in the Flora of Río Cenepa (Croat & al. 2005; Croat & al., in press), *A. collettianum* does not key out to any of them but it is perhaps closest to *A. kayapii* Croat. That species has the collective veins mostly 2–5 mm from the margins, the tertiary veins moderately prominent on the lower surface and has a green to pink spadix.

The species is named in honour of Emily Jane Colletti, Manager of the Aroid Research Greenhouse at the Missouri Botanical Garden. Emily has worked for the senior author for ten years and has been instrumental not only in maintaining the health and order of over 5000 living aroid collections, but also for taking photographs and preparing specimens from the living collection for distribution to other herbaria. She regularly informs us of all sorts of unusual things that happen in the greenhouse. Often the specimens that she brings to our attention represent new or unusual species that have not previously flowered. Emily's role in our research program at the Garden certainly warrants the honour of this new species.

Anthurium miaziense Croat, **sp. nov.**
Holotype: Ecuador, Zamora-Chinchipe, Cantón Nangaritza, Miazi, margin of Río Nangaritza, "suelos entisoles", 4°16'S, 78°42'W, 930 m, 26.10.1991, *Palacios, I. Vargas & M. M. Ruíz 8641* (MO 4311171; isotype: QCNE) – Fig. 2C.

Internodia brevia, 2.6–2.9 cm diam.; cataphylla decidua; folia petiolo 49.6–56.9 cm longo, lamina sagittato-hastata, 36.5–44.6 cm longa, 22.2–26.6 cm lata, lobulis posterioribus 11.5–16.8 cm longis, nervis primariis lateralibus 6–9 utroque; spatha viridis, 15–16.4 cm longa, 1.3–1.6 cm lata; spadix 25.1–25.3 cm longus, 8–9 mm diam., viride-violaceus.

Epiphyte 2 m from ground; *stem* short; *internodes* short, 2.6–2.9 cm diam. (averaging 2.7 cm); *cataphylls* drying intact at upper node, greyish green-brown, rust colour at base, soon mostly deciduous, with only a layer of short pale fibres persisting, length uncertain. *Leaves* erect-spreading with petiole, blade ± pendent, *petiole* 49.6–56.9 cm long (averaging 52.2 cm), 0.3–0.6 cm diam., terete, adaxial surface sulcate, abaxial surface rounded, margins obtusely raised, drying brown to dark brown, paler at base; *geniculum* 2.5–2.9 cm long, 4–5 mm wide, concolorous with and of same width as petiole; *blade* sagittate-hastate, 36.5–44.6 cm long, 22.2–26.6 cm wide (averaging 40.6 × 24.4 cm), 1.7–1.8 × longer than broad, 0.74–0.82 × longer than petiole, broadest at base, moderately coriaceous, drying weakly glossy to matte; upper surface matte and semiglossy, brown to dark greyish brown, lower surface semiglossy, dark brown to dark yellowish brown, moderately bicolorous, drying brownish to dark brown above, brownish to reddish brown below, glands absent; *anterior lobe* 28.7–31.6 cm long, broadly rounded apically, apex gradually acuminate, straight to concave along margin towards base; *posterior lobes* 11.5–16.8 cm long, 7.2–8.2 cm wide, spreading somewhat outward; *sinus* broadly spathulate and parabolic, 8.1–9.7 cm deep, 4.8–6.8 cm wide; *midrib* drying concolorous with blade above, orange-brown to dark red-brown below, midrib shape bluntly acute and narrowly rounded above, broadly convex or round raised below; *basal veins* 5–6, usually coalesced into a ± straight posterior rib, rarely 1st free to base, 3rd and 4th coalesced 8.2–16.6 cm; *posterior rib* 6–10.5 cm long, naked along sinus 2.3–3.8 cm; *primary lateral veins* 6–9 pairs, arising at an acute angle, 35–40° toward apex and middle, 70–90° below middle, then spreading at a 70–90° angle, scarcely more conspicuous than interprimary veins, all major lateral veins on upper surface quilted-sunken; *collective veins* arising from 2nd basal vein, 4–6 mm from margin; upper surface drying densely and minutely granular with an array of larger pale pustular excretions as well as a dense array of pale short-linear cellular inclusions; lower surface drying nearly smooth, sparsely pale short-lineate. *Inflorescence* spreading; *peduncle* 39.4–61 cm long (averaging 47.9 cm); *spathe* green, 15–16.4 cm long, 1.3–1.6 cm wide, linear-lanceolate, spreading, emerging from peduncle at a 45° angle, 3 dimensional shape fully expanded; *spadix* sessile, 25.1–25.3 cm long, 8–9 mm diam., slightly tapered, greenish violet. *Flowers* 7–8 visible per spiral, 3.3–4 mm long; tepals minutely granular to pustulose-granular, lateral tepals 1.7–1.9 mm wide, the outer margin 2-sided, inner margin broadly rounded; stamens 5 mm long, 0.6 mm wide, thecae narrowly ovate, broadly divaricate. *Berry* colour and seeds per locule not known.

Anthurium miaziense is endemic to Ecuador and only known from the type locality in Zamora-Chinchipe Province, Cantón Nangaritza in the valley of the Río Nangaritza on limestone outcrops at 930 m elevation in a Premontane wet forest life zone.

The species is a member of *Anthurium* sect. *Calomystrium* and characterised by its epiphytic habit, terete petioles, long-petiolate leaves, ovate-triangular-sagittate, dark brown drying blades with broadly concave lateral margins as well as by its long-pedunculate inflorescence with green, linear-lanceolate spathe and its long, slightly tapered greenish violet spadix.

The species is named after the type locality in Miazi, margin of Río Nangaritza.

Anthurium nangaritense Croat, **sp. nov.**
Holotype: Ecuador, Zamora-Chinchipe, Cordillera del Cóndor region, Parroquia Zurmi, vicinity Las Orquideas, near Cabañas Yancuam, c. 3 km S of Las Orquideas, slopes W of Río Nangaritza, 4°15'01"S, 78°39'33"W, 1130–1250 m, 17.4.2006, *Croat 97133* (MO 5931518; isotypes: AAU, B, COL, F, HUA, K, NY, QCNE, S, SEL, US). – Fig. 2D.

Internodia brevia, 1.7–2.5 cm longa, 1.5 cm diam.; cataphylla (7–)14–18 cm longa, persistentia in fibris pallidis; folia petiolo 21–35.7 cm longo, lamina plus minusve oblonga, 20.5–56 cm longa, 3.3–9.3 cm lata, nervis primariis lateralibus 7–13 utroque; pedunculus 14.6–23 cm longus; spatha 4.2–10.5 cm longa, 2–6.4 mm lata; spadix 4.5–14.7 cm longus, in siccus 3–4 mm diam.

Epiphyte ± pendent at 2–4 m; *stem* short; *internodes* short, 1.7–2.5 cm long, 1.5 cm diam.; *cataphylls* (7–)14–18 cm long, persisting as closely parallel fine fibres but ultimately forming a pale yellow-brown network of fibres, these flaring, ± straight not tightly appressed. *Leaves* ± pendent, *petiole* 21–35.7 cm long, 4–5 mm diam., medium green, weakly to semiglossy, terete, faintly and variably sulcate, drying brown to yellowish green-brown; *geniculum* 1.5–3.9 cm long, 3–6 mm diam., drying dark brown to black-brown; *blade* oblong to weakly oblong-oblanceolate, 20.5–56 cm long, 3.3–9.3 cm wide (averaging 41.6 × 5.6), 5.3–5.7 × longer than broad, 1.5–2.6 × longer than petiole, acuminate to narrowly long-acuminate at apex, narrowly acute to weakly attenuate at base, subcoriaceous, semiglossy, moderately bicolorous, dark green matte-subvelvety above, moderately paler and semiglossy below, drying olive-green to greyish olive-green above, light greyish-olive-green to dark brownish olive below; upper surface eglandular but densely dark-speckled above with the veins obtusely raised, glandular-punctate, irregularly granular-speckled and sparsely pale-pustular below; *midrib* narrowly rounded at base, bluntly acute toward apex above, slightly paler above, narrowly rounded and slightly paler below, drying finely and irregularly ridged and darker above and below, sometimes paler below, drying concolorous above and below; *primary lateral veins* 7–13 pairs, departing midrib at a 40–45° angle, etched, concolorous and quilted-sunken above, weakly raised and concolorous below, about as prominent as the collective veins; *collective veins* arising from base or from one of the lowermost primary lateral veins, 3–5 mm from margin. *Inflorescence* erect to pendent; *peduncle* pale green, 14.6–23 cm long, 3 mm diam.; *spathe* 4.2–10.5 cm long, 2–6.4 mm wide, medium green, reflexed, sometimes becoming shrivelled and drying 1–2 mm wide; *spadix* sessile and rarely stipitate to 5 mm, cylindroid, dark purple-violet, 4.5–14.7 cm long, 3–4 mm diam. when dry, weakly glossy with pistils weakly protruding. *Flowers* 5–6 visible per spiral, 1.3–1.5 mm long, 1–1.3 mm wide, lateral tepals 0.8 mm wide, the outer margin obtusely 2-sided, the inner margin rounded; stamens held just above tepals, 7–8 mm wide and long, the thecae ovoid, weakly divaricate. *Berry* colour, seed number and spathe persistence all unknown.

Anthurium nangaritense is endemic to Ecuador, known only from the southeastern part in the Cordillera de Cutucú in Morona-Santiago Province and in the Cordillera del Cóndor in Zamora-Chinchipe Province, at on elevation of 600–1120 m in a Premontane wet forest life zone.

The species is a member of *Anthurium* sect. *Porphyrochitonium* and is characterised by its epiphytic habit, short internodes, the network of flaring yellow-brown persistent cataphyll fibres, terete petioles, oblong, matte-subvelvety glandular-punctate blades and the erect inflorescence with a green, reflexed spathe and the slender, dark violet-purple spadix.

Anthurium cenepense Croat, a Peruvian species from Loreto Department at 930–1130 m elevation, is very similar to *A. nangaritense* in having very elongated and narrow, long-acuminate, somewhat pendent blades, but that species differs in having shorter cataphylls (6.5–7 cm long), a longer peduncle (34–43 cm long), a spathe that is more decurrent and larger flowers (1.8–2.3 mm long).

Anthurium nangaritense is similar to *A. vittarifolium* Engl., a species with pendent leaves also occurring in the Amazon basin, but that species has long blades that are 17–38 × longer than broad.

The species is named after the type locality in the valley of the Río Nangaritza.

Paratypes. — Ecuador: Morona-Santiago: Logroño Cantón, Cordillera del Cutucú, Centro Shuar Tumpaim, Cordillera de Kayanaim, at base of hill, 2°42'S, 77°55'W, 600 m, 15.12.2003, *G. Toasa & al. 9477* (QCNE). — Zamora-Chinchipe: Nangaritza Cantón, Cordillera del Condor, Rio Nangaritza valley, near Shaime, 4°18'S, 78°40'W, 930 m, 31.7.1993, *Gentry 80874* (MO, QCNE); Shaime, 4°20'S, 78°40'W, *W. Palacios 6650* (QCNE); Miazi, Río Nangaritza, 4°16'S, 78°42'W, 930 m, 26.10.1991, *W. Palacios & al. 8642* (MO, QCNE); vicinity of Las Orchideas, near Cabañas Yankuam, along Río Nangaritza, Los Tepuis Conservation Area, 1120 m, 4°15'08"S, 78°39'53"W, 16.9.2007, *T. B. Croat & G. Ferry 98716* (MO, QCNE).

Anthurium patens Croat, **sp. nov.**
Holotype: Ecuador, Pastaza, vicinity of Shell, along Río Pindo, c. 1.5 km N of Shell, 1°29'39"S, 78°03'52"W, 1085 m, 5.5.2003, *T. B. Croat, L. Hannon & M. Menke 88583* (MO 5681245; isotypes: AAU, B, COL, F, GB, HUA, K, M, NY, QCNE, S, SEL, US, VEN) – Fig. 3A–B.

Fig. 3. A–B: *Anthurium patens* – leaf blade, adaxial surface and inflorescence (A); inflorescence, close-up (B); C–D: *A. versicolor* var. *azuayense* – type specimen, *Camp E-4435;* D: paratype specimen, *Camp E-3406*.

Internodia 3–4 mm diam.; cataphylla 3.5–6 cm longa; folia petiolo 1.1–5.6 cm longo, lamina 5.2–17.6 cm longa, 1.9–6.9 cm lata, nervis basalibus 2–3 utroque, nervis primariis lateralibus 4–6 utroque; pedunculus 6.2–12.3 cm longus; spatha 2–5 cm longa, 3–7 mm lata; spadix 2.5–5.9 cm longus, 3.5 mm diam.

Terrestrial or hemiepiphytic, vine-like, sprawling, 1–1.3 m tall; *stems* often arching; *internodes* medium grey-green to dark green, matte to weakly glossy, 3–4 mm diam., nodes conspicuously swollen, drying light greyish green to tan; *cataphylls* 3.5–6 cm long, medium green to green, bases brown, mostly deciduous. *Leaves* spreading, *petiole* 1.1–5.6 cm long (averaging 3.5 cm), narrowly and sharply sulcate, C-shaped, flat adaxially with sharp, erect margins, medium green, weakly glossy, drying light tan and light green to olive-green; *geniculum* only weakly swollen, sharply sulcate, drying concolorous to slightly darker than petiole; *blade* 5.2–17.6 cm long, 1.9–6.9 cm wide (averaging 12.6 × 4.6 cm), 1.9–3.5 × longer than broad, 1.8–5.7 × longer than petiole, oblong-elliptic to elliptic-obovate, with the lower half of the blade tapering to a cordulate base, thinly coriaceous, weakly bicolorous, dark green and matte-subvelvety to weakly glossy above, moderately paler and matte below, upper surface drying yellowish brown to greyish green, lower surface light greenish brown to medium green; *midrib* bluntly acute, narrowly raised and concolorous above, narrowly round-raised and slightly paler below, drying slightly darker to concolorous above, slightly lighter to concolorous below; *basal veins* 2–3 pairs (rarely 4 pairs), 1st and 2nd free to base, 3rd and 4th sometimes coalesced 3–4 mm; *primary lateral veins* 4–6 pairs, scarcely more prominent than interprimary veins, departing midrib at a 40–55° angle, weakly quilted, sunken to weakly raised in valleys above, prominently and narrowly raised below, drying slightly darker to concolorous above, slightly lighter to concolorous below; *tertiary veins* weak to distinct, slightly darker than surface, in part etched and moderately obscure to moderately prominent above, in part weakly raised below; *collective veins* arising from 1st basal vein, 7–13 mm from margin at base to 1st primary lateral vein, 5 mm from margin at 2nd primary lateral vein, gradually getting closer to margin as it nears apex. *Inflorescence* erect-spreading; *peduncle* 6.2–12.3 cm long (averaging 8.7 cm), acutely flattened on one side with 2 ribs, spreading with the spadix turned upward usually at a 90° angle to the peduncle; *spathe* 2–5 cm long, 3–7 mm wide (averaging 3.5 cm × 5 mm), spreading at 90° angle to peduncle, medium green to green, weakly glossy; *spadix* sessile or stipitate to 2–3 mm, 2.5–5.9 cm long (averaging 4.1 cm), pale green to dark green, weakly glossy, 3.5 mm diam.; pollen pale yellow to white; pistils acute, dark green, semiglossy. *Flowers* 4 visible per spiral, 1.8–1.9 mm long, 1.6–1.7 mm wide; tepals semiglossy, drying conspicuously granular, yellowish green; lateral tepals mostly 2-sided, sometimes 3-sided, inner margins rounded, thin and scarious-undulate. *Berries* dark green, glossy, early emergent, round at apex.

Anthurium patens ranges throughout lower slopes of the Cordillera Oriental in Ecuador from Napo to Zamora-Chinchipe at 792–1940 m in Premontane moist forest, Tropical moist forest, Premontane wet forest, Lower montane wet forest and Premontane rain forest life zones.

The species is a member of *Anthurium* sect. *Xialophyllium* and is characterised by its sprawling or semi-erect grown, long internodes, mostly deciduous cataphylls, sharply C-shaped petioles, narrow green-drying blades that are tapered below the middle with a narrow cordulate base.

The species is similar to several other *Anthurium* species in section *Xialophyllium*. It differs from *A. microspadix* Schott, which has ovate blades that are merely cordate or rounded at the base, not narrowly tapered toward and cordulate at the base. *A. patens* is also similar to *A. myosuroides* Kunth, but that species differs by having internodes 5–7 mm in diam., blades that are ovate-elliptic, subcordate and proportionately broader at base and dry dark reddish brown to dark reddish olive-green as well as in having fruits yellow to yellow-green, translucent. In contrast, *A. patens* has internodes that are 3–4 mm diam., blades that are oblong-elliptic to elliptic-obovate, with the lower half of the blade tapering to a cordulate base and dry yellowish brown to greyish green above with the lower surface drying light greenish brown to medium green.

Anthurium patens is a species that is vine-like and spreading, hence the epithet "patens" from the Latin meaning "spreading".

Paratypes. — Ecuador: Morona-Santiago: Loma San José Grande-Sendero San José-Río Bomboiza, 2°38'S, 78°27'W, 1300–1600 m, 21.4.1991, *C. Cerón 14382* (MO, QCNE); Gualaquiza–Indanza, 12 km S of Indanza along river, 3°11'47"S, 78°33'06"W, 1250 m, 8.9.2002, *Croat 87307* (MO); Méndez–Paute, 36.8 km SW of Méndez, 2°38'05"S, 78°27'19"W, 1943 m, 12.7.2004, *Croat, L. Hannon, G. Walhert & T. Katan Jua 90870* (MO); 2–4 km N of Arapicos, 800–900 m, 4.4.1981, *Holguer 5950* (GB); Cordillera de Cutucú, W slopes, along a trail from Logroño to Yaupi, 2°46'S, 78°06'W, 1200 m, 11.1976, *M. T. Madison & al. 3239* (MO, SEL); Guarumales (Cola de San Pablo), 2°34'S, 78°29'W, 1700 m, 19.–20.9.1983, *Larsen & Eriksen 45278* (AAU); Gualaquiza–Limón, vicinity of Tumbes, 39 km N of Río Bomboiza bridge, 4.1 km S of Tucumbatza, 3°17'S, 78°31'W, 1520 m, 6.3.1992, *Croat 72769* (MO); Cantón Morona, Centro Shuar unsuants/Transkutuku, 2°32'S, 77°55'W, 1050 m, 21.1.2002, *W. Palacios, N. Jaramillo & F. Nicolalde 15755* (MO); 2°32'19"S, 77°55'30"W, 1170 m, 22.1.2002, *G. Toasa & M. Tirado 8698* (MO,QCNE); Logroño, Centro Shuar Tumpaim, Cordillera de Kaya-

naim, desde la base hasta la cumbre, 2°46'S, 77°55'W, 600–1600 m, 12.12.2003, *G. Toasa & al. 9424* (MO, QCNE). — Napo: Km 2, carretera nueva Cotundo–Coca, 0°28'00"S, 76°58'00"W, 1130 m, 5.8.1984, *C. Dodson, A. Gentry, Palacios & Zaruma 15053* (MO, QCNE); vic. Jondachi, 20.1 km N of Baeza, 5 km S of turn off to Loreto, 0°45'56"S, 77°47'33"W, 1033 m, 19.4.2003, *Croat, L. Hannon & N. Altamirano 87798* (MO); Parque Nacional Sumaco-Galeras, southern slopes of Sumaco volcano, 0°37'S, 77°35'W, 1710 m, 19.10.2005, *J. Homeier & M. A. Chinchero 1950* (MO); Cordillera Galleras, 0°49'S, 77°35'W, 1060 m, 26.10.2006, *S. Trogisch, S. Moritz & J. Homeier 202* (MO, QCNE); Cordillera de Guacamayos, c. 6 km SE of Cosanga, 0°38'S, 77°50'W, 1940 m, 5.10.2006, *S. Trogisch & al. 16* (MO, QCNE), *S. Trogisch & al. 46* (GOET, MO, QCA, QCNE,); Coca–Archidona, between Loreto and Narupa, 40.1 km east of Narupa at main Baeza–Tena Hwy, 0°43'03"S, 77°38'01"W, 7.10. 2007, *Croat, M. Carlsen & D. Levin 99465* (CAS, CUVC, G, GH, GOET, MO, PMA, RB, RSA, TEX); Cerro Antisana, ridge 1 mile NE of Borja, 0°30'S, 78°00'W, 1676 m, 18.8.1960, *Grubb & al. 1319* (K); Sumaco, 3 km este del Caserío de Huamaní, N of Hollín–Loreto road by trail, 0°43'S, 77°36'W, 1200 m, 17.9.1988, *Fernando Hurtado & Angel Alvarado 475* (MO); carretera Hollín–Loreto–Coca, Comunidad Chaluayacu, km 25, slopes of volcán Sumaco, 0°45'S, 77°40'W, 1200 m, 23.12.1988, *C. E. Cerón, A. Gentry, G. Benavides & C. Blanye 5743* (MO, QCNE), *5775* (MO), *5776* (MO), *5808* (MO); Coca–Loreto, between 10 de Agosto and Río Pinguillo, 0°43'S, 77°28'W, 1000 m, 20.10.1988, *C. E. Cerón & C. Iguago 5305* (MO); Hollín–Loreto, between Río Guamani y Río Pucuno, km 40, 0°43'00"S, 77°44'14"W, 1200 m, 12.12.1987, *W. Palacios 2236* (MO); Hollín–Loreto, km 25, slopes S of volcán Sumaco, Comunidad Challus Yacu, 0°43'S, 77°36'W, 1100 m, 17.12.1988, *F. Hurtado 1228* (MO); Hollín–Loreto, km 17, near Río Hollín, 0°41'S, 77°41'W, 1100 m, 14.–22.2.1989, *F. Hurtado & J. Shiguango 1675* (MO); Hollín–Loreto, Río Huataraco, 2 hours by foot from the Aldea de Guagua Sumaco, 0°43'S, 77°32'W, 800–1000 m, 23.–30.8.1989, *C. Cerón & M. Factos 7445* (MO); Cantón Archidona, Hollín–Loreto, km 25, sector Challua Yacu, slopes of volcán Sumaco, 0°45'S, 77°38'W, 1200 m, 21.–27.4.1989, *C. Cerón & F. Hurtado 6480* (MO, US); slopes of volcán Sumaco, Hollín–Loreto, km 31, Comuna Challua Yacu, 0°43'S, 77°40'W, 1200 m, 20.–25.3.1989, *W. Palacios 4108* (MO, QCA); El Chaco, Río Oyacachi near confluence with Río San Juan, c. 10 km W of El Chaco, 0°17'S, 77°51'W, 1750 m, 7.5.1996, *Stahl 2400* (QCA). — Pastaza: Lorocachi, 75°58'W, 1°38'W, 200 m, 26.5. 1980, *Brandbyge & Azanza 31046* (AAU); km 18 on road from Puyo to Tena, 1°21'03"S, 77°55'11"W, 1030 m, 16.4.1978, *H. Kennedy 3861* (MO, SEL); c. 33 km S of Puyo, 24.9 km S of Veracruz, 16 km S of Escuela Fiscal Cotopaxi, 1°38'S, 77°52'W, 900 m, 3.5.1984, *Croat 58952* (MO); Hacienda San Antonio de Barón von Humboldt, 2 km al NE de Mera, 1°27'S, 78°06'W, 1100 m, 27.2.–20.3.1985, *J. Zaruma, D. Neil, M. Baker, W. Palacios 3* (MO); ibid., 1300 m, 19.3.1985, *Baker & al. 5810* (NY); El Porvenir, c. 5 km N of Puyopungu, 1°37'00"S, 75°44'00"W, 17.9.1976, *H. Lugo 4879* (GB, MO); Colonia 24 de Mayo, side road to road Puyo–Puerto Napo, 15–20 km NE of Napo, 0°54'11"S, 77°48'35"W, 900 m, 27.6.1972, *Holguer Lugo S. 2471* (MO); Puyo–Arajuno, trail 5 km NE of Diez de Agosto, 1°22'57"S, 77°52'07"W, 850–900 m, 12.3.1980, *Harling & Andersson 17196* (GB, MO); Puyo–Macas, 3 km SE of Veracruz, 1°31'08"S, 77°54'04"W, 900 m, 3.3.1980, *Harling & Andersson 16828* (GB, MO); along Río Pindo, c. 1.5 km N of Shell, 1°29'39"S, 78°03'52"W, 1085 m, 5.5.2003, *Croat, L. Hannon & M. Menke 88583* (MO); 1 km al E de El Topo between Banos y Mera, 1°27'S, 78°10'W, 1300 m, 18.3.1985, *W. Palacios, D. Neill, M. Baker & J. Zaruma 197* (MO); Puyo–Macas road to Palora, 1.2 km S of main road, 4.7 km from middle of bridge over Río Zamora, 19 km from center of Palora, 1°43'14"S, 77°51'24"W, 935 m, 9.10.2007, *Croat, M. Carlsen & D. Levin 99528A* (MO); Mera, 1°28'00"S, 78°08'00"W, 1100 m, 25.5.–6.6.1968, *Harling & al. 9945* (GB, MO); 1°28'00"S, 78°08'00"W, 1100 m, 3.2.1956, *Asplund 19200* (MO, S); near Río Tigre, 2°07'00"S, 76°04'00"W, 1100 m, 22.11.1955, *Asplund 18571* (MO, S); 1°27'54"S, 78°07'58"W, 1400 m, 15.2.1996, *Jaramillo 18759* (QCA); 5.3 km NW of center of Shell, along gravel road, 1.1 km N of highway, E end of road, 1°27'S, 78°04'W, 1180 m, 3.4.1992, *Croat 73467* (MO); Vía Puyo–Fátima, Estación experimental, 1°25'00"S, 77°59'00"W, 900 m, 1.1995, *W. Palacios 13472* (MO, QCNE). — Tungurahua: Along road from Río Negro on Rió Pastaza to Parque Nacional Sangay, 4.9 km S of Río Negro, 4.8 km S of bridge over Río Pastaza, 1°26'46"S, 78°13'33"W, 1520 m, 19.8.2002, *Croat & L. Hannon 86651* (MO). — Zamora-Chinchipe: Zamora to Romerillos, 13.3 km E of bridge over Río Bombuscaro at Zamora, 0.4 km N of Pituca along river, 4°08'02"S, 78°56'31"W, 975 m, 30.5.2003, *Croat & M. Menke 89802* (MO); 10.7 km E from Los Encuentros, beyond bridge over Río Zamora, 3°46'40"S, 78°38'28"W, 1066 m, 14.9.2007, *Croat & G. Ferry 98588* (MO); Tandaime–Condo Mirador, 18.4 km beyond the turnoff near the military check point near Tundaime, 3°38'12"S, 78°25'49"W, 1570 m, 20.9.2007, *Croat & G. Ferry 98890* (MO); 10 km E of Paquisha, 1400–1500 m, 13.4.1985, *Harling & Andersson 24079* (GB); along road between Zumbi (on Río Zamora, 7.7 km S of Yantzaza), 6.8 km E of Paquisha at Río Nangaritza, 3°54'18"S 78°35'W, 792 m, 27.5.2003, *Croat & M. Menke 89528* (MO); along road between Zumbi on Río Zamora and summit of Cordillera del Cóndor beyond Paquisha, 10.1 km beyond Río Nangaritza bridge, 29.1 km E of Zumbi, 3°56'13"S, 78°37'27"W, 1352 m, 16.7.2004, *Croat, L. Hannon, G. Walhert & T. Katan Jua 91211* (MO); along road from Namirez on Río Zamora and Nambija, 17.9 km E of Río Zamora, 4°03'57"S, 78°47'36"W, 1790 m, 19.7.2004, *Croat 91529* (MO). —

Nangaritza: Parroquia Zurmi, vicinity of Las Orquideas, Cabañas Yancuam, c. 3 km S of Las Orquideas, slopes W of Río Nangaritza, 4°15'01"S, 78°39'33"W, 1128–1250 m, 18.4.2006, *Croat 97179*.

Anthurium versicolor Sodiro var. ***azuayense*** Croat, **var. nov.**

Holotype: Ecuador, Azuay, Cordillera Oriental, 1–8 km N of Sevilla de Oro, 2°47'S, 78° 39'W, 2438–2742 m, 27.7.–12.8.1945, *W. H. Camp E-4435* (MO 2783773; isotypes: F, NY, P, SEL, US). – Fig. 3C–D.

Internodia 1.5–2 cm longa; folia petiolo 31.5–66.2 cm longo, lamina ovato-sagittata, 21–44.6 cm longa, 12.4–29 cm lata, lobulis posterioribus 5.5–14 cm longis, 4.9–11.1 cm latis, nervis basalibus 5–7(–8) utroque, nervis primariis lateralibus 9–11 utroque; pedunculus 15–21.5 cm longus; spatha 7.1–9.3 cm longa, 6–9 mm lata, viridis; spadix 10–24.1 cm longus, viridis.

Terrestrial, suberect, 30–100 cm tall, or scrambling, sometimes appressed-climbing; *stem* to 0.5 m long, drying narrowly and longitudinally ribbed as well as prominently transverse-fissured; *internodes* short near apex, 1.5–2 cm long lower down, 1–2 cm diam., drying yellowish brown, closely ridged longitudinally and closely fissured transversely upon drying; *cataphylls* 10–23.3 cm long, persisting intact at apex, eventually shredding to loose fibres at base. *Leaves* erect-spreading; *petiole* 31.5–66.2 cm long (averaging 44.9 cm), sulcate adaxially, drying sharply and deeply sulcate to broadly sulcate, medium green, sometimes lavender-rose, drying light greyish yellow-brown to light greyish olive to brown; *geniculum* 1.1–2.2 cm long (averaging 1.7 cm), drying concolorous or slightly darker than petiole; *blade* ovate-sagittate to narrowly ovate-sagittate, 21–44.6 cm long, 12.4–29 cm wide (averaging 32 × 19.1 cm), 1.5–2 × longer than broad, 0.60–0.99 × longer than petiole, acuminate at apex, sagittately lobed at base, membranaceous, very deep green and semiglossy above, pale green to bright green and semiglossy below with an infusion of lavender, drying light greyish yellow-brown to light greyish olive to brown, above and below; *anterior lobe* 17.2–33.7 cm long (averaging 24.3 cm); *posterior lobes* 5.5–14 cm long (averaging 9.6 cm), 4.9–11.1 cm wide (averaging 7.5 cm); *sinus* hippocrepiform to spathulate, 4–12 cm long, 1.9–5.5 cm wide (averaging 7.7 × 3.6 cm); major veins in part lavender below; *midrib* very narrowly raised and bluntly acute above, lower narrowly round-raised, drying concolorous above, matte and paler below; *basal veins* 5–7(–8) pairs, 1st free to base, 5th and higher order fused 2–3.5 cm; *posterior rib* 2.1–5 cm long, naked 1.6–4.7 cm; *primary lateral veins* 9–11 pairs, arising from midrib at a 50–55° angle, narrowly raised and ± concolorous above, narrowly raised and paler below; *collective veins* arising from 4th–6th basal veins, 1–6 mm from margin; reticulate veins prominent on both surfaces, drying weakly raised in part on lower surface, usually with weak granulations in the areoles upon magnification. *Inflorescence* erect-spreading; *peduncle* 15–21.5 cm long (averaging 17.8 cm); *spathe* 7.1–9.3 cm long, 6–9 mm wide, pale green to medium green, reflexed-spreading, coiled-contorted when fresh; *spadix* 10–24.1 cm long (averaging 16.7 cm), mostly sessile or very weakly stipitate to 2 mm when in fruit, curved, bright medium green, purplish when immature. *Flowers* 9–10 visible per spiral, 2–2.5 mm long, 1.5–1.7 mm wide; tepals minutely granular, 1.5–1.7 mm wide, outer margin broadly 2-sided, inner margin broadly rounded; stamens held at or slightly above tepals, anthers 0.7 mm long, 0.6 mm wide, thecae scarcely divaricate. *Infructescence* to 23 cm long, drying to 1.6 cm diam., purplish.

Anthurium versicolor var. *azuayense* is known from Ecuador and Peru at 1981–2820 m elevation. In Ecuador it is known only from Azuay Province in the region of Sevilla de Oro in a Lower montane dry forest life zone and in the area of Huigra in Cotopaxi Province in Premontane dry forest or Lower montane dry forest life zones.

The species is a member of *Anthurium* sect. *Cardiolonchium* and is characterised by its terrestrial, somewhat scandent habit, short internodes, long cataphylls persisting at upper nodes, petioles about as long as the blades, the ovate-sagittate, greenish to yellowish brown-drying blades as well as by the green spathe and long-tapered green spadix.

Anthurium versicolor var. *azuayense* is comparable to the typical variety in having leaf blades of similar shape and size and in being frequently terrestrial in habitat. It differs from the typical variety in having blades that dry more yellow-green, have major veins on the upper surface that are more typically acute or bluntly acute on the upper surface, have usually 2–3 pairs of basal veins free to the base and 7–11 pairs of primary lateral veins that are closer together especially toward the apex.

Anthurium versicolor var. *azuayense* is also similar to *A. coerulescens* Engl., another montane species that occurs in southeastern Ecuador and has leaves of similar shape and dried colour as well as a green spathe and a stipitate spadix. That species differs in having typically longer internodes, shorter cataphylls, mostly smaller and larger, somewhat thicker and less veiny leaf blades and a much shorter, less tapered spadix.

The taxon was first collected by W. H. Camp of the New York Botanical Garden in the valley of the Río Chanchan near Huigra in Chimborazo Province between 19 and 28 May 1945 but most of the known material of this taxon was collected by Camp near Sevilla de Oro between 27 July and 12 August 1945 in the Department of Azuay, hence the epithet “azuayense”.

Paratypes. — Ecuador: Azuay: Slopes above Río Norcay, across from Molleturo, 1830–1950 m, 5.6.1943, *Steyermark 52845* (NY, US); Eastern Cordillera, 1–8 km N of Sevilla de Oro, 2438–2743 m, *Camp E-4303* (NY); streams leading into Río Collay, 3–8 km N of Sevilla de Oro, 2133–2529 m, 23.–27.8.1945, *Camp E-4982* (NY, SEL); ibid., 2133–2529 m, 23.8.1945, *Camp E-4894* (NY); streams leading into Río Collay, 3–8 km N of Sevilla de Oro, 27.7.1945, *Camp E-4435* (NY). — Cañar: Cantón Azogues, Parroquia Pindelig, 2°37'09"S, 78°40'57"W, 2820 m, 17.5.1991, *C. Cerón 14806* (MO). — Chimborazo: Río Chanchan, 5 km N of Huigra, 1524–1981 m, 19.–28.5.1945, *Camp E-3406* (NY).

Peru: Cajamarca: San Ignacio, Caserio El Triumfo, Fundo El Convento, 5°13'S, 78'40'W, 2100 m, 30.6.1996, *E. Rodríguez R. 1229* (MO).

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