

Araceae of Parque Nacional Natural de Las Orquídeas, Colombia

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ABSTRACT

A total of 16 new species of *Anthurium* are described as new to science: *Anthurium abajoense* Croat & A. Zuluaga, *A. alcogolloi* Croat, *A. blanquitense* Croat, *A. curtispindunculum* Croat, *A. dabeibaense* Croat, *A. elquincense* Croat, *A. espiranzaense* Croat & A. Zuluaga, *A. frontinoense* Croat & A. Zuluaga, *A. hempeanum* Croat, *A. juanguillermoi* Croat, *A. ovidioi* Croat, *A. pedrazae* Croat & A. Zuluaga, *A. paloense* Croat, *A. sneidernii* Croat, *A. tortuosum* Croat, and *A. triangulopetiolum* Croat.

INTRODUCTION

Few areas in Colombia have created so much excitement as the region in

southwestern Antioquia Department between 300 and 3450 m with a life zone ecology ranging from *Premontane wet forest* to *Tropical wet forest* and *Premontane rain forest* life zones. Much of the region remains totally unexplored but certain areas in recent years have been explored by botanists. Botanical activity began actively with expeditions funded by the National Geographic Society and carried out by the Missouri Botanical Garden and the Universidad de Antioquia as well as the Jardín Botánico de Medellín. The expeditions included Dr. James Zarucchi, Dr. John MacDougal, Alan Brant, Alvaro Cogollo and others with the first set of material being deposited at HUA.



Figure 1. Map showing the location of Parque Nacional Natural de Las Orquídeas in Colombia.

The park occupies areas of three municipalities, Urrao, Frontino and Abriaquí. Access to the park is from the southwest via the city of Urrao reached from Medellín via Amagá and Bolombolo. Buses go as far as Caicedo and from there the park is reached only on foot or with horses or mules.

Anthurium abajoense Croat & A.
Zuluaga, sp. nov. Type:

COLOMBIA. Antioquia: Municipio Frontino, Parque Nacional Natural de Las Orquídeas, Vereda Venados Abajo, Finca de Gabriel Montoya, a la margen derecha del Río Venados, 06°32'24"N, 76°19'10"W, 860–910 m, 23 July 2011, A. Zuluaga, P. Pedraza, J. Betancur, M. F. González, R. Arévalo, D. Sanin, J. Serna & A. Duque 776 (holotype, MO-6353107; isotype, COL). **Figures 2, 3.**

The species is a member of section *Cardiolonchium* characterized by its hemiepiphytic habit, short internodes, cataphylls persisting weakly as a few pale parallel fibers, a terete petiole, bicolorous narrowly ovate-sagittate greenish drying blades which are matte-subvelvety above, semiglossy below, a narrowly parabolic sinus, six pairs of basal veins, only the first pair of basal veins free to the base, the collective veins arising from the 1st pair of basal veins, as well as by the short peduncle, green reflexed spathe and the weakly tapered magenta spadix.

One of the collections, *Zuluaga 768*, differs from the holotype in drying a glossier, darker green, lacking the characteristic surface pustules of *Zuluaga 776*, and having 5(6) basal veins with only the 1st pair free to the base.

In the Lucid Anthurium Key, the species tracks to *Anthurium regale* Linden, a species which differs in having much larger leaves with prominently paler veins and a whitish spadix; *A. velutinum* Engl., differing in having the upper blade surface scabrid and all the veins on the lower surface prominulous; *A. coripatense* N. E. Br. ex Engl., which differs in having typically larger, more coriaceous blades with prominent tertiary veins and a more prominently stipitate, more typically cylindroid spadix and *A. incurvum* Engl., differing in having more broadly ovate blades to 1.1 times longer than broad, with the posterior ribs departing at ca. a 120°

angle (versus ca. a 50° angle for *A. abajoense*).

Hemiepiphyte; **internodes** short; **cataphylls** persisting as few longitudinal fibers. LEAVES 83.7–87.8 cm long with **petioles** terete, 45.6–46.6 cm long, drying 3–4 mm wide, grayish tan, deeply ribbed adaxially; **geniculum** moderately darker than petiole, finely striated, 2.4–3.1 cm long; **blades** ovate-sagittate, green bicolorous, glaucous on both surfaces, moderately coriaceous, 38.1–41.2 cm long, 18.9–20.6 cm wide, 1.5–2.2 times longer than broad, 0.84–0.88 times as long as petioles, abruptly acuminate at apex; **upper surface** glossy, drying semiglossy, densely granular, drying gray-yellow; **lower surface** matte, drying semiglossy, drying light gray-yellow; **anterior lobe** 29.0–31.9 cm long, 18.9–20.6 cm wide, with broadly convex margins, broadest below middle; **posterior lobes** 7.9–8.1 cm long, 10.2–10.9 cm wide, directed downward to turned somewhat inwards; **sinus** spatulate to narrowly parabolic, 8.4–9.1 cm deep, 3.1–3.6 cm wide; **midrib** elevated to at least the petiole, drying paler than upper surface, weakly acute above, moderately paler than lower surface, prominently round-raised below; **primary lateral veins** ca. 6 pairs, arising at a 52–59° angle, elevated to at least the petiole on upper surface, raised below, drying bluntly rounded, weakly raised above, narrowly rounded, moderately raised below, finely pale granular; **basal veins** 6(7) pairs, 1st pair, sometimes 2nd, free to base; **posterior ribs** nearly straight, 4.2–4.9 cm long, naked 1.7–2.7 cm; **tertiary veins**

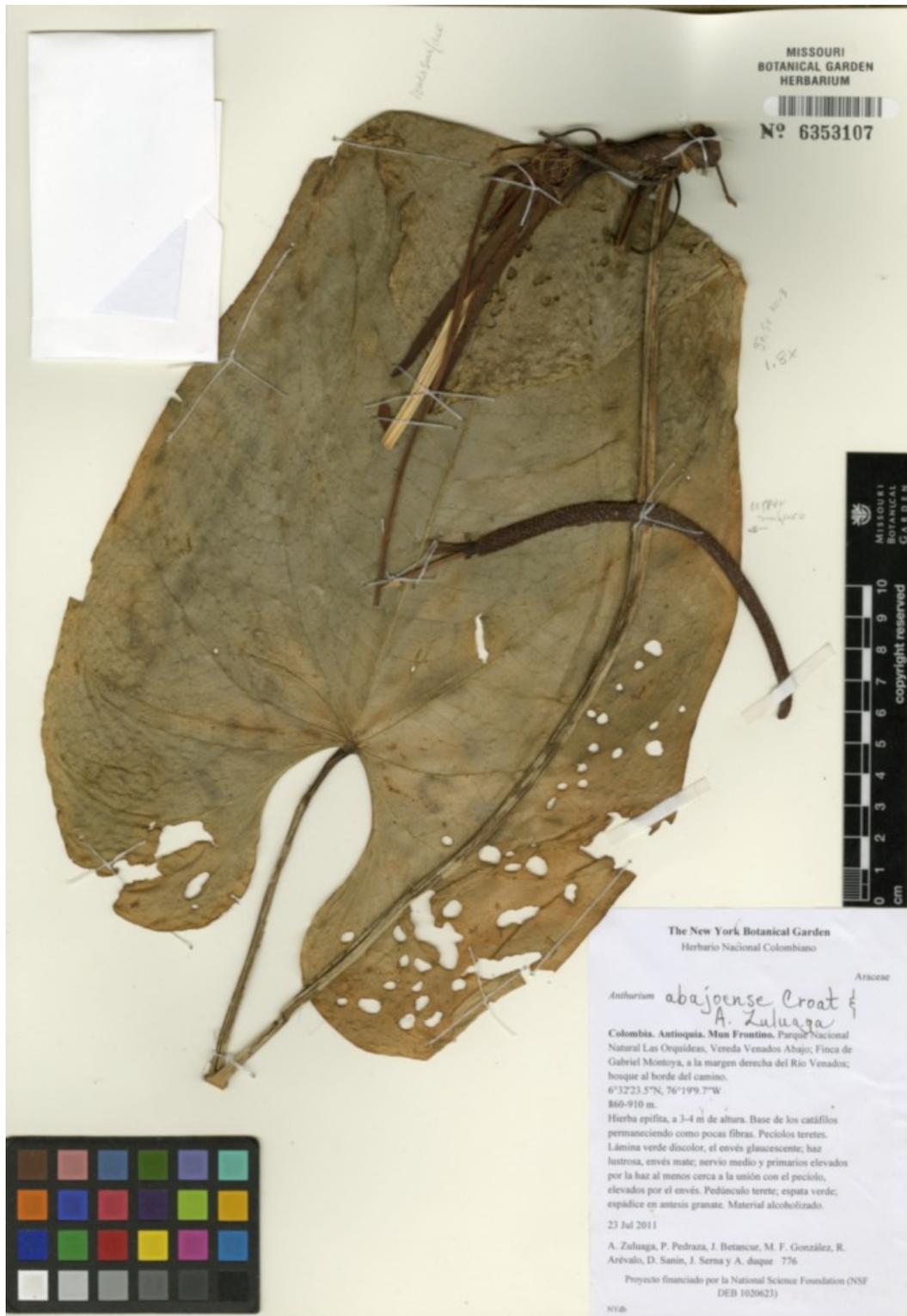


Figure 2. *Anthurium abajoense* Croat & A. Zuluaga (Zuluaga 776). Herbarium type specimen showing leaf blade abaxial surface with a portion of the adaxial surface folded back, petiole and spathe with spadix and cataphylls.

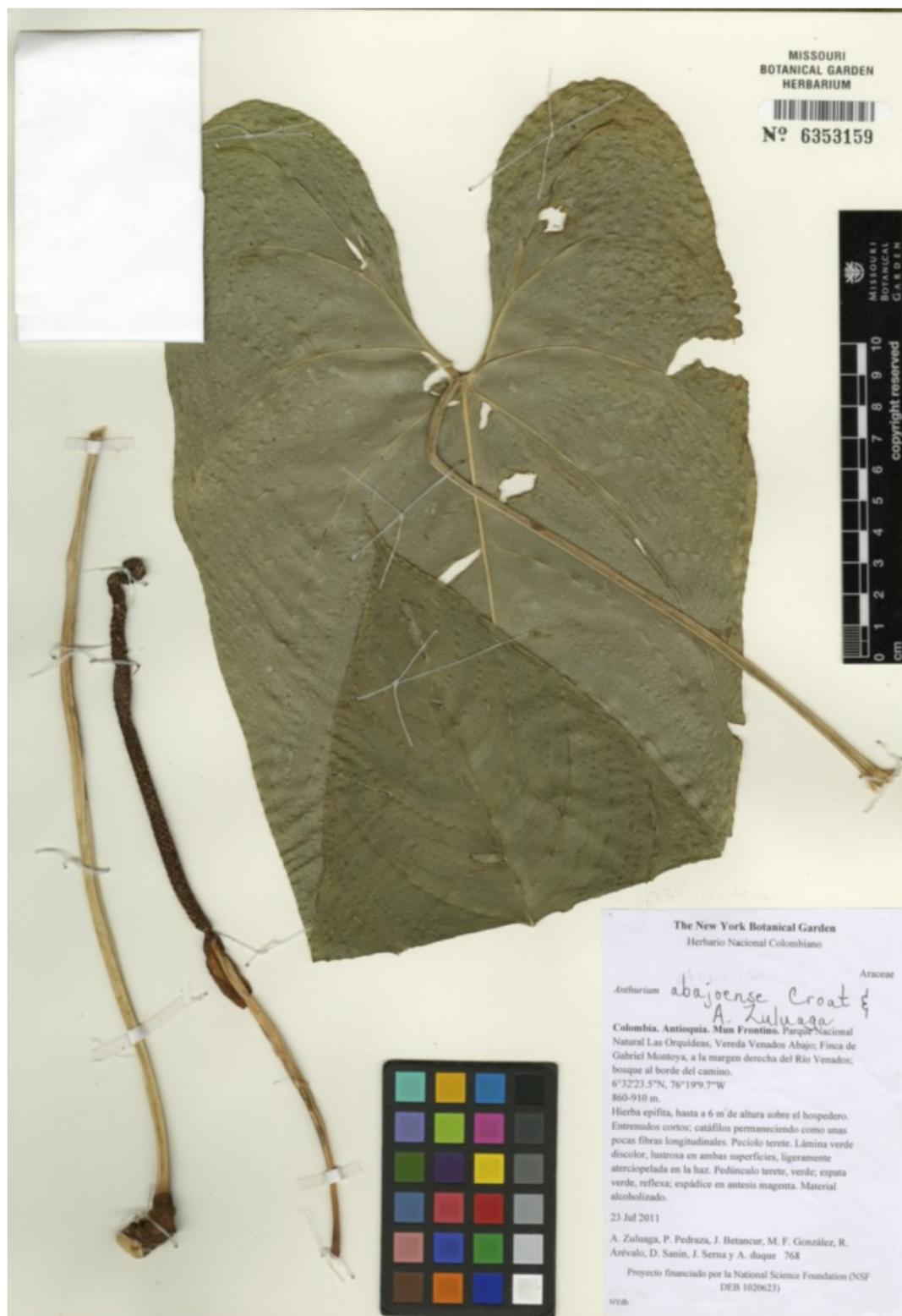


Figure 3. *Anthurium abajoense* Croat & A. Zuluaga (Zuluaga 768) Herbarium specimen showing leaf blade abaxial surface with a portion of the adaxial surface folded back, petiole and inflorescence.

rounded, very weakly raised above, rounded, weakly raised below, moderately darker than upper surface; **collective veins** arising from 1st pair basal veins, running 3–6 mm from margin; **antimarginal vein** present, arising from lower basal veins. INFLORESCENCE with **peduncle** terete, green, 11.8 cm long, drying 3–6 mm diam., drying tan, finely ribbed in upper half, deeply sulcate in lower half; **spathe** green, reflexed, drying reflexed to reflexed-spreading, obovate-elliptic to at least 5.2 cm long, drying 1.4 cm wide, reddish brown, densely granular inside, moderately granular outside; **spadix** at anthesis garnet to magenta, drying dark brown, tapered, 13.1–14.2 cm long, 0.6 cm wide at base, 0.3 cm wide at apex, weakly stipitate; **stipe** 2 mm long, 3 mm diam.; **flowers** 6–8 visible per spiral, 0.7–1.1 mm long, 1.4–2.0 mm wide; **tepals** drying light red-brown in centers to dark brown around edges, drying granular, 1.0–1.3 mm wide, inner margin narrowly rounded to 2-sided, outer margin 2-sided to shield-shaped; **stamens** held at level of tepals, anthers 0.8–0.9 mm long, 0.4 mm wide, thecae weakly divaricate.

Anthurium abajoense is endemic to Colombia, known only from the type locality in Antioquia, Municipio Urrao, in the Parque Nacional Natural de Las Orquídeas at 860–910 m in a *Tropical wet forest* life zone (Holdridge, 1971).

The species is named for the type locality at the Vereda Venados Abajo.

Paratype: COLOMBIA. **Antioquia:** Municipio Frontino, Parque Nacional Natural de Las Orquídeas, Vereda Venados Abajo, Finca de Gabriel Montoya, a la margen derecha del Río Venados; 06°32'23.5"N, 76°19'9.7"W, 860–910 m, 23 July 2011, *A. Zuluaga, P. Pedraza, J. Betancur, M. F. González, R. Arévalo, D. Sanin, J. Serna & A. Duque 768* (MO).

Anthurium alcogolloi Croat, **sp. nov.**
 Type: COLOMBIA. Antioquia: Parque Nacional Natural de Las Orquídeas, camino a San Marcos, 06°33'N, 76°19'W, 950–1060 m, 6 June 1988, *A. Cogollo, J. G. Ramírez & O. Alvarez 3301* (holotype, MO-4241467; isotype, JAUM). **Figure 4.**

The species is tentatively placed in section *Polyneurium*, characterized by its moderately short, slender internodes, moderately elongated dark brown deciduous cataphylls, subterete petioles, brown-drying narrowly oblanceolate acuminate blades which are acute at the base, the collective veins arising from one of the lower primary lateral veins as well as by its long-pedunculate inflorescence with a stipitate brownish long, slightly tapered spadix. The type specimen has irregular black dots along the margin and midrib which may be fungal in origin.

Anthurium alcogolloi is seemingly most closely related to *A. blanquitense* Croat which occurs in the same habitats. That species differs in having greenish drying, more oblong-elliptic blades with the primary



Figure 4. *Anthurium alcogolloi* Croat (Cogollo 3301, MO sheet). Herbarium type specimen showing on left inflorescence and base of leaf blade abaxial surface with adaxial surface folded back; also showing on right leaf blade abaxial surface and base of adaxial surface folded back.

lateral veins on the lower surface more narrowly raised and acute, less prominently granular blades.

Epiphyte; **internodes** short, drying 0.5–1.4 cm diam.; **cataphylls** persisting intact, 2.7–6.3 cm long, drying reddish brown, sparsely pale short-lineate. LEAVES more or less erect, 50.3–66.7 cm long, averaging 59.9 cm long with **petioles** 12.4–30.7 cm long (averaging 20.6 cm), drying 2–5 mm diam., deeply sulcate, drying matte, yellowish tan to brownish tan, densely pale-speckled; **geniculum** 0.5–1.9 cm long, glossy, darker and slightly thicker than petiole, granular and sparsely glandular-punctate; **blades** narrowly oblong-elliptic, 27.2–54.3 cm long, 5.6–8.6 cm wide, (averaging 39.9 x 7.2 cm), 4.4–6.3 times longer than broad (averaging 5.4), 1.1–4.4 times as long as petiole (averaging 2.4), sometimes broadest above middle, abruptly acuminate (1.4–2.8 cm long) at apex, cuneate to broadly cuneate and somewhat inequilateral at base; margins concave near apex, straight midway; **upper surface** drying medium brown, glossy and subcoriaceous, sparsely glandular-punctate; **lower surface** drying red-brown, semiglossy and smooth, sparsely glandular-punctate; **midrib** weakly raised on upper surface, concolorous with upper surface, prominently rounded below, much darker and redder than lower surface, three lateral ribs; **primary lateral veins** 12–16 pairs, emerging at a 76–90° angle, markedly curved upwards, concolorous and faintly raised above, more prominent and narrowly raised, drying darker below; **collective**

veins arising from 1st pair of primary lateral veins, sometimes weakly loop-connected to primary lateral veins, 3–8 mm from margin. INFLORESCENCE erect, brown, with **peduncle** 19.2–25.2 cm long, drying 2–4 cm wide, terete, drying moderately sulcate, yellow-tan to brown-tan, moderately pale-speckled; **spathe** green, drying deep reddish brown, semiglossy, reflexed-spreading, 6.8–10.2 cm long, drying 0.5–0.8 cm wide, lanceolate, weakly tapered toward apex, abruptly acuminate, noticeably ribbed, densely dark-speckled; **spadix** cylindrical, scarcely tapered, 7.6–12.3 cm long, drying 4 mm wide at base, 2 mm wide at apex, weakly stipitate; **stipe** 3–4 mm long, 2 mm wide; **flowers** 3–4 visible per spiral, 1.6–1.9 mm long, 1.4–1.8 mm wide; lateral **tepals** 0.9–1.1 mm wide, inner margins broadly rounded, outer margins 2-sided; **stamens** apparently withdrawing beneath tepals after anthesis, anthers not seen. INFRUCTESCENCE with berries globose-obovoid, initially green but turning purple upon maturation.

Anthurium alcogolloi is endemic to Colombia, known only from the type locality in Antioquia Department in the Parque Nacional Natural de Las Orquídeas at 950–1060 m in a *Premontane rain forest* life zone.

The species is named in honor of Alvaro Cogollo who collected the type collection. Alvaro is an old friend, colleague and former field companion in Antioquia. Cogollo's career as a collector in Antioquia is renowned and he has developed the

herbarium collection at the Jardín Botánico in Medellín to be one of the finest in Colombia. It is a privilege to name this interesting new species in his honor.

Paratypes: COLOMBIA. **Antioquia:** Parque Nacional Natural de Las Orquídeas, road to San Mateo, vic. Quebrada San Mateo, 06°33'N, 76°19'W, 950–1060 m, 6 June 1988, *Á. Cogollo P. et al. 3301* (MO); Municipio, Florencia, Dirección este, Quebrada las Mercedes, 05°31'36"N, 75°02'26"W, 13 Oct 1992, *C. E. Barbosa 7942* (FMB).

***Anthurium blanquitense* Croat, sp. nov.**

Type: COLOMBIA. Antioquia: Municipio Frontino, Corregimiento Nutibara, Inspección Murri, Alto de Cuevas en la vía Nutibara-La Blanquita, Finca El Palmar, sitio El Llano, bosque pluvial primario, 06°40'N, 76°24'W, 2080 m, 16 Feb 1991, *R. Callejas, F. J. Roldán & M. V. Arbeláez 10050* (holotype, HUA-80249). **Figures 5, 6.**

The species is tentatively placed in section *Polyneurium* and is characterized by its usually epiphytic habit, internodes longer than broad, long yellow-brown cataphylls which persist intact at most of the upper nodes, subterete, weakly sulcate petioles, oblong-elliptic, narrowly caudate-acuminate, greenish drying blades with an acute to weakly attenuate base with the collective veins arising from one of the lower primary lateral veins as well as by the long-

pedunculate inflorescence with a green spreading narrowly long-attenuate spathe and the narrowly long-tapered purple-violet spadix with violet-purple early-emergent berries.

The species is closely related to *Anthurium testaceum* Croat & R. A. Baker from Costa Rica and Panama with which it has been confused. That species occurs at similar elevations, between 800 and 2000 m, but that species differs in having flowers with usually only 2 flowers visible in each spiral, whereas in *Anthurium blanquitense* there are usually 3–4 flowers visible per spiral. *Anthurium testaceum* also has leaf blades typically proportionately much longer or more noticeably lanceolate or narrowly ovate versus more nearly elliptic in *A. blanquitense*.

The correct sectional placement of species in this group has been dubious. In the treatment of the Araceae of Costa Rica (Croat & R. A. Baker, 1979), *A. testaceum* was placed in *Leptanthurium* whereas in the revision of *Anthurium* for Central America (Croat, 1983; 1986) the species was placed in section *Xialophyllum*. Now after studying many species in section *Polyneurium* from NW Ecuador where the section seems to be most greatly centered, it appears more likely that *A. testaceum* would be best placed in section *Polyneurium* until a definitive molecular study has been concluded.

Epiphytic, sometimes terrestrial; **internodes** short, 0.6–1.3 cm long, drying



Figure 5. *Anthurium blanquitense* Croat (Callejas 10050). Herbarium type specimen showing on left leaf blade adaxial surface with abaxial surface folded twice; also showing on right leaf blade abaxial surface folded over base of adaxial surface, stems, cataphylls and inflorescence at anthesis and post-anthesis.

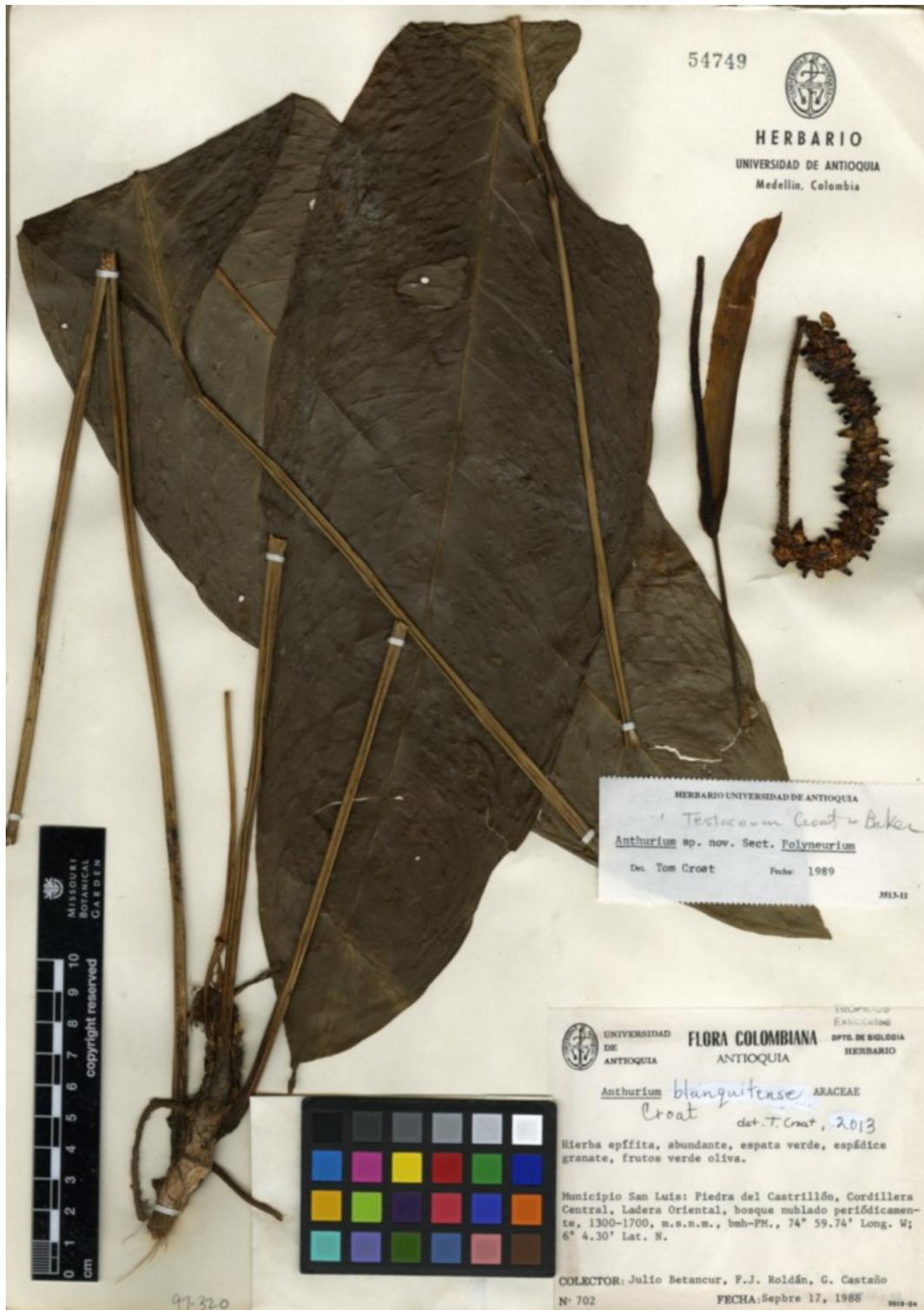


Figure 6. *Anthurium blanquitense* Croat (Betancur 702). Herbarium specimen showing on left leaf blade abaxial surface with base of adaxial surface folded back; also showing on right leaf blade abaxial surface, inflorescence and infructescence.

1.0–1.6 cm diam.; **cataphylls** 7.8–18.3 cm long, persisting intact, as fibers closer to base, ribbing rounded to acute drying reddish brown, matte, moderately pale-speckled, sometimes short-pale-lineate. **LEAVES** 65.9–80.3 cm long with **petioles** terete, 28.3–38.4 cm long (averaging 33.4 cm), drying 2–5 cm diam., yellowish tan, semiglossy, moderately sulcate, drying deeply sulcate with thin sometimes loosening marginal wings; **geniculum** 1.0–1.4 cm long, drying 4–6 mm diam., tannish green; **blades** ovate-elliptic, 37.1–41.9 cm long by 10.8–14.7 cm wide, (averaging 38.8 x 12.2 cm), 2.9–3.6 times longer than broad (averaging 3.2), 1.0–2.3 times longer than petiole (averaging 1.2), broadest midway to slightly below, abruptly acuminate at apex (acumen 1.2–4 cm, sometimes downturned), acute to cuneate at base, weakly inequilateral at base, drying thinly coriaceous to subcoriaceous; **upper surface** drying dark green to olive-green, glossy, surface smooth upon drying, minutely areolate upon magnification; **lower surface** drying medium gray-green, glossy, sparsely and minutely granular; **midrib** weakly raised and slightly rounded above, barely paler than upper surface, prominently rounded below, significantly paler than lower surface with lateral ribbing; **primary lateral veins** 14–18 pairs, departing midrib at a 43–54° angle, weakly and narrowly raised above, narrowly raised to acute below, slightly paler than upper surface, significantly paler than lower surface; **collective veins** arising from first few [3rd] primary lateral veins near base, weak loop-connecting primary lateral veins, 2–6 mm from margin, almost

indistinguishable above, drying weakly acute below. **INFLORESCENCE** erect; **peduncle** 47.7–51.9 cm long (averaging 49.8), drying 2–6 mm diam., terete, drying matte, yellowish tan, sulcus; **spathe** reddish adaxially, green at base and red towards apex abaxially, drying light brown to medium gray-brown, matte, erect-spreading, 4.7–11.2 cm long, 0.9–1.3 cm wide (averaging 9.4 cm x 1.0 cm), narrowly linear-lanceolate, minutely granular with the veins darker and raised upon drying, short-pale-lineate; **spadix** narrowly cylindrical to weakly tapered, 8.2–15.8 cm long, 2–3 mm diam. (averaging 11.5 cm long), violet to garnet, drying dark brown to medium red-brown; **flowers** 2–3 visible per spiral, 1.6–2.2 mm long, 1.2–1.5 mm wide; **tepals** drying light tan-red in centers to dark brown around edges, drying granular, 0.8–1.1 mm wide, inner margin broadly rounded, outer margin 2-sided to shield-shaped; **stamens** held at level of tepals, anthers 0.5–0.6 mm long, 0.3 mm wide. **INFRUDESCENCE** 13.0–16.4 cm long, drying 0.9–1.3 cm wide with berries exerted (averaging 14.9 cm by 1.1 cm); **berries** violet-purple, drying yellow-tan at base darkening to brown at apex, drying 0.9 cm long by 0.4 cm wide, prominently protruded apex; **pericarp** short-pale-lineate.

Anthurium blanquitense is endemic to Colombia, known only from the type locality in Antioquia and Caldas Department at 1060–2080 m in a *Premontane rain forest* life zone.

The species is named for the type locality near La Blanquita in Antioquia Department in the Municipio Frontino.

Paratypes: COLOMBIA. **Antioquia:** Corregimiento Nutibara, cuenca alta del Rio Cuevas, 06°48'16"N, 76°14'51"W, 1790 m, 15 Apr 1987, *D. Sánchez S., C. Orrego, S. Sylva, Francisco J. Roldán, G. E. Martínez A., D. L. Restrepo & J. C. Betancur B. 1207* (MEDEL, MO); Piedra del Castrillón, Cordillera Central, Ladera Oriental, bosque nublado periódicamente, 06°04'N, 74°59'W, 1300–1700 m, 17 Sep 1988, *J. C. Betancur B. 702* (HUA, MO); 1900 m, 23 Nov 1986, *Sanchez 827* (MEDEL, MO).

***Anthurium curtipedunculum* Croat, sp. nov.** Type: COLOMBIA. Antioquia: Municipio de Frontino, region of Murri, road between Nutibara and La Blanquita, 19.2 km from Nutibara, 06°40'N, 76°26'W, 1560 m, 11 Feb 1989, *J. M. MacDougal, D. Restrepo, & D. S. Sylva 3944* (holotype, MO-3670529–30; 3670556). **Figures 7–9.**

The species is an unusual member of section *Belolonchium*, characterized by its hemiepiphytic habit (at 3 m), thick stem (5.5 cm diam.) with short internodes, cataphylls persisting as a network of pale closely arranged thin fibers, long-petiolate leaves (to 1.38 m), terete petioles which are much longer than the blades, narrowly ovate-cordate-sagittate brown-drying, abruptly acuminate blades with 8(9) pairs of basal veins, a single pair of free basal veins,

collective veins arising from the 5th pair of basal veins and mostly 1–3 mm from the margins as well as by the very short-pedunculate inflorescence with a hooding narrowly ovate-elliptic reddish spathe and the short-stipitate cylindroid dark purplish red spadix.

The unusually short peduncle on such a massive plant aids in recognition.

The sectional placement remains somewhat doubtful owing to intermediate characters depicting the section *Belolonchium* and section *Calomystrium*. While it has the fibrous cataphylls of section *Belolonchium* they are not the typical dark brown and conspicuous type usually found on *Belolonchium*. While it has short pale-lineations on the upper surfaces which are frequent for *Calomystrium*, they are exceedingly short and widely spaced and moreover lack the intact cataphylls so consistent for *Calomystrium*.

In the Lucid Anthurium Key the species tracks to *Anthurium bogotense* Schott, *A. cupreonitens* Engl. and *A. denudatum* Engl., all of which differ by having the anterior lobes markedly concave and with long-pedunculate inflorescences. *Anthurium bogotense* and *A. cupreonitens* also differ in having longer and more tapered spadices.

Hemiepiphyte to 3 m; stem 5.5 cm diam.; **internodes** short; **cataphylls** 19.5–26 cm long, drying as network of mostly aligned pale fibers, sub-manilla, with tiny fragments



Figure 7. *Anthurium curtipedunculum* Croat (MacDougal 3944). Herbarium type specimen (sheet 1) showing posterior portion of leaf blade abaxial surface with portion of the leaf blade adaxial surface folded over and inflorescence.



Figure 8. *Anthurium curtipedunculum* Croat (MacDougal 3944). Herbarium type specimen (sheet 2) showing portion of leaf blade abaxial surface with a portion of leaf blade adaxial surface folded back and stem with cataphyll.



Figure 9. *Anthurium curtipedunculum* Croat (MacDougal 3944). Herbarium type specimen (sheet 3) showing portion of leaf blade abaxial surface with inflorescence and cataphylls.

of brown epidermis. LEAVES 1.47 m long with **petioles** 1.38 m long, drying to 1.5 cm diam., sheathed to 6.2 cm, cylindrical, terete, smooth, drying light tan-brown and matte, weakly striated; **geniculum** 4.5 cm long; **blades** ovate-cordate-sagittate, 89.6 cm long, 57.0–63.0 cm wide, 1.57 times longer than broad, broadest at petiole attachment, 0.65 times as long as petiole, moderately coriaceous, abruptly acuminate and downturned at apex, prominently lobed at base; **upper surface** dark green, matte, drying dark brown, sparsely and minutely short-pale-lineate; **lower surface** moderately paler, glossy, drying weakly glossy, medium brown-gray-tan; **anterior lobe** 72 cm long, 59.8 cm wide, with weakly convex margins, broadest below middle; **posterior lobes** 29.7 cm long 20.5 cm wide, directed downward to turned somewhat inwards; **sinus** broadly hippocrepiform, 24.5 cm deep, 17 cm wide; **midrib** acute to narrowly rounded above, drying concolorous with surface, prominently and narrowly rounded to rounded below, drying noticeably darker than surface; **primary lateral veins** ca. 8–9 pairs, arising at a 48–56° angle, acute above, drying slightly lighter than surface, prominent and acutely rounded below, drying slightly darker than surface; **basal veins** 8(9) pairs, 1st pair free to base, 2nd pair coalesced to 1.4 cm, 3rd pair to 4.6 cm, 4th to 9th pair coalesced at 8.9 cm; **posterior rib** weakly rounded towards base, 12.4 cm long, naked to 8.2 cm; **tertiary veins** flat, darker than both surfaces; **collective veins** arising from 5th pair of basal veins, running 2–4 mm from margin. INFLORESCENCE with **peduncle** 2.0 cm

long, drying brown, coriaceous; **spathe** spreading, narrowly ovate, tapered with a long inequilateral acumen, to at least 13.1 cm long, drying 4.4 cm wide, dull red adaxially, light purplish red abaxially with traces of ivory, drying dark reddish brown adaxially, medium tan-brown abaxially, moderately granular, juvenile spathe narrowly long-acuminate, 8.3 mm long; **spadix** dark purplish red, drying dark brown, cylindroid, weakly tapered towards both ends, to 10.4 cm long, 1.8 cm diam., 1.3 cm wide at apex and base, stipitate; **stipe** 1 cm long, 3 mm wide; **flowers** 15–17 visible per spiral, 1.7–2.2 mm long, 1.6–2.0 mm wide; **tepals** drying dark brown, 0.9–1.3 mm wide, inner margin broadly rounded, outer margin 2-sided to 4-sided and broadly shield-shaped; **stamens** not yet emergent, but at apex seemingly mature, anthers 1.7 mm long, 0.6 mm wide, thecae parallel.

Anthurium curtipedunculum is endemic to Colombia, known only from the type locality in Antioquia Department in the region of Murri at 1560 m in a *Premontane rain forest* life zone.

The species epithet “curtipedunculum” is from the Latin “curtus” (short) and “pedunculus” (peduncle) referring to the very short peduncle.

Anthurium dabeibaense Croat, sp. nov.

Type: COLOMBIA. Antioquia: Municipio Frontino, Vereda San Andrés, vía Dabeiba-Fuema, 18–33

km, 76°40'N, 6°23'W, 960–1200 m, 23 Nov 1987, R. Callejas, R. Fonnegra, F. J. Roldán, A. L. Arbeláez 5841 (holotype, NY; isotype, HUA.

Figure 10.

The species is a member of section *Calomystrium* characterized by its terrestrial habit, persistent intact red-brown cataphylls, terete petioles, brown-drying ovate-cordate gradually long-acuminate blades with a narrowly parabolic sinus, 6 pairs of basal veins with 2 pairs of basal veins free to the base, a short posterior rib which is naked much of its length, collective veins arising from the first pair of basal veins as well as by its long-pedunculate, white lanceolate spathe and long-tapered white spadix.

The species perhaps more closely resembles *Anthurium modicum* Croat & Oberle which differs in having the collective veins arising from the lower pairs of basal veins, sparser, short pale-lineations and a more conspicuous and densely dark-speckled upper surface and a dark-punctate lower surface.

In the Lucid Anthurium Key the species tracks to *Anthurium nymphaeifolium* K. Koch & C. D. Bouché which differs in having much thicker and longer petioles, a wider spathe, and conspicuously dark-dotted leaves on the lower surface; *A. sanctifidense* Croat, differing in having blades which typically dry matte on the lower surface with collective veins usually much closer to the margin and with the upper surface much

more pale-lineate and *A. subcaudatum* Engl. differing in having a more V-shaped sinus and a cylindroid spadix.

Terrestrial; **internodes** short, drying ca. 2.5 cm diam.; **cataphylls** 6.5 cm long, persisting intact, drying light red-tan-brown. LEAVES 76.9 cm long with **petioles** 40.6 cm long, drying 4–5 mm diam., terete, moderately sulcate, drying light to medium brown, matte and finely ridged; **geniculum** 3.2 cm long, drying brown-black, deeply sulcate; **blades** broadly ovate-cordate-sagittate, 36.3 cm long, 25.3 cm wide, widest ca. 1.5 cm above petiolar plexus, 1.4 times longer than wide, 0.89 times as long as petiole, moderately coriaceous, gradually long-acuminate (2.7 cm long), drying medium brown, matte, light green, drying light brown and semiglossy above; **upper surface** moderately very short-pale-lineate, minutely granular-ridged upon magnification; **lower surface** moderately to densely pale granular; **anterior lobe** 27.7 cm long, concave; **posterior lobes** 11–12 cm long, 9–10.9 cm wide, oriented downward and weakly inward, somewhat inequilateral; **sinus weakly** spathulate to parabolic, 8.2 cm long, 3.6 cm wide; **midrib** weakly rounded, drying slightly darker above, more prominent and darker below; **primary lateral veins** ca. 5 pairs, arising at a 39–46° angle, narrowly rounded, almost indistinguishable from interprimary veins above, darker than surface below; **tertiary veins** drying concolorous with surface, scarcely raised below; **collective veins** arising from 1st pair of basal veins, 4–8 mm from margin; **basal veins** 5(6) pairs, 1st



Figure 10. *Anthurium dabeibaense* Croat (Callejas 5841). Herbarium type specimen showing leaf blade abaxial surface with apex of adaxial surface folded back with inflorescence.

through 3rd pairs free to base, 4th & 5th pairs coalesced 7–10 mm; **posterior ribs** short, 1.2 cm long, weakly curved, naked to 5 mm. INFLORESCENCES with **peduncle** 32.1 cm long, drying 3 mm diam., drying moderately ribbed, deeply sulcate near base, dark brown, matte; **spathe** lanceolate, 11.7 cm long, to 2.3 cm wide below middle, spreading, white, drying dark brown, short-pale-lineate, moderately pale-granular; **spadix** long-tapered, stipitate 3 mm, 12.2 cm long and 6 mm wide at base and midway, 3 mm diam. near apex, white, drying dark brown, matte; **flowers** 7–8 visible per spiral, 2.2–2.6 mm long, 1.8–2.2 mm wide; tepals brown with sparse granules, lateral tepals 0.7–1.2 mm wide, inner margin weakly rounded, outer margin 2–3-sided to obtusely 4-sided; **stamens** held at the level of the tepals, 0.4 mm long and 0.6 mm wide, thecae divaricate. INFRUCTESCENCE not present.

Anthurium dabeibaense is endemic to Colombia, known only from the type locality in the Department of Antioquia, Municipio Frontino at 960–1200 m in a *Tropical moist forest* transition to *Premontane rain forest* life zone.

The species is named for the type locality along the road to Dabeiba in Antioquia Department.

***Anthurium elquincense* Croat, sp. nov.**

Type: COLOMBIA. Antioquia: Municipio Urrao, Vía Páramo de Frontino, El Quince, 22 Sep 1994,

2740 m, *E. Rentarúa et al.* 10591 (holotype, HUA-093644). **Figure 11.**

The species is a member of section *Tetraspermium* characterized by its terrestrial habit, elongated internodes which dry dark brown matte, densely pale-granular to short pale-lineate, cataphylls persisting semi-intact at the upper nodes, long-petiolate leaves, brown-drying, sharply sulcate reddish petioles, narrowly ovate-elliptic, brown-drying, short-cuspidate-acuminate leaf blades which are acute to narrowly rounded at base, reddish lower surfaces with a single pair of collective veins 4–6 mm from the margins and with a well-developed antimarginal vein as well as by long-pedunculate inflorescences with a red peduncle, a reddish erect-spreading spathe and a short narrowly cylindroid red spadix.

In the Lucid Anthurium Key the species tracks to *Anthurium licium* Croat & Oberle and *A. tonduzii* Engl., both of which differ in having broadly ovate blades; *A. subequans* Croat & Oberle, differing in having shorter, more ovate, more prominently acuminate blades which are glandular-punctate on the lower surface as well as a green spadix which turns dark purple; *A. caucanum* Engl., by its larger leaves (width of 6–20 cm), and

A. cocornaense Croat, differing by having much longer, proportionally more slender stems, proportionately more ovate, more prominently acuminate blades and a stipitate spadix.



Figure 11. *Anthurium elquincense* Croat (Rentería 10591). Herbarium type specimen showing on left leaf blade abaxial surface folded longitudinally covering leaf blade adaxial surface, two more leaf blades adaxial surface, inflorescence and cataphylls.

Terrestrial; **stems** elongated, moderately to densely pale lineate-pustular especially toward apex; **internodes** longer than broad, 1–2.7 cm long, 4 mm diam.; **cataphylls** 2.6–6.0 cm long, persisting intact, becoming weakly fibrous towards base in age, often prolonged into needlelike point, densely pale-granular. **LEAVES** more or less erect, 21.3–24 cm long; **petioles** C-shaped, 6.9–9.4 cm long, 1–2 mm diam., red, drying 1–2 mm diam., brown to tan-brown, broadly and sharply sulcate adaxially with obscure medial ridge towards base and sheath 3.4–3.6 cm long, sparsely glandular-punctate; **geniculum** difficult to discern; **blades** narrowly oblong-elliptic to narrowly ovate-elliptic, 14.4–15.8 cm long, 3.5–3.8 cm wide, 3.8–4.1 times longer than broad, 1.6–2.1 times longer than petiole, narrowly acute and sometimes downturned with a short, terete blackened apiculum ca. 1 mm long, acute to narrowly rounded and sometimes weakly inequilateral at base, drying brownish and weakly bicolorous, sub-coriaceous; **upper surface** drying matte, brown-gray, moderately glandular-punctate, obscurely short-pale-lineate, minutely dark-speckled upon magnification; **lower surface** reddish when fresh, drying tan-gray, semiglossy, sparsely glandular-punctate, moderate short-pale-lineate; **midrib** red when fresh, drying concolorous above, narrowly raised darker and narrowly rounded, drying with an acute medial rib; **primary lateral veins** 8–11 pairs, arising at a 55–60° angle, weakly raised and concolorous on both surfaces, scarcely more distinguishable than interprimary veins; **collective veins** 1 pair, arising from the lower primary lateral veins

ca. 6 mm from the base, 2–6 mm from the margin, more prominent than primary lateral veins; **antimarginal veins** present. **INFLORESCENCE** erect; **peduncle** 9.5–11.2 cm long, drying 1 mm diam., drying matte, dark reddish brown, deeply and finely ribbed, moderately pale-granular; **spathe** 2.4–2.8 cm long, 6–7 mm wide, narrowly lanceolate, erect-spreading, acute-acuminate at apex, red, drying red-brown, matte, prominently veined, densely granular adaxially; **spadix** stipitate, with stipe 2 mm long, 3.9 cm long, 3 mm diam., narrowly cylindroid, red, drying red-brown, gradually paler towards apex; **flowers** 4 visible per spiral, 1.8–2.1 mm long, 1.6–1.9 mm wide; lateral tepals 0.5–0.9 mm wide; inner margins broadly rounded to straight; outer margins 2-sided to broadly rounded; **stamens** held at level of tepals, contiguous; anthers 0.4 mm long, 0.6 mm wide; thecae ovate, slightly divaricate.

Anthurium elquicense is endemic to Colombia, known only from the type locality in Antioquia Department in the Páramo de Frontino at 2740 m in a *Montane rain forest* life zone.

The species is named for the type locality at El Quince in the Páramo de Frontino.

Anthurium espiranzaense Croat & A. Zuluaga, **sp. nov.** Type: COLOMBIA. Antioquia: Municipio Frontino, Parque Nacional Natural de Las Orquídeas, Sector de Venados, Vereda Venados Abajo, sitio La

Esperanza, cuenca de la Quebrada Arenales, 06°32'6.8"N, 76°18'46.3"W, 880–920 m, 29 July 2011, *A. Zuluaga, P. Pedraza, J. Betancur, M. F. González, R. Arevalo, D. Sanin, J. Serna & A. Duque* 825 (holotype, MO-6353132; isotype, COL). **Figures 12, 13.**

The species is provisionally classified as a member of section *Decurrentia*, but is likely an undescribed new section characterized by its terrestrial habits, slender internodes, cataphylls deciduous when intact with only a few fibers persisting, subterete petioles, semiglossy bicolorous, gradually acuminate elliptic-oblong blades with the primary lateral veins scarcely more conspicuous than the interprimary veins, collective veins one pair arising from the base with both surfaces conspicuously granular upon magnification as well as by the erect long-pedunculate inflorescence with the peduncle several narrow-ribbed, spathe lanceolate green and spreading and spadix green becoming glaucous with the tepal becoming violet-purple in fruit with berries violet-purple.

In the *Lucid Anthurium Key* the species tracks to *Anthurium anchicayense* Croat, distinguished by its more coriaceous, more elliptic blades with more broadly spreading primary lateral veins, collective veins arising from one of the lower primary lateral veins and by the red berries and *A. guayaquilense* Engl., from a much lower elevation along the Gulf of Guayaquil in Ecuador distinguished by its longer yellowish spadix and white berries.

Terrestrial or hemiepiphytic (sometimes epiphyte with vine); **stem** terete; **internodes** short or 1–2 cm long, drying 0.7–1.0 cm diam. ; **cataphylls** 9.8–12.0 cm long, deciduous but with a few pale fibers persisting at base, intact at upper nodes, abruptly acuminate at apex (acumen 2 mm long), medium brown to translucent brown, matte, finely ribbed longitudinally, sparsely short-pale-lineate, moderately dark-pustular. LEAVES 24–39 cm long, averaging 36.7; **petioles** 8.4–11.7 cm long (averaging 10.3 cm), drying 3 mm diam., semi-terete, drying bilaterally flattened, dark brown, matte, sparsely short-pale-lineate, moderately dark granular; **geniculum** 0.9–1.3 cm long, drying 3 mm diam., faintly darker brown than petiole, deep ribbing, more densely granular than petiole, moderately short-pale-lineate; **blades** elliptic-oblong, 25.9–27.2 cm long, 7.9–9.6 cm wide (averaging 26.4 cm x 8.9 cm), 2.8–3.3 times longer than broad, 2.3–3.1 times longer than petiole, broadest above middle, gradually acuminate, 0.6–1.4 cm long, 0.5 cm wide midway, narrowly attenuated base, weakly inequilateral, green, bicolorous, new blades densely short-pale-lineate on both surfaces, conspicuously granular throughout; **upper surface** semiglossy, drying dark brown, semiglossy, densely granular, sparsely short-pale-lineate; **lower surface** semiglossy, drying medium brown to tan-brown, semiglossy, sparsely and irregularly granular (granules translucent reddish brown); **midrib** raised, triangular towards the apex, rounded at the base on upper surface, narrowly rounded on lower surface, drying very fine and weakly, narrowly raised on



Figure 12. *Anthurium espiranzaense* Croat & A. Zuluaga (Cogollo 3918). Herbarium specimen showing on left leaf blade adaxial surface with inflorescence, also showing broken portion of leaf blade abaxial surface.



Figure 13. *Anthurium espiranzaense* Croat & A. Zuluaga (Zuluaga 825). Herbarium type specimen showing on left broken portion of leaf blade, also showing on right leaf blade adaxial surface with inflorescence.

upper surface, concolorous, drying moderately ribbed, granular and short-pale-lineate near base on lower surface, darker than surface, (3–4), sparsely short-pale-lineate; **primary lateral veins** 14–16 pairs, departing midrib at a 38–45° angle, drying concolorous on both surfaces, drying faintly raised above, densely granular, weakly raised, narrowly rounded below; **interprimary veins** only slightly less prominent than primary lateral veins on both surfaces; **collective veins** arising from base, 4–8 mm from margin, narrowly raised, only faintly more prominent visibly than primary lateral veins, weakly rounded above, rounded to round-raised below. INFLORESCENCE with **peduncle** 22.6–30 cm long (averaging 27.1), drying 1–2 mm diam., drying medium brown, matte, terete, moderately sulcate with several slender ribs, moderately short-pale-lineate; **spathe** lanceolate, spreading, 4.3–6.5 cm long, 0.5–1.4 cm wide, green, with reddish veins adaxially, drying medium brown, with narrow ribs, densely granular adaxially, short-pale-lineate and granular abaxially; **spadix** 6.5–7.8 cm long, 2–5 mm diam., slightly tapered toward apex, green at anthesis, becoming glaucous, drying black-brown, stipitate (stipe 2 mm long, 3 mm diam.); **flowers** 3–5(7) visible per spiral, to 1.5–2.0 mm long, 1.2–1.4 mm wide; **tepals** becoming purple on infructescence, glossy black, sparsely white-granular, lateral tepals 0.9–1.3 mm wide, inner margins broadly rounded to weakly concave, outer margin 2-sided to broadly rounded; **stamens** withdrawn below the level of the tepals after anthesis; anthers 0.5 mm long, 0.5 mm

wide, thecae broadly ovate, moderately divaricate. INFRUCTESCENCE with berries violet-purple with a yellow base, yellow flowering, sparse arils with two yellowish seeds.

Anthurium espiranzaense is endemic to Colombia, known only from the type locality in Antioquia Department, Municipio Frontino at 880–920 m in a *Tropical wet forest* life zone.

Anthurium espiranzaense is named for the type locality in Sitio La Esperanza in Vereda Venados Abajo in the Parque Nacional Natural de La Orquídeas.

Paratypes: COLOMBIA. **Antioquia:** Municipio Frontino. Parque Nacional Natural de Las Orquídeas, Sector de Venados arriba, margen izquierda del Río Venados, 06°34'N, 76°19'W, 1060–1090 m, 24 July 1988, *A. Cogollo, J. G. Ramírez & O. Álvarez* 3460 (MO, JAUM); 12 Feb 1989, *A. Cogollo et al.* 3918 (MO).

Anthurium frontinoense Croat & A. Zuluaga, **sp. nov.** Type: COLOMBIA. Antioquia: Municipio Frontino, Parque Nacional Natural de Las Orquídeas, Vereda Venados Abajo, Finca de Gabriel Montoya, along Río Venados, 06°32'23.5"N, 76°19'9.7"W, 860–910 m, 23 July 2011, *A. Zuluaga, P. Pedraza, J. Betancur, M. F. González, R. Arevalo, D. Sanin, J. Serna & A. Duque* 775

(holotype, MO-6353139; isotype, COL). **Figure 14.**

The species is a member of section *Xialophyllum* characterized by its terrestrial habit, elongated internodes, deciduous cataphylls, subterete weakly sulcate petioles, bicolorous, brown-drying ovate-elliptic-sagittate blades with a spatulate sinus, narrow posterior lobes, 5 pairs of basal veins, the 1st and sometimes the 2nd pairs free to the base, as well as by the slender, moderately long pedunculate inflorescence with a short green spadix and a slender, scarcely tapered green spadix.

In the Lucid Anthurium Key the species tracks to *Anthurium riocuevense* Croat which differs in having a parabolic sinus and with most of the basal veins free to the base; *A. leptocaulle* Croat differing in having a parabolic sinus and a greenish white to purple spadix; *A. pauciflorum* Croat, differing in having a parabolic sinus and a yellow spadix and *A. hutchisonii* Croat, differing in having the posterior lobes somewhat spreading and with the blades broadest across the base.

Terrestrial and subscandent; **internodes** drying light, grayish tan, matte, to 14.2 cm long, 0.4 cm diam.; **cataphylls** deciduous, not seen. LEAVES 20.6–21.8 cm long; **petioles** subterete, 18.2–18.6 cm long, 2 mm diam., weakly sulcate, drying moderately sulcate, red-brown, gradually darkening towards petiolar plexus; **geniculum** 0.7 cm long; **blades** ovate-

sagittate, 20.6–21.8 cm long, 13.4–14.8 cm wide, 1.5 times longer than wide, 1.1–1.2 times longer than petioles, abruptly acuminate at apex, prominently lobed at base, dark green, matte-subvelvety above, paler and weakly glossy below, drying dark brown above, yellow-brown below; **lower surface** drying weakly granular; **posterior lobes** 5.5–6.1 cm long, 3.8–4.5 cm wide, moderately unequal in size and shape, directed toward the base; **sinus** spatulate, 5.4 cm deep, 1.9 cm wide; **midrib** drying narrowly raised, concolorous above, rounded below, drying narrowly rounded, darker than surface; **primary lateral veins** 4–6 pairs, arising from the midrib at a 40–50° angle, flattened, concolorous, inconspicuous above, finely raised, drying darker than surface below, curving upward near margin; **basal veins** 5 pairs, 1st, sometimes 2nd pairs free to base; **collective veins** arising from 2nd pair of basal veins, loop-connecting to the primary lateral veins 3–5 mm from the margin. INFLORESCENCE 17 cm long; **peduncles** 12.4 cm long, 1 mm diam., green; **spathe** green, drying minutely granular, densely short-pale-lineate, narrowly lanceolate in shape, 6.2 mm long, 9.5 mm wide; **spadix** green, narrowly cylindroid, drying 4.7 cm long, 3.5 mm diam., drying brown-gray; **flowers** 4(5) per spiral, averaging 1.9 mm long, 2.2 mm wide, densely granular; lateral **tepals** 1.0–1.1 mm wide, inner margins broadly rounded, outer margins 2-sided to obtusely 3-sided, **stamens** held at level of tepals and covering style, 0.3 mm long, 0.6 mm wide;



Figure 14. *Anthurium frontinoense* Croat & A. Zuluaga (Zuluaga 775). Herbarium type specimen showing on left leaf blade adaxial surface with apex portion of abaxial surface folded down, also showing on right leaf blade adaxial surface with apex portion of abaxial folded back with inflorescences.

thecae divaricate. INFRUCTESCENCE with fruits green.

Anthurium frontinoense is endemic to Colombia, known only from the type locality in Antioquia Department, Municipio Frontino at 860–910 m in a *Premontane rain forest* life zone.

The species is named for the type locality in the Municipio Frontino in Antioquia Department.

***Anthurium hempeanum* Croat, sp. nov.**

Type: COLOMBIA. Antioquia: Municipio Frontino, Corregimiento Nutibara, cuenca alta del Río Cuevas, 06°51'N, 76°14'W, ca. 1000 m, 13 Apr 1987, D. Sánchez, C. Orrego, S. Sylva, G. Martínez, D. Restrepo, F. Roldan & J. Betancur 1124 (holotype, MEDEL). **Figures 15–18.**

The species is a member of section *Cardiolonchium* characterized by its terrestrial habit, large size, massive yellow-brown-drying cataphylls which remain intact except for the coarsely pale fibrous basal portion, the elongated petiole (to 1 m long) which dries deeply sulcate, narrowly ovate-sagittate, yellow-brown-drying blades with 9 pairs of basal veins, 2–3 pairs of which are free to the base, a well-developed, weakly curved posterior rib which is naked most of its length, the uppermost basal veins prominently branching, collective veins arising from 5th pair of basal veins and 2–4 mm from the margins as well as by the

green spathe, yellowish white long-tapered prominently elongated spadix and berries with a white base and red apex.

In the Lucid Anthurium Key the species tracks to *Anthurium angelopolisense* Croat, differing in having leaf blades drying grayish and epunctate above, yellowish gray-green below with the tertiary veins much less conspicuous; *A. argyrostachyum* Sodiro which differs in having a prominently constricted anterior lobe and a bluish green glaucous spadix; *A. chrysolithos* Croat & Oberle, differing in having much smaller blades (to 32 cm x 23 cm) with the collective veins usually arising from the 1st pair of basal veins and an inflorescence to only 6 cm long with berries solid red; *A. ramosense* Croat, differing in having the cataphylls deciduous more or less intact with only a few fibers at the base persisting, blades with more broadly rounded posterior lobes and the collective veins more distant from the margins (5–10 mm) and *A. silverstonei* Croat & Oberle differing in drying grayish green, having less prominent tertiary veins, and having denser dark punctations on the lower surface .

Terrestrial to 4 m; **internodes** short; **stem** drying to 3.5 cm diam.; **cataphylls** semi-intact, becoming coarsely pale fibrous at base, marcescent. LEAVES 1.01–1.11 m long with **petioles** terete, to at least 1 m, drying 1.7 mm diam., grayish tan, obtusely sulcate, drying sulcate on geniculum, densely pale granular; **blades** ovate-cordate-sagittate, to 100–111 cm long, 44–47 cm wide, 1.90–1.95 times longer than broad,



Figure 15. *Anthurium hempeanum* Croat (Sanchez 1124). Herbarium type specimen showing folded leaf blade with the adaxial surface on the outside.



Figure 16. *Anthurium hempeanum* Croat (*Sanchez 1124*). Herbarium type specimen showing peduncle and infructescence.



Figure 17. *Anthurium hempeanum* Croat (Sanchez 1124). Herbarium type specimen showing folded leaf blade with the adaxial surface of the posterior lobe on the outside.



Figure 18. *Anthurium hempeanum* Croat (*Sanchez 1124*). Herbarium type specimen showing cataphylls forming a netlike reticulum.

0.84–0.92 times as long as petioles, subcoriaceous, drying concolorous; **upper surface** matte, drying yellowish to greenish brown, smooth, sparsely dotted with dark yellow-brown glands, at higher magnification densely granular; **lower surface** drying semiglossy, yellowish brown, diffuse dark punctations, less conspicuously granular; **anterior lobe** 84–92 cm long, 44.3–47.2 cm wide, with margins weakly concave, broadest below middle; **posterior lobes** 28 cm long, 16.7 cm wide, directed downward to turned somewhat outwards; **sinus** broadly arcuate, 16.5–19.5 cm deep, 17 cm wide; **midrib** prominent, rounded on and concolorous to slightly paler than both surfaces, with granules along margins; **primary lateral veins** 22–24 pairs, arising at a 44–52° angle, weakly elevated on upper surface, flatly acute and concolorous, more prominent, acute on lower surface, concolorous, minutely granular along veins; **basal veins** 9 pairs, 1st pair free to base, 2nd pair coalesced to 1.5 cm, 3rd pair coalesced to 3.3 cm, 5th and 6th to 11 cm; **posterior ribs** nearly straight, 11 cm long, naked to 8 cm; **tertiary veins** prominulous, acute, less conspicuous on lower surface; **collective veins** arising from lowermost basal veins (6th–7th pairs), running 1–4 mm from margin. **INFLORESCENCE** with **peduncle** to at least 36.2 cm long, drying 0.9–1.3 cm diam., drying brown-tan, drying moderately ribbed; **spathe** green, reflexed, drying light reddish tan; **spadix** sessile, 54.8 cm long, 1.6 cm diam., 9 mm diam. at apex, whitish yellow, drying light to medium brown, tapered gently toward apex, post-anthesis; **flowers** 12–15 visible per spiral,

2.3 mm long, 1.5–1.8 mm wide; **tepals** sparsely pale granular; lateral tepals 1.3–1.4 mm wide, inner margin rounded, turned up against pistil, outer margin bluntly 2- to 3-sided; **stamens** dried, held at level of tepals, not contiguous, anthers 6 mm long, 4 mm wide, thecae oblong, parallel; **style** drying blackened, pistils emerging above tepals. **INFRUCTESCENCE** with white and purple berries.

Anthurium hempeanum is endemic to Colombia, known only from the type locality in Antioquia Department in the Municipio Fontino at 1000 m elevation in a *Premontane rain forest* life zone.

The species is named in honor of Volunteer Research Assistant, Mackenzie Hempe who spent the summer of 2012 working with the Araceae of the Parque Nacional Natural de Las Orquídeas in Antioquia. Mackenzie, a graduate of Lindbergh High School in St. Louis, entered Wellesley College in the fall of 2012. She is one of the most competent plant describers that I have had working with me and was able to observe and interpret even the most obscure detail of specimens.

Anthurium juanguillermoi Croat, **sp. nov.**

Type: COLOMBIA. Antioquia: Parque Nacional Natural de Las Orquídeas, Sector Calles, margin derecha del Río Calles, 06°31'N, 76°19'W, 1420 m, 25 Mar 1988, *A. Cogollo, J. G. Ramírez & O. Álvarez*

2571 (holotype, MO-4241470; isotype, HUA). **Figures 19, 20.**

The species is a member of section *Porphyrochitonium* characterized by its short internodes, persistent reddish brown cataphylls with frequent fragments of epidermis, long-petiolate dark-drying leaves with subterete petioles, elongated oblong-lanceolate gradually acuminate blades with the base usually acute to narrowly rounded at base with a single pair of collective veins arising from the base and 3–7 mm from the margin with the upper surface eglandular and the lower surface dark glandular-punctate as well as by the long-pedunculate inflorescence with a narrow green spreading spathe and a reddish or yellow spadix with red berries.

In the Lucid Anthurium Key the species tracks to *Anthurium deflexum* Engl. differing in having the leaves pendent from more or less erect petioles and a long-pedunculate inflorescence which much overtops the leaves. The species also resembles *Anthurium punctatum* N.E. Br., which differs in having 13–16 primary lateral veins and blades oblong-elliptic, drying matte to weakly glossy, tan-gray.

One of the specimens, *Cogollo 2568* differs in having sparsely scattered short-pale-lineate on its upper surface and in that all of the veins are less prominently raised yet darker than the type specimen.

Epiphytic, sometimes terrestrial, known to range from 1.7 and 2.3 m high in trees; **internodes** short, drying 0.8–1.7 cm diam.; **cataphylls** 4.7–8.3 cm long (averaging 6.5 cm), persisting as reddish brown fibers. LEAVES 19.0–73.5 cm long; **petioles** terete, 4.9–23.4 cm long (averaging 16.5 cm), drying 3 mm diam. midway 6 mm at base and on geniculum, matte, red-brown, finely ribbed, sometimes with 1–2 deep grooves; **geniculum** 0.9–1.8 cm long, drying 2–6 mm diam., darker and thicker than petiole; **blades** oblong-lanceolate, 14.1–50.1 cm long, 2.4–7.5 cm wide, (averaging 31.6 x 5.0 cm), 4.7–7.8 times longer than broad (averaging 6.3), 1.3–2.9 times longer than petiole (averaging 2.0), broadest below middle, gradually acuminate at apex (acumen ca. 1–2 cm, sometimes downturned), acute to narrowly-rounded, sometimes weakly inequilateral at base, thinly coriaceous to subcoriaceous, drying subcoriaceous on both surfaces; **upper surface** drying dark brown, weakly glossy, weakly granular; **lower surface** drying medium brown, semiglossy, raised glandular-punctate; **midrib** prominent and concolorous above, rounded to narrowly rounded, finely ribbed, darker than surface below; **primary lateral veins** appearing to be too numerous to count above and scarcely more prominent than interprimary veins above, 16–20(25) pairs visible below, departing midrib at a 42–56° angle, drying concolorous on each surface, narrowly raised below; **collective veins** arising near base, 3–7 mm from margin, drying weakly rounded above, acutely raised below; **antimarginal** veins present, 0.4 mm from



Figure 19. *Anthurium juanguillermoi* Croat (Cogollo 2568). Herbarium specimen showing on left apex of leaf blade adaxial surface folded over leaf blade abaxial surface, on right apex of leaf blade abaxial surface folded over leaf blade adaxial surface and inflorescence.



Figure 20. *Anthurium juanguillermoi* Croat (Cogollo 2571). Herbarium type specimen showing on left inflorescence, petioles and cataphylls, showing on right leaf blade base adaxial surface and leaf blade abaxial surface folded over and leaf blade apex folded up.

margin, slightly more conspicuous below. INFLORESCENCE erect; **peduncle** 18.8–46.1 cm long (averaging 34.2), drying 1–5 mm diam., green, drying matte, medium red-brown, granular; **spathe** narrowly linear-lanceolate, erect-spreading, 4.2–13.6 cm long, 0.6–1.2 cm wide (averaging 7.2 cm x 8 mm), green with a red center, drying dark brown, glossy and short-pale-lineate adaxially, matte abaxially; **spadix** weakly stipitate (stipe 1 mm long, 3 mm wide), 4.2–16.6 cm long, 3–7 mm diam. (averaging 10.6 cm x 5 mm), cylindroid, drying dark brown; **flowers** 5–7 visible per spiral, 1.9–2.3 mm long by 0.9–1.4 mm wide; lateral **tepals** 0.8–1.3 mm wide; inner margins broadly rounded; outer margins 2-sided; **stamens** held at level of tepals, anthers 0.3 mm long, 0.5 mm wide, thecae broadly ovate, weakly divaricate. INFRUCTESCENCE with berries purple to red at maturity.

Anthurium juanguillermoi is endemic to Colombia, known only from the type locality in Antioquia at 1420 m in a *Premontane rain forest* life zone.

The species is named in honor of Colombian botanist, Juan Guillermo Ramírez A. from the Jardín Botánico Joaquín Antonio Uribe in Medellín, Colombia. Juan is an excellent plant collector and assisted in the collection of the type specimen.

Paratypes: COLOMBIA. **Antioquia:** Amalfi, vereda Arenas blancas, 06°55'00"N, 074°55'00"W, 1100–1250 m, Apr 1994, R.

Fonnegra G. et al. 4776 (HUA); Urrao, Parque Nacional Natural de Las Orquídeas, Sector Calles, margen derecha del Río Calles, 06°32'N, 076°19'W, 1420 m, 25 Mar 1988, *A. Cogollo P. et al. 2568* (JAUM, MO); *A. Cogollo P. et al. 2571* (JAUM, MO); Camino de Venados arriba hacia Calles, 06°34'N, 76°19'W, 1440 m, 25 July 1988, *A. Cogollo P. et al. 3491* (JAUM, MO); Vereda Calles, Bosque Nacional Natural de Las Orquídeas, Quebrada Honda, Inventario Permanente de bosque húmedo premontano, en el filo al NW de la Cabaña Calles, 06°29'N, 76°14'W, 1330 m, 10 Dec 1992, *J. Pipoly, III 16939* (MO); Inventario Permanente Bosque Pluvial Premontano, margen derecha del Río Calles, *A. Duque, F. Giraldo, W. Rodríguez, E. Álvarez*, 06°32'N, 76°19'W, 1450 m, 26 Nov 1993, *J. Pipoly, III 17152* (JAUM, MO); Río Calles, 1400–1500 m, 2 May 1995, *R. Fonnegra G. et al. 5481* (HUA); *R. Fonnegra G. et al. 5483* (HUA).

Anthurium ovidioi Croat, **sp. nov.** Type: COLOMBIA. Antioquia: Parque Nacional Natural de Las Orquídeas, Sector Venados, margen derecha de camino hacia Venados arriba, 06°33'N, 76°19'W, 900 m, 7 June 1988, *A. Cogollo, J. G. Ramírez & O. Álvarez 3358* (holotype, FMB).

Figure 21.

The species is provisionally placed in section *Decurrentia* characterized by its epiphytic habit, slender stem with short internodes, pale green-drying deciduous cataphylls, short slender subterete petioles drying with a narrow sulcus, narrowly



Figure 21. *Anthurium ovidioi* Croat (Cogollo 3358). Herbarium type specimen showing on left leaf blade adaxial surface and on right two leaf blades abaxial surface.

oblong-linear, green-drying, long-acuminate blades which are more or less acute at the base with the collective veins arising from the lower primary lateral veins and with both surfaces drying conspicuously dark-granular, as well as by the long slender pedunculate inflorescence, the moderately broad, green spathe and a long-stipitate slender green spadix with no more than 2 flowers visible per spiral.

Anthurium ovidioi is closest to collection *Forero 5935* which differs in having much longer cataphylls, much larger blades with proportionately longer petioles to more than 18 cm long and blades with the collective veins arising from the base.

Epiphyte to 2.20 m; **roots** 1–2 mm diam., dark brown, deeply ribbed, scaled, few per node; **stem** to 12.8 cm, slender; **internodes** 0.5–2.2 cm long, drying (0.2)0.3–0.4 cm diam., subcoriaceous, ridged and fissured; **cataphylls** to at least 2.6 cm long, matte, short-pale-lineate, finely ribbed. **LEAVES** scattered along stem near apex; **petioles** subterete, 2.6–2.9 cm long (averaging 2.8 cm), drying 2 mm diam., light gray-green, matte, with narrow sulcus; **geniculum** 4–6 mm long, drying 1 mm diam., fairly indistinguishable from petiole aside from a dense layer of pale granules and being faintly darker; **blades** narrowly oblong-elliptic, 19.3–21.3 cm long, 1.9–2.0 cm wide, 8.7–9.3 times longer than broad, 5.9–7.2 times longer than petiole, broadest slightly above middle, caudate-acuminate, 1.5–1.8 cm long, 0.2 cm wide midway, weakly cuneate or acute at base, dark green and

weakly glossy above, drying weakly glossy, yellowish green-brown above, slightly paler and yellow-green below; **upper surface** minutely black-speckled and densely granular; **lower surface** sparsely black-speckled and densely olive-brown, densely and minutely granular; **midrib** concolorous, prominently round-raised toward base, flattening towards apex on upper surface to rounded and sparsely granular, prominently round-raised below and darker than surface, drying longitudinally ridged; **primary lateral veins** 14–16 pairs, departing midrib at a 42–56° angle, drying slightly darker and weakly raised on upper surface, slightly raised and faintly lighter than lower surface; **collective veins** arising from lower primary veins, 1–3 mm from margin, more prominent than primary lateral veins, drying bluntly raised above, rounded below; **antimarginal veins** present, 0.3 mm from margin, barely visible above, bluntly rounded below. **INFLORESCENCE** green and erect; **peduncle** to 7.1 cm long, drying 6 mm diam., pale tannish green, matte, ridged longitudinally, with fine striations between; **spathe** ovate, 1.8 cm long, 6 mm wide, green, densely granular inside, short-pale-lineate mostly outside; **spadix** stipitate 6 mm, 2.3 cm long, 2.3 mm diam., cylindroid-tapered, drying black-brown; **flowers** 1–2 visible per spiral, 2.3 mm long and wide, tepals dark purplish and subglaucous, with sparse pale cellular inclusions, lateral tepals to 0.9 mm wide; inner margins narrowly rounded to obtusely 2-sided; outer margin broadly rounded or obtusely 3–4-sided; **stamens** not yet emergent, anthers yellow, 0.4 mm long, 0.7

mm wide, drying amber, thecae slightly divaricate. INFRUCTESCENCE with berries violet-purple at maturity.

Anthurium ovidioi is endemic to Colombia, known only from the type locality in Antioquia Department in the Parque Nacional Natural de Las Orquídeas at 900 m in *Premontane rain forest* or *Tropical wet forest* life zones.

The species is named in honor of Ovidio Alvarez who has worked for 28 years as a park ranger at Parque Nacional Natural de Las Orquídeas. Ovidio knows the park well due to his many years of dedication there, and he often serves as an assistant to botanists collecting at the park, as he did in the case of this expedition which collected the type specimen which bears his name.

Anthurium pedrazae Croat & A. Zuluaga, **sp. nov.** Type: COLOMBIA. Antioquia: Municipio Urrao, Corregimiento La Encarnación, Vereda Calles Abajo, Parque Nacional Natural de Las Orquídeas, camino entre páramo El Almorzadero y poco antes de la cabañas de Calles, 06°32'20"N, 76°14'51" W, 1100–1300 m, 31 July 2011, *A. Zuluaga, P. Pedraza, J. Betancur, M. F. González, R. Arévalo, D. Sanín, J. Serna & A. Duque* 838 (holotype, MO-6353146; isotypes, COL, NY). **Figures 22, 23.**

The species is an unusual member of section *Calomystrium* characterized by its

elongated internodes which dry grayish and semiglossy, cataphylls persisting mostly intact, terete petioles which are longer than blades, narrowly ovate-sagittate brownish drying, narrowly acuminate blades with a spatulate sinus, 6 pairs of basal veins with two pairs free to the base and the collective veins arising from the lowermost pairs of basal veins as well as by the moderately long-pedunculate inflorescence, red ovate erect cucullate spathe and the briefly stipitate cylindroid spadix that is much shorter than the spathe.

In the Lucid Anthurium Key the species tracks to *Anthurium atramentarium* Croat & Oberle, differing in having a purplish spathe and greenish to yellowish spadix; *A. nymphaeifolium* and *A. yarumalense* Engl., differing by having short internodes, thicker blades with a broader sinus and a much longer tapered spadix.

Hemiepiphyte or terrestrial and subscandent; stems erect to sprawling; **internodes** brown-gray, to 14.9 cm long, drying 8–9 mm diam., drying brownish gray, moderately to deeply sulcate, semiglossy, sometimes with fine striations; **cataphylls** 10.8 cm persisting at upper nodes, intact with some fibers, finally deciduous, drying medium to dark reddish brown. LEAVES with **petioles** 20.0–37.5 cm long (averaging 30.6 cm), drying 0.5 cm diam. at base, 0.2 cm diam. at blade, terete, moderately sulcate, drying matte, light to medium red-brown, short-pale-lineate; **geniculum** 1.8–2.5 cm long, drying concolorous to slightly darker than petiole, fairly inconspicuous;



Figure 22. *Anthurium pedrazae* Croat & A. Zuluaga (Zuluaga 838). Herbarium type specimen showing on left leaf blade adaxial surface, showing on right leaf blade adaxial surface with inflorescence.

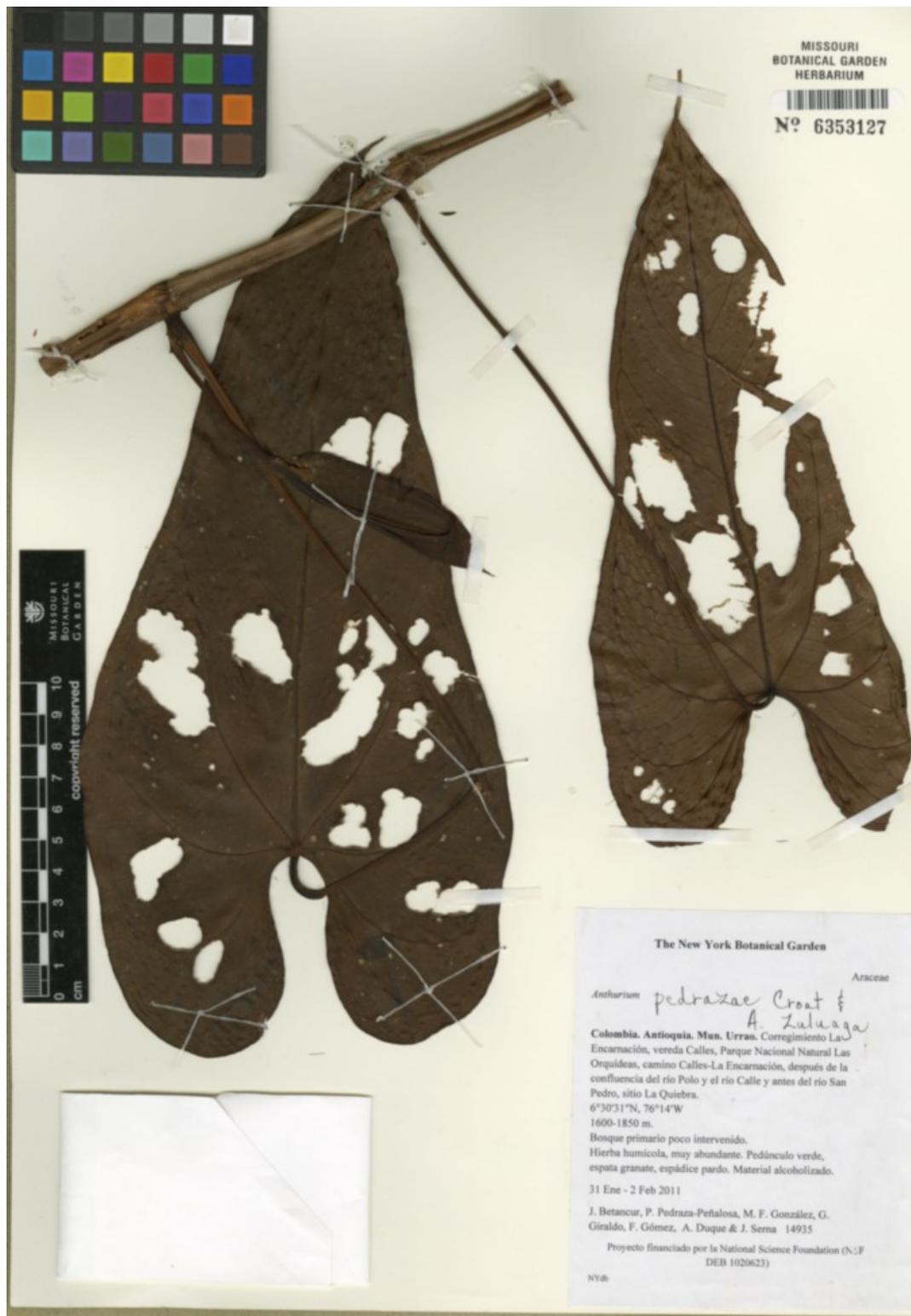


Figure 23. *Anthurium pedrazae* Croat & A. Zuluaga (Betancur 14935). Herbarium specimen showing on left leaf blade adaxial surface with inflorescence, showing on right leaf blade adaxial surface.

blades narrowly ovate-sagittate, 20.4–29.7 cm long, 9.8–13.7 cm wide (averaging 25.2 cm by 11.7 cm), widest from 0.4–2.8 cm above petiolar plexus, 1.6–2.6 times longer than wide, 0.54–1.2 times as long as petiole, discolorous, glossy above and glossy grayish green below, drying mid to light brown above and light brown below, semiglossy above and glossy below, acuminate and downturned at apex (acumen 1.8–2.1 cm long); **upper surface** densely short-pale-lineate, sparsely granular; **lower surface** moderately to densely pale granular; **anterior lobe** 18.6–23.9 cm long (averaging 20.7 cm); **posterior lobes** 6.2–7.3 cm long, 4.4–5.6 cm wide (averaging 6.5 cm by 4.9 cm), oriented down and weakly inward; **sinus** spatulate to weakly parabolic, 4.9–6.5 cm long, 1.8–2.4 cm wide (averaging 5.6 cm by 2.1 cm); **midrib** elevated and narrowly rounded, drying round-raised and concolorous to slightly darker with medial rib (almost winged near the base) above, drying prominently elevated, darker and thicker below with multicolored granules; **primary lateral veins** elevated and acute, 8–12 pairs, arising at a 44–60° angle, drying roundly elevated, slightly darker above, moderately darker below; **tertiary veins** drying concolorous and narrowly rounded above, drying narrowly raised and slightly darker below; **collective veins** arising prominently from 1st pair basal veins, loop-connected to 2nd, 3rd (4th) pairs basal veins, 2–5 mm from margin; **antimarginal vein** lacking; **basal veins** 5–6 pairs, 1st and 2nd pairs free to base, 3rd pair coalesced to 9 mm, 4th pair coalesced 7 mm; **posterior rib** short, only weakly curved, 1.1–1.5 cm long,

naked to 6–8 mm. INFLORESCENCES erect; **peduncle** green to garnet, 6.5–14.8 cm long, drying 2 mm diam., drying obtusely sulcate abaxially, more sharply sulcate adaxially, medium red-brown and matte; **spathe** 5.2–8.1 cm long, to 4.4 cm wide above center, spreading, garnet-red, drying dark red-brown, short-pale-lineate outside, densely granular within; **spadix** white, stipitate 2 mm, 2.0–4.1 cm long and 6–7 mm wide midway, cylindroid, drying red-brown; **flowers** 6–8 visible per spiral, 1.4–1.8 mm long, 1.8–2.4 mm wide, tepals brown, sometimes shield-shaped, lateral tepals 0.6–0.9 mm wide; inner margin broadly rounded; outer margin 2-sided or more commonly 3-sided, sometimes 4-sided; **stamens** held at the level of the tepals, 0.3–0.4 mm long and 0.5–0.7 mm wide, thecae parallel. INFRUCTESCENCE not present.

Anthurium pedrazae is endemic to Colombia, known only from the type locality in Antioquia Department, Municipio Urrao in the Parque Nacional Natural de Las Orquídeas at 1100–1850 m in a *Premontane wet forest* life zone.

The species is named in honor of Colombian botanist, Paola Pedraza who assisted in collecting the type specimen. Paola is a graduate of City University, New York and is now conducting research as the Assistant Curator for the Institute of Systematic Botany at the New York Botanical Garden. Paola is a specialist on the family Ericaceae.

Paratype: COLOMBIA. **Antioquia:** Municipio Urrao, Corregimiento La Encarnación, Vereda Calles, Parque Nacional Natural de Las Orquídeas, camino Calles-La Encarnación, después de la confluencia de Río Polo y el Río Calle y antes del Río San Pedro, Sitio La Quiebra, 06°30'31"N, 76°14'W, 1600–1850 m, 31 Jan–2 Feb 2011, J. Betancur, P. Pedraza-Peñalosa, M. F. González, G. Giraldo, F. Gómez, A. Duque & J. Serna 14935 (COL, MO).

***Anthurium poloense* Croat, sp. nov.** Type: COLOMBIA. Antioquia: Municipio Urrao, Corregimiento La Encarnación, Vereda Calles, Parque Nacional Natural de Las Orquídeas, camino Calles-La Encarnación, después de la confluencia del Río Polo y el Río Calle y antes del Río San Pedro, Sitio La Quiebra, 06°30'31"N, 76°14'W, 1600–1850 m, 31 Jan–2 Feb 2011, J. Betancur, P. Pedraza-Peñalosa, M. F. González, G. Giraldo, F. Gómez, A. Duque & J. Serna 14843 (holotype, NY-01395310; isotype, COL). **Figure 24.**

The species is a member of section *Calomystrium* characterized by its terrestrial habit about as long as broad or slightly longer than broad, persistent intact cataphylls, subterete petioles, ovate-sagittate brown-drying acuminate blades with a parabolic sinus, anterior lobe with margin straight or weakly concave, 5–6 pairs of basal veins, 1(2) basal veins free, the base and collective veins arising from the 4th pair

of basal veins and 1–2 mm from the margin, long-pedunculate inflorescence, green lanceolate-elliptic spreading spathe and narrowly long-cylindroid stipitate green spadix. Also characteristic is the sparsely glandular-punctate and sparsely short-pale-lineate upper blade surfaces and the densely glandular-punctate lower surfaces.

Anthurium poloense is similar to *A. obtusilobum* Schott but that species differs in having thicker blades that dry more gray-brown above and have more prominent short pale lineations, have a spadix cream-colored and are more thickly cylindroid.

In the Lucid Anthurium Key the species tracks to *Anthurium hoffmannii* Schott which differs in having the collective veins arising from the 1st pair of basal veins; *A. johnmackii* Croat & Oberle, differing in having a more narrowly triangular blade with narrower, more elongate somewhat spreading posterior lobes and *A. modicum*, differing in having blades drying more pale yellow-brown with the upper surface densely and minutely dark-speckled above but lacking dark glandular punctations.

Terrestrial; **stem** drying 9 mm diam., dark brown with reddish tinge; **internodes** short; **cataphylls** 5.1–13.6 cm long, persisting intact, drying medium to light brown, short-pale-lineate, sparsely black-punctate. **LEAVES** 65.8–71.4 cm long with **petioles** 40.1–43.2 cm long, drying 2–4 mm diam., matte, medium brown, densely pale-granular, sparsely black-punctate;



Figure 24. *Anthurium poloense* Croat (Betancur 14843). Herbarium type specimen showing on left leaf blade abaxial surface covered by leaf blade adaxial surface with inflorescence.

geniculum ca. 5 mm long, slightly thicker than petiole, concolorous with petiole and midrib, sparsely black-punctate; **blades** ovate-sagittate-cordate, 25.2–28.7 cm long, 20.1–20.9 cm wide, 1.28–1.35 times as long as broad, 0.6 times as long as petiole, gradual acuminate at apex, subcoriaceous; **upper surface** drying dark brownish gray, matte, coriaceous, very sparsely short-pale-lineate, moderately pale-granular, sparsely dark-punctate; **lower surface** drying medium brown, semiglossy, densely dark-punctate; **anterior lobe** 19.4–20.3 cm long, weakly concave upper margins, lobe broadest 2.5 cm above petiolar plexus; **posterior lobes** 9.7–10.3 cm long, 7.4–7.8 cm wide, directed downward; **sinus** broadly parabolic, 7.3–7.5 cm deep by 5.1–5.4 cm wide; **midrib** weakly raised on upper surface, acute and concolorous to upper surface, more prominent below, rounded and darker than lower surface; **primary lateral veins** 8–10 pairs, arising from the midrib at a 48–62° angle, narrowly rounded above and concolorous to upper surface, narrowly rounded below and darker than lower surface; **basal veins** 5(6) pairs, 1st and 2nd pairs free to base, 3rd pair coalesced to 1.8–1.9 cm, 4th and 5th pairs coalesced to 3.1–3.3 cm, 6th pair coalesced to 2.5–2.7; **posterior rib** 3.1–3.6 cm long, naked to 2.4–2.8 cm, weakly curved; **collective veins** arising from 5th basal vein, persisting 1–2 mm from margin, concolorous to and level with upper surface, darker than and narrowly rounded on lower surface. INFLORESCENCE with **peduncle** green, drying light to medium brown, to 2 mm diam., matte; **spathe** to 5.8 cm long, drying

to 1.4 cm wide, lanceolate-elliptic, green, drying reddish brown, densely pale granular; **spadix** to 7.3 cm long, 4 mm diam., cylindroid with minimal tapering at base, stipitate, green, drying dark brown; **stipe** 1.2 cm long, 2 mm diam.; **flowers** 7–8 visible per spiral, 1.6–1.9 mm long, 1.9–2.1 mm wide; **tepals** 1.8–2.0 mm wide, inner margins broadly rounded to straight, outer margins 2-sided, with edges concave, drying medium to dark brown, densely granular; **stamens** not fully emergent, anthers 0.7 mm long by 0.7 mm wide, thecae weakly divaricate.

Anthurium poloense is endemic to Colombia, known only from the type locality in the Municipio Urrao at 1600–1850 m in a *Premontane rain forest* life zone.

The species is named for the type locality near the Río Polo in the Municipio Urrao.

***Anthurium sneidernii* Croat, sp. nov.**

Type: COLOMBIA. Antioquia: Urrao Municipio, Parque Nacional Natural de Las Orquídeas, Vereda Calles, margen derecha del Río Calles, 06°32'N, 76°19'W, 1350 m, *J. Pipoly, III, W. Rodríguez & O. Álvarez 18020* (holotype, MO-4603571; isotype, COL). **Figure 25.**

The species is a member of section *Porphyrochitonium* characterized by its abundance in the understory, terrestrial habit, short slender internodes, persistent red-brown cataphyll fibers, moderately



Figure 25. *Anthurium sneidernii* Croat (Pipoly 18020). Herbarium type specimen showing leaf blades adaxial surface with inflorescence and cataphylls.

elongated C-shaped petioles which dry deeply and narrowly sulcate, narrowly lanceolate-elliptic narrowly acuminate blades which are gray-brown above and grayish yellow-brown below, midrib narrowly acute above, primary lateral veins scarcely more prominent than the interprimary veins which are numerous and close, collective veins that are very close to the margins as well as by the inflorescence that is much shorter than the leaves with a slender peduncle, and a green spathe and spadix.

In the Lucid Anthurium Key the species tracks to *Anthurium caloveboranum* Croat which differs in having much longer oblong-elliptic blades that are up to 5 times longer than broad; *A. cartiense* Croat, differing in having larger blades, obtuse to rounded at base which are epunctate on the upper surface, more remote collective veins, more prominent and more primary lateral veins; *A. crassilaminum* Croat, differing in having much larger (4.5–8 cm wide), more coriaceous blades with collective veins more remote from the margins and a proportionately shorter petiole; *A. gracililaminum* Croat, differing by having much longer, more slender, less bicolorous blades to 6.5 times longer than wide which are more narrowly long-acuminate with more remote collective veins and *A. verrucosum* Croat & D. C. Bay, differing in having cataphylls 4.5–15 cm long and in a net-like reticulum, longer petioles (9–38 cm long), broadly oblong-elliptic blades (24–57 cm long x 5–19 cm), collective veins 36 mm

from the margins and larger inflorescences (peduncle 19–54 and spadix 1.5 cm long).

Terrestrial, sometimes climbing to 2 m; **internodes** 1–2 cm long, drying 1.0–1.6 cm diam.; **cataphylls** 2.4–5.2 cm long (averaging 3.6 cm), pinkish, drying reddish brown, persisting as fibers near base, sometimes intact at apex, darker red with veins prominently round-raised where intact. LEAVES 17–40 cm long (averaging 29 cm); **petioles** 8.1–19.6 cm long, drying 1–2 mm diam. (averaging 12.5 cm x 1.3 mm), often weakly C-shaped, terete, ribbed, sometimes with 1–2 narrowly deep grooves, matte, tannish grey-brown, sparsely dark-glandular-punctate, sometimes sparsely pale pustular; **geniculum** 0.8–2.6 cm long, drying 1–3 mm diam., darker and thicker than petiole, dark brownish black, more sparsely dark glandular-punctate than petiole, more densely pale-pustular when present; **blades** narrowly lanceolate-elliptic, 11.2–22.8 cm long by 2.6–7.4 cm wide, (averaging 17.3 x 5.0 cm), 2.7–4.3 times longer than broad (averaging 3.6), 0.98–1.9 times longer than petiole (averaging 1.5), broadest at middle, narrowly acuminate at apex (acumen 0.6–1.6 cm) narrowly cuneate, sometimes weakly inequilateral at base, base arching away from petiole, drying thinly chartaceous on both surfaces; **upper surface** drying gray-brown, matte, densely minute-black speckled upon strong magnification; **lower surface** drying grayish yellow-brown, semiglossy, raised glandular-punctate; **midrib** prominent and narrowly rounded above, weakly raised and only slightly rounded below, concolorous to both

surfaces; **primary lateral veins** 16–20 pairs, scarcely more prominent than interprimary veins on both surfaces, departing midrib at a 52–62° angle, drying concolorous to and rounded on both surfaces, slightly more prominent below; **collective veins** arising from base, 1(4) mm from margin, drying narrowly rounded above, nearly inconspicuous below. INFLORESCENCE erect, greenish yellow; **peduncle** 10.3–29.7 cm long (averaging 34.2), drying ca. 1 mm diam., drying sulcate, finely ribbed, green, drying tannish grey-brown, matte, moderately to densely pale granular, sparsely dark glandular punctate; **spathe** 1.6–3.4 cm long, 3–6 mm wide (averaging 2.5 cm x 4 mm), narrowly linear-lanceolate, erect-spreading to reflexed-spreading, greenish yellow, drying dark grayish brown to dark reddish brown, matte, sparsely short-pale-lineate and moderately pale granular adaxially, moderately short-pale lineate and densely granular abaxially; **spadix** 2.3–5.9 cm long, 1.5–8 mm diam. (averaging 3.5 cm x 2 mm), narrowly cylindroid, sometimes slightly C-shaped, drying medium to dark brown, stipitate (stipe 2–3 mm long x 1 mm wide); **flowers** 2–3 visible per spiral, 1.4–2.2 mm long by 1.3–2.0 mm wide; **tepals** densely granular, lateral tepals to 1.0–1.2 mm wide; inner margins narrowly rounded to 2-sided; outer margin sharply 2-sided; **stamens** not yet emergent. INFRUCTESCENCE with **berries** ca. 4 mm, red at maturity, subglobose; **seeds** yellowish, drying brownish yellow, 3 mm long x 2 mm wide x 1 mm thick.

Anthurium sneidernii is endemic to Colombia, known only from the type locality in Antioquia Department, Municipio Urrao in the Parque Nacional Natural de Las Orquídeas at 1459–1470 m in a *Premontane rain forest* life zone.

The species is named in honor of Danish botanist Kjell Von Sneidern who collected the first collection of this species. Von Sneidern emigrated to Colombia from Sweden in the 1920's where he became the country's leading ecologist and ornithologist.

Paratypes: COLOMBIA. **Antioquia:** Municipio Urrao, Corregimiento La Encarnación, Vereda Calles, Parque Nacional de Las Orquídeas, finca de Alfonso Pino, en la divisoria de aguas entre las quebradas La Vírola y El Bosque, noroccidentale de la cabaña de Calles, 6°31'35"N, 76°15'50"W, 1450–1470 m, 27 Jan 2011, J. Betancur, P. Pedraza-Peñalosa, M. F. González, G. Giralado, F. Gómez, A. Duque & J. Serna 14765 (MO); Margin derecha del Río Calles, 1300 m, 06°32'N, 76°19'W, 21 Feb 1989, A. Cogollo 4158 (COL); Margin derecha del Río Calles, 1280 m, 06°32', 76°19'W, 2 June 1988, A. Cogollo 3153 (COL). **Caldas:** La Selva, Cordillera Occidental, Vertiente Occidental, 1600–1900, 25 July 1945, K. Von Sneidern 5250 (F).

Anthurium tortuosum Croat, **sp. nov.**
Type: COLOMBIA. Antioquia:
Municipio de Urrao, road between

Urrao and Caicedo, 18 km NE of center of Urrao, in stream, 06°23'N, 76°03'W, 2570 m, *J. M. MacDougal, F. J. Roldán & J. Betancur 4266* (holotype, MO-4369937–39: isotype, JAUM).

The species is a member of section *Belolonchium* characterized by its terrestrial habit, abundance in ravines and canyons, persistent reddish brown cataphyll fibers, subterete sulcate petioles drying reddish brown, narrowly ovate-sagittate, gradually acuminate blades with the anterior lobe shallowly concave, 8 pairs of basal veins, one pair free to the base, well-developed posterior ribs which are naked veins throughout most of its length, as well as by the long-pedunculate inflorescence, green hooding spathe, narrowly cylindroid reddish spadix with early-emergent pistils.

Anthurium tortuosum is most similar to *A. castanae* Croat, which differs in having blades semiglossy below with the areoles of the surface sparsely granular as well as by having the tertiary veins thicker than broad and only sparsely covered with tortuous scabrid scales. In contrast, *Anthurium tortuosum* has blades with the lower surface matte with the surface somewhat areolate as well as by having the tertiary veins more round-raised and more prominently granular-squamate on the entire circumference of the veins and by having the scales paler and more granular).

In the Lucid Anthurium Key the species tracks to *Anthurium bogotense* Schott, differing

in lacking any scabrid veins on the lower surface; *A. floridaense* Croat from western slopes of the Cordillera Central, differing in having the major veins on the lower surface merely ribbed, not at all scarious.

Terrestrial; **internodes** short; **cataphylls** persisting as reddish brown fibers. LEAVES 215 cm long with **petioles** 145.3 cm long, drying to 0.4–1.1 cm diam., smoothly sulcate, drying medium tan-brown and matte, weakly striated; **geniculum** 5.9 cm long, withered, darker than petiole; **blades** ovate-sagittate, to 69.7 cm long, 49 cm wide, 1.42 times longer than broad, 0.48 times long as petiole, coriaceous, gradual acuminate, rugose-bullate; **upper surface** dull, drying dark brown, matte, smooth; **lower surface** drying medium brown, semiglossy, smooth; **anterior lobe** to 52.2 cm long, to 49 cm wide, with convex margins to 33.6 cm above petiolar plexus where margins are weakly concave for 10 cm, broadest at petiolar plexus; **posterior lobes** to 23.6 cm long, to 17.2 cm wide, directed downward to turned inwards; **sinus** broadly hippocrepiform, to 17.7 cm deep and to 12.2 cm wide; **midrib** acute to narrowly rounded above, drying concolorous with surface, prominently round-raised below, drying faintly lighter than lower surface; **primary lateral veins** ca. 11–14 pairs, arising at a 44–58° angle, weakly cuneate above, drying faintly lighter than surface, prominent and narrowly round raised below, drying slightly lighter than surface; **basal veins** 9(10) pairs, 1st, 2nd, 3rd pairs free to base, 4th pair coalesced to 4.7 cm, 5th to 9th pair coalesced at 9.4 cm, acute

to level with upper surface, rounded below, concolorous with upper surface, lighter than lower; **posterior rib** weakly rounded towards base, to 9.8 cm long, naked to 4.4 cm; **tertiary veins** flat above, rounded below, concolorous with upper surface, lighter than lower surface; **collective veins** arising from 3rd pair of basal veins, running 1–4 mm from margin. INFLORESCENCE with **peduncle** 59.7–86.1 cm long, reddish, drying medium reddish brown, deeply sulcate; **spathe** broadly lanceolate, tapered to apex and base, 10.7–12.3 cm long, drying 3.6–4.5 cm wide, green, drying medium tannish brown, gradual lightening towards apex, veins raised both adaxially and abaxially, densely granular abaxially; **spadix** 13.6–16.3 cm long, 1.2–1.8 cm diam., tinged dull red, drying dark brown, cylindroid, weakly tapered to both ends; **flowers** 11–12 visible per spiral, 1.9–2.3 mm long, 1.1–1.4 mm wide; lateral **tepals** 0.9–1.4 mm wide, inner margins narrowly rounded, outer margins sharply 2-sided; **stamens** held just above tepals, anthers 0.9 mm long, 0.7 mm wide, thecae slightly divaricate.

Anthurium tortuosum is endemic to Colombia, known only from the type locality in Antioquia Department at 2570 m in a *Lower Montane rain forest* to *Lower Montane wet forest* life zone.

The specific epithet “tortuosum” comes from the Latin “tortuosus” (meaning bent or twisted in different directions) referring to the tortuous scales on the veins on the lower blade surfaces.

***Anthurium triangulopetiolum* Croat, sp. nov.** Type: COLOMBIA. Antioquia: Urrao Municipio, Parque Nacional Natural de Las Orquídeas, Vereda Calles, Inventario Permanente, margen derecha del Río Calles, 06°32'N, 76°19'W, 1350–1450 m, 7 Dec 1993, J. Pipoly, III, W. Rodríguez & O. Álvarez 17876 (holotype, MO-04588723; isotype, JAUM). **Figure 26.**

The species is a member of section *Porphyrochitonium* as characterized by its short internodes, persistent reddish brown cataphyll fibers, triangular petioles equal to or longer than the blades, narrowly ovate to elliptic dark brown-drying blades which are acute to rounded and apiculate at apex and attenuate at the base with the collective veins arising from or very near the base as well as by the long-pedunculate inflorescences with the spathe green to violet-purple and reflexed-spreading, the green to violet-purple spadix and the berries which are white at the base and violet-purple at the apex.

Some of the paratypes have some differences worth mentioning. *Cogollo 3002* differs slightly from the type specimen in having more oblong elliptic blades, drying lighter gray-brown, having a longer acumen, proportionately longer cataphylls, and darker pustules on both surfaces. *Pipoly 17341* differs in having a red spathe, pink peduncle, and fewer pustules along the petiole. *Cardenas 3258* differs by its proportionately thicker and shorter blades,



Figure 26. *Anthurium triangulopetiolum* Croat (Pipoly 17856). Herbarium type specimen showing on left leaf blade abaxial surface covered partially by adaxial surface on right with inflorescence and cataphylls.

longer petioles and peduncles, and by having the upper surface drying a deeper red.

The species appears to be closest to *Anthurium dnyeri* Croft which differs in having proportionately shorter petioles, proportionately narrower, more oblong-elliptic blades and lavender-white berries.

In the Lucid Anthurium Key the species tracks to *Anthurium brevipes* Sodiro, differing in having narrowly oblanceolate, long-acuminate blades; *A. langendoenii* Croft & D. C. Bay from Bajo Calima in Colombia, differing in having obovate blades with no more than 13 primary lateral veins and a pale yellow-green to cream spadix; *A. spatulifolium* Sodiro from the western slopes of the Andes in Ecuador, differing in having much narrower, oblanceolate blades and *A. vallense* Croft differing in having a much longer, more prominently networked cataphyll.

Epiphyte or terrestrial; **internodes** short, drying 1.3–1.7 cm diam.; **cataphylls** 6.6–15.3 cm long (averaging 10.3 cm), drying red-brown, persisting densely fibrous. LEAVES 31.2–60.8 cm long (averaging 45.75 cm) with **petioles** 12.3–30.6 cm long (averaging 21.9 cm), 3–9 mm diam., drying matte gray-brown, sharply triangular, deeply sulcate, moderately pustular; **geniculum** darker than petiole, densely pustular, 1.2–1.6 cm long; **blades** ovate, sometimes ovate-elliptic, arched, 17.8–30.2 cm long, 5.9–20.9 cm wide (averaging 23.9 x 12.8 cm), 1.4–3.2

times longer than wide (averaging 2.0), broadest below midway, 0.9–1.5 times longer than petiole (averaging 1.2), subcoriaceous, drying discolorous, with thin hyaline margin, narrowly rounded at apex with short acumen or obscure apiculum, attenuate at base; **upper surface** drying semiglossy, red-brown, sparsely glandular-punctate, raised, sparsely pustular (white to light yellow), densely pale-granular; **lower surface** drying lighter, glossy, densely glandular-punctate (the glands weakly raised), moderately to densely pustular (white to light yellow), especially along midrib, usually minutely dark-specked throughout surface upon magnification; **midrib** prominent on both surfaces, narrowly rounded above, slightly darker than surface, broadly rounded near apex, slightly angular midway, more bluntly prominent towards base, darker than surface; **primary lateral veins** ca. 18–21 pairs, arising at a 58–68° angle, paler than surface above, darker than lower surface below, inconspicuously raised above, slightly indistinguishable from interprimary veins, bluntly raised below, scattered with pustules and minutely granular upon magnification; **interprimary veins** concolorous to surface above and below, raised almost equal to primary lateral veins on upper surface, weakly raised on lower surface; **collective veins** arising from the base, 4–8 mm from the margin, weakly raised above, sharply below, concolorous with primary lateral veins on both surfaces; **antimarginal veins** present, slightly more visible on upper surface than lower. INFLORESCENCE erect, **peduncle** 9.6–27.6(–43.4) cm long

(averaging 19.1 cm), 2–8 mm diam. (averaging 4 mm), 2.1–6.3 times longer than spathe (averaging 4.9), sharply sulcate, finely ribbed, drying red-brown, moderately darker along ribs; **spathe** 3.7–4.6 cm long (averaging 4.1 cm), 2–7 mm wide (averaging 5 mm), green to purple, drying deep red-brown, reflexed-spreading-rolled; **spadix** cylindroid, weakly stipitate, 3–4 mm diam., 7.1–13.7 cm long (averaging 11.1 cm), drying to 3–9 mm wide (averaging 6 mm), purple, drying dark brown; **flowers** 3–4 visible per spiral, 2.8–3.6 mm long, 1.2–2 mm wide, tepals matte with white to yellow-brown granules; lateral tepals 1.4–2.3 mm wide, inner margins broadly rounded to straight, outer margins 2-sided to weakly 3-sided; **stamens** barely emerging above tepals at anthesis, then retracting; anthers ca. 0.2 mm long, 0.4 mm wide, thecae broadly divaricate. **INFRUCTESCENCE** greenish white berries, with purple.

Anthurium triangulopetiolum is endemic to Colombia, known only from the type locality in Antioquia Department, Urrao Municipio at 1340–1550 m in *Lower Montane rain forest* and *Tropical wet forest* life zones.

The species epithet “triangulopetiolum” is from the Latin “triangulo” (triangular) and “petiolum” (petiole) referring to the triangular-shaped petiole.

Paratypes: COLOMBIA. **Antioquia**: Parque Nacional Natural de Las Orquídeas, Sector Calles, margen derecha del Río Calles, 06°32'N 076°19'W, 1320–1390 m, 24 Mar

1988, *A. Cogollo P. 2529* (JAUM, MO); Sector Venados, 06°33'N, 76°19'W, 800 m, 3 Apr 1988, *A. Cogollo P. 3002* (JAUM); Sector Calles, 06°33'N 076°19'W, 1250–1375 m, 31 Mayo 1988, *Á. Cogollo P. 3111* (JAUM); En el filo NW de la Cabaña de Calles, 06°32'N, 76°19'W, 1450 m, 1 Dec 1993, *A. Cogollo P. 7649* (JAUM, MO); Quebrada La Bironda, 06°31'N, 76°19'W, 1300–1500 m, 3 Apr 1992, *D. Cárdenas L. & E. Álvarez 3258* (MO); Quebrada Honda, Inventario Permanente, en el filo al NW de La Cabaña Calles, Parcela W, subparcelas W 2–W 3, 06°29'N, 76°14'W, 1340 m, 7 Dec 1992, *J. Pipoly, III 16683* (MO); Inventario Permanente Bosque Pluvial Premontano, margen derecha del Río Calles, 06°32'N, 076°19'W, 1450 m, 26 Nov 1993, *J. Pipoly, III 17153* (JAUM, MO); Zona limitrofe con bosque nublado, 1450–1500 m, 29 Nov 1993, *J. Pipoly, III 17341* (MO).

REFERENCES

- Croat, T. B. & R. A. Baker, 1979. The genus *Anthurium* in Costa Rica. *Brenesia* 16: (Suppl. 1) 1–174.
- Holdridge, L. R., W. H. Hatheway, T. Liang & J. A. Tosi. 1971. *Forest Environments in Tropical Life Zones*. Pergamon Press, New York.
- Reynolds, L., Croat, T.B. & Haigh A. 2009. An interactive Key to the genus *Anthurium* (Araceae). Published on the internet at <http://e-monocot.org/key/8#keyStarted>