A Review of the *Anthurium splendidum* Complex (Araceae)

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ABSTRACT

A revision is made of five closely related species in *Anthurium* section *Cardiolonchium* from Western Colombia. *Anthurium splendidum* Hort. ex W. Bull is reported to be rediscovered, since in its original description in 1883 no known province was cited. One member of this complex, *A. debilis* Croat & Bay, was recently published. Three additional new species closely related to, or previously confused with *A. splendidum,* are described. These are *A. giraldoi* Croat, *A. luxurians* Croat & Cirino, and *A. nutibarense* Croat.

KEY WORDS

Anthurium splendidum complex, Colombia, new species, section *Cardiolonchium.*

INTRODUCTION

In March 1883, the English gardening magazine *The Gardeners' Chronicle* presented a short article (lacking a specific author) of a dozen lines introducing a stunning *Anthurium* that had been recently introduced to horticulture. The plant was assigned the name *Anthurium splendidum,* and the only information given was that the plant had "cordate leaves of about 1 foot in diameter, of the brightest velvety green, the spaces between the veins, however small, being raised in a very singular manner". Nevertheless, the illustration that accompanied the article depicted a startlingly beautiful plant not seen by Europeans. This original, but invalid, description did not mention the stem or depict the petioles or inflorescence, but it was clear from the illustration that the plant was a terrestrial species in section *Cardiolonchium.*

In April 1883, Mr. T. Moore (Moore, 1883), writing in *The Florist and Pomologist,* wrote a short article again featuring *A. splendidum* in which actual dimensions of the leaf are given (18 in. long by 12 in. wide), and also some details of the venation not previously obvious, namely that the leaf surface is scabrous, leaf tissue between the veins is raised in "papillose blisters", and the "ribs of the under surface between the ribs is punctate with minute pallid bladdery looking bodies".

The following year, in 1884, Emile Rodigas formally published the species with a Latin description in *Illustraciones Horticole* (Rodigas, 1884). In this article, Rodigas formally described the species and attributed the authority as Hort. Bull. The Latin description of the species was only thirty-one words: "Foliorum petioli quam lamina longiores, tertes, sulcati; lamina magna, bullata, ovato-cordata, coriacea, supra pulcherrime glauca; nervi primarii e basi nascentes saepissime septem, patentes; nervi secundarii cum margine anastomosantes. Flores nonum vidimus." This article reillustrated the plant showing the petioles as conspicuously striate. The leaves in the figure showed a plant that was virtually identical to that illustrated in *Gardeners' Chronicle* so it can be assumed that other Europeans had also by then acquired the plant.

In January 1884, N. E. Brown at Kew, writing in *Gardeners' Chronicle* (Brown, 1884), described the plant in much greater detail, giving dimensions of parts and describing the inflorescence for the first time. Brown claimed not to know anything of the source of the species except that it was from South America. At the same time Brown also prepared two herbarium specimens from a plant cultivated at Kew Gardens. Since these specimens, presumably taken from the same living plant, are all that exists from the era when the plant was in cultivation and being described they must serve as type material.

In the late 1950s, Mr. George Wagner of Orlando, Florida introduced a bullate-leaved plant into horticulture. It came into the hands of Ervin Wurthmann of Tampa who propagated it and erroneously distributed it under the name *Anthurium splendidum*. By the late 1960s relatively few of these plants were still in cultivation, but one of the largest was grown by Bob Wilson of Fantastic Gardens in Miami. More recently the species has been more successfully grown and even sometimes cross-pollinated with different individuals of presumably the same clone to set viable seed (as for example, by Marilyn Johnston, then living in South Dade County, Florida). The true identity of this plant has not been questioned since the original *A. splendidum,* and any memory of it, had long since disappeared in Europe with only two herbarium collections at Kew existing.

No one doubted the determination of these plants cultivated in South Florida until recent years when other collections of two similar species of *Anthurium* section *Cardiolonchium* were made in Colombia. These new Colombian collections, though initially confused with the well-known plant then going by the name *A. splendidum,* are quite distinct in a number of characters. Close examination makes it obvious that one of the two recently collected Colombian species is the true *A. splendidum* and matches the type material perfectly. The true *A. splendidum* was collected by both authors independently at the Quebrada Antón near the Risaralda border in Chocó Department. It differs from the species cultivated in South Florida and determined erroneously as *A. splendidum* in having thinner blades that are minutely rugose rather than bullate and in having scales on the venation of the lower blade surface. Plants from the Quebrada Antón are believed to be the first recollection of *A. splendidum* since the original collection in the early 1880's by some as yet unknown collector, exactly matching what we can determine from the original descriptions mentioned above, and matching the specimens made by N. E. Brown in 1884 from the original collections imported by Mr. Bull. This is an important discovery since the original description gave no locality except Colombia. Since much is still uncertain about the original material a re-description of the species is warranted. In addition, some close relatives of *A. splendidum* are described here for the first time. A key to the species in the complex follows.

KEY TO THE *ANTHURIUM SPLENDIDUM* COMPLEX

1. Leaf blades with upper surface covered with narrow rows of slender, conspicuous, scale- like protrusions of the leaf tissue; lower blade surface with minute dark punctiform to elongate markings; petioles less than 15 cm long . . . *A. giraldoi* Croat
1. Leaf blades with upper surface more or less smooth, lacking any conspicuous protrusions; lower blade surface either lacking any markings or with the markings colorless; petioles rarely less than 15 cm long.
   2. Major and most minor veins on lower blade surface bearing thin wings and/or scales (membranous tooth-like projections) at intervals; venation with the areoles (areas between the reticulate veins) markedly cavate (forming small pockets), these surrounded by markedly raised uneven ridges.
      3. Leaf blades with the lower surface drying matte with a somewhat "frosty" appearance with pale speckles; upper blade surface short, pale-lineate; Chocó (280–350 m) . . . . . *A. splendidum* Hort. Bull ex Rodigas

3. Leaf blades with lower surface drying semiglossy with dark, granular projections; upper blade surface lacking pale lineations; Antióquia (950–500 m) . . *A. nutibarense* Croat

2. Veins of lower blade surface not bearing scales; venation with the areoles not markedly cavate and surrounded by high ridges.
4. Upper surface of blades glossy, not matte or subvelvety; venation more or less bullate to rugose, the tertiary veins sunken throughout the entire blade surface . . . . . *A. luxurians* Croat & Cirino
4. Upper surface of blades matte or subvelvety, not at all glossy; venation, weakly bullate, not rugose, the tertiary veins not markedly sunken . . . . . *A. debilis* Croat & Bay

Anthurium splendidum Hort. Bull. ex Rodigas, *Illustr. Hort.* 31: 13–14. t. DX. 1884. Holoneotype: COLOMBIA. Exact locality unknown. Jan. 1884, *Masters s.n.* (K). (Note: The larger of the two specimens, one with the closed, rather than hippocrepiform sinus, is selected as the type). Figure 1.

Terrestrial; stem short and stout; **internodes** very short, 2.5–4.5 cm diam.; **cataphylls** membranaceous, 4.5–5 cm long, green, tinged red-brown, rounded at apex, sometimes with the midrib free-ending, weathering to fibers, then deciduous. LEAVES held in a dense cluster; **petioles** erect to erect spreading with blades spreading to pendent, 23–38 cm long, 6–8 mm diam., olive-green, subterete, bearing (5)10–14 membranous wings, the wings crisped, especially on the geniculum, continuous with the ribs on the lower midrib or major veins of the lower surface, flattened adaxially with erect margins; **blades** ovate to narrowly ovate, conspicuously lobed at base, conspicuously bullate, thinly coriaceous and stiff in fresh material, acute at apex, 28–51 cm long, 20–33 cm wide, broadest above (distal to) petiole attachment, dark black-green and subvelvety matte or weakly glossy above, matte and somewhat paler below, drying thin and narrowly discolored along the tertiary veins, drying weakly glossy and gray-green above, matte and yellow-green below; the upper surface sparsely short-pale-lineate, lower surface, smooth and matte; margin more or less straight, revolute; posterior lobes narrowly rounded, 1.5–9 cm long, sometimes overlapping; sinus hippocrepiform to oblong or closed, 5–8.5 cm deep; **midrib** acute in deep valleys and concolorous above, convex and prominently and acutely ridged below; **primary lateral veins** 6–10 per side, arising at ca. 45° angle, arcuate toward apex, acute in deep valleys above, acutely raised to round-raised and 3-ribbed below (connecting directly to ribs on petioles), all the major veins of the lower surface denticulate-scaly on lower surface; tertiary veins deeply sunken above, prominently raised below; the area between the tertiary veins divided into markedly raised ridges, some of these even excavated to form pockets; **basal veins** 6–7 on both sides, 1st to 3rd pair free to the petiole, the remaining 3–4 coalesced (3–)7.5–15 cm, 1–2 of the highest order (most distal from apex) free to the margin, the remainder joining a collective vein; posterior rib naked 2–3 cm; collective veins arising from one of the lowermost basal veins usually the 5th or 6th (sometimes the 2nd or 3rd in mature blades) and extending ca. 5 mm from margins all the way to the apex; surface epunctate. INFLORESCENCES erect, held above the leaves; **peduncle** pale green, 5 or more winged-angulate, equal to or slightly longer than the subtending petioles; **spathe** reflexed, to 12.5 cm long, to 3.7 cm wide, lanceolate, bright white, narrowly long-acuminate at apex, obliquely inserted, cordate and somewhat clasping at base, prominently greenish-veined on lower surface, somewhat pink-tinged on upper surface; **spadix** medium green, pale yellow at anthesis, sometimes bicolorous with the lower portion yellow and the remainder green, to 10.5 cm long, sessile, weakly tapered to apex, narrowly rounded at base. INFRUCTESCENCE not seen.

Anthurium splendidum is thought to be endemic to Colombia, known only from *Tropical wet forest* transition to *Premontane* (T-wf/P) life zone (Holdridge, 1971), in the Department of Chocó near the Ris-

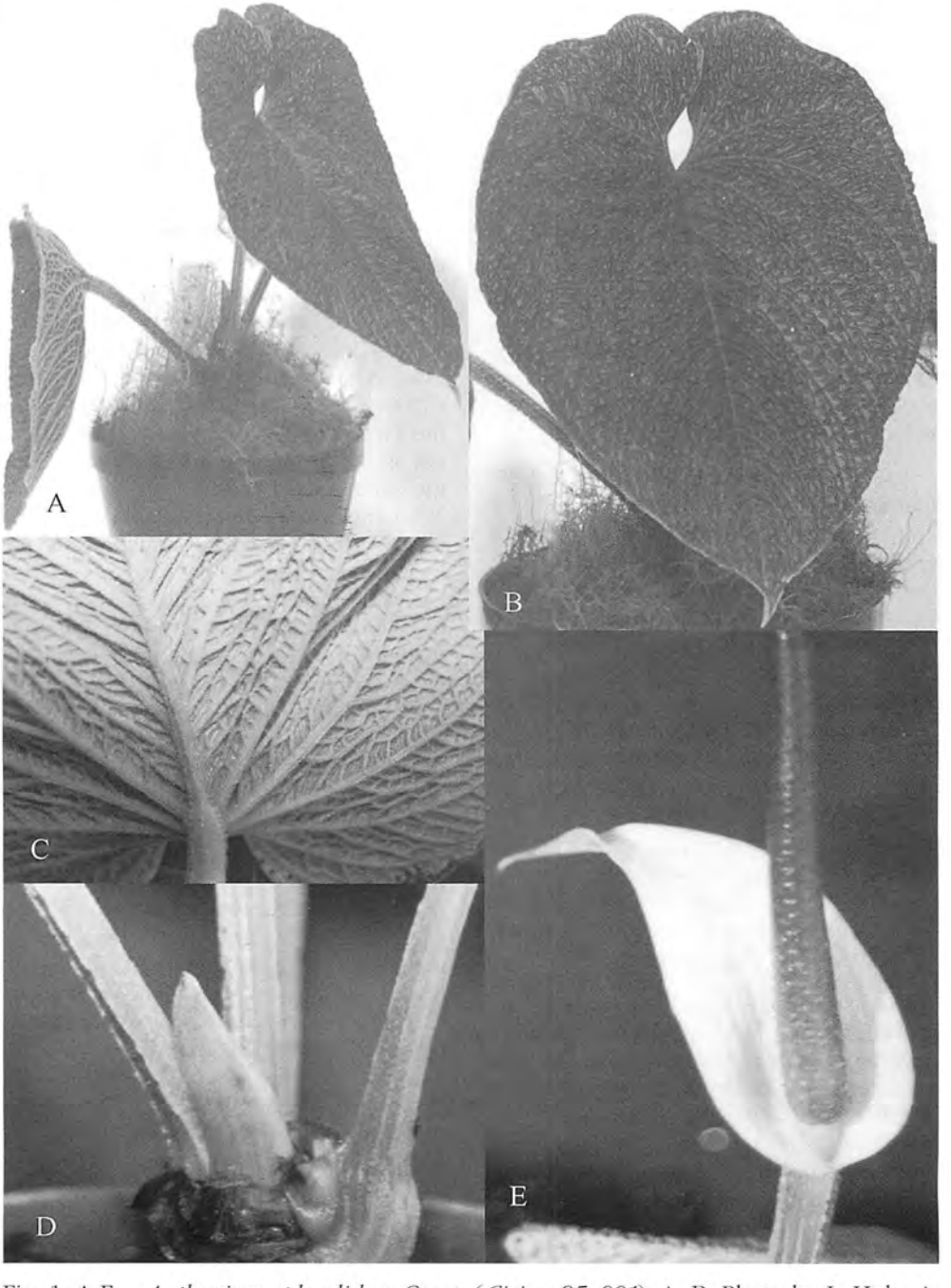

Fig. 1. A-E. *Anthurium splendidum* Croat. (*Cirino 95–001*). A, B. Photo by L. Holy. A. Habit. B. Leaf blade adaxial surface. C, D, E. Photo by H. Tagami, Hawaii. C. Leaf blade close-up of abaxial surface and petiole attachment. D. Petiole bases showing cataphylls. E. Inflorescence.

aralda border. It might be expected in other areas within this life zone. It occurs along streams in usually dense shade and is characterized by its terrestrial habit, promptly deciduous cataphylls, prominently ribbed petioles and lower midrib and the thin, deeply rugose, almost black-green blades which are sub-velvety and matte on the upper surface as well as by the white spathe and yellow spadix.

The species is obviously related to all of the species discussed in the introduction, especially *A. nutibarense*. All of these other species are deemed new to science and a treatment of the relatives of *A. splendidum* follows.

Specimens examined—COLOMBIA. **Chocó:** Along rd. from Santa Cecilia, 15.2 km W of Santa Cecilia, 17.3 km E of Tabor Quebrada Antón, 28.1 km E of Playa de Oro, 5°20′41″N, 76°14′42″W, 280–350 m, 12 Aug. 1997, *Croat & Gaskin 80719* (JAUM, MO); *Cirino 95-001* (MO).

Anthurium luxurians Croat & Cirino, **sp. nov.** Type: COLOMBIA. Exact locality unknown, cultivated plant from material collected by George Wagner of Miami and distributed by Ervin Wurthmann of Tampa, cultivated at Silver Chrome Nurseries, Homestead, Florida by Denis Rotolante, *T. B. Croat 94069* (holotype, MO; isotypes, B, COL, K, US). Figure 2.

Planta terrestris; caudex brevia; internodia brevia, 1.5–4 cm diam.; cataphylla decidua; petiolus 25–89 cm longus; lamina ovata vel anguste ovata, 25–75 cm longa, 15–50 cm lata, pagina superior lustrosa, bullatus; spatha reflexus, ad 12.5 cm longa, et 5.7 cm lata, anguste ovata, alba vel cremeus; spadix viridis, luteus per anthesin, ad 19 cm longus.

Terrestrial; stems short and stout; **internodes** short, 1.5–4 cm diam., medium green, tinged weakly with red; **cataphylls** heavily tinged reddish brown, rounded at apex with free-ending apex, weathering to fibers then deciduous. LEAVES usually moderately few, clustered at apex of stem but not closely arranged; **petioles** erect-spreading, 25–89 cm long, 0.75–1.5 cm diam., terete and 7–9 ribbed circumferentially, the ribs moderately wavy, especially on midrib, continuous with midrib and posterior rib on lower blade surface; **blades** mostly pendent, ovate to narrowly ovate, 25–6.5 cm long, 15–50 cm wide, broadest at petiole attachment or slightly distil to petiole attachment, acute to acuminate at apex, prominently lobed at base, coriaceous, conspicuously bullate; margin straight, revolute; anterior lobe to 46 cm long; posterior lobes narrowly rounded to slightly longer than broad, directed toward the base, broadly rounded on outer margin all the way to the middle of the blade, the surface flat or turned up only slightly at an angle to the midrib; sinus spathulate to narrowly V-shaped, sometimes narrowly hippocrepiform, 5–19 cm deep, 2.5–7 cm wide; major veins acute and in valleys on upper surface, acute on lower surface; **midrib** prominently ribbed on lower surface; **primary lateral veins** 5–10 per side, departing midrib at 35°–60° angle, weakly arcuate toward apex, usually joining a collective vein distant from the margins, smooth and glabrous, never scaly; collective veins usually arising from the uppermost basal veins, or in larger blades from the 1st and 2nd basal veins or even from the posterior rib; **basal veins** 5–7 on each side, 1st to 2nd or 3rd pairs free to the petiole, the remaining 3–5 pair coalesced 4–9 cm; upper surface dark green and glossy; lower surface much paler, epunctate. INFLORESCENCE erect, held slightly above the leaves; **peduncle** 8–29 cm long, ½–⅔ as long as petioles; **spathe** reflexed, 6.5–12.5(19) cm long, 3–5.7(10.50 cm wide, narrowly ovate, acuminate, cordate at base, somewhat wavy on margins, obliquely attached to petiole, white to cream with greenish veins abaxially; **spadix** green, turning yellow at anthesis, 6.5–21 cm long, briefly stipitate, weakly tapering to apex, narrowly rounded at apex. INFRUCTESCENCE with **berries** red to purple, 5–7 mm long.

Anthurium luxurians is assumed to be endemic to Colombia though its exact lo-

Fig. 2. A-D. *Anthurium luxurians* Croat & Cirino. A. Habit showing inflorescences. Cultivated by M. Posada de Robledo. B. Leaf blade adaxial surface showing arching basal veins, collective veins and primary lateral veins. Photo by H. Tagami, Hawaii. C. Habit showing inflorescence overtopping leaves with stem, petioles and lower leaf blade surface showing prominently winged petioles and prominently raised veins on lower surface. Plant and photo by M. Johnson, Miami, FL. D. Inflorescences, left post-anthesis, right at anthesis. Cultivated by M. Posada de Robledo.

cation is unknown. It is likely that the species occurs on the western slopes of the Cordillera Occidental since this is the region where two other closely related co-genera occur (see below). Indeed collections that may be the same species have been collected in Valle Department between Loboquerrero and Cisneros by Colombian horticulturist Marta Posada (Medellín) along the humid arroyos of the otherwise dry western slopes of the Cordillera Occidental. If these collections prove to be *A. luxurians* it would explain the much greater success in the cultivation of *A. luxurians* than *A. splendidum* which is very difficult to grow except in a mist house. The Posada living collection was not vouchered, but photos show it to be rather different in venation pattern with two pairs of basal veins in deep valleys and extending all the way to the apex of the blade, and also with the primary lateral veins not at all apparent. In contrast, typical material of *A. luxurians* has the basal veins more broadly arching and joining into a single collective vein that extends to the apex and also has 3–6 distinct primary lateral veins. The Posada collection may prove to a sibling species of *A. luxurians* since all of the existing cultivated material of *A. luxurians* may be from a single introduction. Future collections may prove that the species is more variable and thus might prove the collection from the western slope of Valle Department to be conspecific with *A. luxurians*.

The species is characterized by its short, thick stem, short internodes, sharply winged-ridged petioles, conspicuously bullate glossy blades as well as by the whitish narrowly ovate-cordate spathe and yellow, briefly tapered spadix. It differs from *A. splendidum* (a species with which it has long been confused) in having bullate, more coriaceous glossy blades rather than relatively much thinner, deeply rugose, subvelvety and matte leaves. The growth requirements of the two species are radically different, with *A. luxurians* capable of being grown under a wide variety of humid conditions. In contrast, *A. splendidum* will survive only under conditions of very high humidity such as in an enclosed mist house.

The species has long gone by the name *A. splendidum* Hort. owing to its strong resemblance to that species, but in recent years several wild collected plants from the region have provided new and important insights into this species and its closely related co-genera described in this paper.

Anthurium luxurians has been in cultivation for about 30 years in the area of South Florida and for a lesser period of time elsewhere in the United States. It was originally collected in Colombia by George Wagner of Orlando, Florida and was later distributed by Ervin Wurthmann of Velva Dean's Tropicals in Tampa.

Anthurium luxurians is one of the most attractive of ornamental plants in the family (hence the name "luxurians" meaning luxuriant). Though it has been confused with *A. splendidum* it is even more easily confused with the next species described in this paper (see below).

Anthurium debilis Croat & Bay, *Aroideana* 27: 97. Type: COLOMBIA. Valle, Bajo Calima Region, Buenaventura–Málaga at km 51.3, 4°09'N, 77°11'W, <100 m, 8 Feb. 1990, *T. B. Croat & J. Watt 70362* (holotype, MO–3780752; isotypes, AAU, B, CAS, COL, CUVC, EAP, F, G, GOET, GH, HUA, INB, JAUM, K, MEXU, M, NY, P, PMA, QAP, QCA, QCNE, RSA, S, TEX, UB, USM, US, VEN, WU). Figure 3.

Terrestrial to 50 cm tall; sap briefly white in stem; stem erect, short and stout; petiole scars conspicuous; roots few, light brown; **internodes** very short, 1.5–4 cm, reddish brown; **cataphylls** 2.6–4.5 cm long, narrowly rounded at apex, sometimes with the midrib extending beyond the end, persisting semi-intact and dark brown at apex, then as fibers, then deciduous or rotting off. LEAVES closely aggregated, erect to spreading; **petioles** more or less erect, (14–)25–50 cm long, about as long as blades, to 5–10 mm diam., subterete to sharply C-shaped, dark green to

Fig. 3. A-D. *Anthurium debilis* Croat & Bay. A. (*Croat 75770*). Habit with leaves showing prominently quilted primary lateral veins. B, C, D. (*Croat 70362*). B. Lower surface of leaf blade showing paler lower surface with pleated primary lateral veins. C. Side view of stem and leaves with inflorescence. D. Petiole bases with immature inflorescence.

brownish green or pink, matte, 5–10-ribbed or -winged circumferentially, becoming crisped on the geniculum (and to a lesser extent on the swollen sheathed portion), the ribs extending onto the lower surface of the blade; geniculum 9–15 mm long; **blades** ovate, (18–)20–64 cm long, (16–)20–46 cm wide, about as broad as long to 1.5 times longer than wide, broadest usually well above the middle, obtusely short-acuminate at apex, prominently lobed at base, subcoriaceous, moderately smooth to weakly bullate, not rugose above, much paler and matte below; posterior lobes narrowly rounded, somewhat longer than wide, the outer margin nearly straight to the broadest point of the anterior lobe; sinus spathulate to narrowly V-shaped, sometimes closed with lobed overlapping, 2–12.5 cm deep, 2.5–7 cm wide; **basal veins** 5–7 per side, 1st & 2nd (3rd) free to the base, 3–4 pairs coalesced 7.5–15 cm, the larger basal veins wavy; major veins narrowly raised to acutely raised above, in valleys, acutely raised below; **midrib** acutely raised in valley above, much paler and matte, marginally ribbed (3-ribbed) on lower surface, 1-ribbed toward the apex; **primary lateral veins** 6–10 per side, acute and sunken in valleys above, acute below, departing midrib at 30°–45°angle, weakly curved toward the apex, smooth and glabrous, never scaly; collective veins arising from the 1st basal vein or one of the lower primary lateral veins; margins straight, revolute; upper surface medium green to dark olive green, semiglossy to matte or matte-subvelvety, quilted between the primary lateral veins, broadly bullate on the quilted portions especially in the lower half of the blade, mottled with gray-green on areas between the major veins above; lower surface much paler epunctate, matte, pleated-raised between the primary lateral veins, drying medium to dark gray or gray-green above, yellow-green to yellow gray-green below; tertiary veins dark green and mostly flat below. INFLORESCENCE erect, shorter than petioles; **peduncle** 6–26 cm long, 2–8 mm diam., ca. ½ as long to longer than the petiole, terete, striate-ridged circumferentially, the ribs brittle; **spathe,** lanceolate, (1.2)3–12.5 cm long and (.03)1–5.7 cm wide reflexed, white to green, tinged pink to purple with elevated green veins on lower surface, narrowly acuminate at apex, cordate at base, obliquely inserted on peduncle; stipe 3–7 mm long; **spadix** green, turning yellowish to bright golden-yellow and glossy at anthesis, (1.2–)7.5–13 cm long, (4–)6–15 mm wide; stamens held at level of tepals; pollen pale yellow. Flowers ca. 4 per visible spiral, prominently 4-lobed, 1 mm long, 1.5 mm wide; lateral tepals shield-shaped; tepals 0.6 mm long, 0.6 mm wide, outer margins usually sharply 4-sided; inner margins broadly rounded or obtusely angular; exposed portion of stigmas 1 mm wide, 0.4 mm long. **Berries** dark purple, obovoid, 5–8 mm long, moderately glossy; mesocarp white; seeds 1 mm wide, greenish white.

Anthurium debilis is endemic to western Colombia at 40–350 m elevation in areas of *Tropical wet forest* (T-wf), *Tropical pluvial forest* (bp–T) and the transition zone between pluvial forest and *Premontane wet forest* (bp–PM). The species occurs along streams in shaded areas, usually in wet clay soil. It is distinguished by its terrestrial habit, ridged petioles, subvelvety upper leaf surface and the quilted blades that are only weakly bullate.

The species is related to *A. splendidum* Hort. Bull. and to *A. luxurians* described above. The cultivated material of the latter species has long gone erroneously by the name *A. splendidum* Hort. ex W. Bull. *Anthurium debilis* differs from *A. luxurians* in having subvelvety matte blades which are quilted and only weakly bullate (versus glossy and bullate to rugose for A. luxurians). *Anthurium debilis* differs from *A. splendidum* in having subcoriaceous, rather smooth to weakly bullate blades rather than the thin, minutely rugose blades of the latter.

A collection from the Municipio Pie de Pato, on the slopes of the Serrania del Baudó, 21 Aug. 1985, *J. Espina et al. 1645* (CHOCO) may also be this species, but has leaves dramatically larger and inflores-

cence with a long peduncle (to 50 cm long) and long tapered spadix (to 30.5 cm long). The collection also differs from collections of typical *A. debilis* in having the upper epidermis smooth and amorphous on magnification with prominent short linear cellular inclusions on the lower surface. In contrast *A. debilis* have greatly enlarged cells on the upper surface and lack the pale lineations on the lower surface.

The epithet "debilis" (or weak) refers to the fact that this species is a weak grower in cultivation compared to its closely related cultivated relative *A. luxurians*.

Specimens examined—COLOMBIA. **Chocó**: Andagoya, 70–100 m, 20–30 Apr. 1977, *Killip 35366* (COL); Municipio de Istmina, alto Río San Juan, estribuciones de los Cerros La Mojarra, Quebrada El Saltado, 80–100 m, 26 June 1983, *J. Espina et al. 1365* (CHOCO); Bolívar-Quibó 44.8 mi. W of Bolívar, 5°40′N, 76°23′, 350 m, 16 Dec. 1980, *Croat & Cogollo 52116* (COL, MO); Serrania de Baudó, Las Animas–Pato on Río Pato, ca. 4 km SW of Pato, 5°30′N, 76°46′W, 150 m, 18 Apr. 1983, *Croat 56132* (JAUM, MO); Río Condoto, vic. Condoto, 70 m, 23 Aug. 1955, *Idrobo 1846* (COL); Nuquí, Corregimiento Terminales, Quebrada Piedra Piedra, 0–25 m, 6 Sep. 1994. *Acevedo-Rodriguez et al. 6618* (HUA); Pacific coast, Correg. Terminales, Quebrada "Piedra-piedra", Hotel Pijibá, 1 hr. by boat SW of Nuquí, 5°37′N, 77°15′W, 0–150 m, 6 Sep. 1994, *Callejas et al. 11193* (HUA); Quebrada Piedra Piedra, 0–25 m, 6 Sep. 1994, *Acevedo-Rodríguez 6818* (HUA). Base of Cerro Torrá, trail along Río Surama, 200–300 m, 21 Feb. 1977, *Forero et al. 3057* (COL). Valle, Queremal to Buenaventura, 28 km W of Queremal, 3 km W of Anchicaya, 3°37′00″N, 76°58′00″W, 12 July 1997, *Croat & Gaskin 79745* (CUVC, MO); Buenaventura–Málaga, km 49, 4°02′N, 77°04′W, 150 m, 17 July 1993, *Croat & Bay 75818* (CM, CUVC, MO); Bajo Calima Region, Málaga-Buenaventura, vic. of Málaga Naval Base at Río Bongito, 4°00′44″N, 77°20′04″W, 40 m, 29 July 1997, *Croat & Gaskin 80515* (CUVC, GUAT, GUAY, HUA, LPB, MO); San José Palmar–Novita, vic. Santa Rosa, 4°57′N, 76°30′W, 350 m, 11 May 1983, *Croat 56614* (JAUM, MO).

Anthurium nutibarense Croat, **sp. nov.** Type: COLOMBIA. Antióquia: Frontino, region of Murrí, Nutibara–La Blanquita, 19.4 km from center of Nutibara, 6°40′N, 76°26′W, 1,460 m, 10 Feb. 1989, *J. M. MacDougal, D. Restrepo & D. S. Sylva 3867* (HUA, JAUM, MO). Figures 4A, 4B.

Terrestris, ad 40 cm; internodia brevia, 1.5 cm diam.; cataphylla 4.5 cm longa; petiolus 18–20 cm longus, alatus; lamina ovata, sagittata, bullata, 27–36 cm longa; nervis primariis lateralibus 4–5 utroque; pedunculus 27–38 cm; spatha 6.5–9.5 cm longa, 0.8–1.5 cm lata, eburneus; spadix atroviridis vel brunneus, 7.5–9.8 cm longus, 5–6 mm diam. in sicco.

Terrestrial, up to 40 cm tall; **internodes** short, 1.5 cm diam.; **cataphylls** 4.5 cm long, the uppermost drying reddish brown, intact, soon thin, pale, more or less parallel fibrous, then falling; **petioles** winged-ridged, 18–20 cm long, drying reddish brown; **blades** ovate, sagittate, conspicuously bullate, 27–36 cm long, 19.5–25.7 cm wide, 1.3–1.4 times longer than wide, 1.2–1.3 times longer than petioles, acute to shortly acuminate at apex, deeply lobed at base, drying matte and gray-green to grayish yellow-green above, semiglossy and yellow-green to yellow-brown below; anterior lobe 21–29.5 cm long, broadest somewhat below middle; sinus spathulate to closed, 6–10 cm long, 1–3 cm wide; **midrib** drying narrowly raised and more or less concolorous above, more or less round-raised, several-ribbed and dark brown below (the ribs with scaly protrusions); **primary lateral veins** 4–5 per side, arising at an acute angle then spreading at 40–50° angle, weakly arcuate and loop-connecting the collective veins, convex in weak valleys above, more or less round-raised and several ridged below with narrow, more or less translucent wings with tooth-like protrusions along the margins, wings often webbed and con-

fluent in the angles of other veins; **basal veins** 5–7 pair, the 1st pair free to the base, the 2nd almost free to the base, the 5th & 6th coalesced 2.5–4 cm long; posterior rib naked 2.5–4 cm.; tertiary veins prominently and narrowly raised, sometimes also bearing narrow wings; upper surface usually minutely granular (these sometimes weakly darker than surface) and usually sparsely pale-lineate; lower surface densely and minutely translucent-granular. INFLORESCENCE with **peduncle** 27–38 cm long, drying dark yellow brown, many ridged, the ridges sometimes with weak projections; **spathe** 6.5–9.5 cm long, 0.8–1.5 cm wide, ivory, tinged pink, sometimes green inside, and greenish yellow outside, drying light brown; **spadix** gradually long-tapered, dark green to brown, 7.5–9.8 cm long, drying 5–6 mm diam. at base.

Anthurium nutibarense is endemic to Colombia, known only from the mountains of Antioquia on the western slopes of the Cordillera Occidentale at 950–1500 m in *Premontane rain forest* (P-rf).

The species is distinguished by its terrestrial habit, short internodes, prominently ridged petioles, conspicuously bullate, ovate-sagittate blades with the veins of the lower surface bearing winged ribs with scaly appendages.

The species is closely related to *A. splendidum,* a species known from lower elevations in *Tropical pluvial forest* (T-pf). Both share more or less bullate blades of similar shape and color with a certain degree of variously winged ribs. *Anthurium splendidum* differs in having a matte, somewhat frosty lower surface, and lacking the dark granular projections, as well as the upper surface being pale short-lineate.

Paratypes—COLOMBIA. **Antióquia:** Parque Nacional "Las Orchideas", Sector Calles, right margin of Río Calles, 6°32′N, 76°19′W, 1,240 m, 29 Mar. 1988, *Cogollo et al. 2787* (JAUM, MO); Frontino, Nutibara, region of Murrí, Nutibara–La Blanquita, km 20–32, ca. 6°45′N, 76°20′W, 950–1,380 m, 20 Apr. 1988, *Luteyn et al. 12123* (HUA, NY); La Blanquita, Nutibara–La Blanquita, 14.5 km W. of Nutibara, 870–950 m, 6°45′N, 76°25′W, *Callejas et al. 6655* (HUA, MO).

Anthurium giraldoi Croat, **sp. nov.** Type: COLOMBIA. Valle: Mun. Cali, Finca Zingara, Cordillera Occidental, E slope near the continental divide, ca. 2,100 m, *J. Giraldo-Gensini 943* (holotype, CUVC; isotypes, K, MO, US). Figures 4C, 4D.

Terrestris: internodia 1–6.5 cm longa, 6–7 mm diam.; cataphylla 2–4 cm longa, persistens in fibris; petiolus 3.2–4(6) cm longus, subteres, manifeste costata; lamina hebetata, ovato vel anguste ovata, debiliter subcordata, 6–20.5 cm longa, 5–14.5 cm lata; nervis primariis lateralibus 5–9 utroque; pedunculus 1.3–4 cm longus; spatha 1.0–1.3 cm long, viridis, interdum suffusa rubra; spadix 1.2–1.6 cm longus, 3 mm diam., flavoviride.

Terrestrial; stem succulent, creeping then erect; **internodes** 1–6.5 cm long, 6–7 mm diam., drying 3–5 mm diam, yellow-green, tinged reddish, matte to weakly glossy, drying grayish yellow-brown, finely and weakly striate; **cataphylls** to 2–4 cm long, soon pale-fibrous, the fibrous in part persistent at the upper nodes; **petioles** (3.2–)6–23 cm long, coarsely several-ribbed (the ribs markedly undulate with jagged margins), sheathed usually scarcely at all but sometimes sheathed form ½ to ⅔ its length; sheath free-ending; **blades** ovate to narrowly ovate, 6.0–20.5 cm long, 5.0–14.5 cm wide, 1.2–1.6 times longer than wide, rounded to acute at apex, often weakly mucronate, weakly subcordate at base, matte, dark green above, drying dark yellow-brown to medium yellow-brown above, moderately paler and yellow-green below, drying grayish yellow-brown below; **midrib** sunken and concolorous above, convex, 1-ribbed along either side, slightly paler than surface below; basal veins 3–4 per side, narrowly and prominently raised above and concolorous above, convex to round-raised, 1–3 ribbed (the ribs sparsely hispidulous) slightly pal-

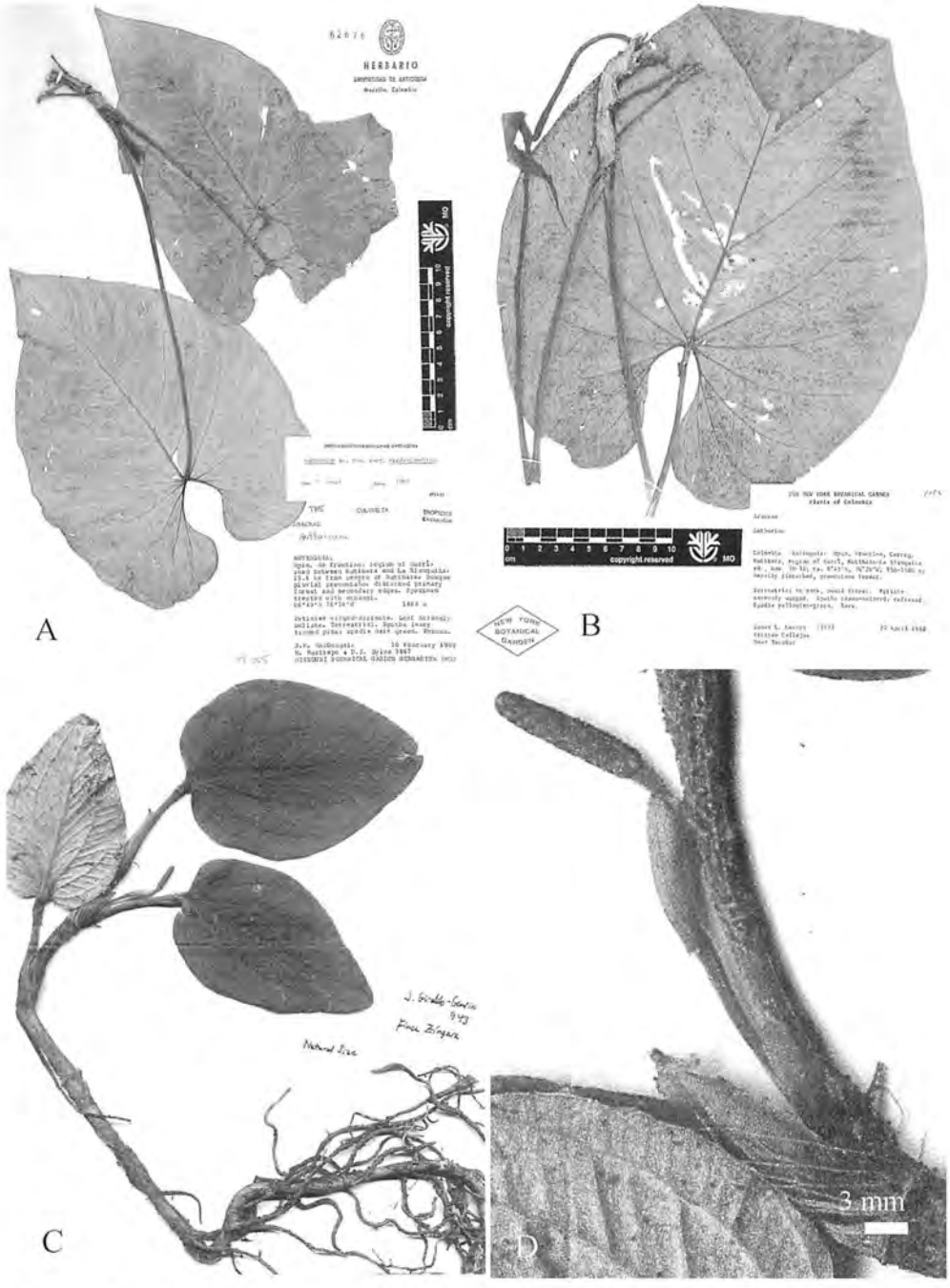

Fig. 4. A-B. *Anthurium nutibarense* Croat. A. (*MacDougal et al. 3867*). Herbarium specimen showing 2 leaves. B. (*Luteyn et al. 12123*). Herbarium specimen with leaf and inflorescence. C–D. *Anthurium giraldoi* Croat. (*Giraldo-Gensini 943*). C. Entire plant flattened but still fresh. D. Close-up of stem, inflorescence, petioles and blades.

er below; **primary lateral veins** 5–9 per side, arising at an angle of 20–40° degree, weakly sunken and concolorous above, narrowly raised and concolorous below, drying weakly raised and concolorous above, narrowly raised and acute, slightly darker below; the upper surface with the areas between the veins densely covered with irregular rows of irregularly shaped protrusions and ridges of the same texture and color as the blade surface, the protuberances often inequilateral, usually flattened, pointed, oriented mostly parallel to the veins, often most prominently raised on the distal end and diminished toward the proximal end; lower surface with minute, irregular punctations. INFLORESCENCE erect; **peduncle** 1.3–4 cm long, 1.2 mm diam., red, drying 0.6 mm diam. coarsely several ribbed, tinged purple, drying yellow-brown; **spathe** pale green to weakly tinged reddish, reflexed to erect, 1.0–3.5 cm long, 3–5 mm wide, curled over peduncle, green; **spadix** stipitate (stipe purplish-violet, to 1.0–7 cm long, 1–1.5 mm diam. on drying) 1.2–4.2 cm long, 1.2–5 mm diam. on drying, medium-dark yellow-green, scarcely tapered to the apex. Flowers 3–4 per spiral; tepals triangular to shield-shaped, drying minutely granular, 0.9 mm wide, the outer margin 2-sided, the inner margin rounded; stamens scarcely exserted; anthers 0.2 mm long, 0.4 mm wide, the thecae broadly spreading.

Anthurium giraldoi is only known only from Valle and Chocó Departments along the continental divide in *Montane wet forest* life zone between Cali and Anserma in cloud forest near the summit of the Cordillera Occidental. It is characterized by its terrestrial habit, heavily sheathed, coarsely ribbed petioles, small matte-subvelvety, ovate blades which are coarsely veined on the lower surface and by the short-pedunculate, strongly stipitate green spadix. One of the most unusual characteristics of the species is the upper blade surfaces that are covered with irregular rows of mostly pointed scaly protuberances.

The species was first collected in 1976 by Enrique Forero at Alto de Galapágo between Anserma and San José del Palmar. It is named in honor of Colombian botanist Jorge Giraldo-Gensisi who collected the type species during his work on the Flora of Finca Zingara, his family's property along the divide between the western slope of the Cordillera Occidentale and the valley of the Río Cauca.

Specimens examined—COLOMBIA. **Chocó**: Ansermanuevo–San José del Palmar, Alto del Galápago, 2,050–2,100 m, 25 Aug. 1976, *Forero et al. 2082* (COL, MO); **Valle**: Hacienda Tokio, vic. of microwave tower ca. 10 km S of Queremal, 2,000 m, 3°30'N, 76°42'W, 26 Feb. 1983, *Gentry et al. 40846* (COL).

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