

Contributions to the Araceae Flora in Northwestern Pichincha Province, Ecuador

Part 1: *Anthurium* of ENDESA Reserve

Thomas B. Croat
Missouri Botanical Garden
P.O. Box 299
St. Louis, Missouri 63166-0299, USA

Jimena Rodríguez de Salvador
Pontificia Universidad Católica de Ecuador
Quito, Ecuador

All drawings are by Iñigo Salvador

ABSTRACT

This is the first in a planned series of local florulas leading to the complete revision of the Araceae for Ecuador. The ENDESA reserve, operated by the Universidad Católica is located in central Ecuador in an area of *Premontane rain forest*. The flora, now known to have 76 species of Araceae is still poorly known except for *Anthurium*, the subject of this revision. Thirty-two species of *Anthurium* are treated. Ten new species and one new variety are described. New taxa are *Anthurium balslevii* Croat & J. Rodríguez, *A. cabuyalense* Croat & J. Rodríguez, *A. cupulispatham* Croat & J. Rodríguez, *A. hebetatilaminum* Croat & J. Rodríguez, *A. jaramilloi* Croat & J. Rodríguez, *A. jimena* Croat, *A. magnifolium* Croat & J. Rodríguez, *A. nigropunctatum* Croat & J. Rodríguez, *A. pulverulentum* Sodiro var. *adsimile* Croat & J. Rodríguez, *A. rodrigueziae* Croat, and *A. silanchense* Croat & J. Rodríguez. One new combination is made, *Anthurium propinquum* Sodiro var. *albispadix* Croat & J. Rodríguez.

INTRODUCTION

The ENDESA reserve is a biological preserve located on the lower slopes of Volcán Pichincha in the northwestern part of the Province of Pichincha at 0°03'N, 79°07'W. It was established in 1981 by the Corporación (Enchapes Decorativos, S.A.), a subsidiary of the Corporación Forestal Juan Manuel Durini, in conjunction with the Pontificia Universidad Católica de Ecuador for the purpose of conducting investigations on the flora and fauna of the region (Jaramillo & Jorgensen, 1989).

It is located between 650 and 800 m in a region of *Premontane rain forest* (Holdridge Life Zone System) south of km 113 on the Quito-Puerto Quito Road. The entrance is 10 km north of Caserío Alvaro Pérez Intriago (Jaramillo & Jorgensen, 1989 loc. cit.). The reserve consists of 85 hectares of primary forest dissected by the Río Cabuyales and is surrounded by areas of secondary vegetation and forest regrowth.

Rainfall is on average 5,545 mm mostly falling from November to May with fluctu-

ations between 399 and 881 mm per month. The driest period, between June and October, still receives ample precipitation, averaging between 145 and 242 mm per month (INCEL, 1977–1980).

This study was part of a thesis (Rodríguez, 1989) made by the junior author. Since the Araceae of Ecuador are such an important part of any local flora, this study is being published to assist others in the identification of *Anthurium* from the western slopes of the Andes. In order to assist biologists with determinations of plants and to better understand the phytogeography of Araceae a complete exsiccatae of each species for Ecuador is included as well as a taxonomic discussion of each species concerning problems in other parts of Ecuador. Reports will be forthcoming on other floristic regions of Ecuador as preliminary studies proceed for a full treatment of the Araceae of Ecuador by Croat.

The family Araceae with 105 genera and about 3,000 species is one of the largest and taxonomically most complex in Ecuador. Species diversity in Ecuador is perhaps greatest in the northwestern part of the country on the Pacific slope in the provinces of Carchí, Esmeraldas, and Pichincha. A second area of high species diversity occurs on the eastern slopes of the Andes.

In general, regions of the Andes are so species-rich and so poorly known that a study of this nature is difficult. Naming plants from the Andean region is a daunting task, and in general only a small portion of the flora can be easily named. Fortunately, the study area is relatively near those where Padre Luis Sodiro spent many years collecting and describing plants. His activities took him to many areas on the western slopes of Volcán Pichincha and many of the species he described (or which he sent to Adolf Engler in Berlin and were described there) are members of the flora of the ENDESA reserve. Though many of the type specimens are fragmentary and all are undesignated, Sodiro's descriptions were among the most detailed ever published in this era. Sodiro's work was immensely useful for this study.

The floristics of the ENDESA reserve are important since this is the first detailed report of the floristics of any member of the Araceae for the region. It will allow comparisons with the only other species-rich site for Araceae outside of the Río Palenque Biological Reserve which lies at a lower elevation on the southern edge of Pichincha Province in an area of *Tropical wet forest* (T-wf).

The Araceae flora of the ENDESA reserve, like other areas in *Premontane rain forest* (P-rf) is relatively rich in Araceae. Though *Anthurium* is the only genus well studied in the area, it is known to have also at least one species of *Chlorospatha*, one *Dieffenbachia*, two *Monstera*, over 25 *Philodendron* (perhaps over half of which are new to science), two *Rhodospatha*, three or four *Stenospermation*, one *Syngonium* [*S. crassifolium* (Engl.) Croat], and one *Xanthosoma* (*X. daguense* Engl.). Since the species of *Anthurium* enumerated thus far total only 32 species, more collecting will undoubtedly turn up more species. For a complete listing of the species of Araceae currently known for this flora and an indication of its similarity with other florulas in Ecuador (namely Río Palenque, La Favorita, and Jatun Sacha) see Croat (1995).

Most specimens for use in the study were collected by Jimena Rodríguez, Croat, Croat & Rodríguez and Jaime Jaramillo (Universidad Católica). Some recent collections by Gunnar Harling & Lennart Andersson (University of Göteborg) and by Michael Grayum (Missouri Botanical Garden) & Nelson Zamora (Universidad de Heredia, Costa Rica), though few in number, have proven to be new to the flora.

This paper will provide detailed descriptions of all *Anthurium* species in the flora, including ten new species and one new variety. The exsiccatae will represent all collections known for Ecuador in order to give a better understanding of the phytogeography of each species and to allow for curation of specimens deposited in other herbaria. This will provide a better background for an ultimate completion of the Araceae for all of Ecuador.

TAXONOMIC TREATMENT

Anthurium Schott, Wein. Zeitschr. Kunst 3:828. 1829.

Herbs, usually epiphytic, sometimes terrestrial; stems short to elongate; internodes short to elongate; roots usually numerous at each node; cataphylls usually lanceolate, persistent or deciduous, usually promptly weathering to fibers. LEAVES commonly clustered near the end of the stem; petioles usually firm, stiff or flexible, briefly sheathed at base, geniculate at apex, cross-sectional shape highly variable; blades usually subcoriaceous, rarely thin or coriaceous, extremely variable in form, simple and usually ovate, elliptic, or lanceolate, frequently cordate at base or digitately lobed with the lobes united or divided to the base into distinct segments, net-veined; midrib stout, the primary lateral veins and the basal veins often forming a collective vein along the margin; basal veins often joined to form a posterior rib. INFLORESCENCE one per node, pedunculate; spathe usually flat, inserted on the peduncle at an oblique angle, sometimes decurrent at base, usually lanceolate, rarely ovate or naviculiforme, usually not convolute at the base, usually persistent, usually free before anthesis, usually spreading or reflexed, sometimes erect, sometimes hooding spadix, often colored; spadix uniform, usually gradually tapered to apex, sometimes cylindroid, rarely clavate or globose, sessile or stipitate, many flowered, variously colored; flowers perfect, usually protogynous, closely aggre-

gated in spirals, truncate at apex, the apex usually rhombic, sometimes quadrangular or 4-lobed in outline; the sides of the apex straight or sigmoid to jaggedly sigmoid; tepals 4, flattened throughout most of their length, broader and truncate at apex, usually triangular at apex, the lateral pair covering partly the anterior and posterior pair; pistil usually exposed between the 4 tepals, simple, 2-celled, included or exerted at anthesis; stigma usually a slit-like depression in the apex of the pistil; ovules usually 1 or 2 per cell, rarely 3 or more; stamens 4, usually weakly exerted at anthesis, with only a small part of the filament exposed, the filaments flattened and fleshy, promptly shrinking and withdrawing the anther to the surface of the tepals, less commonly with the stamens protruding well above the tepals, then often persisting, not retracting, usually the lateral pair of stamens emerging first, followed by the anterior then the posterior stamen; anthers 2-celled, usually broader than long, opening by a longitudinal slit, pollen variously colored. INFRACTESCENCE usually pendent, sometimes erect; berries ovoid, oblong-ovoid, oblong or obovoid, succulent and juicy, variously colored, 2-celled, usually with one seed per cell; pericarp moderately thin, mesocarp usually translucent, sweet; seeds usually somewhat flattened, usually with a sticky appendage on at least one end.

The genus has perhaps 1,000 species with the majority occurring in South America. Ecuador is one of the major centers of distribution.

KEY TO THE ANTHURIUM OF ENDESA RESERVE

1. Blades divided into 3 lobes or segments.
 2. Blade trifoliate, thin, the segments completely free to the base; peduncle shorter than the petiole *A. trisectum* Sodiro
 2. Blade deeply 3-lobed (trisect), moderately coriaceous, the lobes broadly united at the base; peduncle equalling or somewhat longer than the petiole *A. truncicolum* Engl.
1. Blades entire, elongate or cordate but not at all 3-lobed or divided.
 3. Blades acute to obtuse or weakly subcordate at base, not deeply and conspicuously cordate.
 4. Blades dark glandular-punctate on at least one surface typically elongate, mostly elliptic to oblong.
 5. Plants more or less scandent; stems with internodes typically longer than wide, mostly

- less than 5 mm diam.; blades typically broadest at the middle; section *Tetraspermium* Schott.
6. Blades dark glandular-punctate only on lower surface; spathe typically stiffly erect *A. trinerve* Miq.
 6. Blades dark glandular-punctate on both surfaces; spathes spreading or reflexed.
 7. Cataphyll fibers, except for the uppermost, broadly spreading and together forming a small cage-like structure around the stem *A. lacinosum* Sodiro
 7. Cataphyll fibers erect or nearly so, scarcely or not at all spreading from the stem *A. citrifolium* Sodiro
 5. Plants usually not at all scandent; stems with internodes usually broader than long or nearly so, typically more than 1 cm diam.; blades typically broadest above the middle, or more than 9 cm wide or more than 25 cm long; section *Porphyrochitonium* Schott.
 8. Petioles much shorter than blades (blades as much as 8–16 times longer than petioles), sheathed throughout most or all its length; blades held in a tight erect rosette; lower midrib usually acute *A. rodrigueziae* Croat
 8. Petioles $\frac{1}{2}$ – $\frac{3}{4}$ as long as blades, sheathed only at the base; blades mostly irregularly spreading or pendent, not held in a tight upright rosette; lower midrib convex.
 9. Blades eglandular and glossy on the upper surface; plants always epiphytic *A. margaricarpum* Sodiro
 9. Blades glandular and matte, velvety to subvelvety on upper surface (weakly glossy and merely somewhat velvety for *A. cabuyalense*); plants epiphytic or terrestrial.
 10. Plants terrestrial; blades 3.5–7 times longer than broad *A. aureum* Engl.
 10. Plants epiphytic; blades either 8–11 times longer than broad or less than 3 times longer than broad (if between 3.5–7 times longer than broad, then with a second collective vein near the base).
 11. Blades 2.5–5 times longer than wide, bearing secondary collective veins near the base *A. magnifolium* Croat & J. Rodríguez
 11. Blades 8 or more times longer than wide.
 12. Blades acute at base, weakly velvety; the collective veins less than 5 mm from the margins; inflorescences more than 15 cm long; spadix dark green *A. cabuyalense* Croat & J. Rodríguez
 4. Blades typically eglandular, lacking dark glandular punctations on either surface (except dark-punctate, not gland-dotted in *A. nigropunctatum* Croat & Rodríguez).
 13. Internodes longer than broad.
 14. Blades broadly ovate & subcordate, to 32 cm wide with up to 5 basal veins *A. silanchense* Croat & Rodríguez
 14. Blades at most elliptic, less than 18 cm wide and lacking more than a single pair of basal veins.
 15. Leaves less than 25 cm long; blades drying blackened; primary lateral veins obscure; collective veins arising from the base *A. interruptum* Sodiro
 15. Leaves 30–80 cm long; blades drying reddish to yellowish brown; primary lateral veins distinct; collective veins arising from one of lowermost primary lateral veins *A. incomptum* Madison
 13. Internodes broader than long or as broad as long.
 16. Blades strap-shaped and pendent, conspicuously velvety; inflorescence less than 10 cm long; spadix whitish to whitish pink *A. pallidiflorum* Sodiro
 16. Blades ovate to oblong-ovate, mostly cordate at base, not strap-shaped, pendent and velvety.
 17. Blades with collective veins often more than 10 mm from margins; spadix stipitate 6–30 mm; fruits dark purple-violet.
 18. Blades more than 1.5 times longer than wide, acute to at most rounded at base *A. michelii* Guillaumin
 18. Blades less than 1.4 times longer than wide, usually conspicuously cordate base *A. lancea* Sodiro
 17. Blades with collective veins 2–8 mm from margins; spadix sessile (stipitate to ca. 4 mm); fruits yellow-green to green or unknown (probably purplish) in *A. hebatatilaminum*.
 19. Blades matte on lower surface; spadix yellow-green to yellow or purplish.
 20. Blades 1.6–2.5 times longer than wide, drying pale green on lower surface; tertiary veins prominent on live specimens; spadix yellow *A. ochreatum* Sodiro
 20. Blades ca. 3 times longer than wide, drying brown on lower surface; tertiary veins not prominent on live specimens; spadix dark violet-

- purple *A. bebetatilaminum* Croat & J. Rodríguez
19. Blades semiglossy on lower surface; spadix yellow to golden yellow or orangish; berries white and variegated with purple to purple and streaked with yellow stripes *A. balslevii* Croat & J. Rodríguez
3. Blades conspicuously cordate at base, not merely subcordate.
21. Blades prominently constricted above the base.
22. Blades to 50 cm long, drying green; spadix bright yellow, less than 8 mm diam. *A. panduriforme* Schott
22. Blades 50–120 cm long, drying brown; spadix pink to magenta, 10–20 mm diam. *A. jimena* Croat
21. Blades not at all constricted above the base.
23. Blades often more than 60 cm wide; spathe red, prominently naviculiform, erect; spadix maroon, protruding forward at 90 degree angle from peduncle *A. cupulispatham* Croat & J. Rodríguez
23. Blades less than 60 cm wide; spathes variously colored but not red; spadix not maroon and protruding forward at 90 degree angle from peduncle.
24. Blades dark-punctate on both surfaces (but not of distinct glands as in first half of couplet 4); cataphylls coriaceous and persisting intact *A. nigropunctatum* Croat & Rodríguez
24. Blades epuncate; cataphylls mostly either promptly weathering to fibers or deciduous.
25. Blades mostly more than 1.5 times longer than wide; primary lateral veins more than 22 pairs per side (sometimes as few as 17).
26. Internodes usually broader than long at anthesis; spadix whitish to green; spathe early deciduous; berries red *A. dolichostachyum* Sodiro
26. Internodes longer than broad; spadix bluish green and weakly glaucous; spathe persistent; berries green.
27. Margins of the anterior lobe almost straight to weakly concave; primary lateral veins 32–39 *A. pulverulentum* Sodiro var. *adsimile* (Sodiro) Croat & J. Rodríguez
27. Margins of the anterior lobe broadly rounded; primary lateral veins ca. 25 pairs *A. pulverulentum* Sodiro var. *pulverulentum*
25. Blades mostly less than 1.5 times longer than wide; primary lateral veins less than 22 per side (mostly 6–16).
28. Blades drying blackened; primary lateral veins prominently loop-connected at the primary lateral veins, averaging more than 1 cm from the margins; spadix prominently stipitate (the spathe not hooding); berries violet-purple *A. lancea* Sodiro
28. Blades drying green; primary lateral veins not prominently loop-connected, less than 5 mm from the margins; spadix sessile or stipitate with a hooding spathe; berries red or green.
29. Spadix cream to green; major veins on upper surface often prominently raised and thicker than broad; berries green *A. versicolor* Sodiro
29. Spadix red to violet-purple to maroon; major veins raised or sunken but never markedly acute or thicker than broad; berries red or purplish.
30. Blades drying brown, the veins reddish brown; spathe hooding the spadix; spadix prominently stipitate, cylindrical and stubby, reddish; fruits red *A. jaramilloi* Croat & J. Rodríguez
30. Blades drying green, the veins paler yellowish green; spathe spreading, never hooding the spadix; spadix sessile, dark violet-purple, prominently tapered to the apex; fruits dark violet-purple.
31. Blades less than 30 cm long; plants less than 40 cm tall; berries bright red *A. rivulare* Sodiro
31. Blades usually more than 1 m tall; berries usually violet-purple.
32. Inflorescence dark purplish at anthesis; leaf blades with veins usually dark; petiole usually drying reddish brown *A. propinquum* Sodiro var. *propinquum*

32. Inflorescence white to creamy at anthesis; leaf blades with veins and petioles usually drying reddish brown
 *A. propinquum* Sodiro var. *albispadix*
 Croat & J. Rodríguez

Anthurium aureum Engl., Bot. Jahrb. Syst. 25:414. 1898. Type: Colombia. Antioquia: Frontino, western Andes, 1,200–1,700 m, *Lehmann 7360* (holotype, F; isotype, F). Figures 1–5.

Anthurium marginellum Sodiro, Rev. Chil. Hist. Nat. 9:202. 1905. Type: Ecuador. Esmeraldas: Alto Tambo and El Hojal *Sodiro s.n.* (August 1904), (lectotype, B; isolectotype, QPLS).

Terrestrial or sometimes epiphytic near the bases of tree trunks; stem to 25 cm long; internodes 1.5–2 cm long; cataphylls 5–7 cm long, reddish brown on drying, weathering to fine reddish brown fibers covering the internodes; petioles 20–40 cm long, 4–5 mm diam., terete and weakly sulcate to weakly flattened, at least sometimes narrowly flattened adaxially with 3 narrow close ribs, dark green, semiglossy, sheathed 1.2–2.2 cm; geniculum 1–2 cm long; blades lanceolate to oblong-elliptic, subcoriaceous, 38–46 cm long, 5.4–10.5 cm wide, acute to narrowly acuminate at apex, acute to attenuate at base, upper surface dark green, matte, subvelvety and obscurely glandular-punctate (the punctae minute and well dispersed), drying gray-brown or gray-green to dark brown; lower surface light green, moderately paler, semiglossy to glossy and conspicuously dark glandular-punctate, drying yellow-brown to yellow-green; midrib convex, concolorous and darker than surface above, acute and slightly darker than surface below; primary lateral veins 16–24 per side, arising at 38–48 degree angle, quilted-sunken above, more or less pleated-raised below, drying scarcely more conspicuous than the interprimary veins; collective veins arising from the base, 1–4 mm from the margin. Inflorescence erect; peduncle 24–37 cm long, 3–4 mm diam., violet-purple to purplish, equalling or shorter than petiole; spathe lanceolate, 6–12 cm

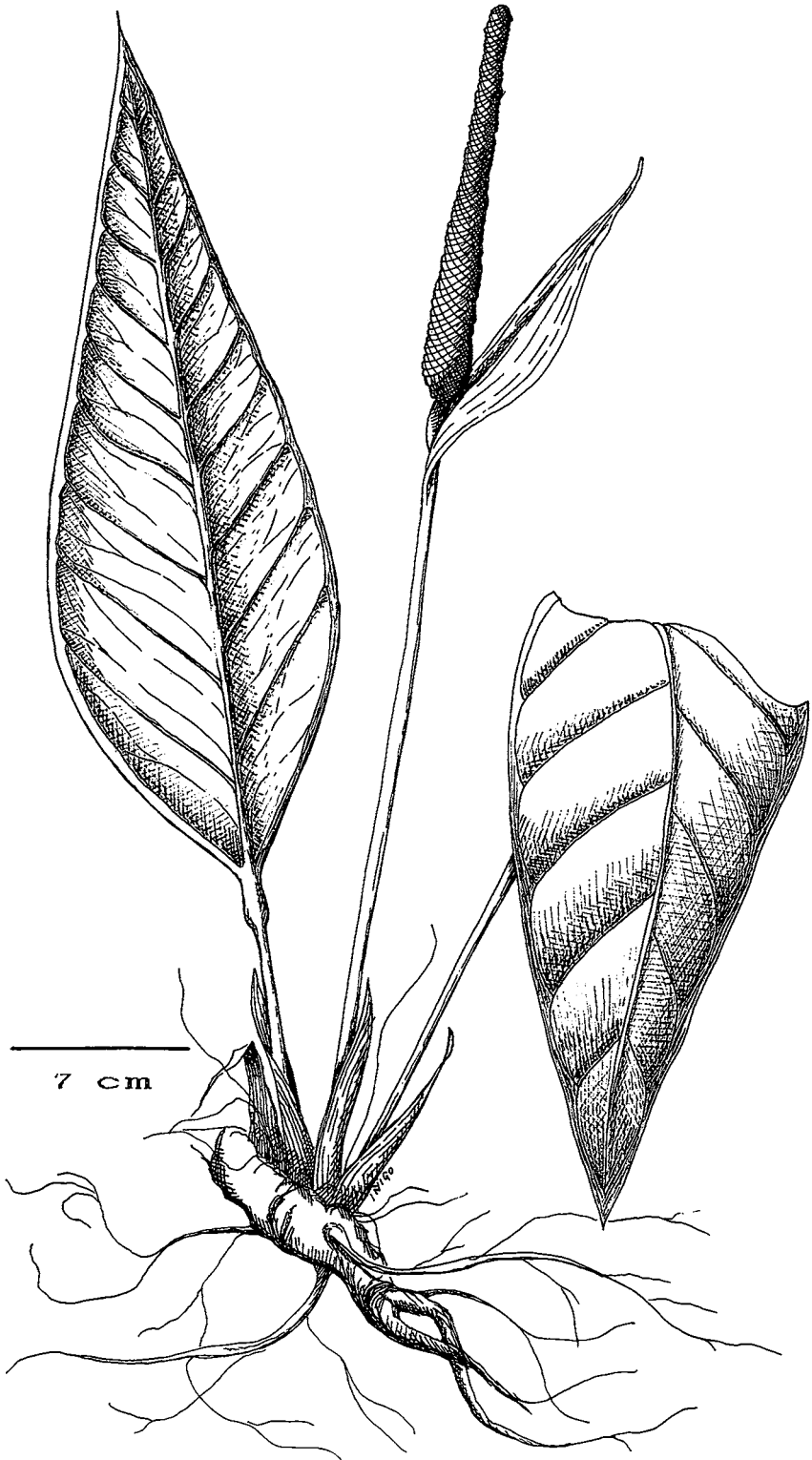
long, 9–25 mm wide, green, moderately thin, inserted at a 30 degree angle, erect then recurved, acuminate at apex, the margins meeting at an acute angle at base; spadix white to cream, or yellow-green, semiglossy, 8–12 cm long, 4–6 mm diam. near the apex, 7–8 mm diam. at base; stipitate 2–5 mm; flowers rhombic, 3.6–4 mm long, 3.2–3.5 wide, ca 5 per spiral; lateral tepals 1.5–2 mm wide; stamens 1.2 mm long (full length), positioned just above tepals; anthers cream. Infructescence to 17 cm long, arcuate; berries violet-purple, ovoid, 2.7 mm long, constricted toward the apex; pericarp with raphide cells; seeds 2, 1.9 mm long, 1.7 mm wide, cream, 1 per locule.

Anthurium aureum is known from the western slopes of the Andes in Colombia and Ecuador (Antioquia to Pichincha) ranging from 500 to 1,700 m.

The species is distinguished by its terrestrial habit, subterete, weakly sulcate petioles, as well as by the narrow blades which have the upper surface dark green, subvelvety, and matte as well as obscurely glandular-punctate with small, sparse glands and have the lower surface light green, semiglossy, more conspicuously glandular-punctate and drying yellowish brown below. In addition, the species frequently has a purplish peduncle, white to greenish spadix and purple berries.

The species is a member of sect. *Porphyrochitonium* and is most easily confused with *A. margaricarpum* which has blades of similar size and shape. In addition to being an epiphyte that species differs in being eglandular and semiglossy on the upper surface.

Anthurium magnifolium, which is similar to *A. aureum* in having a matte upper blade surface also differs (in addition to being epiphytic) in having typically proportionately broader blades (2.6–4 times longer than broad rather than mostly 4–7





times longer than broad in *A. aureum*) which are abruptly acuminate at apex (rather than gradually and narrowly long-acuminate) and also usually have a pair of secondary collective veins near the base which lies 2–3 mm from the margins. In addition, *A. magnifolium* often has a broadly and sharply sulcate or sharply V-shaped petiole.

Another species with somewhat matte blades (weakly velvety) is *A. cabuyalense*. It differs from *A. aureum* in having longer blades (72–80 cm long) which are even proportionately narrower (7.6–8 times longer than wide).

Anthurium aureum differs from *A. rodrigueziae*, the only other member of sect. *Porphyrochitonium* in the flora, in having much longer petioles (short and fully sheathed in *A. rodrigueziae*).

ENDESA collections: *Balslev & Balseca* 4770 (AAU); *Croat* 73163 (CM, F, G, MO, QCA), 73189 (CR, MO, QCNE); *Croat & Rodríguez* 61484 (CAS, CM, MO, QCA, US,



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Fig. 1. *Anthurium aureum* Engl. ENDESA.

Figs. 2–4. *Anthurium aureum* Engl. *Croat* 61500. Figs. 2–3. Habit. Fig. 4. Leaf (upper surface) with inflorescences.



Fig. 5. *Anthurium aureum* Engl. Croat 61500. Leaf (lower surface).

W), 61500 (B, K, MO, QCA, US); *Grijalva 083* (QCA); *Harling & Andersson 22329* (GB); *Jaramillo 6528, 6546, 6557, 6644, 7622* (QCA); *Jaramillo et al. 5207, 5239* (QCA); *Palacios 6923* (MO, QCNE); *Rodríguez 201, 216* (QCA), *220* (MO, QCA), *230* (QCA), *310* (MO, QCA), *332* (QCA), *418* (K, QCA); *Yépez 11* (QCA). Other collections seen: CARCHI: Chical, 12 km below Maldonado on Río San Juan, 1°04'N, 78°17'W, 1,200 m, *Madison et al. 4748* (SEL); El Pailón-Tobar Donoso ca. 45 km below Maldonado, 800 m, *Madison & Besse 7070* (QCZ); above San Marcos de Coaqueres, trail to Gualpí Bajo, 1°6'N, 78°17'W, 1,000 m, *Öllgaard et al. 57296, 57384* (AAU). ESMERALDAS: Lita, 550–650 m, *Madison et al. 5055*. MORONA SANTIAGO: Río Macuma, near the Río Macuma, *McElroy 53* (QCA). PASTAZA: road to Tarabita over Río Pastaza, 3 km from Puyo-Mera road, 100 m, *Croat 49698* (QCA). PICHINCHA: Hotel Tinalandia, 9.6 km E of Santo Domingo de los Colorados, 700 m, *Croat 53704* (QCA).

Anthurium balslevii sp. nov. Type: Ecuador. Pichincha: Reserva Endesa, 8 km N of km. 113 on Quito-Puerto Quito Highway; ca. 700 m, 0°05'N, 79°02'W, 15 July 1986, *Croat & Rodríguez 61505* (holotype, MO-3422195; isotypes, AAU, B, K, NY, QCA, US). Figures 6–10.

Plerumque *terrestris*; *internodia brevia*, 1–2 cm diam.; *cataphylla* 5–10 cm longa; *petiolus* 10–50 cm longus, *subteres*; *C-formatis*, *et anguste complanatus vel anguste*

aut leniter sulcatus; *lamina plerumque triangularis-ovata aut ovata-elliptica*, (18)24–57 cm longa, (7)8–26 cm lata, *late obtusa vel truncata, raro subcordata basi*; *inpolita infra*; *nervis primariis lateralibus* 8–14 utroque; *pedunculus* 16–50 cm longus; *spatha lanceolata, viridis*, 7–15 cm longa, 1–2 cm lata; *spadix* 5.5–14 cm longus, *plerumque luteus, stipitata* 2–4 mm; *beccae purpureae aut albae*.

Usually terrestrial, sometimes epiphytic; stems to 40 cm long; internodes short, 1–2 cm diam.; cataphylls 5–10 cm long, drying fibrous, reddish brown, and promptly deciduous or persisting intact at upper nodes with bases of fibers persisting lower down; leaves commonly erect; petioles 10–50 cm long 3–6 mm diam., subterete, C-shaped and narrowly flattened to narrowly or lightly sulcate, sheathed 1.5–2.5 cm; geniculum 7–17 mm long, paler green or light purple, sulcate; blades triangular-ovate to ovate-elliptic or sometimes oblong narrowly oblong-elliptic, (18)24–57 cm long, (7)8–26 cm wide [(2)2.2–2.6(4.5) times longer than wide], moderately thin, narrowly acuminate to caudate-acuminate at apex, broadly obtuse to truncate, rarely subcordate at base, dark green and semiglossy above, paler and semiglossy to matte below; midrib convex and concolorous, drying sometimes bluntly acute above, round-raised, paler, sometimes purplish or light brown below, sometimes weakly striate; primary lateral veins 8–14 per side, arising at 40–50° angle, narrowly sunken and somewhat quilted, drying weakly raised above, convex to narrowly raised and somewhat pleated-raised below; interprimary veins often present, coursing somewhat irregularly to the collective; secondary and tertiary veins scarcely visible or sometimes with a few tertiary veins somewhat raised below; collective veins arising from the uppermost basal veins or sometimes from one of the lower primary lateral veins, 4–10 mm from the margin; antimarginal veins present. Inflorescence erect; peduncle 16–50 cm long, 2–3 mm diam., subterete, lightly sulcate, equalling or shorter than petioles; spathe lanceolate, membranaceous, green, lanceolate, drying yellowish, 7–15 cm long, 1–2 cm wide, in-

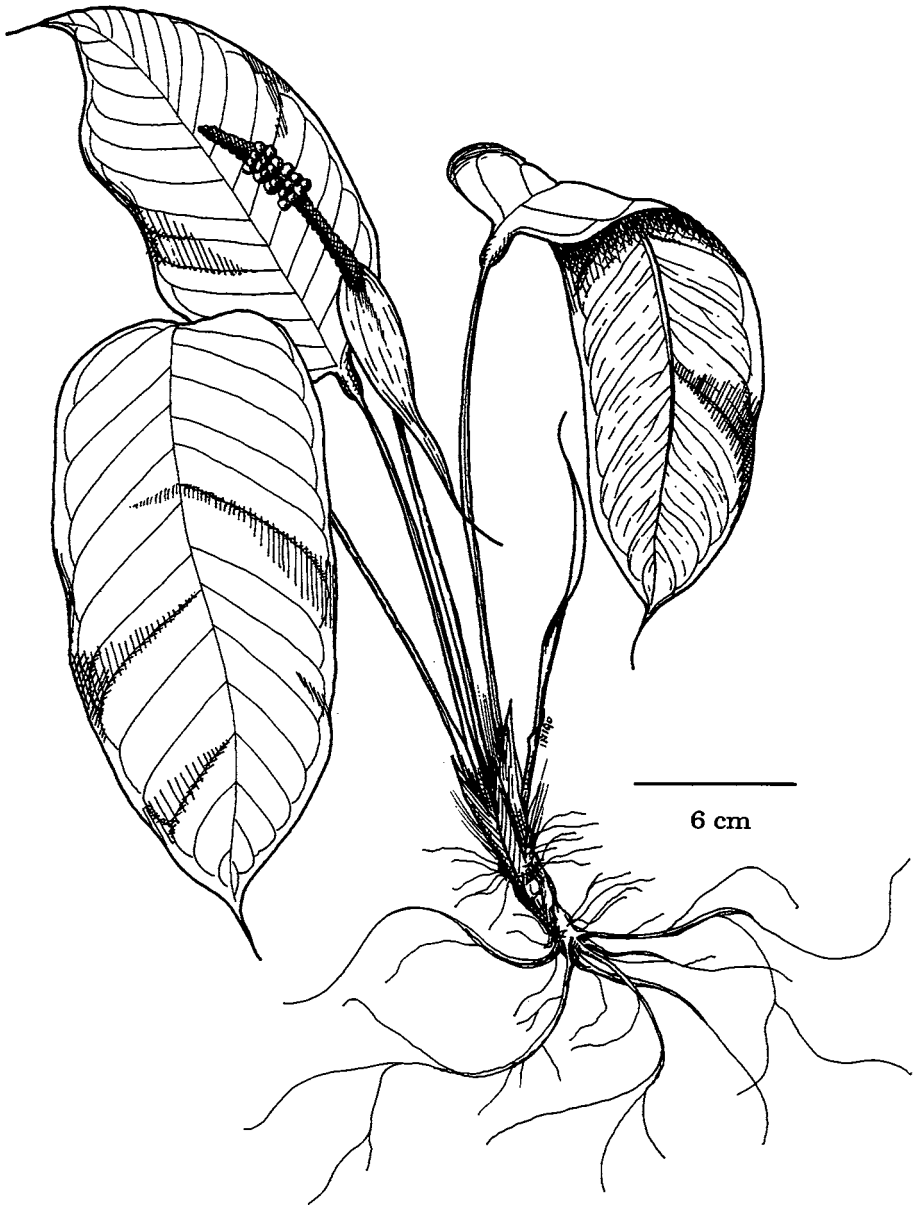


Fig. 6. *Anthurium balslevii* Croat & Rodríguez. ENDESA.

serted at an angle or 45 degrees, spreading or erect-spreading, acuminate or cuspidate at apex, the margins meeting at an angle of 40 degrees at base; spadix 5.5–14 cm long, 3–5 mm diam., weakly curved, semiglossy, yellowish and sometimes green-tipped, becoming yellow to golden-yellow or orange at anthesis, stipitate 2–4 mm; flowers ca.

3 visible per spiral, transversely rhombic to about as broad as long, 4.8–5.5 mm wide; tepals 1.8–1.9 mm wide, granular, inner margins straight to weakly concave; stamens 0.5–0.8 mm long, held at the surface of the tepals; anthers yellowish; stigma discoidal. Infructescence purplish, to 19 cm long, often recurved, tepals often scurfy



Figs. 7-10. *Anthurium balslevii* Croat & Rodríguez. Croat 61485. Fig. 7. Habit. Fig. 8. Spathe & spadix. Fig. 9. Habit. Fig. 10. Mature infructescence showing enlarged tepals and early-emergent variegated berries.

brown at apex; berries early emergent, turbinate, clavate to obovoid, purple or white, variegated with violet-purple, sometimes purple with yellow-green longitudinal stripes, maturing from the base of the spadix and remaining firm apparently until very mature, often not developing fruits near the apex; pericarp thick, mesocarp mucilaginous, transparent; seeds 2, somewhat discoidal, 5.0–5.6 mm diam.

The species is known only from the western slopes of the Andes in Ecuador. At ENDESA the species is common in the primary forest. A collection from Loja Province at 2,600 to 2,800 m, (*Jaramillo & Winner-skjold 5787*) despite the great differences in elevation, is virtually identical to some collections of the species at ENDESA and is believed to be this species. Other sterile collections from Esmeraldas and Los Ríos Provinces are also believed to be this species. More collections are needed to better ascertain the true range of the species.

This species is characterized by usually being a terrestrial plant with short internodes, long-petiolate blades 3–3.2 times longer than wide, semiglossy on the lower surface with collective veins arising from near the base and extending somewhat loop-connected to the tip. It is also characterized by its green to yellowish spadix.

The species is a member of a complex of closely related species. At ENDESA it is most similar to *A. bebetatilaminum*. That species differs in having blades matte beneath and typically cordate to subcordate at the base and by having a purplish spadix.

Anthurium balslevii is also very similar to both *A. cuspidatum* Masters and *A. oreophilum* Sodiro, species which have similar blade shapes but which differ in having dark violet-purple spadices. Both of the latter also differ in having blades which are frequently more distinctly cordate at the base.

The species is also related to *A. longicaudatum* Engl. but that species, in addition to having a violet-purple spadix, has more nearly ovate blades 1.3 to 1.4 times longer than broad (versus 2.2–3, or sometimes to 4.1 times longer than wide for *A. balslevii*).

Collections representing a new species

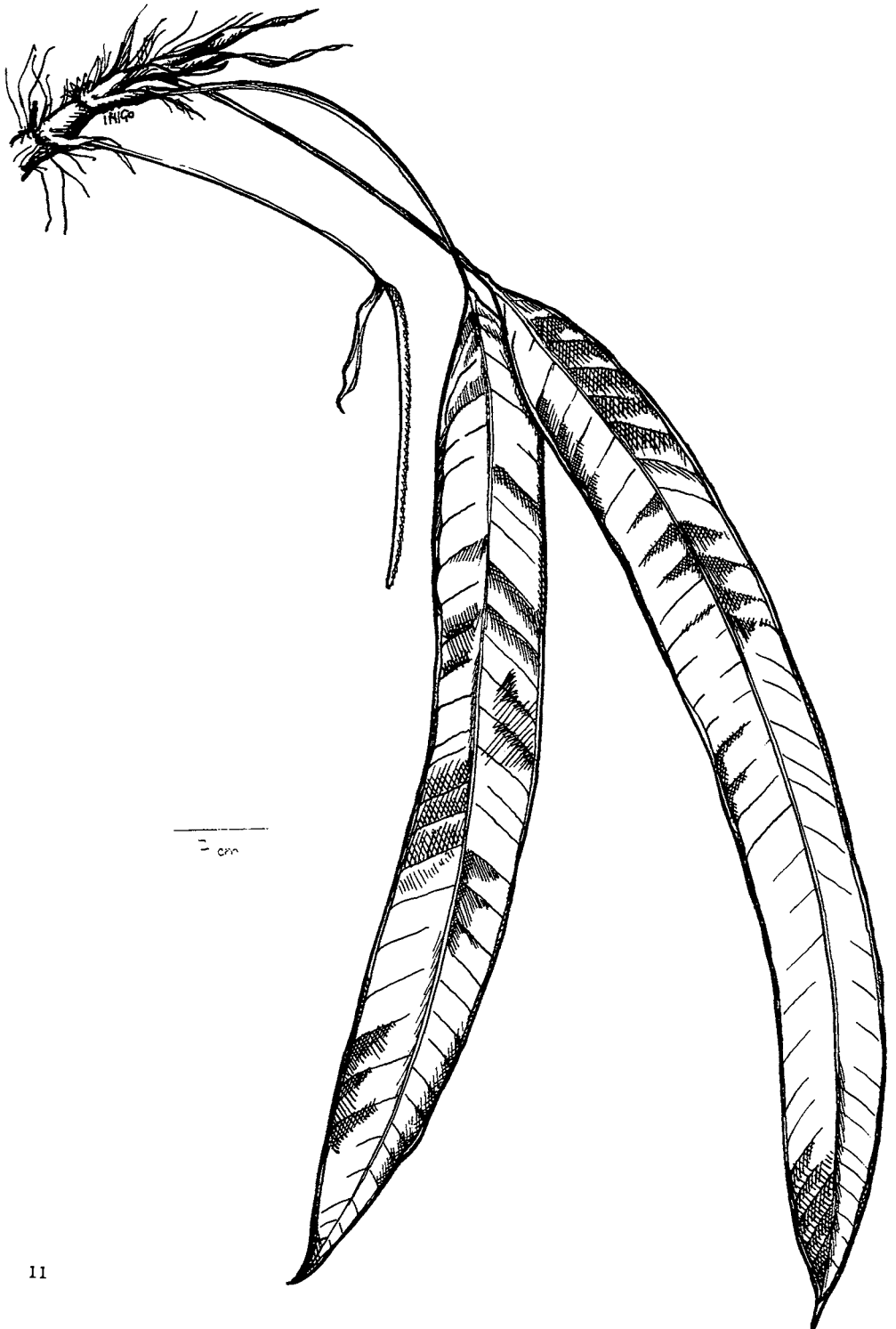
from Esmeraldas Province in the drainage of the Río San Miguel are very similar in general appearance to the acute based specimens of *A. balslevii*. They differ in having dark purple rather than yellowish spadices and red rather than purplish berries. The new species is represented by *Harling 4648, 4576, 4581 and 4583* (all S), *Holm-Nielsen 25371, 35455, 25513, and 25526* (All AAU) as well as by *Méndez et al. 132* (MO) and *Rubio & Quelal 626*.

Two doubtful collections that may belong in this species are *Yáñez & Foster 210* from Manta Real on the Río Patul (Azua-Cañar border) and *Harling 4613* from Esmeraldas along the Río Grande.

The species was first collected by Jaime Jaramillo, F. Coello, and E. Azanza in March of 1983 and later in the same year by Henrik Balslev and S. Balseca. Since the former collector is honored in this same treatment with another *Anthurium*, this species is named in honor of Henrik Balslev who collected many Araceae while he was doing research with Aarhus University in Ecuador.

ENDESA collections: *Arguello & Betancourt 327; Ayala 23* (QCA); *Balslev & Balseca 4774* (NY); *Croat 73157* (MO), *73163* (MO); *Croat & Rodríguez 61485, 61505* (MO, QCA); *Grayum et al. 9343* (MO); *Jaramillo s.n.* (QCA), *6354* (QCA), *6468* (MO, QCA), *6544* (QCA), *6698* (MO, QCA), *6716* (QCA); *Jaramillo et al. 5235* (QCA); *Rodríguez 180* (MO, QCA), *185* (MO), *191* (MO, QCA), *275* (K, QCA), *351, 385* (QCA). Other collections seen: ES-MERALDAS: Lita, *Cobb 27A* (MO, U). LOS RÍOS: Caserío Palmar de Bimbe, E of Santo Domingo-Quevedo Hwy, 10.5 km N of Patricia Pilar, 0°35'S, 79°12'30"W, *Croat 57001* (MO). LOJA: Loja-Zamora, km 16–24, 2,600–2,800, *Jaramillo & Winnerskjold 5787* (QCA).

Anthurium cabuyalense Croat & J. Rodríguez, sp. nov. Type: Ecuador. Pichincha: ENDESA reserve, 9 km N. of km 113 on Quito-Puerto Quito road, 750 m, 0°05'N, 79°02'W, 16 July 1986. *Croat & Rodríguez 61519* (holotype, MO-3422812; isotype, QCA). Figures 11–12.



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Fig. 11. *Anthurium cabuyalense* Croat & Rodríguez. ENDESA.

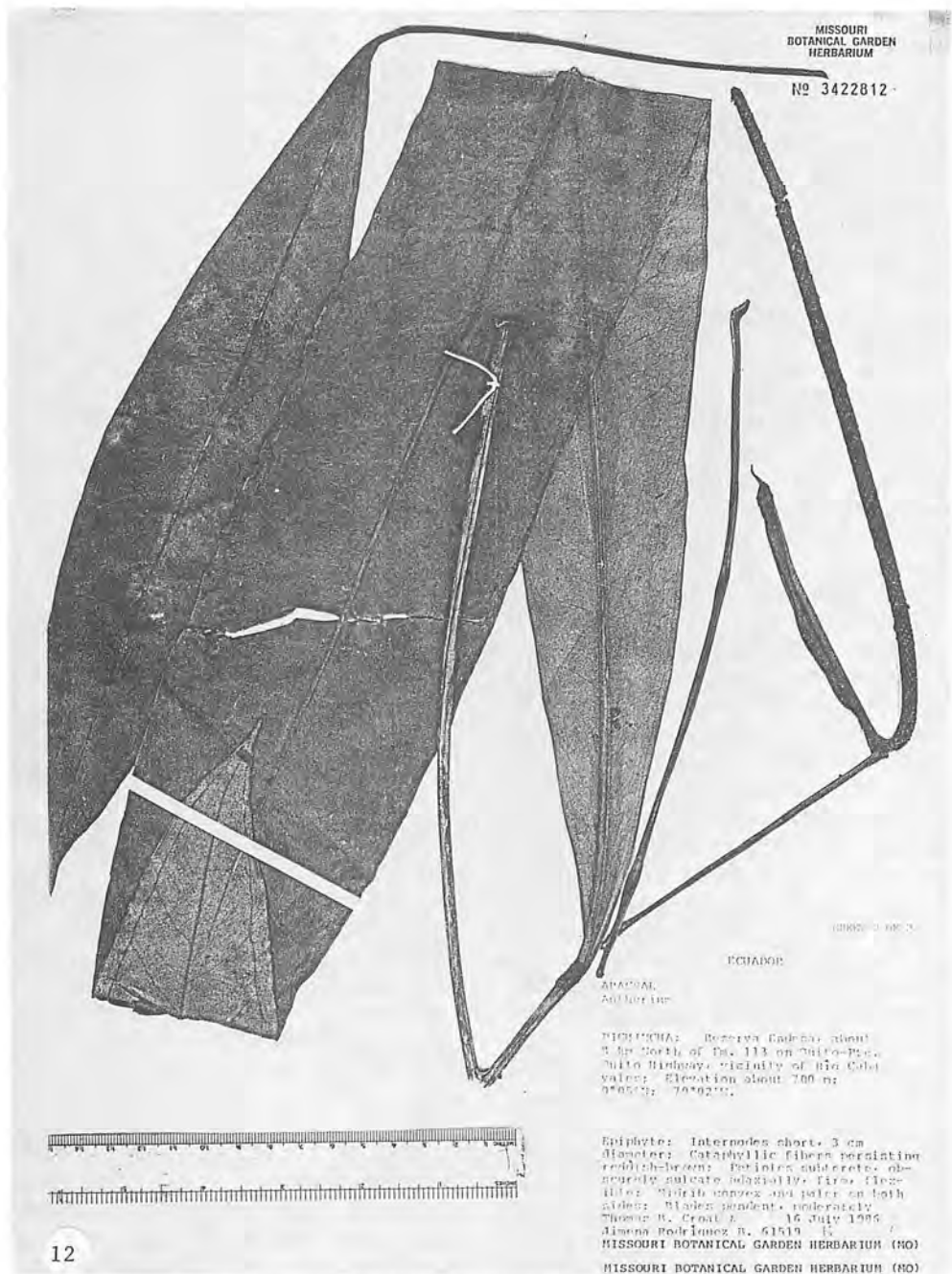


Fig. 12. *Anthurium cabuyalense* Croat & Rodríguez. Croat & Rodríguez 61519. Type specimen.

Planta epiphytica; internodia brevia, 3 cm diam.; cataphylla persistentia ut fibrae tenue; petiolus subteres, obscura sulcata, 30–38 cm longa; lamina oblonga, 72–80

cm longa, 9–10 cm lata, glanduloso-punctatus in superficiebus ambabus; nervis primariis lateralibus usque 30 utroque; pedunculus 32 cm longus; spathe viridis, 10.5

longa, 11 mm lata, spadix subsessilis, atroviridis.

Epiphyte; internodes short, 3 cm diam.; cataphylls persisting as reddish brown fibers; leaves spreading-pendent; petioles subterete, obscurely sulcate adaxially, 30–38 cm long, ca. 5 mm diam., firm and flexible; blades oblong, 72–80 cm long, 9–10 cm wide, 7.6–8 times longer than wide, moderately coriaceous, moderately bicolorous, dark green and weakly glossy and somewhat velvety above, medium glossy and weakly glossy below; the surface somewhat undulate, glandular-punctate both above and below, more sparsely so above; midrib convex and paler on both surfaces; primary lateral veins up to 30, flat and only weakly visible, drying weakly raised, scarcely more conspicuous than the interprimary veins; interprimary veins several between each primary lateral vein; tertiary veins obscure; collective veins arising from the lower $\frac{1}{3}$ of the blade, 1–6 mm from the margin, weakly sunken above, flat and darker than the surface below, more conspicuous than the primary lateral veins, drying weakly raised on both surfaces. Inflorescences spreading-pendent; peduncle 32 cm long, tinged purplish; spathe green, linear-lanceolate, 10.5 cm long, 11 mm wide, abruptly acuminate at apex, inserted at ca 45 degree angle, spreading at about a 90 degree angle to the peduncle; the margins rolled under along their entire length, meeting acutely at base, weakly decurrent; spadix subsessile, dark green, directed at a 105 degree angle; stipe 1–2 mm in back, 6 mm long in the front; flowers rhombic, 2.6–3 mm long, 1.8–2 mm wide, 6–7 visible per spiral; lateral tepals 1.8–2 mm wide, the inner margin straight to broadly convex; stamens emerging at the surface of the tepals; anthers broadly ovate, 0.4 mm wide. Infructescence not seen.

Anthurium cabuyalense is known only from the type locality in *Premontane wet forest* (P-wf) at 700 m elevation. It is distinguished by its long petiole spreading-pendent leaves with subvelvety oblong blades and long petiolate dark green inflorescence.

The species is similar to *A. pallidiflorum*

at the ENDESA reserve but that species differs in having blades which are velvety on the upper surface, rounded at the base and they are not glandular-punctate on either surface.

Anthurium cabuyalense is also very similar to another undescribed member of sect. *Porphyrochitonium* from the Río Nangaritza valley in Zamora-Chinchipec Province. It also has elongate blades and long petioles but it differs in having blades only 5.5 times longer than wide rather than over eight times longer than wide.

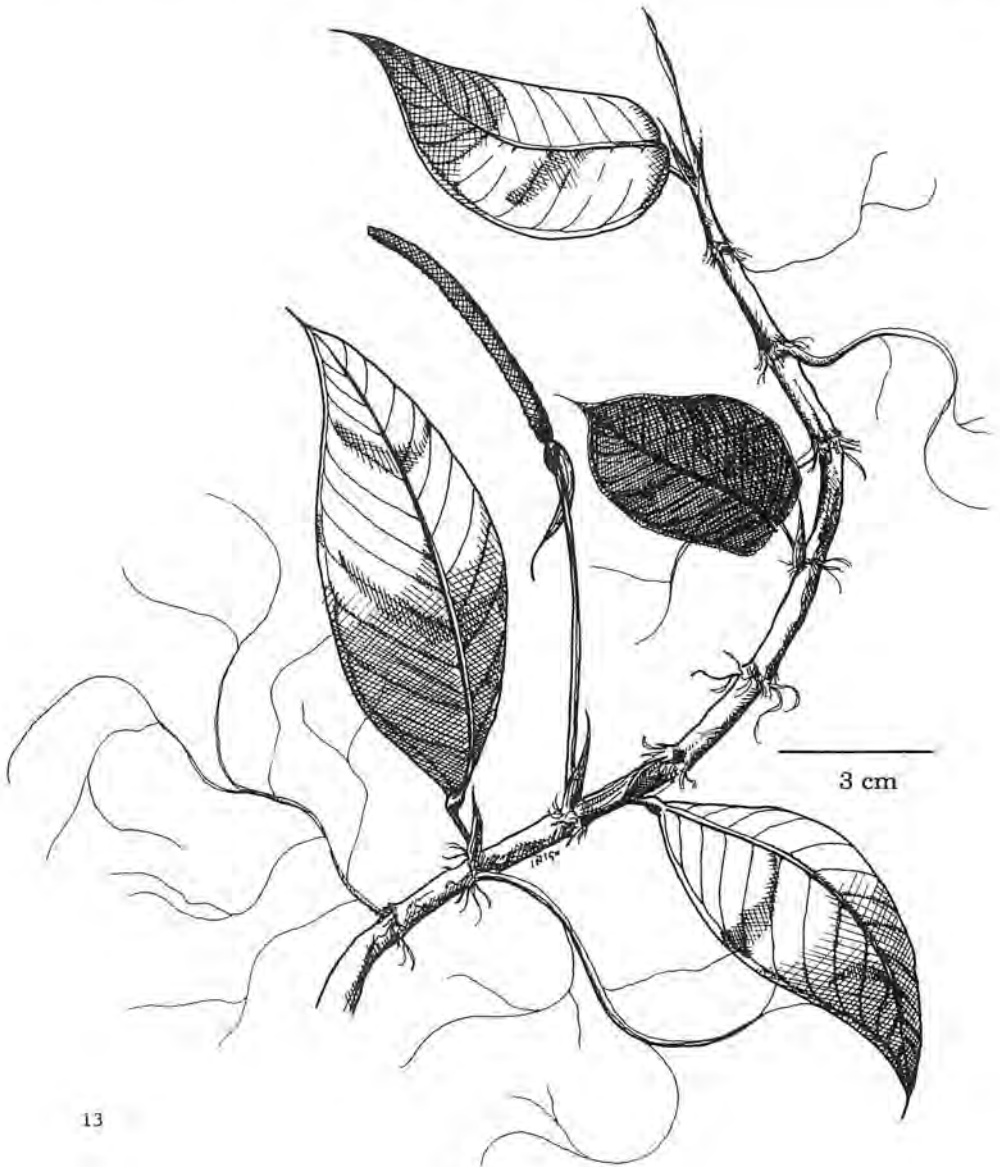
The species is named after the Río Cabuyales which passes through the ENDESA property.

ENDESA collections: *Croat & Rodríguez 61519* (MO).

Anthurium citrifolium Sodiro, Anal. Univ. Centr. Ecuador 15 (108):5. 1901. Type: Ecuador. Pichincha: Nanegal, *Sodiro s.n.* (January 1901; not seen). *Sodiro s.n.* (July 1903) from Nanegal (B) may serve as the neotype. Figures 13–15.

Anthurium tenuinerve Sodiro, Anales Univ. Centr. Ecuador 17:258. 1903. Type: Ecuador. Pichincha: Volcán Atacazo *Sodiro s.n.* (Oct. 1902).

Pendent or scandent epiphyte, rarely terrestrial and to 1.5 m tall; internodes 2–6 cm long, 4–6 mm diam., sometimes purplish brown; drying reddish brown, smooth; cataphylls thin, green, 3–4 cm long, promptly weathering to moderately coarse tan to reddish brown fibers, these in part forming a reticulum and held moderately close to the stem; petioles sharply C-shaped or subterete and weakly sulcate to flattened with raised margins adaxially, 1.8–4.5 cm long, sheathed 5–10 mm; geniculum 7–14 mm long, shaped like the petiole; blades usually oblong-elliptic, sometimes elliptic to ovate-elliptic, 13–18 cm long, 4–7.3 cm wide, acuminate at apex, obtuse to rounded, sometimes weakly subcordate at base (1.8)2.3–3.9 times longer than broad, moderately coriaceous, drying yellowish brown, conspicuously glandular-punctate on both surfaces, upper surface dark green and velvety, drying minutely granular; lower surface much paler and weakly glossy below;



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Fig. 13. *Anthurium citrifolium* Sodiro. ENDESA.

midrib thicker than broad and paler, drying somewhat knife-edged above, thicker and paler, drying convex, wrinkled and paler beneath; primary lateral veins 8–10 pairs, sunken on both surfaces, scarcely visible to weakly raised on drying; collective veins arising from the base, more conspicuous than the primary lateral veins, drying weakly raised, 5–11 mm from the margin; secondary collective veins extending into the

margin in the lower $\frac{1}{4}$ of the blade; anti-marginal veins present; inflorescence erect, 1.5–3 times longer than petioles; peduncles weakly ridged, 3–8 cm long, drying 1–2 mm diam., striate; spathe reflexed, lanceolate to oblong-elliptic, 2–3.8 cm long, 5–10 mm wide, abruptly acuminate and tightly inrolled at apex, green to yellow-green, sometimes purplish within, rounded to obtuse at base; spadix sessile, pale



Fig. 14. *Anthurium citrifolium* Sodiro. Croat 72386. Stem showing inflorescence.

green, pale yellow-green to yellowish or bright yellow, 2.7–5.5 cm long, drying 3–5 mm diam.; flowers rhombic, 3–3.4 mm wide, 1.8–2.2 mm wide, 3–5 per spiral; lateral tepals 1.8–2.7 mm wide, the inner margins straight to broadly convex; pistils weakly emergent; stamens held at the level of the tepals, anthers broadly ovate, 0.4–0.5 mm wide; infructescence to at least 7 cm long, drying ca 10 mm diam., tepals green with purple margins, berries green, rounded at apex.

Anthurium citrifolium ranges from southern Colombia (Nariño) to Ecuador along the Pacific slope of the Andes from 600 to 1,900 m elevation. It is a member of sect. *Tetraspermium* Schott and is distinguished by its elongate internodes, persistent, more or less erect cataphyll fibers, short petioles, small more or less oblong-elliptic blades glandular-punctate on both surfaces.

At ENDESA the species is most easily confused with *A. lacinosum* which differs in having proportionately narrower blades, and proportionately shorter petioles but es-

pecially in having the persistent cataphyll fibers prominently spreading and forming a cupuliform basket around the nodes on the upper part of the stem. It also differs from *A. citrifolium* in having proportionately longer and more slender spadices, ranging from 25–50 times longer than wide (versus 12–15 times longer than wide for *A. citrifolium*).

Sodiro compared the species with *A. subandinum* Engl., a quite unrelated species. Perhaps for this reason Engler (1905) placed the species in section *Xialophyllum* Schott rather than in sect. *Tetraspermium* where it properly belongs.

The var. *verruculosum* Sodiro has not been seen but is probably a synonym. It was deemed to be different by Sodiro without any clear indication as to why. He described the peduncle as being 2–3 times longer than the petioles versus 3–4 times longer for *A. citrifolium* and the spadix 6–7 cm long versus 4 cm long. He described for the first time the mature fruits as being white. Nothing in this description would appear to warrant its separation.

Elsewhere the species is very close to a new species represented by *Croat 55711* collected in Cotopaxi Province near El Corazón at 1,030 m elevation. That species has similar persisting cataphyll fibers and blades but differs in being a long-pendent plant hanging down for about 1.5 meters and in having a dark purple-violet spadix.

Sodirol (1903) reported that the species has a stipe 2–3 mm long, but no material seen by these authors have a stipe more than about 1 mm long.

ENDESA collections: *Balslev & Balseca 4700* (QCA), *4730* (QCA); *Rodríguez 279* (MO, QCA), *340* (QCA), *350* (QCA). Other collections: CARCHI: Tulcán Cantón: Awá reserve, Gualpí Medio, 900 m, 1°01'N, 78°16'W, *Quelal et al. 628* (MO, QCNE); El Pailón, ca. 45 km below Maldonado, path to Tobar Donoso, 800 m, *Madison & Besse 7083* (QCA); Chical, *Christenson 1554* (recollection of live plant SEL 78-1613 based on *Plowman 14076*). El ORO: Zaruma-Santa Rosa, Piñas-El Placer, 1,100–1,200 m, *Harling & Andersson 14368* (GB, MO). ES-MERALDAS: Lita, 550–650 m, *Madison et al. 5146* (QCA); Lita-San Lorenzo Road, 18 km W of Lita, 675 m, 0°55'N, 78°28'W, *Croat 72386* (MO, QCNE). PICHINCHA: Reserva, Florística-Ecológica "Río Guajalito", Quito-Santo Domingo, via Chiriboga, km 59, 3.5 km NE of road, 0°13'53"S, 78°48'10"W, *Jaramillo & Zak 8117* (QCA).

Anthurium cupulispathum Croat & J. Rodríguez, sp. nov. Type: Ecuador. Pichincha: ENDESA reserve, 9 km N of km 113 on Quito-Puerto Quito road, 750 m, 0°05'N, 79°02'W, 15 July 1986, *Croat & Rodríguez 61456* (holotype, MO-34753-60; isotypes, B, K, QCA, US). Figures 16–21.

Planta terrestris; internodia brevia, 1.5–6 cm diam.; cataphylla, persistentia semi-intacta; petiolus teres, obtusus sulcatus, (54)99–173 cm longus; lamina ovato-cordata (28)61–105 cm longa 44–88 cm lata; nervis primariis lateralibus 6–10 utroque; pedunculus 15–38 cm longus; spatha erecta, naviculiformis, 18–20 cm longa, 6.5–7.5 cm diam., extus pallide rubroviolacea vel rubra, intus atrorubra; spadix leniter



Fig. 15. *Anthurium citrifolium* Sodirol. *Croat 72386*. Stem showing cataphylls appressed to stem.

angustus ad apicem, 20–30 cm longus, 2.0–3.2 cm diam., maroon.

Terrestrial; internodes short 1.5 to 6 cm diam.; cataphylls green, tinged reddish, ca 25 cm long, turning dark red-brown and persisting semi-intact at upper nodes, eventually weathering to more or less longitudinally oriented fibers; petioles terete to U-shaped, obtusely and narrowly sulcate to deeply and obtusely sulcate, (54)99–173 cm long, to 4 cm diam. at base, ca. 2.5 cm diam. midway, firm, moderately flexible to brittle, smooth, drying brown; geniculum often reddish; blades ovate-cordate, (28)61–105 cm long, (35)44–88 cm wide, subcoriaceous to moderately coriaceous, semiglossy, weakly bicolorous, drying grayish brown above, yellowish brown below; midrib obtusely triangular and paler or reddened, moderately paler than surface above, convex to quadrangular, becoming acute toward the apex, often drying acute on the lower surface; primary lateral veins 6–10, arising at ca 45 degree angle, moderately



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Fig. 16. *Anthurium cupulispatum* Croat & Rodríguez. ENDESA.



Figs. 17–20. *Anthurium cupulispatum* Croat & Rodríguez. *Croat 61456*. Fig. 17. Habit. Fig. 18. Stem with roots, fibrous cataphylls, and petiole bases. Fig. 19. Junior author with stem and inflorescence. Fig. 20. Inflorescence showing spathe and spadix.



Fig. 21. *Anthurium cupulispathum* Croat & Rodríguez. Croat 49359. Inflorescence with old persistent spathe.

straight to weakly curved to the margins, moderately acute, paler or reddish, drying acute above, more sharply triangular and paler, drying moderately acute below; collective veins usually arising from the first basal veins, the remaining basal veins in part collecting but eventually merging with the margin; tertiary veins moderately obscure, in part sunken above, darker and slightly raised below; basal veins (4)8–10(11) pair, the 1st pair free to the base, the 2nd almost free, the 6th or 7th and higher coalesced 11–18 cm; posterior rib naked with the sinus for most of its length; posterior lobes broadly rounded, curving in toward each other; sinus hippocrepiiform when young, mitered in age, broader than deep, inflorescence erect; peduncle 15–75 cm long, to 1 cm or more diam., irregularly and faintly costate, tinged with purple; spathe erect, directed at ca. 180° angle with the peduncle, naviculiform, narrowly ovate in outline, to 18–20 cm long, 6.5–7.5 cm diam., pale reddish violet to red outside, dark red inside (elsewhere pale green), moderately coriaceous, semiglossy, drying

dark red-brown; spadix slightly tapered to apex, 20–30 cm long, 2.0–3.2 cm diam., maroon to deep red-maroon, protruding forward at 90 degree angle to peduncle; stipe 0.5–1.5 mm long on both sides; flowers more or less quadrangular, 1.6–2 mm long, 1.6–2 mm wide, 20–25 visible per spiral, the sides straight parallel to the spirals, jaggedly sigmoid perpendicular to spiral; tepals dark maroon, matte, lateral tepals 3-sided to shield-shaped and 4-sided, 1–1.3 mm wide, the inner margins broadly rounded; pistils green, soon weakly exerted; stamens held at about the level of the tepals; anthers linear, drying 1–1.4 mm long, 0.3 mm wide, the thecae not at all divaricate. Inflorescence pendent to 48 cm long, 5–10 cm diam., tepals lavender to pink-magenta, to 1.5 cm long, each with an obtuse apical projection; berries oblong, white with tiny magenta tip, pale, translucent orange-white in basal part, to 1.3 cm long, 3–4 mm diam., weakly tapered toward both ends; pericarp thick, whitish, mesocarp white, mealy, seeds 2–3 per berry, greenish, oblong, ca. 4 mm long, 2.5 mm diam.

Anthurium cupulispathum is apparently endemic to the western slopes of the Andes in Ecuador from 600 to 3,300 m, but a collection from the Central Cordillera in Central Colombia, (between Tulua and Lucia) Croat 70674, is remarkably similar if not identical to *A. cupulispathum*. Another collection, Croat 69945, from the eastern slopes of the Western Cordillera, is likewise possibly this species. More studies need to be made in the intervening areas to determine the true extent of the range of the species.

The species is rare at the reserve, having been found only once along the Río Cabuyales near the trail to the primary forest. It is more common at higher elevations especially above 1,000 m. In Ecuador the species ranges from Carchí to Loja and it is certainly to be expected in adjacent Peru and Colombia.

Anthurium cupulispathum is a typical member of sect. *Belolonchium* Schott emend. Engl. and is recognized by its very large size, thick, short internodes, persistent cataphyll fibers, terete, obtusely sulcate petioles, large blades with conspicuous incurved posterior lobes and with a conspicuously naked posterior rib, as well as a short-pedunculate inflorescence with a large, boat-shaped reddish spathe and thick maroon spadix.

Specimens from higher elevations have more pronounced tertiary venation on the lower surface but do not appear to have other major differences.

Anthurium cupulispathum is related to *A. giganteum* Engl. Both share larger ovate-cordate blades with incurved posterior lobes, a long, curved posterior rib and reddish spadices. The latter differs in having the more coriaceous, less conspicuously veiny blades, primary lateral veins which often merge with the margin of the blade and a longer, more slender spadix.

Because of its size it should not be confused with any other species at the reserve except *A. jimense*. That species has a prominent constriction above the base of the blade, ribbed petioles, and a pale green to white spathe.

The species is similar to *A. gualeanum* Sodiro which differs in having the spathe

circular in cross-section at anthesis and almost closed except for a narrow opening at the front. That species also usually occurs above 2,000 meters elevation.

It is also perhaps closely related to another apparently new species from Volcán Pichincha collected by Asplund (17464). That species has a blade of similar size and shape and a stubby red spadix similar in shape and size to *A. cupilaspalum*. It differs in having the lower blade surface drying more reddish brown with prominulous reticulate veins and with obscure dark nonglandular dots. It also has the collective vein arising from one of the lower basal veins and coursing regularly along the margin and in having a white spathe.

Anthurium cupulispathum is similar to another new species from southern Colombia and northern Ecuador (Nariño and Carchí respectively). This species, represented by Croat 69565, collected at La Planada in Nariño (among others), differs in having a constricted anterior lobe, a slender green spathe and a yellowish-white spadix with emergent stamens (held at about the level of the tepals in *A. cupulispalum*).

Also similar are Besse *et al.* 2264 and 2296 as well as Madison 3989 and 4001 collected near Maldonado in Carchí Province at 1,800–2,300 m. They are similar to *A. cupulispalum* in having large cordate blades and reddish spadices. These collections differ in having the collective veins arising from one of the lowermost basal veins, a multi-ridged petiole, a whitish (not reddish) more or less oblong (not naviculi-form) spathe and longer, proportionately more slender, deep rosy pink spadix. Madison 4001 is a huge plant with blades said to be 2 m long (actual herbarium specimen was seen to measure only 135 cm × 80 cm).

Larsen *et al.* 45601 from 3,300 m on the SW slopes of Volcán Cotacachi in Imbabura Province is somewhat doubtful since the collection has no notes.

ENDESA collections: Croat & Rodríguez 61456 (B, K, MO, QCA, US). Other collections: AZUAY: 1–8 km N of Sevilla de Oro, 8–9,000 ft., Camp 4473 (NY). CARCHI: Maldonado-Tulcán, 2,300 m, Besse *et al.* 2295 (MO, SEL). COTOPAXI: 1 km N of Pucayacu, 0°41'30"N, 79°06'30"W, Croat

57059 (MO). EL ORO: 11 km W of Piñas on road to Sta. Rosa, 850 m, *Dodson et al.* 9006 (MO, SEL), 11 km W of Piñas on old road to Arenillas, 3,100 ft., *Thompson* 159 (MO). IMBABURA: Volcán Cotacachi, Cotacachi-Selva Alegre, 3,300–3,350 m, 0°21'N, 78°26'W, *Larsen et al.* 45601 (AAU). LOJA: Parque Nacional Podocarpus, Loja-Zamora, E of Cerro Yanococha, 2,550–2,650 m, 3°59'S, 79°07'W, *Madsen* 75530 (AAU); E of Nudo de Cajanuma, 2,900 m, 4°05'S, 79°10'W, *Madsen* 75929 (AAU). MANABI: Machalilla National Park, 1°36'N, 80°42'W, *Gentry* 7256 (MO); slopes of Montecristi, 600 m, *Besse et al.* 124 (SEL). PICHINCHA: Quito-Nono, Hacienda Yanococha, 3,700 m, *Ulloa* 348 (QCA); Tandayapa-Mindo, 10 km N. of Tandayapa, 2,530 m, *Croat* 49359 (MO); Quito-La Concordia, via Puerto Quito, km 54, 1,350 m, *Dodson et al.* 15219 (MO); Nanegal-Nuevo Azuay, near frontier with Imbabura Province, 5.1 km N of Pacto, 13.8 km n. of Gualea, 1,070 m, 0°10'N, 78°45'W, *Croat* 61620 (CM, CUVC, HUA, MO, PMA, QCA, RSA, SCZ, TEX); Quito-Santa Domingo de los Colorados via Chiriboga, San Juan-La Palma, 19 km SW of Chiriboga, 1,980 m, *Croat* 38782 (MO); 1,000–2,000 m, 0°10'S, 78–79°W, *Hammel & Trainer* 15818 (MO); 1 km E of Río Pilatón, 960 m, 0°18'S, 78°55'30"W, *Grayum & Zamora* 9433 (MO); Tinalandia, 9.6 km E. of Santo Domingo de los Colorados, 700 m, 0°16'S, 79°07'W, *Croat* 55739 (MO); Hacienda Covadonga on Río Pilatón, ca. 1000 m, *Asplund* 16736 (S).

Anthurium dolichostachyum Sodiro, Anal. Univ. Quito 15 (108):12. 1901. Type: Ecuador. Cotopaxi: Angamarca, *Sodiro* s.n. (Nov. 1900); (holotype, B; isotype G). Figures 22–26.

Terrestrial or appressed-climber; stem stout, to 120 cm long; internodes 2.5–8 cm long, 1.5–5 cm diam., (sometimes much longer than broad even on adult plants but mostly about as broad as long), medium green, semiglossy, turning light brown; cataphylls promptly weathering to coarse, pale fibers, often with only the bases persisting; petioles 65–100 cm long, subterete, narrowly obscurely sulcate, sometimes deeply

sulcate, sheathed 15–25 cm; geniculum 2.5–3.5 cm long, drying darker than the remainder; blades broadly to narrowly ovate, 58–109 cm long, 40–79 cm wide, 1.3 times longer than wide, acuminate at apex, deeply cordate at base, moderately coriaceous, stiff, dark green and velvety matte above, slightly paler and matte to semiglossy below, usually drying somewhat green to yellowish brown on both surfaces, sinus hippocrepiform to spatulate 12–23 cm deep; anterior lobe 34–67 cm long; midrib concolorous and prominently raised to acute above, convex slightly paler, and yellowish below; primary lateral veins 22–28 per side, arising at 45–50 degree angle, narrowly raised and slightly paler above, convex, yellowish and paler below; basal veins 7–9 per side, first 3 free to base, 6th and higher order coalesced to ca. 4 cm; collective veins arising from the 5th basal vein, to 3.5 cm from the margin; secondary basal vein 4 mm from the margin; tertiary veins clearly visible. Inflorescence spreading; peduncle 30–55 cm long, 4–6 mm diam., terete, ca. ½ as long as the petioles; spathe lanceolate, 25–35 cm long, 2–3 cm wide, moderately coriaceous and brittle, pale green, erect-spreading, inserted at an angle of 20 degrees, acuminate at apex, the margins meeting at an obuse angle at the base, not withering or falling easily at anthesis but often falling free before fruiting; spadix creamy white to pale yellow or greenish, becoming dark green 26–45 cm long, 1–3 mm at apex, 5–7 mm diam. at base, stipitate 3–5 mm; flowers narrowly rhombic, 10–12 visible per spiral, 1.8–2.4 mm long and wide; lateral tepals 1.2–1.4 mm wide, the inner margins straight; stamens 1–2 mm long, held at surface of tepals; anthers cream to yellow. Infructescence 24–60 cm long, 2.5–3 cm diam.; berries early emergent, subclaviform, to 5 mm diam., dark red or purple at the apex and white at the base; pericarp with raphide cell; seeds discoidal, two olive-green.

Anthurium dolichostachyum ranges from southern Colombia (Nariño to at least central Ecuador on the western slopes of the Andes at 100 to 200 m elevation. In Ecuador it is known from most provinces including Carchí, Esmeraldas, Imbabura, Pichincha,

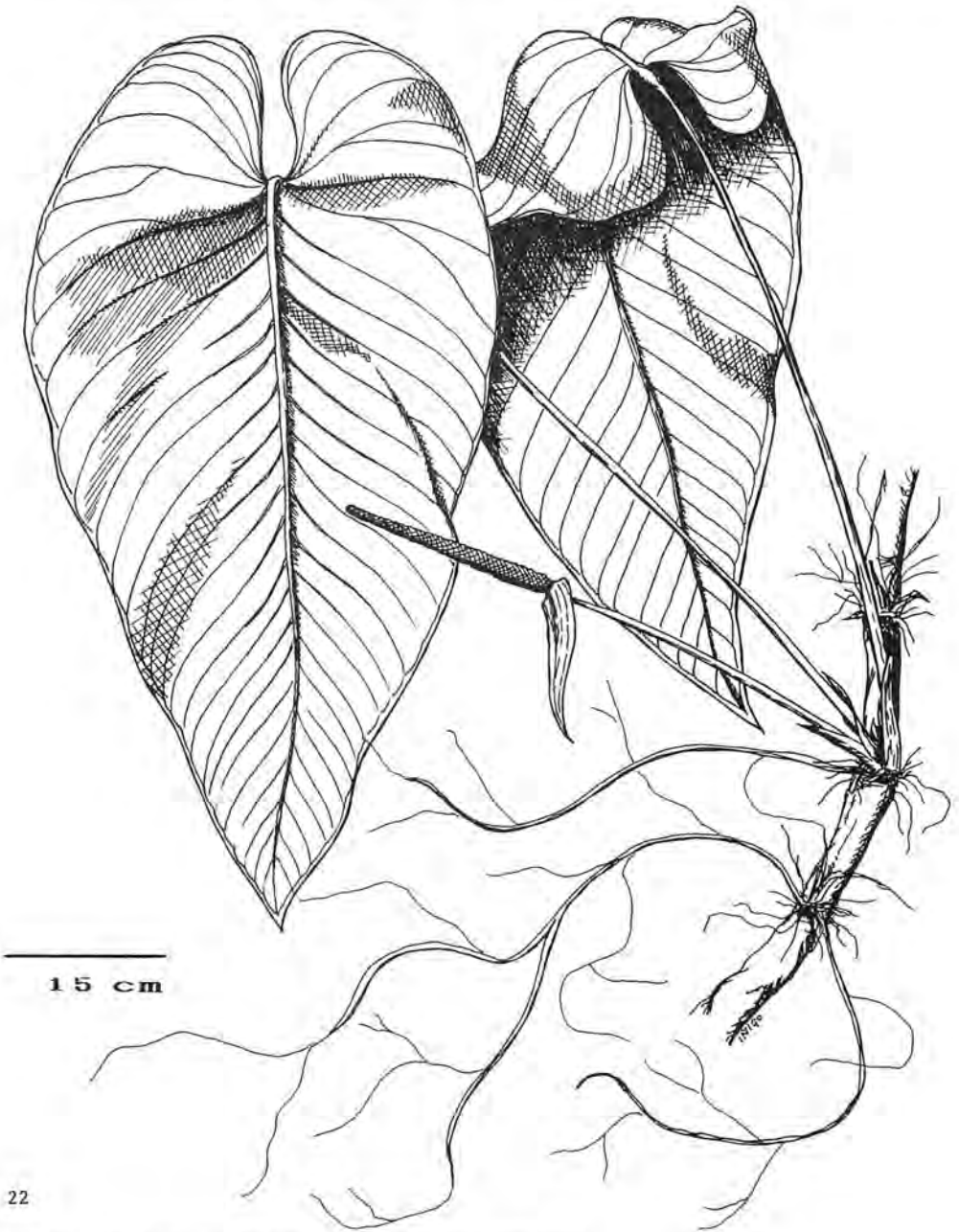


Fig. 22. *Anthurium dolichostachyum* Sodiro. ENDESA.

Chimborazo, Cotopaxi, Guayas, and El Oro. Most collections have been made from Pichincha where the species is very common. While the species typically dries with greenish blades, some collections made on

the slopes of Volcán Pichincha at elevations above 900 m dry with blades conspicuously brown. Most of these brown-drying collections (Croat 38747, 38773, 56976, 72949) were made along or near



Figs. 23–26. *Anthurium dolichostachyum* Sodiro. Figs. 23–24. *Croat* 72887. Fig. 23. Leaf in habit. Fig. 24. Stem with cataphyll fibers, petioles, and erect inflorescence. Fig. 25. *Croat* 73173. Inflorescence (post-anthesis). Fig. 26. *Croat* 72989. Stems with petiole bases and a pendent inflorescence showing emergent berries.

the Chiriboga Road between 890 to 2,000 m, but such material was also collected at Tandayapa (Croat 49348) at 1,875 m, at Maquipucuna at 1,550 m (Gentry & Valencia 73217), and at the Reserva Geobotánica Pululahua at 1,600 m (Cerrón *et al.* 4749).

The species is recognized by its semi-persistent cataphyll fibers, long-petiolate, large ovate-cordate, somewhat velvety leaf blades with narrowly raised upper veins, the long-tapered pale green to whitish spadix, the early deciduous pale green spathe, and the red berries.

The species is most closely related and perhaps inseparable from *A. baezanum* Sodiro, a species with similar though smaller blades, thin cataphylls which are deciduous intact and a smaller inflorescence which has the slender greenish spathe deciduous usually even before the end of anthesis. *Anthurium baezanum* also occurs in much dryer areas along the Pacific coast at 50–920 m from Esmeraldas, Manabí, Guayas, and El Oro Provinces of Ecuador as well as in the Peruvian Department of Tumbes (Zarumilla Province).

The species has been confused with *A. dolichophyllum* Sodiro but that species has proportionately smaller blades which are semiglossy, proportionately longer petioles and purplish spadices.

ENDESA collections: Croat 73173 (B, MO, NY, QCA), Croat & Rodríguez 61446 (AAU, B, F, K, M, MO, NY, QCA, QCNE), 61529 (G, M, MO, QCA); Jaramillo 6699 (MO, QCA), 6719 (MO, QCA); Laegaard 52242 (QCA); Rodríguez 197 (MO, QCA), 260, 321, 323, 335 (MO, QCA), 390 (K), 391, 407 (QCA). Other representative collections: Ecuador: CANAR: Azoques-El Triunfo, 1 km S of La Delicia, 2°27'S, 79°10'W, Croat 50870 (MO); Azogues, Guayaquil-Machala, 1 km S of Ponce Enríquez, 70 m, Dodson *et al.* 9179 (MO); Azogues-El Triunfo, ca. 5 km W of La Delicia, ca. 8 km SE of El Truncal, 600 m, 2°27'S 79°15'W, Croat 50901 (MO). CARCHI: El Pailón, ca. 45 km below Maldonado, trail to Tobar Donoso, 800 m, Madison & Besse 7175 (QCA, SEL); Valle de Maldonado, Tulcán-Maldonado Rd., km 67, 2,400 m, 78°04'W, 0°53'N, Holm-Nielsen *et*

al. 6138 (AAU). CHIMBORAZO: Alausí-El Triunfo, 6.9 km W of Huigra, 1,350 m, 2°19'S, 79°W, Croat 61563 (MO); 33.8 km W of Huigra, 15 km E of border of Guayas Province; 45.2 km E of El Triunfo, 1,110 m, 2°17'S 79°06'W, Croat 61588 (MO); Macuchi, Quevedo-Latacunga, 3 km E on road, 1,800 m, Dodson & Gentry 10169 (MO, SEL). COTOPAXI: La Mana, Guayacán-Montenuevo, 23.8 km N of Guayacán, 3.5 km N of Pucayacu, 800 m, 0°41'S, 79°06'W, Croat 73253 (MO); Quevedo-Latacunga, 44.7 km E of Quevedo, 12.4 km E of La Mana, 400 m, 0°51'S, 79°12'W, Croat 55860 (MO); 55.5 km from Quevedo, 23.5 km E of La Mana, 930–950 m, 0°53'S, 79°04'W, Croat 57053 (MO); 1 km N of Pacayacu, 14 km N of Río Guasaganda, 22 km N of Palmar, 670 m, 0°41'30"S, 79°06'30"W, Croat 57075 (MO); Quevedo-El Corazón, 6.4 km NW of El Corazón, 67.5 km SE of Quevedo, 980 m, 1°07'S, 79°07'W, Croat 55852 (MO); 63.4 km SE of Quevedo, 6 km NW of El Corazón, 1,030 m, 1°07'S, 79°07'W, Croat 55783 (MO); Quevedo-El Corazón, vic. Las Juntas, 200 m, Harling & Andersson 19026 (GB, MO); El Corazón-Facundo Velo, 1–3 km S of El Corazón, 1,300–1,400 m, Harling & Andersson 19217 (GB, MO); Río Guapara, ca. 20 km NW El Corazón, 250 m, Sparre 17202 (S), 17288 (S); without locality, Sodiro *s.n.* (AAU); Guayacán (13.1 km N of La Mana)-Montenegro (N of Pucayacu), 23.6 km from Guayacán, vic. Escuela Quindigua, 0°39'S, 79°05'W, Croat 73479 (MO, QCNE); Río Pilalo, Tenefuerste, km 52–53, 750–1,300 m, Dodson & Gentry 12304 (MO). EL ORO: Saracay Balzas-Velacruz, ca. 8 km SE of Aracay, 400 m, Harling & Andersson 18776 (GB, MO); Santa Rosa, km 13 W of Piñas 950 m, Dodson *et al.* 9164 (MO); Arenillas-Piñas, 1,650 m, 3°40'S, 79°45–55'W, 1,650 ft., 3°40'S 79°45–55'W, Thompson 368 (MO); Sambotambo, at crossroads ca. 5 km below Piñas, 3°39'S, 79°43'W, 1,450 m, Madsen 86943 (AAU). ESMERALDAS: Santo Domingo de los Colorados-Esmeraldas, 134 km NW of Santo Domingo, 62 km N of Quindiné, 80 km SE of Atacames, 270 m, 0°35'N, 79°33'W, Croat 55581 (MO); Río Lita, vic. Lita, Croat 38930 (MO); Santo Domingo de los Colorados-Esmeraldas, 90 km

NW of Santo Domingo, 8.8 km NW of Quinindé, 85 km SE of Esmeraldas; elev. 270 m, 0°26'N, 79°3'W, 270 m, 0°26'N, 79°3'W, 55569 (MO); Muisne, Esmeraldas-El Sucio, 7.2 km S of main Atacames to Muisne Road, 43.2 km S of Sua, 160 m, 0°37'N, 79°54'W, *Croat 73073* (MO); San Miguel, Limones, Sector Río Grande, Comunidad Corriente Grande, 350 m, 0°45'N, 78°47'W, *Tipaz et al. 2286*, (MO, QCNE); Pueblo San Miguel, 200 m, 0°45'N, 78°54'W, *Holm-Nielsen et al. 25396* (AAU, MO); 0°45'N, 78°54'W, *Holm-Nielsen et al. 25382* (AAU); Esmeraldas-Muisne Rd., 50 km SW of Atacames, 150 m, 0°38'N, 79°58'W, *Balslev & Steere 3100* (AAU, NY); Río San Miguel, Pueblo Cayapas, 200 m, 0°45'N, 78°54'W, *Holm-Nielsen et al. 25366* (AAU); Chontaduro-Río Verde Rd, km 3–10, 200 m, 1°N, 79°29'W, *Balslev & Steere 3134* (NY); Río Cayapas, Playa Grande, ca. 2 km SE of San Francisco de Cayapas, *Sparre 18040* (S); Río Esmeraldas, opposite Quinindé (Rosa Zárate), *Asplund 16344* (S); Hacienda Guayas, ca. 20 km S of Esmeraldas, *Sparre 15495* (S); Hacienda Timbre, ca. 25 km S of Esmeraldas, *Sparre 15292* (S); Río Sapayo, 1 km upstream, 120 m, 0°50'N, 78°56'W, *Holm-Nielsen et al. 25609* (AAU). GUAYAS: Río Bamba-Bucay, ca. 0.5 km E of junction in road to El Triunfo near town of Bucay, 510 m, 2°15'S, 79°05'W, *Croat 50911* (MO); near frontier of Los Ríos, Bolívar, & Chimborazo Provinces, 0.9 km E of junction to El Triunfo at edge of Bucay, above Río Chimbo, 315 m, 2°12'S, 79°05'W, *Croat 61596* (MO); 2–4 km W of Bucay, ca. 170 m, *Gentry 12311* (MO); Cañar-Chimborazo-Bolívar border area, vic. Bucay 1,000–1,250 ft., *Camp E-3707* (MO, NY); Río Daule below Pichincha, Hacienda Santa Barbara, *Harling 4820* (S); 3 km W of Bucay, 270 m, *Hitchcock s.n.* (NY, US). IMBABURA: Cotacachi: Parroquia Apuela; Sector Cuellage, 1,600 m, 0°15'N, 78°25'W, *Tipaz & Aulestia 1652*, (MO, QCNE); Río Mira valley, Ibarra-Lita, 2 km E of Lita, 665 m, *Croat 38956* (MO). LOS RIOS: Río Palenque Science Center, Quevedo-Santo Domingo, km 56, 150–200 m, 0°32'S, 79°20'W, *Croat 38659* (MO), *50660* (MO), *Gentry 9565* (MO), *Gentry & Dodson 41296* (MO), *54866* (MO); *Dodson et al. 4300* (SEL, US);

Dodson 5594 (US); 9 km E of Patricia Pilar, 1 km E of Escuela Centinela, 58 km ENE of Quevedo, 300–400 m, 0°36'S 79°18'W, *Iltis E-88* (WISC); Río Pita, Babohoyo-Montalvo, Hacienda Clementina, *Asplund 5318* (S); 20 m, *Sparre 14487* (S), *14498* (S); Hacienda Clementina, Samana, 600 m, *Harling 556* (S); Centinela, 29.5 km W of Patricia Pilar (S of Santo Domingo de los Colorados), 450–475 m, 0°33'S 79°22'W, *Croat 50677* (MO). MANABI: Río la Morena, Chone-Santo Domingo Rd., ca. 15 km NNE of Flavio Alfaro, 100 m, *Harling & Andersson 18918* (GB), *Harling 9432* (GB), *9433* (GB), *9434* (GB, MO). MORONA-SANTIAGO: 250 m, *Brandbyge & Asanza 32304* (AAU). NAPO: near Baeza, 1,900 m, *Dwyer & McBryde 9575* (QCA). PASTAZA: Puyo-Veracruz, km 5–6, 900 m, *Sparre 17599* (S). PICHINCHA: road from La Independencia to Río Caoni, E of Esmeraldas-La Concordia Road (Santo Domingo de los Colorados), 9.4 km E of jct. of main road, (N of La Concordia), 210 m, 0°9'N, 79°21'W, 210 m, *Croat 55645* (MO); Santo Domingo de Los Colorados-Esmeraldas, km 32, 285 m, *Ellenberg 285* (MO), *3069* (MO); along old road to Quito from Alluriquín via Chiriboga, 2–3 km from main Alóag-Santo Domingo de los Colorados road, 0°18'13"S, 78°54'30"W, 890–1,010 m, *Croat 56976* (MO); Río Blanco, vic. Valle Hermoso, 1.9 km N of Santo Domingo-Esmeraldas Highway, 25 km NW of Santo Domingo, 410 m, 0°05'S, 79°15'W, *Croat 50683* (MO), *72989* (M, MO, NY); Río Blanco, below confluence with Río Toachi, 300 m, *Harling 4510* (S); Santa Domingo de los Colorados-Aloag, along Río Toachi, 600 m, 0°16'S, 79°07'W, *Croat 55670* (MO); Maquipucuna, 5 km E of Nanegal, 1,550 m, 0°7'N, 78°37'W, *Gentry & Valencia 73217* (MO); Maquipucuna, Río Pichán, 7.5 km airline SE of Nanegalito, 2,030 m, 0°02'30"N, 78°37'W, *Webster et al. 30207* (DAV); Parroquia Nanegal, Cerro Sosa, ca. 5 km airline SE of Nanegal, 1,700–1,800 m, 0°07'N, 78°38'W, *Webster & Castro 28203* (DAV); Chiriboga (old road to Santo Domingo and Quito) and Quito, 6.2 km N of Chiriboga, 2,000 m, 0°10'S, 78°47'W, *Croat 72178* (MO); 0.1 km from main Alóag-Santa Domingo Road, 1,200 m, *Croat 72956*

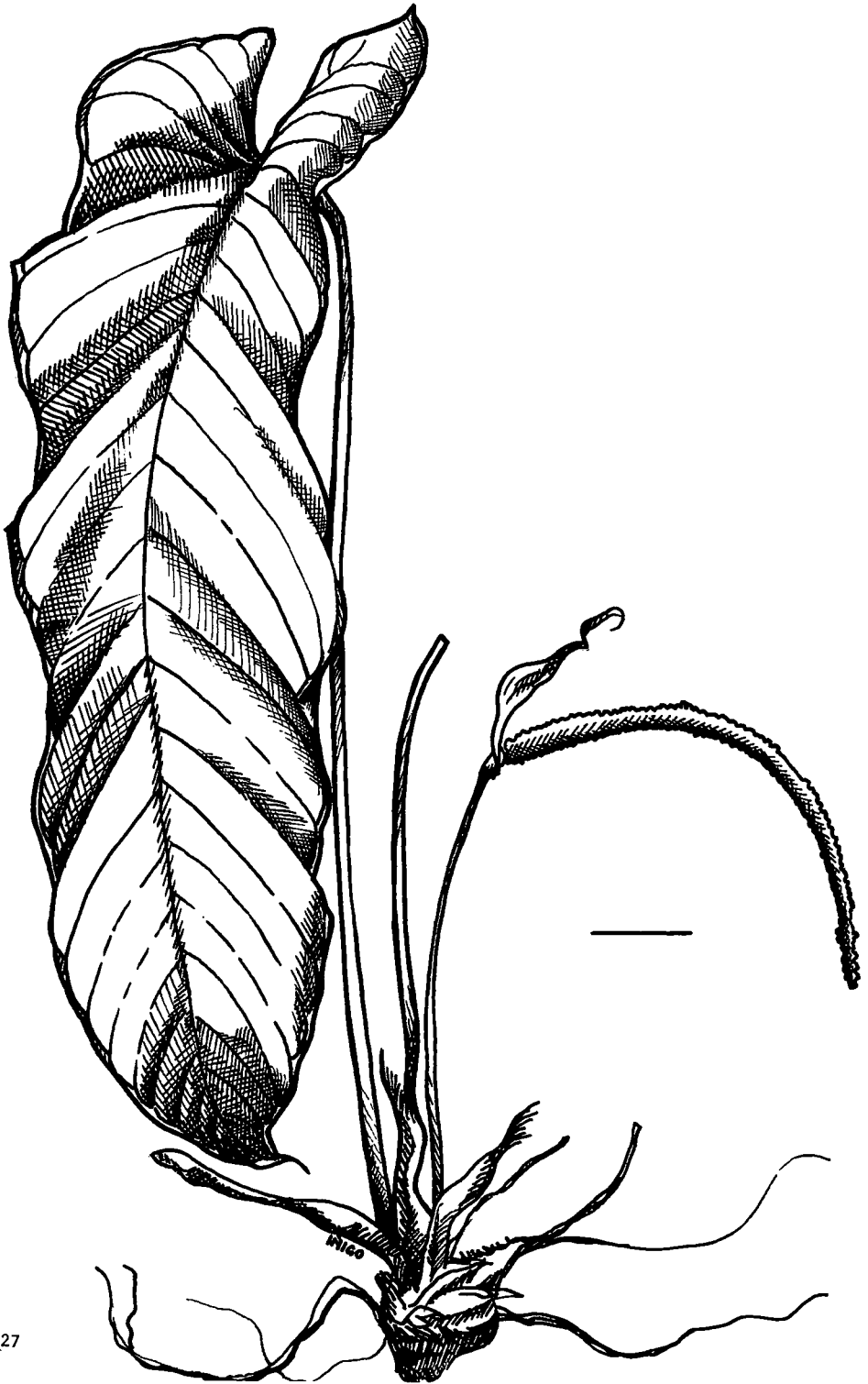
(MO); San Juan-La Palma via Chiriboga, 2 km NE of La Palma, 930 m, *Croat 38749* (MO); 27 km S of San Juan, 12 km NE of Chiriboga, 2,000 m, 0°17'S, 78°42'W, *Croat 50604* (MO); 19 km NE of San Juan, 15 km NE of Chiriboga, 1,710 m, 0°17'S, 78°43'W, *Croat 50613* (MO); Quito-Chiriboga-Em-palme, Km 92, desvío a Mulaulte, Quebrada Mulaulte, 1,200–1,300 m, 0°15'S, 78°50'W, *Zak & Jaramillo 3167* (MO); Parroquia Calacalí: Reserva Geobotánica del Pululahua, Sta. Rita. La Escuela, 1,600 m, 0°05'N, 78°30'W, *Cerón et al.*, 4749 (MO); Mejían Cantón, Alóag-Santo Domingo, 54.2 km W of main junction of Santo Domingo Road near Alóag, 1,300 m, *Croat 72949* (MO, US); 46 km W of main Quito-Latacunga road, 34 km E of Alluriquín, 1,490 m, 0°25'45"S, 78°46'30"W, *Croat 56960* (MO); Alóag-Santo Domingo, vic. San Ignacio, km 23, 2,000 m, *Sparre 14668* (S); El Paraíso-Saguangal Rd., 11 km from El Paraíso, 1,250 m, 0°12'N, 78°46'W, *Holm-Nielsen et al.* 37601 (AAU); Alóag-Santo Domingo Rd., vic. Alluriquín, at confluence between Río Alluriquín and Río Toachi, 600 m, *Sparre 16748* (S); Alóag-Santo Domingo Rd., vic. Tandapí (M. Cornejo Astorga) at confluence of Río Tandapí with Río Pilatón, 1,500 m, *Sparre 13902* (S), 14053 (S); Quito-Aloag-Sto. Domingo de los Colorados, Km 94, sector "La Esperie", 1,500–1,800 m, 0°20'S, 78°50'W, *Zak & Jaramillo 3098* (MO); Quito-Santo Domingo de los Colorados, San Juan-La Palma via Chiriboga, 2 km NE of La Palma, 930 m, *Croat 38744* (MO), 38747 (MO); 9 km NE of La Palma (36 km SW of Chiriboga), 1,270 m, *Croat 38773* (MO); Chiriboga-Santo Domingo de los Colorados, near Los Dos Ríos, 1,100 m, *Asplund 16767* (S); Quito-Santo Domingo de los Colorados, vic. El Cuello, 2,000 m, *Asplund 10101* (S); Alóag-Santo Domingo, vic. San Ignacio, Km 23, 2,000 m, *Sparre 14598*, 11681 (S); Non-Nanegal, 6 km from Tandayapa, 2,050 m, 0°03'N, 78°59'W, *Croat 50237A* (CM, MO); Tandayapa-Mindo, 0.3 km above Tandayapa, 1,725 m, 0°01'N, 78°21'W, *Croat 72896* (MO); 1.5 km above Tandayapa, 1,960 m, *Croat 50240* (MO); Calacalí-Nanegalito, 24.6 km W of mitad del Mundo, 16.8 km W of Calacalí, 2,175 m, 0°01'N, 78°21'W, *Croat*

72896 (MO); 1.5 km above Tandayapa, 1,960 m, *Croat 50240* (MO); Calacalí-Nanegalito, 24.6 km W of mitad del Mundo, 16.8 km W of Calacalí, 2,175 m, 0°01'N, 78°34'W, *Croat 72887* (MO); Pacto-Nuevo Azuay road, 2.3 km N of Paraiso, 1,320 m, 0°11'N, 78°04'W, *Croat 61631* (MO). ZAMORA-CHINCHIPE: Loja-Zamora, 26 km E of Loja, 2,025 m, 4°05'S, 79°04'W, *Croat 50756* (MO).

Antburtum hebetatilaminum Croat & J. Rodríguez, sp. nov. Type: Ecuador. Pichincha: ENDESA reserve, Quito-Puerto Quito, km 113, 10 km N, 0°05'N, 79°02'W, *Rodríguez 270* (holotype, MO-3160586; isotype, SCZ). Figure 27.

Planta epiphytica, rarius terrestis; internodia 1–4 cm longa, ca. 2–2.5 cm diam.; cataphylla 15–20 cm longa, persistentia intacta versus apicem, ut fibrae inferne; petiolus 40–63 cm longus, 3–5 mm diam., sulcatus aut acute C-formatis; lamina anguste ovata, 45–60 cm longa, 16–21 cm lata, hebetatus adaxiliter; nervis primariis lateralibus 19–23 utroque; nervis basalibus 2–4 utroque, plerumque liberis ad basin aut cum 2 coalitis ca. 1.5 cm; pedunculus 30–45 cm longus; spatha lanceolata, viridis, 13–20 cm longus, 1.4–1.7 cm lata; spadix 14–20 cm longus, purpureus; bacculus purpureus.

Appressed epiphyte or rarely terrestrial; stems to 50 cm long, internodes short, 1–4 cm long, 2–2.5 cm diam.; cataphylls 15–20 cm long, persisting intact toward apex, decomposing into fibers and persisting below; petioles 40–63 cm long, 3–5 mm diam., sulcate to sharply c-shaped, sometimes 5-ribbed, sheathed 5–6.5 cm; geniculum 1.6–2.7 cm long, drying darker; blades narrowly ovate, 45–60 cm long, 16–21 cm wide, broadest at the point of petiole insertion, subcoriaceous, gradually to abruptly acuminate at apex, truncate to subcordate at base, dark green and semiglossy above, paler and matte below; midrib convex above, round-raised below, sometimes purplish and weakly striate; primary lateral veins 19–23 pairs, narrowly sunken above, convex below, arising at 43–47 degree angle, ter-



tiary; veins prominent below, weakly raised; basal veins 2–4 pairs, free or with 2 coalesced ca. 1.5 cm; collective veins arising from one of the lowermost primary lateral veins or the uppermost basal veins, 3–5 mm from the margin. Inflorescence erect; peduncle 30–45 cm long, sometimes sulcate and 5-ribbed, $\frac{1}{3}$ – $\frac{2}{3}$ as long as petioles; spathe lanceolate, green, sometimes with purplish veins, 13–20 cm long, 1.4–1.7 cm wide, erect-spreading, inserted at an angle of 45 degrees, margins meeting acutely at base; spadix 14–20 cm long, sessile, narrowly long-tapered, dark violet-purple; flowers quadrangular to rhombic, 2.9–3.2 mm diam., 7–9 per spiral; tepals 2.8–3 mm perpendicular to the axis; lateral tepals with the inner margins convex; stamens to 1.7 mm long; anthers yellowish red. Infructescence purplish, to 25 cm long, 1.5 cm diam., erect, berries 3.5–4.5 mm long, globose to obovoid, purple, sometimes longitudinally streaked with yellow-green; pericarp thin; mesocarp mucilaginous, translucent; seeds 2–3 mm long, 1 mm wide, olive-green, 1 per locule.

Anthurium hebetatilaminum is known only from the western slopes of the Andes in Ecuador at 800 to 1,000 m elevation. All currently confirmed collections are from Pichincha Province.

The species is recognized by its appressed epiphytic habit, short internodes with only the pale bases of cataphyll fibers persisting, by its sharply sulcate, C-shaped petioles, blades 2.2–3.1 times longer than wide and matte on the lower surface, the long-pedunculate inflorescence as well as by the usually dark violet-purple spadix and violet-purple berries.

At ENDESA *A. hebetatilaminum* is most similar to *A. balslevii*. That species differs in having blades semiglossy beneath and typically acute to weakly subcordate at the base and especially by having a greenish to yellowish spadix.

Elsewhere the species is most easily confused with *A. cuspidatum* and *A. oreophil-*

um, both of which have blades of similar shape but which differ in having blades glossy on the lower surface.

Tipaz et al. 1534, collected in the Awá reserve near Tobar Donoso in Esmeraldas Province, is perhaps also this species. It has the same matte lower blade surface with whitish speckles. It differs in having the collective veins 6–10 mm distant from the margin, versus 2–3 mm distant in *A. hebetatilaminum* from ENDESA.

Another species with which this one can be confused is represented by *Madison 4014* and *4040* from the Río Toachi at 900 m, an apparently undescribed species which also has the lower blade surface matte. That species differs in having the lower blade surface noticeably paler and in having a reddish brown spadix.

ENDESA collections: *Rodríguez 270* (MO, QCA), *395* (QCA). Other collections seen: PICHINCHA: Quito-Allurquín Hwy., near Allurquín, 800–1,000 m, *Madison 4039* (cultivated as *Selby 77-2095*).

Anthurium incomptum Madison, Selbyana 2:286. 1978. Type: Ecuador. Los Ríos: Río Palenque Science Center, Quevedo-Santo Domingo, km 56, 150–220 m, *Madison 2114* (holotype, SEL; clonotypes MO, QCA, US). Figures 28–29.

Epiphyte; stems to 50 cm or more long; internodes 2–10 cm long, 8–15 mm, mostly less than 1 cm diam.; cataphylls 10–29 cm long, persisting brown and eventually deciduous; petioles 15–27 cm long, 3–5 mm diam., subterete, obscurely flattened adaxially, sheathed 2–10 cm; geniculum 2–5 cm, drying darker than the remainder; blades ovate-elliptic to narrowly elliptic, 25–59 cm long, 5–18.5 cm wide midway, acute to narrowly acuminate at apex, acute to weakly attenuate at base, subcoriaceous, dark green and semiglossy, drying dark brown above, semiglossy to matte and pale green, drying yellowish brown below; midrib convex on both surfaces, concolorous, drying reddish brown below; primary lateral veins 9–12

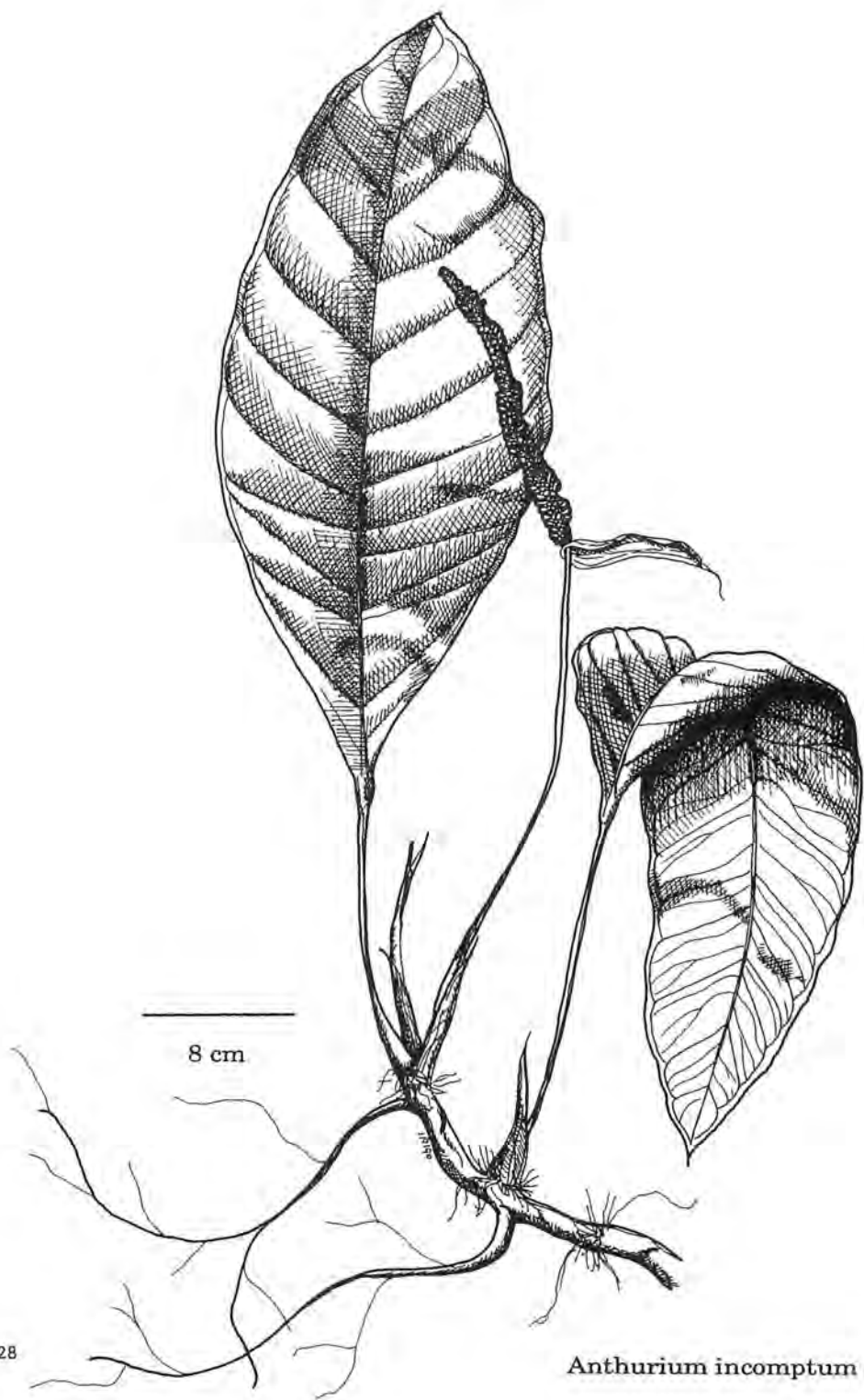


Fig. 28. *Anthurium incomptum* Madison. ENDESA.

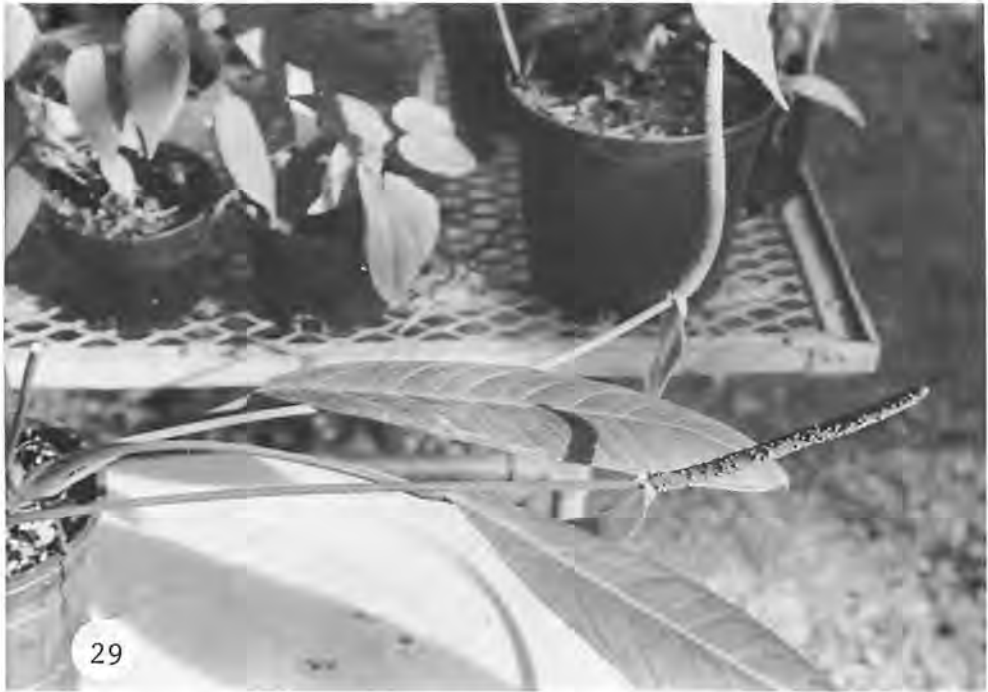


Fig. 29. *Anthurium incomptum* Madison. Habit. Cultivated at Selby Gardens. (Selby 77-2022).

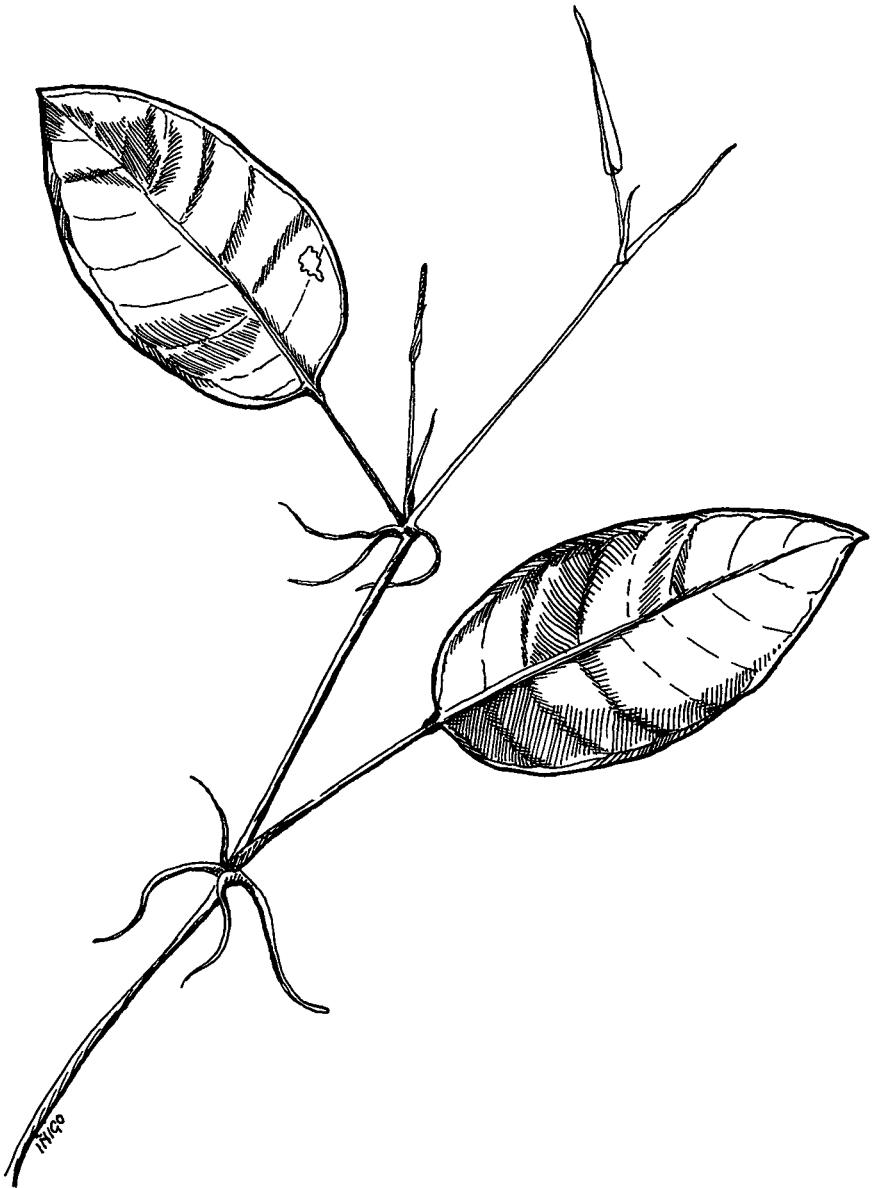
pairs, sunken above, drying concolorous, weakly raised, convex below, drying reddish brown, arising at an acute angle then spreading to a 50 degree angle, equal in shape to the midrib; collective veins arising from the 2nd–4th primary lateral vein, 4–10 mm from the margin; tertiary veins in part sunken above, weakly raised below; inflorescence spreading; peduncle 16–42 cm long, 4 mm diam., up to 1.5 times longer than the petiole; spathe 6–16 cm long, 1.2–2.2 cm wide, linear-lanceolate, medium green usually with purplish violet lines, inserted at an angle of 40 degrees, erect-spreading, finally recurved, acuminate at apex, the margins meeting at an obtuse angle at the base; spadix dark violet-purple, sessile, 6–19 cm long, 4–5 mm diam. at base, 2–3 mm diam. toward apex; flowers 7–9 per spiral, rhombic, 2 by 2.8 mm diam.; tepals matte, 2.5–3 mm long, 1.5 × 2.5 mm wide, lateral tepals slightly raised; stamens 1–1.15 mm long; infructescence to 30 cm long, pendent, berries orange to red, globose, slightly pointed, early-emergent, to 6 mm

long, pericarp thick with raphide cells at the base, mesocarp white and pasty; seeds 3.2–3.8 mm long, 2 mm thick, greenish yellow, 1 per locule.

The species is endemic to western Ecuador at 200 to 800 m, ranging from Esmeraldas to Cotopaxi Provinces. It is certainly to be expected in adjacent Nariño Department of Colombia.

It is apparently closely related to *A. caulorrhizum* Sodiro, but that species has a much shorter stubbier spadix and is a terrestrial plant with short internodes.

ENDESA collections: *Croat & Rodríguez* 61496 (MO), 61501 (CM, G, K, MO, QCA, US); *Jaramillo* 6773, 6990, 7582 (QCA); *Rodríguez* 213, 228 (CR, QCA), 245 (CR, QCA), 355, 374 (QCA), 379 (MO, QCA). Other collections: COTOPAXI: La Maná Cantón: Guayacán-Montinuevo (N of Pucayacu), 1,480–1,530 m, 0°39'S, 79°05'W, *Croat* 73741 (MO, QCNE); 1 km N of Pucayacu, 22 km N of Palmir on Quevedo-Latacunga Hwy, 670 m, 0°41'30"S, 79°06'30"W, *Croat* 57077 (MO); Quevedo-



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Fig. 30. *Anthurium interruptum* Sodiro. ENDESA.

El Corazón, 1.9 km NW of El Corazón, 1225 m, 1°07'S, 79°06'W, *Croat 55816* (MO, QCNE). EL ORO: 10 km W of Piñas, 900 m, *Dodson & Gentry 8979* (MO). ESMERALDAS: Quinindé Cantón: NE of Golondrinas, Cooperativa 3 de Septiembre, sector San Isidro, near Río Jordán, 0°20'N, 79°12'W, 300 m, *Palacios 11484* (MO, QCNE). LOS

RIOS: Río Palenque Science Center, 200 m, *Madison 2114* (SEL); Tinalandia, 9.6 km E of Santo Domingo de los Colorados; 600 m, 0°16'S, 79°07'W, *Croat 55676* (B, MO, QCA).

Anthurium interruptum Sodiro, Anal. Univ. Centr. Ecuador 15 (108):5. 1901. Type: Ecuador. Cotopaxi: Angamarca,



Figs. 31–32. *Anthurium interruptum* Sodiro. Croat & Rodríguez 61458. Stems

Sodiro s.n. (Nov. 1899); (holotype, B). Figures 30–32.

Terrestrial or epiphytic, scandent; stems to 1 m or more long, with long internodes (to 18 cm) alternating with short internodes (5–10 mm long), 4–6 mm diam.; cataphylls to 7 cm long, persisting intact at upper nodes, weathering promptly below and deciduous; petioles terete, narrowly sulcate, narrowly flattened toward apex, 6–11 cm long, less than 2 mm diam.; blades broadly elliptic to oblong-elliptic, or narrowly ovate, 12–19.7 cm long, 5–8.7 cm wide, subcoriaceous, acuminate to abruptly acuminate, obtuse to rounded at base, paler and glossy on lower surface; midrib convex above, less prominent below and paler below; primary lateral veins obscure, drying weakly raised and scarcely or not at all more prominent than the interprimary veins, at least the larger ones weakly puckered, arising at ca. 30–55° angle; collective veins arising from the base, no more conspicuous than the lateral veins above, more distinct than the lateral veins below, 4–7 mm from margin. Inflorescence (based on other Ecuadorian collections); inflorescence longer than petioles; peduncles 4.5–14 cm long; spathe green, oblong-lanceolate, 4–5 cm long, 1–1.5 cm wide; spadix 2.5–4 cm long; flowers 4-lobed, 2.3–3.5 mm long; lateral tepals 1.5–2.3 mm wide. Infructescence to 12 cm long; berries red, ca. 7 mm long.

Anthurium interruptum ranges from Guatemala, Colombia, Ecuador, Peru (Cuzco), and Bolivia (La Paz) from 150 to 1,630 m elevation. It is apparently rare in the reserve, having been collected only once. In Ecuador it is restricted to the western slopes of the Andes.

The species is recognized by its slender, cane-like stems with long internodes alternating with a series of shorter internodes, by its blackish drying elliptic to oblong-elliptic to obovate blades with rather obscure primary lateral veins and by the



showing elongate internodes, roots, and leaves.

greenish to yellow-green or brownish spadix and reflexed, green spathe.

Material previously determined as this species from the Amazon basin has been determined to be a new species, *A. ceronii* Croat. While both species have narrow, blackish-drying leaves and red berries *A. ceronii* has larger blades and has short, thick stems with consistently short internodes.

ENDESA collections: *Croat & Rodriguez 61458* (CM, G, K, QCA). Other collections: GUAYAS: 5 km S of Naranjal, 50–100 m, *Harling & Andersson 19436* (GB, MO). IMBABURA: Lita, 600 m, *Cobb 18* (MO); 2.5 km E of Lita, 750–775 m, *Croat 38984* (MO). LOS RIOS: Babahoyo-Montalvo, Hacienda Clementina, 20 m, *Sparre 14489* (S); Hacienda Clementina, 150 m, *Harling 193* (S). MANABI: Machalilla National Park, below San Sebastián, 1°36'S, 80°42'W, 400–420 m, *Gentry & Josse 72686* (MO). PICHINCHA: La Centinela, 13 km E of Patricia Pilar, 0°32'S, 79°11'W, 1,000 m, *Croat 73022* (MO); 29.5 km W of Patricia Pilar, 450–475, 0°33'N, 79°22'W, *Croat 50622* (MO); Reserva Forestal La Favorita, vic. Chiriboga, 1,600–1,800 m, 0°16'S, 78°44'W, *Benavides & Loroña 118* (MO, Q); Alluriquín-Chiriboga, 1,200–1,400 m, *Madison 4062* (MO, NY, SEL); 21 km S. of Chiriboga, 1,630–1,730 m, 0°21'S, 78°50'W, *Croat 50632* (MO); 36 km SW of Chiriboga, 1,270 m, *Croat 38768* (MO); Alóag-Santo Domingo, Toachi, 850 m, *Sparre 18448* (S).

Antburium jaramilloi Croat & J. Rodríguez, sp. nov. Type: Ecuador. Pichincha: ENDESA reserve, 9 km N of km 113 on Quito-Puerto Quito road, ca 750 m. 0°05'N, 79°02'W, 15 July 1986, *Croat & Rodriguez 61465* (holotype, MO-3418460; isotypes, AAU, B, F, K, NY, QCA, QCNE, K, US). Figures 33–36.

Plerumque terrestris; caulis usque 60 cm longa; internodia brevia, 1–2.5 cm diam.; cataphylla 6–19 cm longa, persistentia ut fibrae; petiolus (22)45–90 cm longus, 3–10 mm diam., C-formatus, sulcatus; lamina ovato-cordata, (25)35–55 cm longa, 30–40 cm lata; sinus parabolicus vel hippocrepi-formis. Pedunculus 30–60 cm longus; spa-

tha ovata vel cymbiformis, (2.2)4.5–8 cm longa, 2.5–4 cm lata, viridis; spadix 5–10 cm longus, 5–8 mm diam.; infructescentia pendens, usque 13 cm longa; baccae rubrae.

Mostly terrestrial, sometimes epipetric or as an appressed epiphyte; stems to 60 cm long; internodes short, 0.5–1.3 cm long, 1–2.5 cm diam.; cataphylls 6–21 cm long, promptly turning reddish brown and weathering into a reticulum of pale reddish brown to tan persistent fibers, obscuring petiole scars; leaves erect with the blades pendent; petioles (22)45–90 cm long, 3–10 mm diam., subterete, sharply C-shaped, U-shaped toward apex, sharply to obtusely sulcate, pluricostate toward base with the angles slightly winged, drying brown, sheathed 2–6 cm; geniculum 1–2.5 cm long, sometimes reddish, drying and darker than petiole; blades ovate-cordate, caudate-acuminate at apex (acumen 2.5–3 cm long) (25)35–55 cm long, 30–40 cm wide, broadest at the point of petiole insertion, subcoriaceous to chartaceous, moderately bicolorous, dark green and matte above, semiglossy and somewhat paler below, drying yellowish brown; the margins often narrowly undulate; sinus obovate or closed, parabolic to hippocrepiiform when flattened; the posterior lobes about as long as broad, sometimes overlapping; midrib convex to acute above, thicker, convex and darker below; primary lateral veins 13–16 pairs, arising at 45–55 degree angle, raised above in valleys, narrowly raised below, drying reddish brown; interprimary veins 1–2 between each pair of primary lateral veins; tertiary veins visible below, darker; collective veins arising from one of the middle basal veins, usually the 3rd to 5th basal veins; basal veins 6–8 pairs, the 1st pair coalesced 5–17 mm, the 4th and higher veins coalesced 3.5–4.5 cm; the posterior rib 4–6(13) cm long, naked with the sinus most of its length. Inflorescence erect, ½–¾ as long as the petioles; peduncle 30–60 cm long, to 4 mm diam., pluricostate; spathe ovate to cymbiforme, erect and hooding spadix, (2.2)4.5–8 cm long, 2.5–4 cm wide, light green, often tinged with red or ma-



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Fig. 33. *Anthurium jaramilloi* Croat & Rodríguez. ENDESA.

genta and with the veins reddish, inserted at 45 degree angle, acuminate at apex, the margins joined around the peduncle at the base; spadix cylindric and stubby, spread-

ing laterally and curved somewhat toward the base, 5-10 cm long, 5-8 mm diam., reddish yellow to red or dull magenta, stipitate 5-18(25) mm; flowers rhombic, 2.2 mm



Figs. 34–35. *Anthurium jaramilloi* Croat & Rodríguez. Croat & Rodríguez 61465. Fig. 34. Habit. Fig. 35. Inflorescence.

long, 1.7 mm wide, 10–12(15) visible per spiral; lateral tepals 1.5–2 mm wide, the inner margins straight; stamens 3.3 mm long; anthers somewhat orange; infructescence pendent, to 13 cm long, dark red; berries red, globose, to 4.5 mm long; pericarp thick with a few raphides medially, mesocarp mucilaginous, translucent; seeds 3 mm long, 2 mm wide, somewhat flattened, pale green, 1 per locule.

Anthurium jaramilloi is known only from the vicinity of the Reserva ENDESA where it is common in both the primary forest and in regrowth, frequently colonial in primary forest. It is characterized by its generally terrestrial habit, many veined, ovate-triangular, deeply lobed blades which dry reddish brown, the short inflorescence with a hooding spathe and the curved cylindroid spadix as well as by its red berries.

The species would key to *A. livescens* Sodiro in his key of *Anthurium* species for Ecuador (Sodiro, 1903) but that species has blades which dry greenish and with the posterior rib only briefly naked with up to 4 free basal veins. In contrast, *A. jaramilloi* has the posterior rib naked 4–6(13) cm and has none of the basal veins completely free to the base.

Anthurium jaramilloi is also superficially similar to *A. vulcanicum* Sodiro, also described from Volcán Pichincha, but that species has blades with tertiary venation sunken above and more conspicuously raised beneath as well as having an inflorescence which is subequal to the petiole (versus shorter than the petiole in *A. jaramilloi*) with a linear-lanceolate spathe, and a purple spadix with anthers drying sessile.

The species is named in honor of Jaime Jaramillo, one of the most prodigious Ecuadorian collectors who was responsible for collecting many of the collections of Araceae at the reserve and who has collected widely throughout Ecuador.

ENDESA collections: *Campaña et al.* 1 (QCA), 13 (QCA); *Carvajal et al.* 3 (QCA); *Croat & Rodríguez* 61465 (MO, QCA); *Grayum et al.* 9449 (MO, QCA); *Freire* 2 (QCA); *Hammel & Wilder* 17226 (MO); *Jaramillo* 5232 (MO, QCA), 6529 (QCA), 6723 (MO, QCA); *Pacheco* 13 (QCA); *Rod-*



Fig. 36. *Anthurium jaramilloi* Croat & Rodríguez. *Croat & Rodríguez* 61465. Stem with persistent cataphyll fibers and lower part of petioles.

riñez 171, 173, 174 (QCA), 224, 301 (MO, QCA), 327 (MO, QCA), 336 (K, QCA), 398 (QCA).

Anthurium jimena Croat, sp. nov. Type: Ecuador. Pichincha: Reserva Endesa, 9 km N of km 113 on Quito-Puerto Quito road, 750 m, 0°05'N, 79°02'W, 15 July 1986, *Croat & Rodríguez* 61464 (holotype, MO-3418455-58; isotypes, AAU, B, K, NY, QCA, QCNE, US). Figures 37–41.

Planta epiphytica; internodia brevia, 3–5 cm diam.; cataphylla 20–33 cm longa, persistentia semi-intacta; petiolus (23)48–150 cm longa, sulcatus; lamina subtriangulari-cordata, (24)50–120 cm longa, (12)60–100 cm lata; lobus posticus incurvatis, lobus anticus constrictatis supra basin; pedunculus 21–50 cm longus; spathe alba vel dilute viridis, interdum suffusa magentea, patens, 17–20 cm longa, 3–4.5



Fig. 37. *Antburium jimenezae* Croat. ENDESA.



Figs. 38–41. *Anthurium jimenae* Croat. Croat 61464. Fig. 38. Habit, upper blade surfaces. Fig. 39. Habit, lower blade surfaces. Fig. 40. Stem showing short internodes, persistent cataphyll fibers, and finely costate petioles. Fig. 41. Inflorescence (post-anthesis).

cm lata; spadix sessilis vel stipitata 3 mm, rubroroseus vel magenteus, 15–27 cm longus, 1–2 cm diam.

Epiphyte; stems 1.2–1.5 m long; internodes short, 3–5 cm diam.; cataphylls 20–33 cm long, subcoriaceous, reddish brown at apex, persistent semi-intact toward apex, eventually weathering to reddish brown fibers with patches of semiglossy epidermis; petioles (23)48–150 cm long, equal to or longer than the blades, green, subterete, sharply and narrowly concave-sulcate and sometimes 4 to many-ribbed (ca. 15) circumferentially, brittle, sheathed 3–6 cm; geniculum 2–3 cm long, drying darker; blades subtriangular-cordate, (24)50–120 cm long, (12)60–100 cm wide, pendent from the petiole, broadest at point of petiole insertion, anterior lobe prominently constricted about midway, lower half of the blade more or less reniform with rounded, prominently incurved posterior lobes, apical half oblong-triangular and acuminate to cuspidate at apex, broadly confluent with the basal portion, subcoriaceous, weakly bicolorous, dark green and semiglossy above, drying gray-green, slightly paler and semiglossy to matte below, drying yellow-brown to reddish brown, the margins broadly undulate; sinus broadly rounded to truncate at apex, ca. 30 cm wide, 12–20 cm deep; midrib bluntly acute above, almost acute below, (the two sides convex but with an acute rib); major veins moderately paler below; primary lateral veins to 14–16 pairs, arising at 35–50° degree angle, then curving toward margin, narrowly acute on both surfaces, drying brown below; interprimary veins 1–2 between each set of primary lateral veins; secondary veins in part sunken above, raised below; tertiary veins in part sunken above, raised below; basal veins 9–11 pairs, the 1st pair coalesced 1.5–4 cm, 8th–10th coalesced up to 117 cm; posterior rib naked along the sinus most of its length; collective veins arising from one of the lowermost basal veins, 3–5 mm from the margin. Inflorescence erect-spreading; peduncle 21–50 cm long, to 1 cm diam., variously striate and obtusely sulcate adaxially; spathe white to light green, sometimes tinged ma-

genta, spreading, 17–20 cm long, 3–4.5 cm wide, subcoriaceous, narrowly acuminate and inrolled at apex, cordulate and somewhat decurrent at base; spadix erect, sessile, or stipitate 3 mm, reddish pink to magenta, weakly tapered to apex, 15–27 cm long, 1–2 cm diam.; flowers rhombic, 2.5 mm long, 2.4 mm wide, 10–15 visible per spiral, the sides straight on both sides; lateral tepals 1.8–2.4 mm wide, the inner margins rounded to straight, the sides with raphides present; stamens held at the level of the tepals; anthers yellow, 1.8–2 mm long, drying ca. 0.2 mm wide; infructescence red, more than 3 cm diam.; berries early-emergent, 4 mm long, red-violet to magenta at apex, whitish in lower $\frac{2}{3}$; seeds 1 per locule, 2.5 mm long.

Anthurium jimenesae is known only from the Pacific slope of Ecuador at 600 to 750 m elevation in *Premontane wet forest* (P-wf). At ENDESA it is found only infrequently in the primary forest and in areas of regrowth.

It is characterized by its huge, much constricted blades, the sulcate, many-ribbed petioles, white to pale green spathe, reddish bluntly tapered spadix and reddish bicolored berries. At Reserve ENDESA it could be confused only with *A. cupulispathum* because of the size of that species but it has a deeply boat-shaped reddish spathe and a blade that is not constricted above the base.

Madison et al. 4528 from Chical at 1,200 m in Carchí Province having a contracted anterior lobe and a rose-colored spathe is perhaps this species but it differs in having a more slender, pale green spadix (with a rose tinge) to ca. 43 cm long and 1 cm diam. Specimens from higher elevations near Maldonado (1,800–2,300 m) in Carchí (*Besse et al. 2264* and *2296* as well as *Madison 3989* and *4001*) are also similar in having multi-ridged petioles, blades with the collective veins from near the base and in having rosy pink spadices, but they differ from *A. jimenesae* in having the blades not at all contracted above the base. These collections probably represent a new species with affinities to *A. jimenesae*.

ENDESA collections: *Croat & Rodríguez*

61464 (AAU, B, K, MO, NY, QCA, QCNE, US); *Rodríguez 53* (QCA), 283 (MO, QCA), 330 (QCA); *Velasteguí & Arguello 98*. Other collections seen: IMBABURA: Ibarra Cantón: Lita, 600 m, *Madison et al. s.n.* (Selby 78-1913). CARCHI: SE of Maldonado, 2,480–2,550 m, *Thompson & Rawlins 932* (CM). PICHINCHA: 53.2 km E of Allurquín, on Machachi-Santo Domingo de los Colorados road, 2,660 m, 0°26'S, 78°36'W, *Thompson & Rawlins 1082* (CM).

Antburium lactinosum Sodiro, Anal. Univ. Centr. Ecuador 15:300. 1902. Type: Ecuador. Pichincha: Nanegal and Río Pitalón (not seen). Figures 42–46.

Scandent epiphyte; stems pendent to 2.0 m or more long; internodes 0.4–6 cm long, mostly less than 7 mm diam.; cataphylls 2–4 cm long, promptly weathering to fibers, these spreading then turning upward to form a basket-like structure around the node; petioles 1–5 cm long, 1–3 mm diam., subquadrangular, sharply sulcate adaxially and ribbed abaxially, sheathed 6–17 mm; geniculum 4–17 mm long; blades oblong-lanceolate to ovate-elliptic, 6.5–17 cm long, 2.5–7 cm wide, abruptly acuminate at apex, cuneate at base, semiglossy and glandular-punctate on both surfaces, drying yellowish brown; midrib concolorous and thicker than broad to acute, drying almost knife-edged above, drying darker than surface and narrowly acute, convex and slightly paler below, drying somewhat acute; primary lateral veins 8–11, arising at an angle of 40–50°, weakly raised on both surfaces, slightly paler above, darker beneath, flat, drying weakly raised; collective veins 1–2 pairs, arising from the base, the innermost 2–13 mm from the margin, the outer collective vein, when present, usually merging with the margin in the lower ½ of the blade, rarely extending all the way to the tip of blade. Inflorescence erect-spreading; peduncle 2–16 cm long, 2–3 mm diam., sulcate adaxially and 3-ribbed adaxially, 4–8 times longer than petiole; spathe 0.6–5.8 cm long, 5–10 mm wide, lanceolate, green, tinged red, subcoriaceous, inserted at an angle of 60 degrees, recurved, acute-acuminate at apex,

the margins meeting at an obtuse angle at the base; spadix 1.6–16.7 cm long, 2–4 mm diam., 20–25 times longer than wide, green becoming lavender purple to pink or yellow; flowers 5 visible per spiral, rhombic, 2.8–3.5 long, 1.5–2.5 mm wide; lateral tepals 1–2 mm wide, the inner margins convex, stamens 1 mm long. Inflorescence to 24 cm long, pendent, turning pale burgundy; berries pale purple turning hyaline to white, subglobose to obovoid, more or less quadrangular in cross-section, flattened at apex, 2–5 mm diam.; pericarp thick; mesocarp translucent, mucilaginous; seeds 1.8–2.5 mm long, 1 mm wide, elliptic to pateliforme, green, 2–4 per locule.

The species is endemic to Ecuador, between 300 and 1,300 m elevation, ranging from Carchí to Cotopaxi and Los Ríos Provinces. It is certainly to be expected in adjacent Colombia in Nariño Department.

Croat 57071 from Pucayacu had blades velvety and matte above but otherwise appears to match this species very well.

ENDESA Collections: *Cerón & Ayala 10095* (MO, QCNE); *Croat & Rodríguez 61504* (MO, QCA); *Hammel & Wilder 17224* (MO); *Harling & Andersson 23273* (GB, MO); *Rodríguez 187* (CR, MO, QCA), 424 (QCA); *Jaramillo et al. 5218* (MO, QCA), 66039 (MO, QCA). Other collections seen: CARCHI: Awá reserve, Gualpí Chico, 1,330 m, 0°58'N, 78°16'W, *Hoover et al. 2834* (MO). COTOPAXI: Quevedo-Latacunga, 55.5 km E of Quevedo, 930–950 m, 0°53'N, 79°04'W, *Croat 57031* (MO); 1 km N of Pucayacu, 670 m, 0°41'30"S, 79°06'30"W, *Croat 57071* (MO). LOS RÍOS: Quevedo Cantón: Parroquia Centinela-La Pirámide, E of Patricia Pilar, 650 m, 1°40'S, 79°20'W, *Quelal & Tipaz 356* (K, MO). PICHINCHA: Centinela, 12 km E of Patricia Pilar, 600 m, *Besse et al. 135*.

Antburium lancea Sodiro, Anal. Univ. Centr. Ecuador 16:273. 1902. Type: Ecuador. Cotopaxi: Angamarca, *Sodiro s.n.* (lectotype, B; isolectotype, G). Figures 47–49.

A. lancea Sodiro, var. *canarense* Sodiro, Anturios Ecuatorianos: Monografía II. Contribuciones al conocimiento de

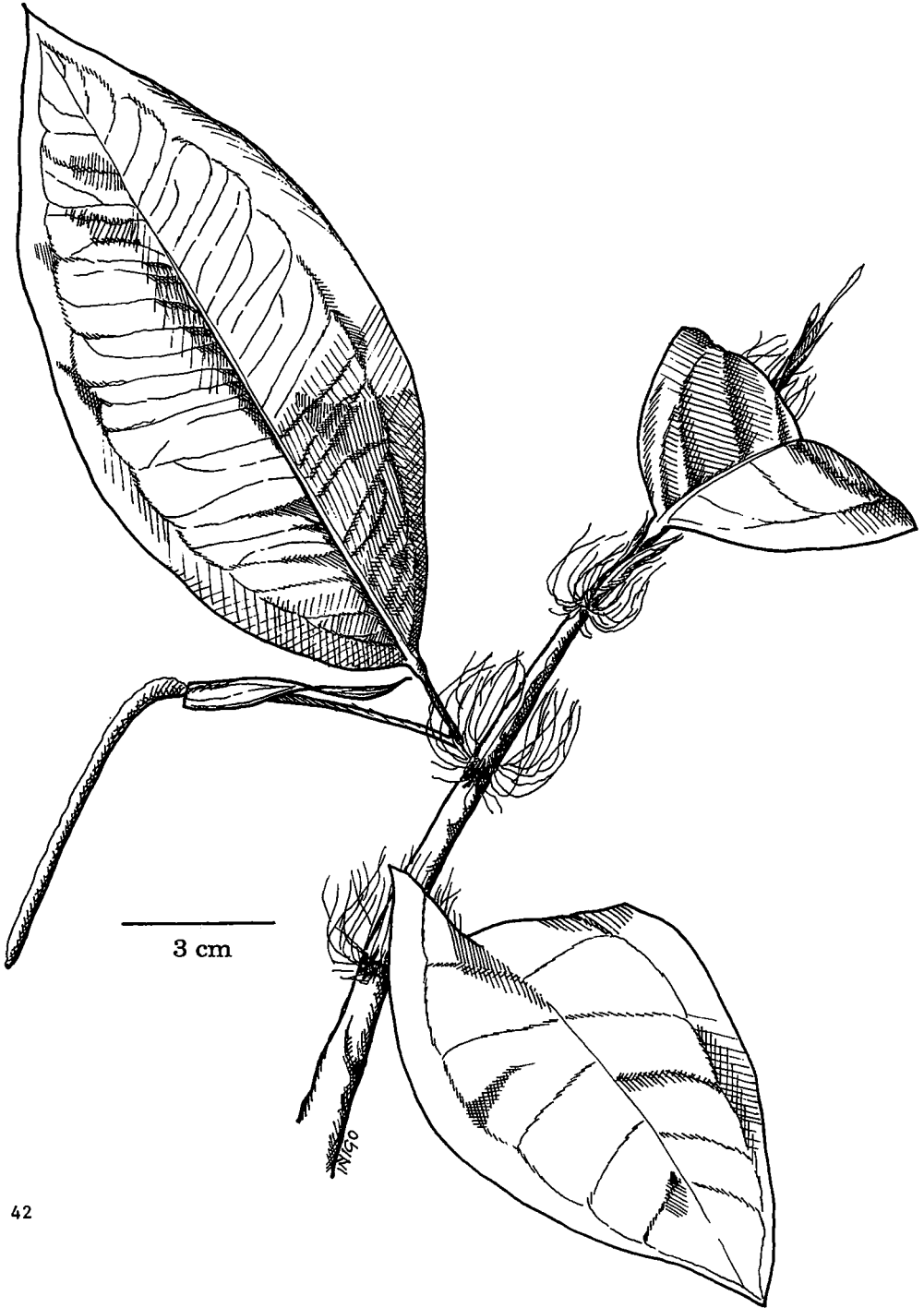


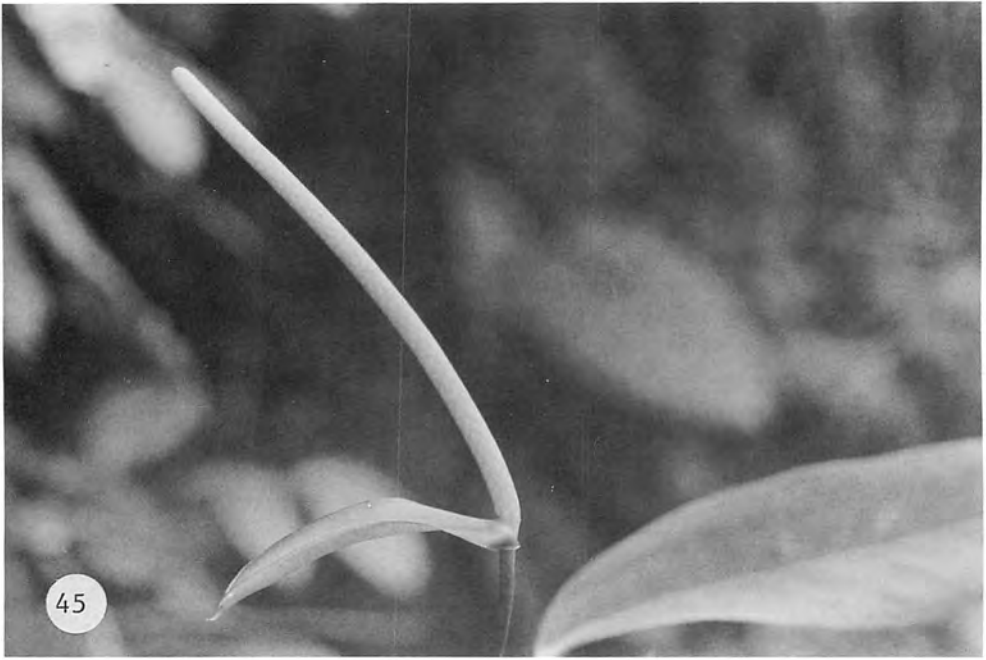
Fig. 42. *Anthurium lacinosum* Sodiro. ENDESA.

la flora Ecuatoriana, Adiciones. P. 6. 1903. Type: Ecuador. Cañar: *Rimbach 88* (not seen, perhaps lost).

Terrestrial, stem to 70 cm long; internodes 2–3 cm long, 1.5–4 cm diam.; cataphylls 5–15 cm long, green and persistent; leaves more or less erect; petioles 25–80 cm long, 6 mm diam., obtusely flattened to obtusely sulcate, sometimes sharply D-shaped, medium green, weakly glossy, sheathed 2–2.5 cm; geniculum 1–3 cm, darker than the petiole; blades broadly ovate-cordate, to triangular-hastate to elliptic or ovate-elliptic, 18–48 cm long, 13–42 cm wide, 1.2–1.3(1.6) times longer than wide, broadest at petiole insertion or near the base, coriaceous to subcoriaceous, acuminate to abruptly acuminate at apex, attenuate at base, with or without posterior lobes, the geniculum sometimes appearing remote, dark green and semiglossy above, medium green and matte to weakly glossy below, both surfaces typically drying dark brown to black; sinus arcuate with a decurrent petiole or lacking; midrib convex above, acute beneath, sometimes also sharply 3-ribbed, becoming acutely 1-ribbed toward the apex, darker than surface above, drying dark brown and thicker than broad below; primary lateral veins 6–10 pairs, departing midrib at 30–40 degree angle, prominently and acutely raised above; tertiary veins in part raised below; basal veins (1) 3–6 (7) pairs, the 1st free to the base, the others variously coalesced 2.5–6 cm; posterior rib (when present) naked along the sinus for most of its length; collective veins arising from the 1st through 4th basal veins, 7–14 mm from the margin (elsewhere at higher elevations from 1st basal veins or from one of the primary lateral veins). Inflorescence semi-erect; peduncle 30–61 cm long, 5–8 mm diam.; obtusely sulcate adaxially, about as long as the petioles; spathe spreading, linear-lanceolate, 6–10 cm long, 1.2–1.7 cm wide, green, membranaceous, acuminate apex, the margins meeting at an obtuse angle at the base; spadix green, 6.5–8 cm long, 4–12 mm diam. near the base, 3–5 mm diam. near the apex, stipitate 3–1.8 cm; flowers rhombic, 2.8–3.4 mm long, 2–2.6 mm wide, 3–5 visible per



Figs. 43–44. *Anthurium lacinosum* Sodi-ro. Croat 57071. Fig. 43. Habit. Fig. 44. Stem showing basket-like persistent stipules.



Figs. 45–46. *Anthurium lacinosum* Sodiro. Croat 57071. Fig. 45. Inflorescence. Fig. 46. Infructescence with early-emergent berries.

spiral; lateral tepals 1.4–1.6 mm wide, the inner margins broadly rounded; stamens held at level of tepals; anthers cream, ovoid, 0.5 mm long, 0.6 mm wide, the thecae scarcely divericate; infructescence to 16 cm long, arcuate-pendent; berries early emergent, purple to violet-purple, whitish at very base, globose, maturing irregularly on the spadix; pericarp thick with raphide cells basally; mesocarp pasty, white; seeds 6–7 mm long, 5 mm wide, discoidal, green, 1 per locule.

The species ranges from Colombia (Chocó and Nariño) to Ecuador along the western slopes of the Andes at 650 to 1,850 m elevation. In Ecuador the species ranges from Carchí and Esmeraldas to Pichincha, Cotopaxi, Chimborazo, Cañar, and Azuay. It is a highly variable species, especially in the degree to which its posterior lobes are developed and may represent more than one variety. At ENDESA some collections (*Croat & Rodríguez 61451* and *61520*) are especially unusual in having blades that are more or less elliptic and attenuate at the base, drying yellowish brown rather than blackened.

The species is common in the ENDESA reserve. Despite considerable variation both at ENDESA and throughout its range the species can be recognized by its usually terrestrial habit, by its usually black-drying leaves with a prominently attenuate leaf base leading to what appears to be a remote geniculum, by the generally remote collective veins (often up to 1.5 cm from the margin), by the prominently stipitate green spadices and purple berries.

Timaná 966 from Cuzco Department of Peru may be this species. If so it would greatly extend the range to the south. The collection, made in Quispicanchis Province on Cerro Santa Ana at ca. 1,500 m, has the collective veins arising from the first basal veins and a short stipe but otherwise matches Ecuadorian material well. More collections are needed to ascertain its identity.

It is a highly variable species throughout its range. Collections from higher elevations in Chimborazo, Bolívar, Guayas and Azuay at 1,000–2,300 m are mostly much



Figs. 47–48. *Anthurium lancea* Sodiro. *Croat 61467*. Fig. 47. Habit (in cultivation). Fig. 48. Inflorescence.



Fig. 49. *Anthurium lancea* Sodiro. Croat 72346. Inflorescence.

smaller with thicker blades that dry mostly yellow-brown rather than the characteristic black and usually have most of the basal veins merging with the margin rather than joining the collective veins. These collections also have thicker cataphylls which dry intact (See *Camp* 3117). However, some specimens in the same population have leaves intermediate with those of the type. It is perhaps an element of this form that Sodiro described as *A. lancea* var. *canarense*. Though the type of this variety has never been located, his description of var. *canarense* fits the material just described reasonably well. The following additional collections are examples of this form: *Asplund* 15505, *Camp* 3355, *Croat* 61571, *Steyrmark* 52841, *vanaderWerff*, 12479, 12495, 12538. Particularly unusual, even for plants from Cotopaxi is *Croat* 73654 which has remote collective veins but dries bright yellow-green above and much paler yellow-green below. This plant collected near El Corazón, is so different that it may represent a new variety. It may be the same

as *Croat* 73782 from Pucayacu which differs only slightly.

Collections of *A. lancea* from northwestern Ecuador in Carchí and Esmeraldas and in Colombia (Nariño—*Croat* 71415, 71634); Chocó (*Croat* 56645 & *Forero & Gentry* 791) have the collective veins closer to the margins and a shorter stipe but otherwise match the Pichincha material reasonably well.

The Sodiro collections (both assumed to be types) at Berlin and Geneva are very different in blade shape from collection at the Central University in Quito (Q) where a number of Sodiro types are deposited. The former have blackish drying blades with the lobes turning outward and downward while the collection at Q has brownish drying blades with the posterior lobes turned somewhat inward. Though both forms represent *A. lancea*, the Berlin collection was selected as the lectotype because it is more typical for the species.

ENDESA collections: *Croat* 61467 (MO), 61520 (CM, K, MO, QCNE), 72948 (MO);

Rodríguez 207, 274 (MO, QCA), 306 (MO, QCA), 334 (K, QCA), 363 (MO, QCA), 387 (QCA); *Harling & Andersson* 23264 (GB). Other collections seen: AZUAY: Río Norcay, vic. Molleturo, 1,830–1,950 m, *Steyermark* 52841 (NY). CARCHI: vic. Maldonado, 1,830 m, *Madison* 3994 (SEL); El Pailón, ca. 45 km below Maldonado, *Madison & Besse* 7075 (SEL). BOLIVAR: Chillanes-El Tambo, 1,700–2,300 m, *v.d. Werff et al.* 12479, 12495 (MO); Chillanes-Yaquibusu, 2,300 m, *v.d. Werff* 12538 (MO). CARCHI: Tulcán Cantón: Awá reserve, Centro El Baboso, 1,800 m, 0°53'N, 78°25'W, *Tipaz et al.* 1992 (MO); Maldonado, 1,800 m, *Madison* 3994 (SEL); El Pailón, 45 km below Maldonado, 800 m, *Madison & Besse* 7075 (SEL); Gualpi Chico, 1,330 m, 0°58'N, 78°16'W, *Hoover et al.* 3234 (QCA). BOLIVAR-CHIMBORAZO: Pallatanga-Yunguilla-Llimbe, Río Chimbo, *Zak & Jaramillo* 2810 (MO). CHIMBORAZO: Alausí-El Triunfo, 26.4 km W of Huigra, 1,270 m, 2°20'S, 79°02'W, *Croat* 61571; Río Chanchan, 5 km N of Huigar, 1,700–2,700 m, *Camp* 3117 (AAU, LAS, MO, NY, SEL), 3361 (AAU, MO, NY, SEL, US), 3355 (NY); Huigra-Naranjapata, 1,050 m, *Asplund* 15505 (S); Huigra, 1,610 m, 2°15'S, 78°55'W, *J. F. Smith* 2031 (MO). COTOPAXI: Angamarca, *Sodiros s.n.* (B); *Sodiros s.n.* (Nov. 1890) (Q). ESMERALDAS: San Lorenzo Cantón: Awá reserve, Parroquia Alto Tambo, valley of Río Mira, Centro de La Unión, 250 m, 0°52'N, 78°26'W, *Aulestia & Aulestia* 1263 (MO); vic. Lita, 550–650 m, *Madison et al.* 5187 (SEL); 37.8 km W of Lita, 390 m, 0°56'N, 78°39'W, *Croat* 72346 (MO); 10–20 km NW of Lita, 800 m, 0°55'N, 78°35'W, *Gentry et al.* 70157 (MO); Río Lita, Sector El Cristal, 1,450 m, 0°49'N, 78°26'W, *Palacios* 4344 (MO); Quinindé Cantón: La Bella Jungla, NE of Golondrinas, Cooperativa Unidos Venceremos, 300 m, 0°20'N, 79°12'W, *Palacios* 11465 (MO). PICHINCHA: Nono-Nanegal, 11–12 km NW of Nono, *Croat* 38833 (MO); Tandayapa-Mindo, ca. 5.5 km N. of Mindo, *Croat* 49389 (MO); Tandayapa-Mindo, km 73, 2,300 m, 0°02'S, 78°42'W, *Croat* 60261 (MO); Maquipucuna, Cerro Sosa, 2,075–2,225 m, 0°04'30"N, 78°36'30"W, *Webster et al.* 29206, 29414, 29179 (DAV);

1,700–1,800 m; 29197 (DAV); 1,600 m, 28148 (DAV, MO); Maquipucuna, 1,300–1,700 m, 0°08'N, 78°35'W, *Tipaz & Quelal* 200 (MO); 1,200 m, 0°10'N, 78°35'W, *Es-pinoza* 725 (MO).

Antburium magnifolium Croat & J. Rodríguez, sp. nov. Type: Ecuador. Pichincha: ENDESA reserve, 8 km N of km 113 on Quito-Puerto Quito road, vic. Río Cabuyales, 750 m, 0°05'N, 79°02'W, 16 July 1986, *Croat & Rodríguez* 61605 (holotype, MO-3423778; isotypes, (AAU, B, BR, CAS, CM, COL, CR, CUVC, DUKE, EAP, F, G, GB, GH, HUA, K, MEXU, MY, NY, P, PMA, Q, QCA, QPLS, QCNE, RB, RSA, SCZ, S, TEX, US, VEN). Figure 50.

Planta epiphytica; internodia brevia, 1–2 cm diam.; cataphylla 5.4–8.6 cm longa, persistentia semi-intactum; petiolus 21–46 cm longus, subteres, obtusus complanatus aut sulcatus; lamina elliptica vel oblongo-elliptica, 32–51 cm longa, 9–17 cm lata, glanduloso-punctata in superficiebus ambabus; pedunculus 25–45 cm longus; spatula 8–14 cm longa, 1.5–2.5 cm lata, oblongo-lanceolata, viridis; spadix viridis vel pallide flavoviridis, 7–19 cm longa, 3–5 mm diam., sessilis aut stipitatus 2–3 mm; baccae 3–3.5 mm longae, rubrae.

Epiphyte; stems to 50 cm long, internodes short, 1–2 cm wide; cataphylls 5.4–8.6 cm long, turning reddish brown, persisting semi-intact or soon weathering into semi-intact tan to reddish brown fibers, often with pieces of epidermis remaining; leaves erect or pendent; petioles 21–46 cm long, subterete, obtusely and broadly flattened to sharply convex or V-sulcate, green with darker speckles, sheathed 4–5 cm; geniculum 1.8–3.8 cm long, drying much darker; blades elliptic to oblong-elliptic, 32–51 cm long, 9–17 cm wide, coriaceous, acuminate to cuspidate at apex, acute to weakly attenuate at base, glandular-punctate on both surfaces, markedly bicolorous, dark green and matte above, weakly glossy below; midrib convex on both surfaces, sometimes acute beneath; primary lateral veins 11–13, arising at 45–50 degrees, sunk-



Fig. 50. *Anthurium magnifolium* Croat & Rodríguez. ENDESA.

en above, convex below; tertiary veins scarcely visible; collective veins arising from the base, shaped like the primary lateral veins, 1–15 mm from the margin midway; tertiary veins obscure; secondary collective veins usually present at the base, 1–2 mm from the margin. Inflorescence spreading; peduncle 25–45 cm long, to 5 mm diam., as long as or sometimes longer than the petioles, weakly speckled, sometimes striate; spathe light green, oblong-lanceolate, 8–14 cm long, 1.5–2.5 cm wide, chartaceous, inserted at 40° angle, then reflexed or recurved, acute at apex, the margins meeting acutely at base; spadix green to pale yellow-green, 7–19 cm long, 3–5 mm diam., sessile or stipitate 2–3 mm, scarcely tapered to the apex; flowers rhombic, 2.1 mm long, 1.5 mm wide, 8–9 visible per spiral; lateral tepals 1–2 mm wide, the inner margin, concave or straight; stamens held at the surface of the tepals; anthers orangish, 0.3 mm long, 0.4 mm wide on drying, the thecae slightly divaricate. Infructescence to 20 cm long, pendent; berries 3–3.5 mm long, pyriform, red; pericarp with raphides, mesocarp mucilaginous; seeds 2–2.5 mm long, elliptic to discoidal, olive-green, 1 per locule.

Antburium magnifolium is known only from the type locality in *Premontane wet forest* (P-wf) at about 700 m elevation. It is a member of section *Porphyrochitonium* and is distinguished by its typically large leaves (unusual for this section and hence the name assigned) with blades matte on the upper surface and with a pair of secondary collective veins near the base, 1–2 mm from the margin.

ENDESA collections: *Croat & Rodríguez 61506* (MO, QCA); *Jaramillo 6478* (MO, QCA); *Rodríguez 204* (MO, QCA), *237* (QCA), *256* (MO, QCA), *349* (K, QCA), *411* (QCA).

Antburium margaricarpum Sodiro, *Anales Univ. Centr. Ecuador* 15 (108):4. 1901. Type: Ecuador. Pichincha: Gualea, *Sodiro s.n.* (lectotype, SI; isolecotype B, G). Figures 51–54.

Epiphyte; stems 2–20 cm long; internodes 6–20 mm diam.; cataphylls 4–6 cm

long, drying reddish brown, promptly weathering to fibers; leaves semi-erect; petioles 10–35 cm long, 3–4 mm diam., subterete, C-shaped, sharply flattened adaxially, sheathed 1–2 cm at base, the geniculum 5–15(20) mm long, drying darker than the petiole; blades oblong-elliptic, 25–45 cm long, 4–11 cm wide, narrowly acute at apex, acute or sometimes obtuse at base, subcoriaceous, semiglossy, dark green and eglandular above, semiglossy and moderately paler and dark glandular-punctate below; midrib weakly raised convex and concolorous above, convex below; primary lateral veins (15)20–23 per side, departing the midrib at about a 45 degree angle; the collective veins arising from the base of blade or from one of the primary lateral veins in the lower ¼ of the blade, extending to the apex 3.5–5.5 mm from the margin; antimarginal vein weak, 0.5 mm from the margin. Inflorescence semi-erect; peduncle 5–25(32) cm long, subterete, usually about half as long as the petiole; spathe oblong-lanceolate, 2–7(10) cm long, 4–7(14) mm wide, dark green tinged with red or purple, inserted at an angle of 50 degrees, recurved, cuspidate at the apex, the margins meeting at an obtuse angle at the base; spadix gradually tapered, sessile or stipitate 1–2 mm, dark green at anthesis, 5–15 cm long, 5 mm diam.; flowers quadrangular in outline, 5 visible per spiral, 2–2.6 mm long (in directions of axis); the inner margins of the tepals 1–1.6 mm wide; stamens held at level of tepals; anthers yellow, pollen soon white; pistil to 1.2 mm long, slightly longer than the stamens, broadly botuliforme; stigma sub-bilabiate; infructescence to 23 cm long, pendent, purplish violet; berries ovoid, purplish in upper half, whitish toward the base, maturing pale gray-white, primarily in the center of the spadix, mesocarp white and pasty; seeds 2, somewhat discoidal, 3.2 mm long, 2.2 mm diam.

Antburium margaricarpum is apparently endemic to Ecuador, known at present only from the western slopes of the Andes on Volcán Pichincha at 650 to 1,600 m elevation. At Reserva ENDESA it is encountered in both the primary and secondary forest. It is characterized by its epiphytic

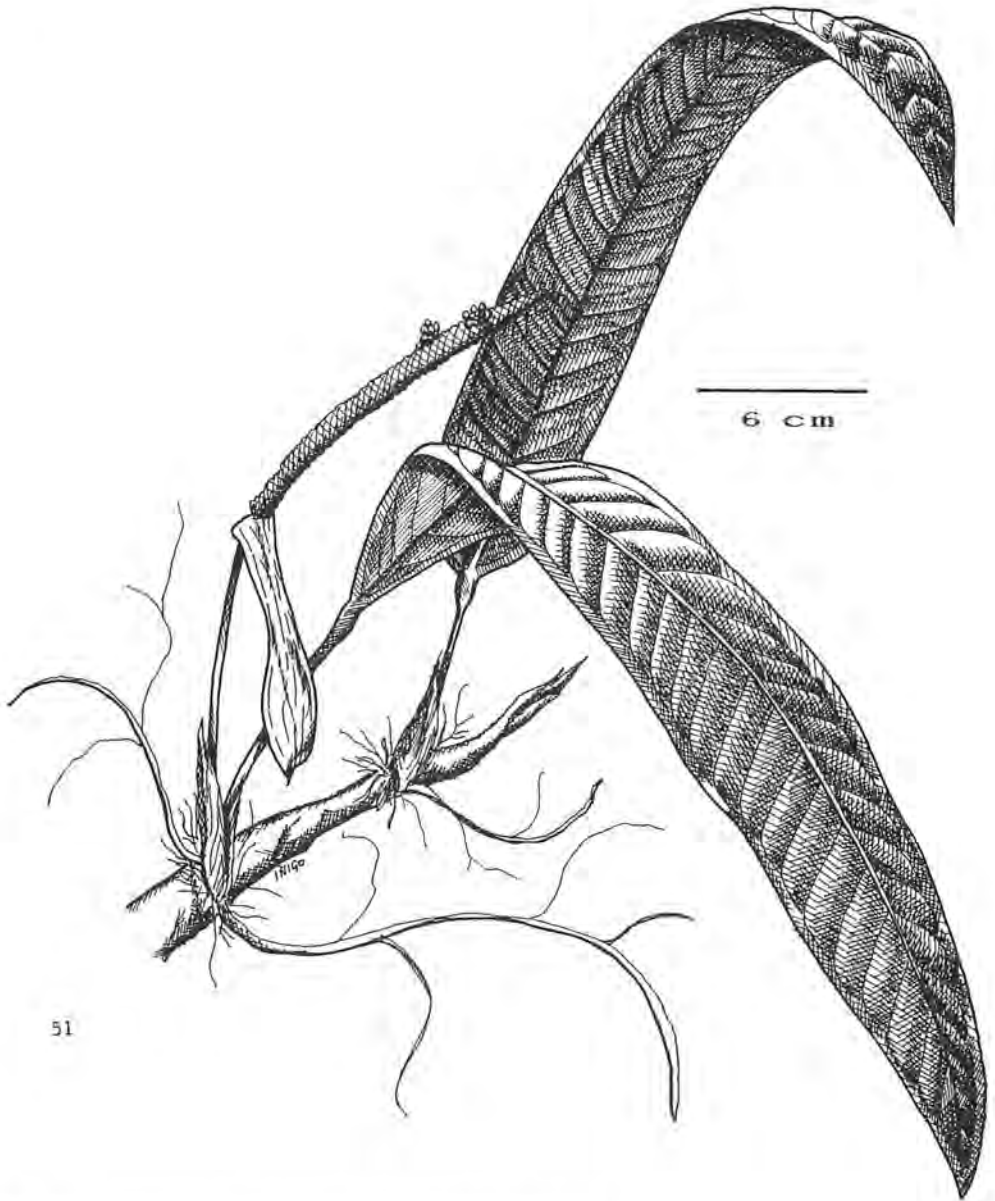


Fig. 51. *Anthurium margaricarpum* Sodiro, ENDESA.

habit, oblong-elongate blades which are dark glandular-punctate on the lower surface and epunctate on the upper surface. It is the only member of section *Porphyrochitonium* at ENDESA with blades which are epunctate on the upper surface.

Sodiro described the species as having

petioles which are deeply flattened-sulcate adaxially but this character is probably somewhat variable. Most collections actually do not mention the petiole cross-section but most appear to be at least sharply C-shaped, and it is easy to imagine that many might have deeply sulcate petioles.



Anthurium margaricarpum has been confused with *A. andinum* Engl., a poorly known species whose type specimen was collected in Cotopaxi, Mun. Pujilí, near Angamarca at 2,400 m elevation. It has similar blades but which differs in having glandular punctations on the upper surface and in having a purplish spadix (versus eglandular on the upper surface and in having a green spadix).

At ENDESA reserve *Anthurium margaricarpum* is most easily confused with *A. aureum*. That species also differs in having blades glandular on the upper surface but it also differs in being terrestrial.

Anthurium margaricarpum may also be confused at the reserve with *A. cabuyalense* which is an epiphyte with elongate leaf blades. It differs in having longer blades (72–80 cm long) which are 7.6–8 times longer than broad and only weakly glossy and somewhat velvety above.

The species is perhaps most closely related to (or possibly inseparable from) a presumed new species represented by Croat 50665, 73028 and 73037 from Centinela in Los Ríos Province as well as Croat 73798



Figs. 52–54. *Anthurium margaricarpum* Sodiro. Croat 73151. Fig. 52. Habit. Fig. 53. Habit, showing upper blade surfaces and inflorescences. Fig. 54. Infructescence with a few remaining berries near apex.

from near Pucayacu in Cotopaxi Province. That species looks very similar, at least in superficial terms, but has the upper blade surface subvelvety rather than semiglossy.

A single collection, *Rodríguez 212* from ENDESA, with much smaller vegetative and fertile parts and blades which dry with obscure brownish speckles on the upper surface (versus not speckled and with epidermal cells forming an areolate pattern on drying for *A. margaricarpum*) is tentatively placed here as well but may prove to be a distinct and new species.

Palacios et al. 9771 from Carchí Province at more than 2,000 m may also be this species.

Sodirot describes the spadix of *A. margaricarpum* as being stipitate 2–3 mm but none of our material (including any of the specimens annotated by him) have a spadix stipitate on the back side more than 1–2 mm. Perhaps his measurements were based on fresh material and some shrinkage has resulted from drying.

Only two Sodirot collections exist which specifically mention Gualea. Of these, the collection at the herbarium of Instituto Darwinion (SI) is clearly the most complete, with stems, an inflorescence and leaf blades of three sizes. It was therefore chosen as the lectotype.

ENDESA collections: *Croat 61484* (AAU, CM, COL, K, M, MO, Q, QCA, QCNE, OPLS, US, VEN), *73151* (B, CM, COL, K, MO, NY, QCA); *Jaramillo 6704, 6744, 7605* (QCA); *Rodríguez 178* (QCA), *180A, 217, 218* (MO, QCA), *234* (QCA), *336A* (K, QCA), *338* (MO, QCA), *384, 416* (QCA). Other collections seen: CANAR: Azogues-El Triunfo, ca. 5 km W of La Delicia, 8 km SE of El Truncal, 2°27'S, 79°15'W, *Croat 50907* (MO). COTOPAXI: Angamarca, *Sodirot s.n.* (Q). PICHINCHA: Nanegal, *Sodirot s.n.* (Jan. 1901) (P); Nanegal, *Sodirot s.n.* (July, 1903) (MO); Nanegal & Gualea, *Sodirot s.n.*, *Sodirot s.n.* (G); Gualea, *Sodirot s.n.* (B, SI); Bosque Protector Maquipucuna, ca. 5 km SE of Nanegal, 1,250–1,600 m, 0°05–07'N, 78°37.5–38.5'W, *Webster et al. 27481, 27595, 27634, 27652, 28119* (DAV), *28127* (DAV, MO), *29121, 29307, 30294, 30404, 30508* (DAV).

Anthurium michelii Guillaumin, Bull. Mus. Hist. Nat. (Paris) 31:263. 1925. Type: Panama. Bocas del Toro: hills beyond Fish Tree Lagoon, *Wedel 2276* (holotype, P). Figures 55–56.

Terrestrial; internodes short, to 1.7 cm long; cataphylls green, to 12.5 cm long, thin, apiculate at apex, persisting semi-intact and reddish brown; petioles sharply C-shaped in cross-section, 14–23 cm long, drying ca. 2–3 mm diam., longer than blades on juvenile plants, shorter than blades on more adult blades, stiff; blades (14)24–34 cm long, (6.5)10–20 cm wide, 1.5–4.7 times longer than broad, ovate to ovate-elliptic, subcoriaceous, glossy above, much paler and weakly glossy below, drying dark olive-green to yellow-green above, yellow-green to dark gray-green or gray-yellow below, acuminate to acute or obtuse and mucronate at apex, rounded or weakly subcordate and attenuate at base; midrib convex above, drying narrowly acute above, acute below, drying acute, darker than surface; primary lateral veins 5–10 per side, sunken above, convex below; arising at an acute angle (especially those in the lower ½ of the blade) then spreading at 35–55° angle, weakly raised above, convex below, drying thicker than broad, darker than surface; the lowermost 1–3 primary lateral veins running down along the midrib and appearing almost as basal veins; tertiary veins in part prominent and darker than surface below; collective veins loop-connecting the primary lateral veins, 4–12 mm from the margins. Inflorescence erect; peduncle 18–37 cm long, drying 1–4 mm diam.; spathe green, 2–8 cm long, 3.5–10 mm wide, erect-spreading, prominently decurrent at base; spadix green, stipitate 4–20 mm, 2.5–6.5 cm long, 2–5 mm diam., semiglossy, becoming darker in age; flowers 5–6 per spiral, 1.8–2 mm long, 1.4–1.8 mm wide, lateral tepals 0.8 mm wide, drying light greenish, weakly glossy, inner margins broadly rounded to obtusely angular; stamens barely exerted. Inflorescence spreading; berries early emergent, green, becoming purple, subglobose to ellipsoid, to 1 cm long.

Anthurium michelii ranges from Costa



Figs. 55–56. *Anthurium michelii* Guillamin. Croat 50759. Showing leaf, inflorescence, and infructescence.

Rica to Panama, Colombia and Ecuador at 40–1,400 m. In Colombia it is known from Antioquia, Carchí, Nariño and in the Amazon basin in Amazonas. In Ecuador it also occurs on both sides of the Andes, occurring in Pichincha, Los Ríos and Cañar on the Pacific slope and in Napo and Zamora-Chinchipe in the Amazon basin. In South America the species ranges from 120 to 1,800 m in the Amazon basin while on the Pacific slope it ranges from 200 to 1,400 m elevation.

The species is recognized by its terrestrial habit, typically short internodes, usually more or less elongate, attenuate-based, blades and long-pedunculate, prominently stipitate greenish spadix, green lanceolate spathe and usually dark purple fruits.

The species is a highly variable one, and the above description pertains only to material from the ENDESA reserve because there is a possibility that it might represent a distinct variety. It differs from material collected elsewhere in Pichincha, especially the many collections made at Centinela in Los Ríos Province, by having blades dry paler green. Centinela collections, like most material of the species throughout its range dry darker, often somewhat blackened, and also have shorter internodes. Blades are also often proportionately more narrow, ranging up to nearly 5 times longer than wide. Blades may be much larger elsewhere as well, such as with *Rubio et al. 1100* in Esmeraldas with blades 45 × 20 cm (to as much as 54 × 22 cm in Central America).

While *Croat & Rodríguez 61520* has relatively remote collective veins, *Rodríguez 263* has the collective veins much closer to the margin.

Plants with a leaf shape similar to *A. michelii* at ENDESA are common in a form of *A. lancea* that occurs at La Planada in Nariño Department of Colombia. The La Planada forms of *A. lancea* have narrowly ovate-triangular blades with the collective vein arising from one of the lowermost primary lateral veins and extending to the apex rather near the margin of the blade while the basal veins are all free to the margin. The Nariño plants perhaps warrant varietal recognition while the curious plants at EN-

DESA perhaps are the result of hybridization.

ENDESA collections: *Croat & Rodríguez 61451* (MO, QCA), *61520* (CM, K, MO, QCNE); *Rodríguez 263* (QCA). Other collections seen: CAÑAR: Azogues-El Triunfo, ca. 2 km S of Hwy at Cedro Pampa, 900–1,000 m, 2°35'S, 79°10'W, *Croat 50913* (MO). ESMERALDAS: San Lorenzo Cantón: Awá Reserve, Parroquia Alto Tambo, valley of Río Mira, Centro de la Unión, 250 m, 0°52'N, 78°26'W, *Aulestia & Aulestia 1344* (MO, QCNE); 10 km E of Alto Tambo, Comunidad La Unión: 20 m, 1°02'N, 78°26'W, *Rubio et al. 1100* (MO, QCNE). NAPO: Baeza-Lago Agrio, 760 m, *Croat 49514* (MO); Tena-Puyo, 61.5 km N of Puyo, 500 m, *Croat 49650* (MO); Archidona Cantón, Volcán Sumaco, Comuna Challua yacu, 1,200 m, 0°43'N, 77°40'W, *Palacios 4148* (MO, QCNE); Volcán Sumaco, Hollín-Loreto, km 31, 1,200 m, 0°43'S, 77°40'W, *Palacios 4148* (MO, QCNE); Coca-Baeza, via Loreto & Hollín, 6.7 km W. of Río Pucuno, 20 km W of Loreto, 1,130 m, 0°48'S, 77°30'W, *Croat 72648* (MO, QCNE); 5 km SE of Loreto, 450 m, 0°43'S, 77°20'W, *Hurtado 2664* (MO, QCNE); Río Pucuno-Río Guamaní, 1,100–1,200 m, 0°46'S, 77°26'W, *Cerón 2920* (MO, QCNE); Cantón El Chaco: Codo Sinclair, Río Quijos, 650 m, 0°08'N, 77°27'W, *Palacios 5763* (MO, QCNE); Río Quijos, ca. 10 km S of Reventador, 1,450 m, 0°08'S, 77°30'W, *Palacios 5997* (MO, QCNE); Río Quijos, Finca La Ave Brava, 1,800–1,900 m, 0°12'S, 77°39'W, *Palacios 5356, 5440* (MO, QCNE); Orellana Cantón: Sector Huashito, 20 km N of Coca, PALMORIENTE property, 250 m, 0°20'S, 77°05'W, *Espinoza 78, Rubio 313* (MO, QCNE); Tena Cantón: Estación Biológica Jatun Sacha, Río Napo, 8 km E of Misahuallí, 400 m, 1°04'S, 77°36'W, *Cerón 6399* (MO, QCNE); Project of Payamino, 200 m, 0°26'S, 77°01'W, *Brandbyge & Asanza 30027* (MO); Río Bueno-Santa Rosa, *Harling et al. 7171* (S). PICHINCHA: Mejía Cantón: Alóag-Santo Domingo de los Colorados, km 54.2 W. of Interamerican Hwy, 1,300 m, 0°22'S, 78°50'W, *Croat 72948* (MO); Quito-Santo Domingo, Dos Ríos, Chiriboga Road, km 90, 1,100 m, *Dodson & Thurston 14157* (MO); Centinela, crest of

Montañas de Ila, Patricia Pilar-24 de Mayo, km 12, 650 m, *Dodson & Gentry 8713*, *Dodson et al. 14772*; *Fallen & Dodson 851*, *Gentry et al. 28487* *Hansen et al. 7770* (MO); Centinela, 600–675 m, 0°37'S, 79°18'W, *Grayum & Zamora 9384* (MO); 29.5 km W of Patricia Pilar, 0°33'S, 79°22'W, *Croat 50670* (MO); Caserio de Bimbe, E of Santo Domingo-Quevedo Hwy, beginning 10.5 km N of Patricia Pilar, 550–575 m, 0°35'S, 79°12'30"W, *Croat 56993* (MO). SUCUMBIOS: Lago Agrio Cantón: Parroquia Dureno, Cofán-Dureno Community, 0°02'S, 76°42'W, *Cerón & Cerón 3124* (MO, QCNE). ZAMORA-CHINCHIPE: El Panguí Cantón: Zamora-Gualaquiza, 70.9 km N of Río Zamora, Los Encuentros-El Panguí, 935 m, 3°42'S, 78°25'W, *Croat 72710* (MO, QCNE); La Saquea on Río Yacuambi-Yangzatzta and near Pincho, 900–1,000 m, *Harling & Andersson 13978* (M); Loja-Zamora, Río Zamora, 39 km E of Loja, 610 m, 4°05'S, 79°W, *Croat 50759* (MO).

Anthurium nigropunctatum Croat & J. Rodríguez, sp. nov. Type: Ecuador. Pichincha: ENDESA reserve, 9 km N of km 113 on Quito-Puerto Quito Highway, ca. 750 m, 0°05'N, 79°02'W, 15 July 1986, *Croat & Rodríguez 61457* (holotype MO-3422149; isotypes, AAU, B, CAS, COL, F, K, M, NY, QCA, QCNE, US, VEN). Figures 57–62.

Planta plerumque epiphytica; internodia brevia, 2–3 cm diam.; cataphylla 14–30 cm longa, persistens intacta; petiolus teretes, obtusus sulcatus 25–115 cm longus, 6–9 mm diam.; lamina anguste ovata-cordata, 28–61 cm longa, 24–42 cm lata; pedunculus 16–64 cm longus; spatula palide viridis, lanceolata et naviculaformis, erecta, aut erecto-patens, 11–28 cm longa, 2–8 cm lata.

Epiphytic or secondarily terrestrial in regrowth; stems to 60 cm long; internodes short, 2–3 cm diam.; cataphylls 14–30 cm long, green, promptly turning red-brown, persisting intact at upper nodes, eventually deciduous; petioles terete, sometimes obtusely sulcate, 25–115 cm long, 6–8 mm



Fig. 57. *Anthurium nigropunctatum* Croat & Rodríguez. *Croat & Rodríguez 61457*. Habit, showing stem, cataphylls, petiole bases, and two young infructescences.

diam., flexible, sheathed 5–10 mm diam.; geniculum 2.5–5.5 cm long, pale green; blades narrowly ovate-cordate, 28–61 cm long, 24–42 cm wide, (1.2)1.4–1.7 times longer than wide, mostly 1.5 times longer than wide, broadest just above the base, semiglossy, slightly bicolorous, dark green above drying dark brown to grayish, slightly paler beneath, drying reddish brown to grayish, abruptly acuminate at apex, deeply cordate at base, the lobes rounded; both surfaces dark glandular punctate, lower surface with glands more conspicuous (at least on drying), concentrated principally in the vicinity of the major veins; sinus hippocrepiform to spatulate, 6–14 cm deep; midrib convex above, more prominent, acute and paler below, drying reddish brown; primary lateral veins 7–9 pairs, convex above, bluntly acute below, departing at a 35°–45° angle, weakly curved to the collective vein; collective veins arising usu-



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Fig. 58. *Anthurium nigropunctatum* Croat & Rodríguez. ENDESA.



ally from the 1st pair of basal veins, sometimes the 2nd pair of basal veins, rarely from one of the primary lateral veins, loop-connected and often difficult to discern; tertiary veins obscure below; basal veins 5–7, all free to the base; inflorescence erect; peduncle 16–64 cm long, 5–10 mm diam., subterete, obtusely sulcate, about $\frac{3}{4}$ as long at the petioles; spathe light green, lanceolate and boat-shaped, erect, erect-spreading, sometimes slightly hooding the end of the spadix, 11–28 cm long, 2–8 cm wide; subcoriaceous, acuminate at apex, inserted at 20 degrees angle and meeting at an acute angle at base; spadix creamy white, cylindrical, 8–17 cm long, 6–20 mm diam., stipitate 5–8 mm; flowers more or less quadrangular, 2.1–2.6 mm long, 2–2.2 mm wide (dried) 10–18 visible per spiral; tepals drying ca. 1 mm wide, the inner margin rounded ca. 1.4 mm wide; stamens held at the

Figs. 59–61. *Anthurium nigropunctatum* Croat & Rodríguez. Croat & Rodríguez 61457. Figs. 59–60. Habit. Fig. 61. Inflo-

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rescence at anthesis and young infructescence.



Fig. 62. *Anthurium nigropunctatum* Croat & Rodríguez. Croat & Rodríguez 61457. Young infructescence.

level of the tepals, anthers yellow drying 0.6 mm long, 0.6 mm wide, scarcely divaricate; infructescence erect, to 19 cm long; berries 3.5–8.5 mm long, claviforme, carmen-red, white at the base, drying narrowly acute; pericarp thick with raphides toward the base, mesocarp mucilaginous, yellowish; seeds 3–3.5 mm long, discoidal, green, 1 per locule.

Anthurium nigropunctatum is known only from the western slope of the Andes at 400 to 700 m elevation. It is common only along the road to the primary forest and in the regrowth areas but rare in the primary forest. It is a member of section *Calomystrium* Schott, the only member of this section at Reserva ENDESA. It is characterized by its persistent intact cataphylls, the punctate, cordate blades, the boat-shaped pale green erect spathes, creamy white cylindroid spadix and the early emergent red berries. The name refers to the dark glandular punctations which are not common in section *Calomystrium*.

This species has been called *A. xanthostachyum* Sodiro, an unrelated species that differs in having longer internodes (6–12 cm long), fibrous, persistent cataphylls, much veiner blades which are 2.5–3 times longer than wide and a greenish yellow spadix.

Two collections from El Oro Province (*Dodson 9017* and *Schupp et al. 25*) from west of Piñas differs in apparently lacking glandular punctations on the upper sur-

face. These otherwise seem to match the other material of the species very well.

Croat 50631 is perhaps also this species but it differs in having blades more narrowly ovate, over 2 times longer than wide and in having more conspicuous punctations on the upper surface.

ENDESA collections: *Croat & Rodríguez 61457* (G, MO, QCA); *Jaramillo 7604* (QCA); *Rodríguez 309, 320, 324* (QCA), *344A* (K, MO, QCA), *392, 354* (QCA). Other collections: EL ORO: 14 km W of Piñas, 740 m, *Schupp et al. 25* (MO, QCA), 11 km W of Piña, *Dodson et al. 9017* (MO, SEL). ESMERALDAS: Quinindé Cantón: Bilsa Biological Reserve, Montañas de Mache, 35 km W of Santa Isabela, 0°21'N, 79°44'W, *Pitman & Kueppers 739* (QCNE, MO); Fila de Bilsa, 7 km E of San José Bilsa, 400–600 m, 0°37'N, 79°51'W, *Gentry & Josse 72844*; Zapallo, 20 km SE of San Mateo, 0°59'N, 79°34'W, *Balslev & Steere 3119* (AAU); Esmeraldas-El Sucio, 2.3 km S of El Sucio, 18.6 km S of Atacames-Muisne Road, 180 m, 0°36'N, 79°54'W, *Croat 73094* (MO). LOS RIOS: Río Palenque Biological Station, 150–220 m, *Dodson 6682* (QCA), *Dodson & Gentry 6391* (MO, QCA), *Dodson s.n.* (Selby 14-76-32) (QCA); Montañas de Ila, 12 km W of Patricia Pilar, 600 m *Madison 4271* (SEL); vic. Centinela, 12.5 km E of Patricia Pilar, *Davenport et al. 2061* 13 km E of Patricia Pilar, 0°32'N, 79°11'W, 1,000 m, *Croat 73000* (MO, QCNE); 29.5 km E of Patricia Pilar, 0°33'N, 79°22'W, *Croat 50675* (MO, QCA); 10 km E of Patricia Pilar, *Palacios & Freire 7414* (MO, QCNE); Patricia Pilar-24 de Mayo, km 12, Cordillera de Chujchigán, 550 m, *Dodson 6108* (cultivated at Selby Gardens 76-0091-030 and vouchered by *Madison 4166, Ingram 1179* and *Christenson 1151*). PICHINCHA: Santo Domingo de los Colorados Cantón: Río Blanco, just S of Valle Hermoso, 25 km NW of Santo Domingo, 0°05'N, 79°15'W, 410 m, *Croat 72984* (CM, GH, HUA, M, MO, PMA, QCNE); Tinalandia, along Río Toachi, 9.6 km E of Santo Domingo de los Colorados, 600 m, 0°16'S, 79°07'W, *Croat 55678* (MO). TUNGURAHUA: Cantón Baños: Parroquia Río Negro, 1°24'N, 78°10'W, *Cerón 1565* (MO).

Anthurium ochreatum Sodiro, Anal. Univ.

Centr. Ecuador 15(108):10. 1901. Type: Ecuador. Pichincha: forests of Nanegal & Gualea, *Sodiro s.n.*; apparently lost. Lectotype designated here: Ecuador. Cotopaxi: Pujilí Cantón: Angamarca, *Sodiro s.n.* (November, 1900), (lecto-type, B; isolectotype, G). Figures 63–67.

Anthurium crebinerve Sodiro, Anal. Univ.

Centr. Ecuador 15(108):10. 1901. Type: Ecuador. Pichincha: Nanegal, *Sodiro s.n.* (Dec. 1899).

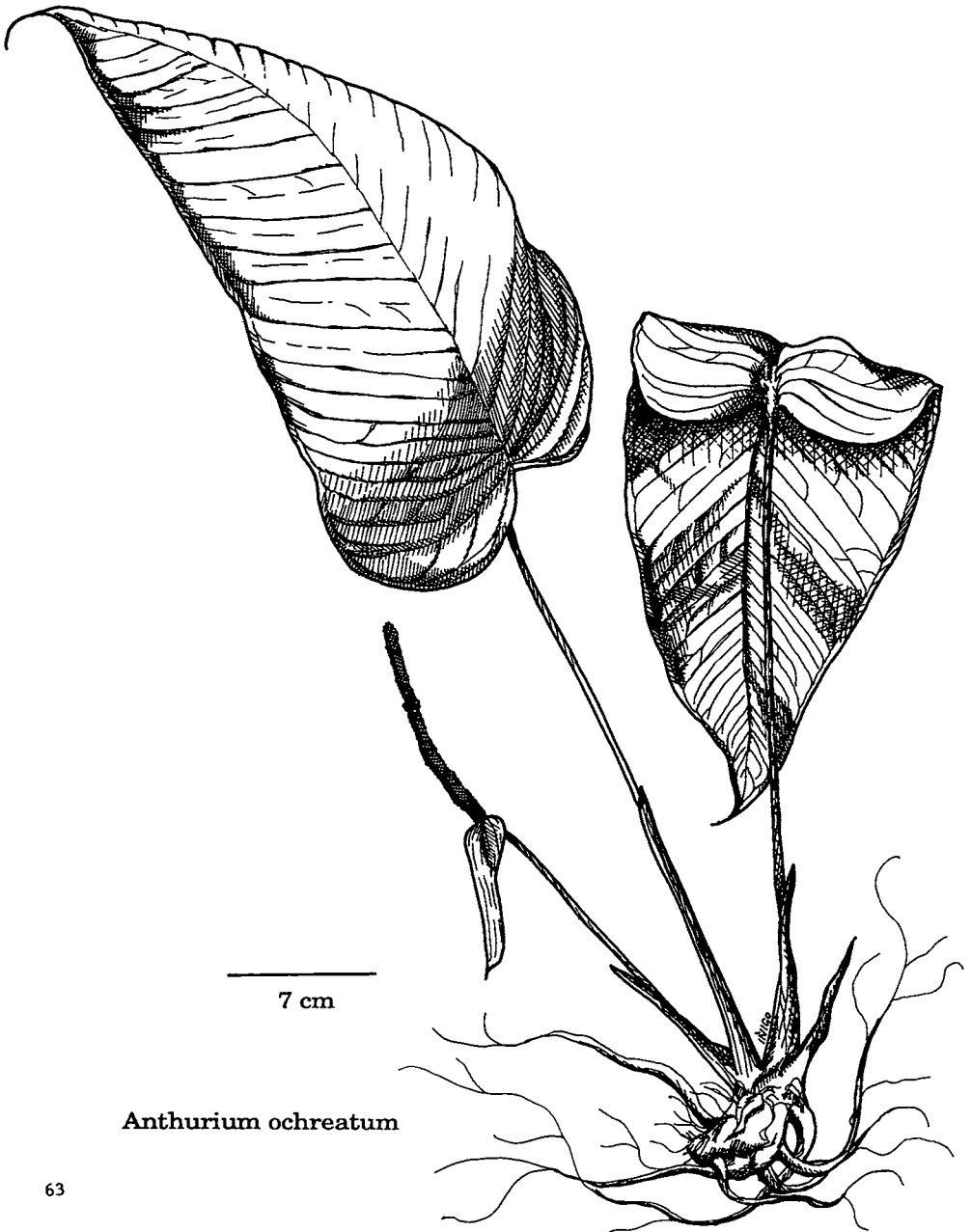
Usually terrestrial, sometimes an appressed epiphyte; stems to 30 cm long, elsewhere to ca. 1 m; internodes 2–5.5 cm long, 7–15 mm diam., medium green, semiglossy, drying tan-brown, moderately smooth; cataphylls 10–20 cm long, pale-speckled; leaves erect, petioles 25–40 cm long, 4–7 mm diam., subterete, narrowly and obtusely sulcate (elsewhere sharply C-shaped with medial rib as in *Croat* 73766), dark green, weakly glossy, densely pale-speckled, sheathed 3–6 cm; geniculum 1–1.6 cm long, paler green than the surface; blades ovate-elliptic to triangular-ovate, (20)31–41 cm long, (11)14–22 cm wide, 1.5–2.2 times longer than wide, chartaceous to thinly coriaceous, dark green and glossy to subvelvety above, pale green and semiglossy to matte below, acuminate to cuspidate at apex, subcordate or rarely rounded at base, sometimes the lobes unequal; the margins undulate; the sinus broadly arcuate to broadly v-shaped, up to 4 cm deep; midrib raised in a valley above, round-raised and darker below, densely pale-speckled; primary lateral veins 15–22 per side, arising at 35–40 degree angle, prominently sunken, drying narrowly raised, narrowly raised below; interprimary veins sometimes present; basal veins 1–3 pairs, free to the base; collective veins arising from one of the lowermost primary lateral veins or the first or second basal veins, sometimes from one of the lower basal veins, 3–6 mm from the margin; reticulate veins drying raised below. Inflorescences erect; peduncle 10–24 cm long, ca. 4 mm diam., densely pale-speckled, about ½ as long as the pet-

iole; spathe linear-lanceolate, 8–15 cm long, ca. 5 mm wide, membranaceous, green to pale green, inserted at 45 degree angle, spreading to recurved or reflexed, cuspidate at apex, the margins meeting at an obtuse angle, densely pale dotted on both surfaces; spadix pale yellow to pale green, subsessile, 8–16 cm long, 4–7 mm diam.; flowers rhombic, 2.6 mm diam., 5–7 visible per spiral; tepals semiglossy, 1.3–1.8 mm wide, the inner margin convex; stamens 1–1.3 mm long (full length); anthers orange; pistils early emergent, elongate; infructescence to 18 cm long, curved; berries botuliforme, green, to 4.6 mm long, maturing sporadically throughout the spadix; pericarp with raphides; mesocarp musciliginous, translucent; seeds oblong to discoidal, 2.7 mm long, 1.8 mm wide, 1 per locule.

The species is endemic to the western slopes of the Andes in central Ecuador between 600 to 2,070 m elevation. At the ENDESA reserve the species is found only in the primary forest. The species is recognized by its typically terrestrial habit, elongate tan-brown-drying stems, rather elongated slender internodes, sulcate petioles about as long as the blades, thin, veiny green-drying subcordate blades and by its yellowish spadix.

Anthurium ochreatum is very similar to *A. hieronymi* Engl., but that species differs in having the blade base rounded to acute versus subcordate in *A. ochreatum*, and in having the collective veins more remote from the margins. It is also similar to *A. membranaceum* Sodiro a species occurring in northern Ecuador and differing in having more elongate blades that are typically rounded to truncate at the base.

Sodiro (1903) keys out *A. crebinerve* in his section *Cordifolia* and *A. ochreatum* in his section *Integrifolia* Sodiro (lacking posterior lobes) but the extant material determined by Sodiro show the two to be virtually identical. In his key he admits that *A. ochreatum* is sometimes subcordate. Another curious thing is that he keys *A. ochreatum* out as being three times longer than broad yet the only specimens extant determined by Sodiro (those from Anga-



Anthurium ochreatum

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Fig. 63. *Anthurium ochreatum* Sodiro. ENDESA.

marca) have blades ranging from 1.6–2.2 times longer than broad.

ENDESA collections: *Croat & Rodríguez* 61495 (G, K, M, MO, QCA); *Harling & Andersson* 23301 (GB); *Jaramillo* 6703, 6708,

7581, 76248, 6729, (QCA); 6787 (MO, QCA); *Rodríguez* 167 (MO, QCA) 177 (QCA), 190 (MO), 226 (K, QCA), 356, 364, 388 (QCA). Other collections seen: CO-TOPAXI: Quevedo-El Corozón, 8–10 km W



Figs. 64–65. *Anthurium ochreatum* Sodiro. Fig. 64. Croat 73766. Habit, with inflorescence. Fig. 65. Croat 72144. Stems

of El Corazón, 850–1,000 m, *Harling & Andersson 19103* (MO); La Maná Cantón: vic. Pucayacu, 0°39'S, 79°05'W, 1,480–1,530 m, *Croat 73766* (MO). IMBABURA: Otavalo Cantón: Otavalo-Selva Alegre, 57.6 km W of Pan-American Hwy, 2,070 m, 0°16'N, 78°30'W, *Croat 72251* (MO). PICHINCHA: El Paraíso-Saguangal, 3 km from El Paraíso, 1,500 m, 0°10'N, 78°46'W, *Ollgaard et al. 37779, 37795, 37807* (AAU); Alóag-Santo Domingo de los Colorados, San Ignacio, km 23, 2,000 m, *Sparre 14721, 17744* (S); Tandápi, confluence of Río Tandápi and Río Pilatón, *Sparre 16729* (S); Quito-Santo Domingo (old road), 12–15 km N of La Palma, 1,430–1,540 m, 0°20'S, 78°55'W, *Luteyn et al. 8761*; 2–3 km N of La Palma, 890–1,010 m, 8°18'13"S, 78°54'30"W, *Croat 56983* (MO); 15 km NE of Chiriboga, 1,710 m, 0°17'S, 78°43'W, *Croat 50616* (MO); Tandayapa-Mindo, 19.5 km S of Tandayapa, ca. 5.5 km N of Mindo, 1,930 m, *Croat 49395* (MO); km 79 ca. 5 km S of Mindo, 1,770 m, 0°02'S, 78°44'W, *Croat 50266, 50268* (MO); km 73 N of Tandayapa, 2,300 m, 0°02'S, 78°42'W, *Croat 50265* (MO); Mindo, 1,200 m, 0°05'S, 78°45'W, *Neill & Azanza 10338* (B, MO, QCNE, US); Nono-Nanegal, 6 km SE of Tandayapa, 2,050 m, 0°03'N, 78°59'W, *Croat 50238* (MO); Gualea-Armenia, 3 km from Armenia, 1,800 m, 0°06'N, 78°43'W, *Ollgaard et al. 37887* (AAU); Reserva Maquipucuna, Cerro Sosa, ca. 5 km (airline) S. of Nanegal, 2,000 m, 0°07'N, 78°38'W, *Webster et al. 28230* (DAV); northern boundary, 10 km N. of Nanegalito, 1,200 m, 0°10'N, 78°35'W, *Neill et al. 8657* (MO, QCNE); Parroquia Nanegal: Río Umachaca W of Hacienda El Carmen, 1,250 m, 0°07'N, 78°38–38.5'W, *Webster & Kelch 28731* (DAV).

Anthurium pallidiflorum Engl., Bot. Jarhb. Syst. 25:395. 1898. Type: Ecuador. Pichincha: Río Peripa, near San Miguel de los Colorados, *Sodiro s.n.* (B). Figures 68–72.

← showing elongate internodes and deciduous cataphylls.



Figs. 66–67. *Anthurium ochreatum* Sodiro. Croat 56986. Fig. 66. Habit. Fig. 67. Immature infructescence.

Anthurium annulatum Sodiro, Anal. Univ. Centr. Ecuador 15(108):5. 1901. Type: Ecuador. Cotopaxi: Angamarca, *Sodiro s.n.* (Nov. 1900); (G, Q, QPLS).

Anthurium lorifolium Sodiro, Anal. Univ. Centr. Ecuador 15(108):5. 1901. Type: Ecuador. Santo Domingo de los Colorados, *Sodiro s.n.* (Aug. 1885) (Q).

Anthurium spruceanum Engl., Pflanzenz. IV. 23B (Heft 37):109. 1905. Type: Ecuador. Chimborazo: *Spruce s.n.* (July, 1860) (K).

Epiphyte; stems to 1 m long; internodes 5–10 mm long; cataphylls 4–16 cm long, green, promptly weathering to persistent long, pale fibers; petioles 11–40 cm long, 3 mm diam., subterete, narrowly and obtusely sulcate, sheathed 7–8 cm; geniculum 6–16 mm long, paler than the remainder; blades strap-shaped, moderately coriaceous, 31–105 cm long, 5.5–13 cm wide (7–8 times longer than wide), acuminate at apex, rounded at base, dark green and velvety above with glandular punctations, slightly paler and matte beneath; midrib convex and paler above, sometimes cream-colored, slightly paler and more prominently raised beneath; primary lateral veins 40–46 per side, departing at an angle of 35–40 degrees, obtusely pleated-raised above, flat below; tertiary veins not evident; collective veins arising from the base, sometimes with a secondary collective vein which soon merges with the margin, 6–14 mm from the margin; antimarginal vein present, ca. 1 mm from the margin. Inflorescence erect to erect-spreading; peduncle 13–26 cm long, equalling or shorter than the petioles; spathe linear-lanceolate, membranaceous, 4–12 cm long, 1–1.5 cm wide, pale green, acuminate at apex, the margins meeting at an acute angle at the base; spadix whitish pink, 5–10 cm long, 4–7 mm diam., stipitate 2–3 mm; flowers rhombic, 1.6–1.9 mm diam., 7–10 visible per spiral; lateral tepals 0.8–1.6 mm wide, inner margin broadly rounded to nearly straight; stamens 1.3 mm long; anthers yellowish. Infructescence to 20 cm long, pendent; berries ellipsoid, red-

carmine in apical half, white at the base, maturing simultaneously throughout the length of the spadix; pericarp with a few raphides, mesocarp muscilaginous, translucent; seeds green, discoidal, 3.5–5 mm long, 1 per locule.

The species is endemic to Ecuador, occurring only on the western slopes of the Andes at 20 to 930 m elevation. At Endesa the species is frequent in both the primary forest and in regrowth. The species is characterized by its strap-shaped velvety leaves and short inflorescence. It resembles both sect. *Porphyrochitonium* Schott and sect. *Pachyneurium* Schott series *Multinervia* Croat but is a member of neither, lacking the glandular punctations of the former and the involute veneration of the latter. The species is most easily confused with *A. acutissimum* Engl., a member of section *Pachyneurium* which has involute rather than convolute veneration. In addition that species has proportionately longer peduncles (22–64 cm long).

ENDESA collections: *Croat & Rodríguez 61510* (MO, QCA); *Luteyn & Borchsenius 13361* (MO); *Rodríguez 169* (MO, QCA), *182* (K, MO, QCA), *255* (MO, QCA), *362* (QCA), *382* (QCA). Other collections: Province Unknown: Santo Domingo-Quinindé, km 170–175, *Acosta Solís 13886* (F). CHIMBORAZO: Volcán Chimborazo, *Spruce s.n.* (July, 1860) (K). Naranjapata-Olimpo, valley of Río Chanchan, 800–1,000 m, *Horich s.n.* (UC). COTOPAXI: Quevedo-Latacunga, 55.5 km E of Quevedo, 930–950 m, 0°53'N, 79°04'W, *Croat 57025* (MO); km 52–53, Tenefuerte, Río Pilaló, *Dodson & Gentry 12176* (MO); 3 mi. E. of El Palmar, 800 m, *Dodson & Gentry 10264* (MO); Pujilí Cantón: Angamarca, *Sodiro s.n.* (Nov., 1900); without exact locality, 800 m, *Gilmartin 808* (US). ESMERALDAS: Eloy Alfaro Cantón: Río Chimbagal, tributary of Río Cayapas, Comuna de Corriente Grande, 150–200 m, 0°41'N, 78°50'W, *Yáñez et al. 1444* (MO). LOS RIOS: Hacienda Monica, 12 km E of San Carlos, 180 m, *Sparre 19403, 19404* (S); Hacienda Clementina, Babahoyo-Montalvo, 195 m, *Sparre 195*; 20 m, *Sparre 14482* (S); Río Palenque Biological Station, 200 m, *Gentry 10104* (MO); 210–



Fig. 68. *Anthurium pallidiflorum* Engl. ENDESA.

250 m, *Croat 38665* (MO). PICHINCHA: Quito-Alluriquín via Chiriboga, 2–3 km N of La Palma, 890–1,010 m, 0°18'13"N, 78°54'30"W, *Croat 56965* (MO); Alóag-Santo Domingo, Alluriquín, confluence Río Alluriquín & Río Toachi, ca. 600 m, *Sparre 14803* (S); vic. Hotel Tinalandia, 9.6 km E of Santo Domingo de los Colorados, 600 m, *Croat 55671* (MO, QCA); vic. Santo Domingo de los Colorados, *Sodirol sn.* (July, 1875) (Q); 600 m, 0°16'S, 79°14'W, *Cerón & Benevides 6228* (MO); Río Blanco at Villa Hermosa, 2 km S of Santo Domingo-Esmeraldas Hwy, 250 m, 0°5'S, 79°15'W, *Croat 50686* (MO); La Corina, 6 km E. of Centinela, 20 km E of Patricia Pilar, 430 m, *Gentry & Shupp 26681* (MO).

Anthurium panduriforme Schott, Prod. Aroid. 536. 1860. Type: Costa Rica. San Miguel, *Wendland 776* (GOET). Figure 73.

Terrestrial; stems to 60 cm long; internodes 1–4 cm long, 0.5–3 cm diam.; cataphylls 20–25 cm long, initially persisting as fibers then deciduous; leaves erect; petioles 40–60 cm long, 5 mm diam., subterete to obtusely D-shaped toward apex, obtusely sulcate, sheathed 2–5 cm; geniculum 1–1.5 cm long, darker than the remainder; blades somewhat panduriforme, 30–54 cm long, 20–36 cm wide, broadest at the petiole insertion, acute to acuminate at apex, deeply lobed at base, subcoriaceous, dark green and glossy, drying grayish green above, much paler and glossy, drying yellow-green and glossy below, sometimes with obscure glandular dots; the posterior lobes 16–26 cm long, rounded, directed downward or outward; sinus spatuliform to hippocrepiform; midrib weakly raised and concolorous above, more prominent and tinged brownish below; primary lateral veins 19–21 per side, sunken above, convex, drying paler than surface beneath, arising at 30–45 degree angle, prominently raised below; basal veins 6–9 pairs; collective veins arising from the 3rd or 4th basal vein, 1.5–5 mm from the margin; antimarginal veins present; peduncle 15–30 cm long, 3 mm diam., sulcate adaxially, sometimes striate, green tinged maroon, $\frac{1}{4}$ – $\frac{1}{2}$ as



Figs. 69–70. *Anthurium pallidiflorum* Engl. *Madison 4025*. (Cultivated, *Selby 77-2097*). Fig. 69. Leaves showing pale midrib. Fig. 70. Infructescence.



Figs. 71–72. *Anthurium pallidiflorum* Engl. Fig. 71. Habit in cultivation at Missouri Botanical Garden. Fig. 72. Inflorescence (*Selby 78-231*).

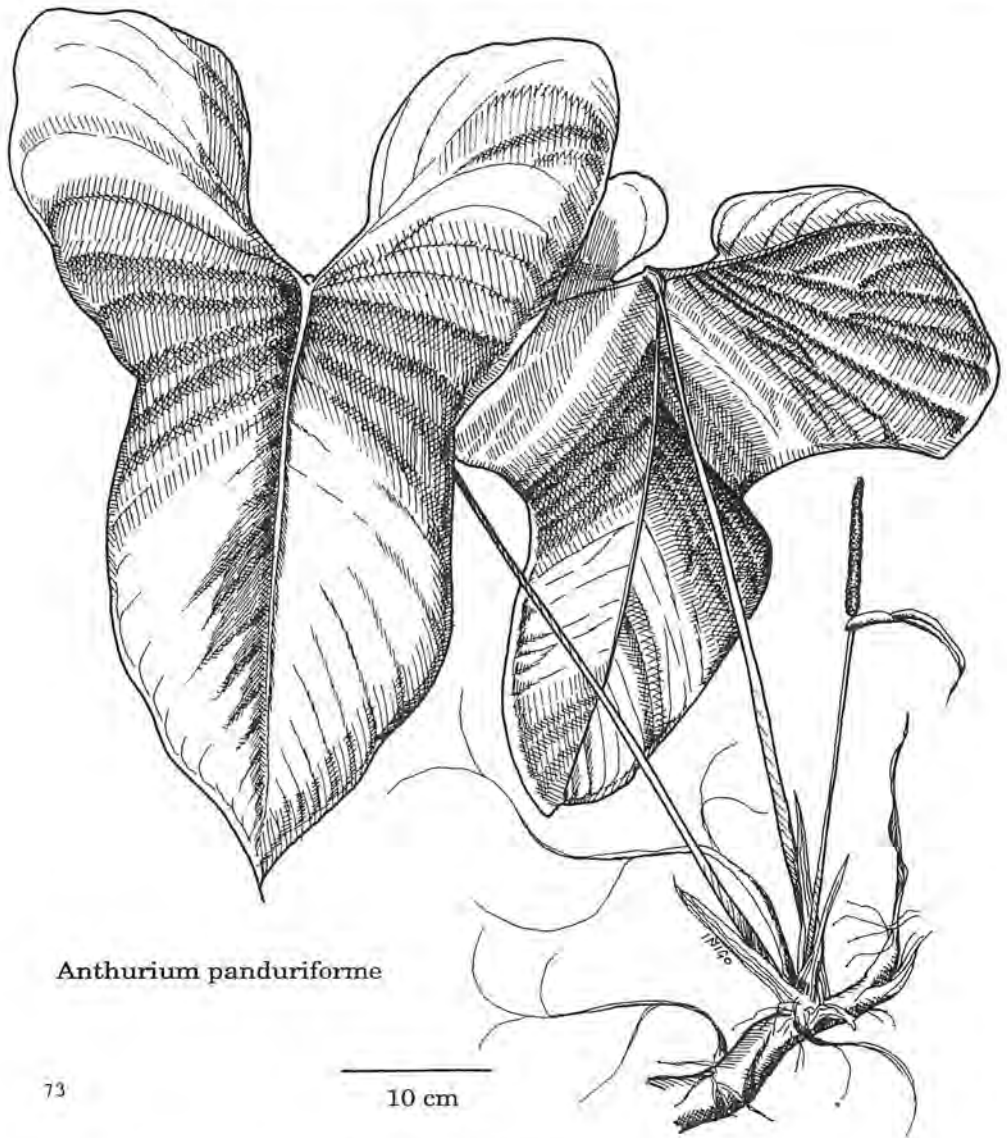


Fig. 73. *Anthurium panduriforme* Schott. ENDESA.

long as the petioles; spathe linear-lanceolate, green with purplish violet lines, 8–15 cm long, 1–2.5 cm wide, subcoriaceous, inserted at 45 degree angle, recurved, acuminate at apex, the margins meeting at an angle of ca. 110° at the base; spadix golden-yellow to yellowish orange, sessile, 8–15 cm long, 5–8 mm diam.; flowers rhombic to quadrangular, 2.1–2.3 mm diam., 7–8 visible per spiral; lateral tepals 1.5 mm wide,

the inner margins convex, with raphides on the lateral walls; stamens 1.6 mm long, prominently exserted; anthers yellow; berries ovoid, pale green; seeds greenish white, 2.3–2.5 mm long, 0.8–1 mm wide, 1 per locule.

The species ranges from Costa Rica to Ecuador at elevations from 400 to 1,560 m. At Endesa the species is rare in both the primary forest and in regrowth. It is rec-

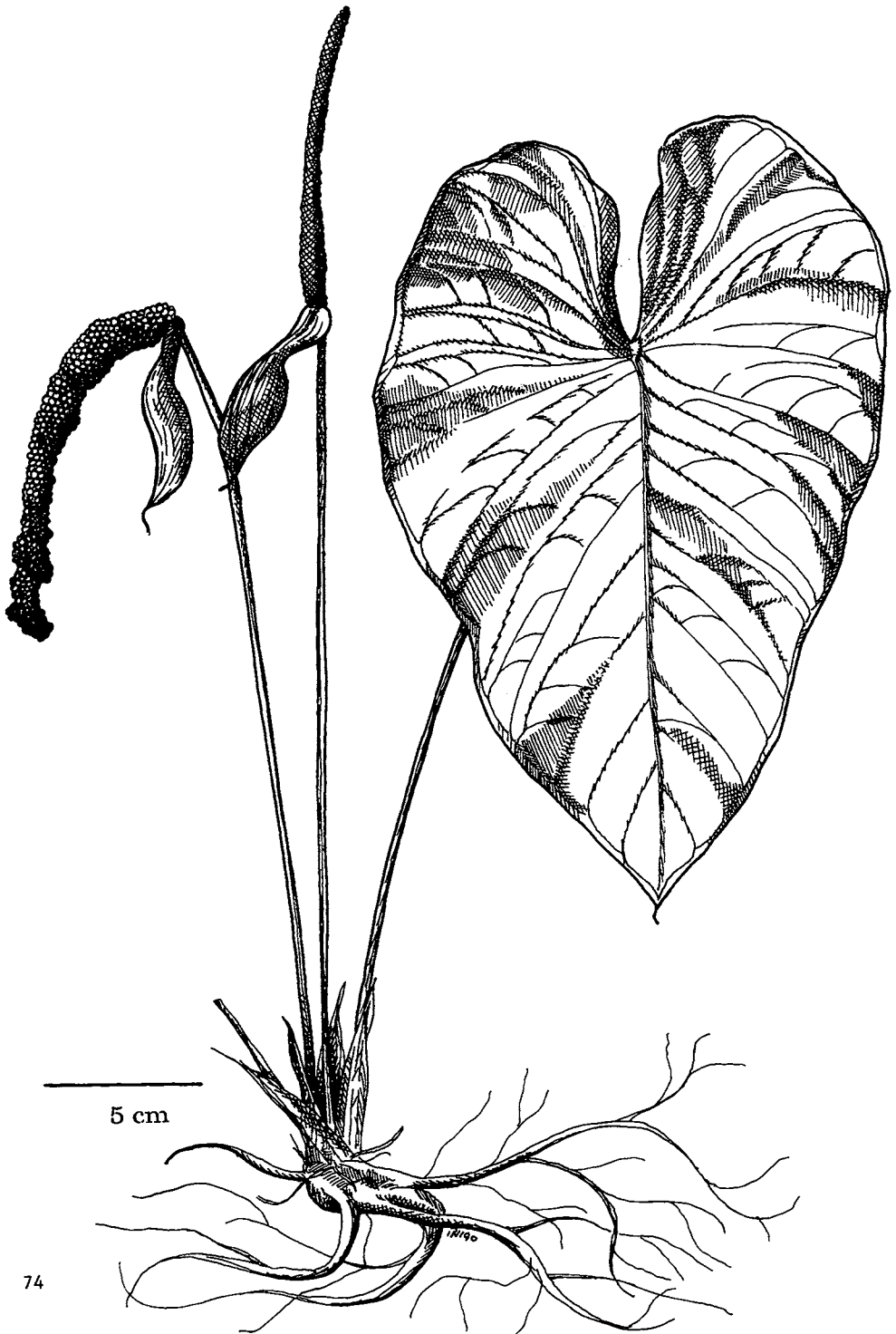


Fig. 74. *Anthurium propinquum* Sodiro var. *propinquum*. ENDESA.



Fig. 75. *Anthurium propinquum* Sodiro var. *propinquum*. Croat 55543. Leaf.

ognized by its shiny panduriform blades and bright golden-yellow inflorescence.

ENDESA collections: *Croat & Rodríguez* 61468 (CM, G, K, MO, QCA); *Harling & Andersson* 23247 (GB); *Jaramillo* 7626 (QCA); *Rodríguez* 198 (MO), 225, 395A (QCA), 419 (K, QCA), 423 (QCA). Other collections seen: CARCHI: El Pailón, ca. 45 km below Maldonado, along path to Tobar Donoso, 800 m, *Madison & Besse* 7177, 7180 (SEL). ESMERALDAS: vic. Lita, 550–650 m, *Madison et al.* 5058 (SEL). PICHINCHA: Tinalandia, 9.6 km E of Santo Domingo de los Colorados, 700 m, 0°16'S, 79°07'W, *Croat* 55740 (MO); Centinela, 10 km airline miles SE of Patricia Pilar, 0°37'S, 79°18'W, *Grayum & Zamora* 9402 (MO).

Anthurium propinquum Sodiro var. *propinquum*, Anturios Ecuatorianos, Monografía II. Contribuciones al conocimiento de la flora Ecuatoriana, Pp.



Fig. 76. *Anthurium propinquum* Sodiro var. *propinquum*. Croat 61524. Petioles and inflorescence.

i–xxxii, 1–231, 1–7 (Adiciones), pls. 1–28. Quito. Type: Ecuador. Río Cañar: *Rimbach s.n.* (B). Figures 74–76.

Anthurium williamsii K. Krause, Notizbl. Bot. Gart. Berlin-Dahlem 11:610. 1932. Type: Panama. Darién: near Cana, *Williams* 817 (not seen).

Terrestrial; stem to 60 cm long; internodes short, to about 2 cm long, (1.5)3–5.5 cm diam.; turning light brown; cataphylls 7–12 cm long, mostly deciduous, the base of the fibers persistent, at least the uppermost persisting as a reticulum of light brown fibers, sometimes with patches of epidermis; petioles terete, glossy, 45–131 cm long; blades ovate-cordate, 1.3 times longer than wide, thinly coriaceous, 33–47 cm long, 22–35 cm wide, 1.2–1.8 times longer than wide, acuminate at apex, deeply cordate at base, dark green and glossy above, slightly paler and matte beneath; major veins concolorous above, paler beneath; midrib convex on both surfaces; primary lateral veins (7)10–13 per side, sunken above, round-raised beneath, arising at 45 degree angle; secondary veins in part sunken above, raised on lower surface; tertiary veins moderately obscure; basal veins 8 pairs, the 1st & 2nd free to the base, the 3rd almost free, the remainder weakly coalesced for less than 2 cm; the posterior rib barely naked with the sinus; collective veins arising from one of the lowermost basal

veins, 2–4 mm from the margins. Inflorescence erect; peduncle to 80 cm long; spathe green, 10–14 cm long, 1.7–2.2 cm wide, acuminate at apex, inserted at 45 degree angle then reflexed-spreading, the margins meeting at an obtuse angle at base; spadix 17–23 cm long, 6–10 mm diam., gradually long-tapered, dark violet-purple, glossy; flowers rhombic, 2.4–2.8 mm long, 1.5–1.8 mm wide, 7–8 visible per spiral; lateral tepals 1.4–1.8 mm wide, the inner margins broadly rounded; infructescence erect; berries early emergent, reddish purple when immature, becoming dark violet-purple.

Anthurium propinquum ranges from Costa Rica to Ecuador from sea level to 1,800 m, and is wide ranging in Ecuador on the western slopes of the Andes in Carchí, Esmeraldas, Imbabura, Pichincha, Los Rios, Cañar, Cotopaxi, Bolívar, and Azuay. In Ecuador the species is known from 100 to 1,300 m but is most common from 500 to 900 m, especially along streams. At Reserva ENDESA it is common in the mature forest along the banks of streams, sometimes occurring directly on the rocky flat bottoms above flowing water.

The species is characterized by its terrestrial habit, short internodes, semi-intact cataphylls with coarse pale fibers at the base, moderately thin, greenish-drying blades 1.2–1.8 times longer than wide, and by the long-pedunculate inflorescence with a green, lanceolate spathe, a long-tapered dark purple spadix, and dark violet-purple berries.

The var. *propinquum* is distinguished from var. *albispadix* in having the spadix dark violet-purple at anthesis and in having the petioles and major veins on the lower blade surface drying pale. Both varieties are similar in being terrestrial, in having similar green-drying blades and dark violet-purple berries. Both varieties occur at ENDESA, with var. *albispadix* occurring principally as an understory herb in the forest and var. *propinquum* preferring stream banks.

Anthurium propinquum is similar to both *A. praealtum* Sodiro and *A. oreophilum* but both of these species differ in having blades 2–2.3 times longer than broad, and in hav-

ing usually up to 5 pairs of basal veins. Based on an inspection of the type material and by careful analysis of Sodiro's descriptions it is probable that *A. praealtum* and *A. oreophilum* are synonyms.

Anthurium propinquum has long been confused with *A. dolichophyllum* Sodiro, but that species has proven to have its affinity with *A. tremulum* Sodiro, a species with triangular-cordate, brown-drying blades (rather than a broadly ovate green-drying blade as is usually the case with *A. propinquum*).

Madison & Besse 7033 (SEL) from El Pai-lón in Carchí Province, ca. 45 km below Maldonado on the path to Tobar Donoso, at 800 m is apparently also *A. propinquum* but it is described as being a scandent epiphyte and was reported to have a red spadix.

ENDESA collections: *Cerón & Ayala 10091* (MO); *Croat & Rodríguez 61446, 61481, 61524* (B, CM, K, MO, QCA, QCNE); *Harling & Andersson 23246* (GB) *Jaramillo 6719* (MO, QCA); *Mena 228* (QCA); *Rodríguez 223, 223C, 249* (QCA). Other collections: W slopes, W Andes, 1,100–1,600 m, *Lehmann 5338* (F, K). AZUAY: Andes of Cuenca, W of Cuenca, 1,100–1,600 m, *Lehmann 5338* (F). BOLIVAR: Limón, 880–1,100 m, *Solís 6351* (F). CARCHI: San Marcos, 600 m, 1°08'N, 78°20'W, *Thompson et al. 778* (CM); Tulcán: Gualá Reserve, Parroquia El Chical, Sector Gualpí Medio, Río Canumbí, 0°02'N, 78°15'W, 1150 m, *Grijalva et al. 496*; Lita, *Selby 78-1181* (MO); Carchí-Esmeraldas, ca. 20 km past Lita on road Lita-Alto Tambo, 550 m, *van der Werff et al. 12013* (AAU, MEXU, MO); Reserva Etnica Awá, Parroquia El Chical, sector Gualpí Medio, Río Canumbí, 1,150 m, 1°02'N, 78°15'W, *Grijalva et al. 496* (MO); Lita, *Selby 78-1181* (MO); San Marcos, ca. 600 m, 1°08'N, 78°20'W, *Thompson et al. 778* (CM). COTOPAXI: Tene fuerte, Río Pitaló, km 52–53, Quevedo-Latacunga, 750–900 m, *Dodson & Dodson 11990* (MO), *11988* (MO, SEL); Quevedo-Latacunga, 44.7 km E of Quevedo, 124 km E of La Mana, W of Latacunga, 400 m, 0°51'S, 79°12'W, 400 m, 0°51'S, 79°12'W, *Croat 55858* (MO). EL ORO: Arenillas-Piñas, 3°40'S, 79°45'–55'W,

1,000 m, *Thompson 367* (MO); 5 km W of Piñas, 3,800 ft., *Thompson 147* (MO); 11 km W, 3,100 ft., *Thompson 157, 161*; 11.5 km W, 3,050 ft., *Thompson 163* (MO); 11 km W of Piñas on new road to Sta. Rosa, 850 m, *Dodson et al. 9081* (SEL); 20 km W of Piñas, 3°39'S, 79°46'W, 500, *Madsen 86931* (AAU). ESMERALDAS: San Lorenzo Cantón: 20 km W of Lita, *van der Werff et al. 12013* (MO); Lita, 600 m, *Madison et al. 5283* (QCA, SEL), [vouchered by *Christenson 1548* (MO, SEL)]; Río Bravo de Cayapas, 250 m, 0°41'N, 78°56'W, *Holm-Nielsen 25516* (AAU); Río Verde, above Businga, alt. 300 m, 1°N, 79°30'W, *Juncosa 787* (MO, QCA); Río San Miguel, *Harling 4580* (S); Río Grande, 70 m, *Harling 4620* (S); Santo Domingo-Quinindé, Km 170–175, *Acosta-Solis 14009* (F); Esmeraldas-Santo Domingo road, 63 km SE of the jct. of roads to Esmeraldas and Súa, 117 km NW of Santo Domingo de los Colorados, 60 m, 0°34'N, 79°33'W, *Croat 55634* (MO). GUAYAS: near frontier of Los Ríos, Bolívar, & Chimborazo Provinces, 0.9 km E of junction to El Triunfo at edge of General Elizalde (Bucay), above Río Chimbo, 315 m, 2°12'S 79°05'W, *Croat 61595* (MO); Cañas-Chimborazo-Bolívar, vic. Bucay, 100–1,250 ft., *Camp E-3849* (NY). IMBABURA: Otavalo, Otavalo-Selva Alegre, 57.6 km W of Pan-American Highway in Otavalo, 2,070 m, 0°16'N, 78°30'W, *Croat 72256* (MO); Ibarra, Ibarra-Lita, 13.5 km E of Lita, 800 m, 0°55'N, 78°27'W, *Croat 72260* (MO). LOS RIOS: Río Palenque Biological Station, 210–250 m, *Croat 38667, 38674, 38691* (MO); vic. Montalvo, ca. 40 km E of Babahoyo, 100–200 m, 1°47'S, 79°17'W, *Holm-Nielsen et al. 2702* (AAU, MO); Centro Científico Río Palenque, 210–250 m, *Croat 38667, 38674, 38691* (MO); Río Palenque Biological Station, vic. Km 56 Quevedo-Santo Domingo, 150–220 m, *Dodson & Vrieze 4359* (RPSC, SEL, US); vic. Montalvo, ca. 40 km E of Babahoyo, 100–200 m, 1°47'S, 79°17'W, *Holm-Nielsen et al. 2702* (AAU, MO, NY). PICHINCHA: El Paraíso-Saguangal, 3 km from El Paraíso, 1,500 m, 0°10'N, 78°46'W, *Ollgaard et al. 37778* (AAU); Quito-Santo Domingo de los Colorados, km 95, *Dodson & Thien 1245* (MO); Quito-Alluriquín, via Chiriboga, 1,100–1,230 m, 0°20'S, 78°55'W, *Luteyn et al. 8734*; 1 mi. E of Río Pilatón, 0°18'S, 78°55.5'W, *Grayum & Zamora 9432* (MO, QCA); 2 km NE of La Palma at Río Pilatón, 930 m, *Croat 38746* (MO); 2–9 km E of Río Pilatón, 1,100–1,230 m, 0°20'S, 78°55'W, *Luteyn et al. 8734* (MO, NY); Santo Domingo de los Colorados, 0°14'S, 79°08'W, *Hammel & Trainer 15878* (MO); vic. Hotel Tinalandia, 9.6 km E of Santo Domingo de los Colorados, 600 m, 0°16'N, 79°07'W, *Croat 55677, 55725* (MO); Santo Domingo-Puerto Limón, km 23, 100 m, 0°21'S, 79°22'W, *Kvist 40202* (AAU); Centinela, Patricia Pilar-Flor de Mayo, km 12, 600 m, 0°30'S, 79°10'W, *Webster 22936* (MO); Caserío Palmar de Bimbe, 10.5 km N. of Patricia Pilar, 550–575 m, 0°35'N, 79°12'30"W, *Croat 56984* (MO); Santo Domingo de Los Colorados, just W of town, 600 m 0°14'S, 79°08'W, *Hammel & Trainer 35878* (MO); Cantón Quito: Parroquia Calacalí, 20 km from Calacalí-Na-negalito road, 2,000 m, 0°02'N, 78°39'W, *Cerón et al. 5898* (MO); San Juan-La Palma via Chiriboga, 2 km NE of La Palma, 930 m, *Croat 38746*; Río Blanco, 300 m, *Harling 4483* (S); Quito-Alluriquín via Chiriboga, ca. 1 km E of Río Pilatón bridge, 960 m, 0°18'S, 78°55'30"W, *Grayum & Zamora 9432* (MO); Alóag-Santo Domingo Rd., vic. Toachi, at confluence between Río Pilatón and Río Toachi, 850 m, *Sparre 13857* (S); vic. Santo Domingo de los Colorados, 600 m, 0°14'S, 79°08'W, *Hammel & Trainer 15878* (MO); Santo Domingo de Los Colorados, vic. Rancho Brahman, ca. 10 km NW of town on road to Esmeraldas, 400 m, *Sparre 14099* (S); vic. Hotel Tinalandia S of hwy. between Santo Domingo de los Colorados & Alóag, along Río Toachi, 9.6 km E of Santo Domingo de los Colorados, 600 m, 0°16'S, 79°07'W, *Croat 55677* (MO); Santo Domingo de Los Colorados, along road from main Alóag-Santo Domingo Highway to Chiriboga near its start at Río Toachi, 0.1 km from main Alóag-Santo Domingo Road, ca. 1,200 m, 0°18'S, 78°55'W, *Croat 72958* (MO); along old road to Quito from Alluriquín via Chiriboga, 2–3 km from main Alóag-Sto. Domingo de los Colorados road, 0°18'13"S, 78°54'30"W, 890–1,010 m, *Croat 56982* (MO).

Anthurium propinquum Sodiro var. ***albispadix*** Croat & J. Rodríguez var. nov. Type: Ecuador. Pichincha: Río Blanco, at Valle Hermosa, 1.9 mi. N of Santo Domingo de los Colorados-Esmeraldas Hwy., 410 m, *Croat 72981* (holotype, MO-4075125; isotypes, AAU, B, COL, F, K, NY, QCA, QCNE, S, US). (Photo on back cover.)

Plerumque terrestris; internodia brevia, 2–4 cm diam.; cataphylla persistentia intacta; petiolus 89–92 cm longus, teres aut subteres; lamina ovato-cordata, 47–70 cm longa, 30–42 cm lata, nervis basalibus liberis ad basim. Inflorescentia erecta; pedunculus 29–72 cm longa; spatha viridis 10–22 cm longa, 1–3 cm lata; spadix albus; bacca purpureus.

Usually terrestrial, sometimes epiphytic near the ground, stems to 60 cm long; sap turning orangish; internodes short, 2–4 cm diam.; cataphylls to 23 cm long, persisting intact, reddish brown; petioles 89–92 cm long, 6–10 mm diam. midway, terete or subterete, sometimes weakly flattened or narrowly and obscurely sulcate adaxially, dark to medium green and semiglossy, drying reddish brown; blades ovate-cordate, 47–70 cm long, 30–42 cm wide, thinly coriaceous, dark green and glossy to semiglossy above, slightly paler and weakly glossy below; midrib convex and scarcely paler, sometimes purplish above, convex to round-raised and paler below; basal veins 5–6 pairs, mostly free to the base, sometimes the 3rd–5th weakly coalesced near the base; primary lateral veins 8–10 pairs, sunken or weakly raised in valleys above, prominently raised to acute and paler below, prominently turned upward toward the margins connecting 2 or more lateral veins before merging with the margins; interprimary veins usually present, drying reddish brown; collective veins usually arising from one of the primary lateral veins, even sometimes near the apex, sometimes loop-connected from one of the middle basal veins tertiary veins visible below, slightly raised. Inflorescence erect; peduncle terete, to 29–72 cm long; spathe 10–22 cm long, 1–2 cm wide, narrowly acute at apex, green, tinged

purple, spreading then reflexed; spadix 13–23 cm long, 5–8 mm diam., cream or creamy white or white to pale yellowish at anthesis, sometimes with orangish tip, soon flesh-colored, brownish white, greenish or pale brown, dark green in fruit. Inflorescence to 40–47 cm long, to 2.5 cm diam., dark green to maroon, berries early emergent and green, turning dark purple, bright red-violet or purplish violet, the lower half paler or whitish when exerted.

Anthurium propinquum var. *albispadix* is endemic to Ecuador, ranging from Esmeraldas to Cotopaxi Provinces, usually at 130 to 300 m and terrestrial, ranging to 1,500 m, and often epiphytic near the ground at higher elevations.

The species consists of two varieties (both of which occur at ENDESA) and is recognized by its generally terrestrial habit, short internodes with persistent, more or less intact cataphylls, long, subterete petioles, moderately thin, veiny, ovate-cordate blades with essentially free basal veins. The var. *albispadix* is recognized by its white to cream spadix as well as by its generally purplish brown-drying petioles.

Anthurium propinquum var. *propinquum* Sodiro has a similar range as var. *albispadix* but generally is found at somewhat higher elevation, especially between 500 to 900 m elevation. While var. *albispadix* occurs in the understory, var. *propinquum* occurs commonly along streams.

Anthurium propinquum has been confused with *A. leucostachyum* Sodiro, a similar species with a white spadix. Sodiro described the species as having leaf blades 20–35 cm long. The only known type specimen of *A. leucostachyum*, has narrowly ovate leaves which are 14–17 cm long. That species, though still poorly known probably does not represent this species, which has leaves 47–70 cm long. The type specimen of *A. leucostachyum* also has collective veins arising from the first or second basal vein, a condition which is rare in typical material of the taxon described here.

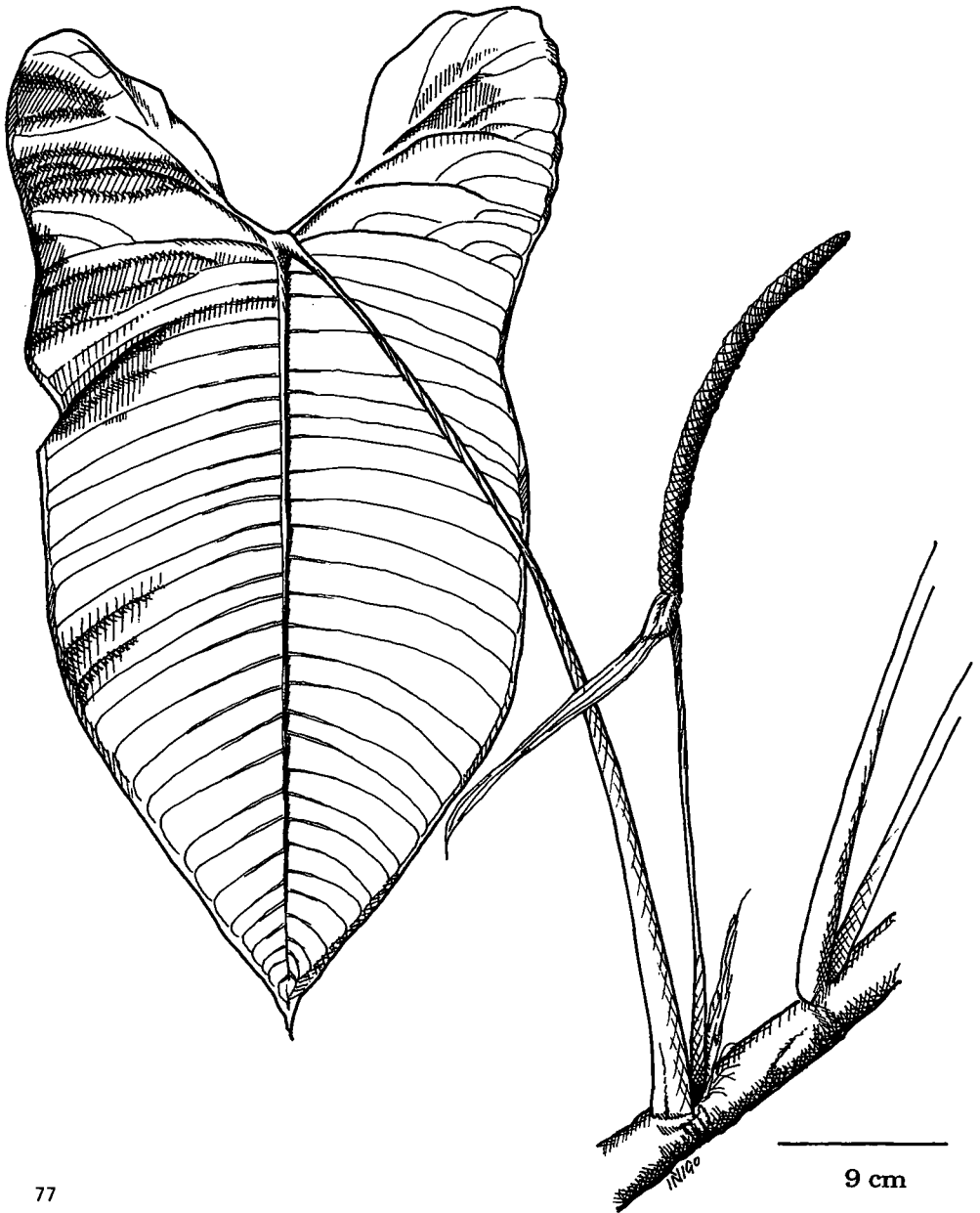
ENDESA Collections: *Grayum & Zamora 9367* (QCA, MO). Other collections: CAÑAR: Azoques-El Triunfo (road to Guayaquil, Machala, Riobamba), 1 km S of La De-

licia, 2°27'S, 79°10'W, *Croat 50871* (MO); *50872* (MO). COTOPAXI: Quevedo-Latacunga, 3 km E of El Palmar, 800 m, *Dodson & Gentry 10251* (SEL); La Maná Cantón: 0.8 km N of Pucayacu, 0°41'S, 79°06'W, 670 m, *Croat 73257* (MO), 1 km N of Pucayacu, *Croat 57062* (MO); Pujili, El Corozón-Quevedo via Moraspungo, 0.8 km below El Corozón, 1,420 m, 1°09'S, 79°07'W, *Croat 73723* (MO). ESMERALDAS: Río Mutilé, 8.6 km beyond bridge over Río Esmeraldas (near San Mateo), 6.6 km beyond Univ. Tecn. Torres, 80 m, 0°52'W, 79°33'W, *Croat 55631* (MO, QCA); Río Onzolé at Río Belavista, 130 m, *Holm-Nielsen et al. 25837* (AAU); Muisne Cantón, Esmeraldas-El Sucio, 2.3 km S. of El Sucio, 18.6 km S of Atacames-Muisne Road, 180 m, 0°36'N, 79°54'W, *Croat 73093* (MO); Río Verde, vic. Businga, 300 m, 1°N, 79°30'W, *Juncosa 787* (MO); La Independencia-Río Coani, 9.4 km E of main Esmeraldas-La Concordia Hwy, 210 m, 0°9'N, 79°21'W, *Croat 55635* (MO); 8.8 km NW of Quinindé, 270 m, 0°26'N, 79°03'W, *Croat 55543* (B, K, MO, NY, QCA); midway between Santo Domingo de los Colorados and Quinindé, *Asplund 16383* (S); Esmeraldas-Quinindé, 40–50 km SE of Esmeraldas, *Harling & Andersson 16715* (GB); Esmeraldas-Santo Domingo, 117 km NW of Santo Domingo de los Colorados, 60 m, 0°34'N, 79°33'W, *Croat 55634* (MO). GUAYAS: vic. Bucay (General Elizalde), 0.9 km E of jct. to El Triunfo, near Río Chimbo, 2°12'S, 79°05'W, *Croat 61596* (MO). LOS RIOS: Centro Científico Río Palenque, 200–220 m, 0°35'S, 79°21'W, *Croat 39691*, *Croat 50657*, *73057* (MO); *McMahon 4258* (SEL). PICHINCHA: El Paraíso-Saguangal, 3 km from El Paraíso, 1,500 m, 0°10'N, 78°46'W, *Ollgaard et al. 37774*, *37778* (AAU), 11 km from El Paraíso, 1,250 m, 0°12'N, 78°46'W, *Ollgaard et al. 37619* (AAU); La Independencia-Puerto Quito, 0.5 km W. of Puerto Quito, 0°08'N, 79°16'W, *Croat 73146* (MO); Quito-La Independencia, km 147, 0°07'N, 79°20'W, 200 m, *Grayum & Zamora 9367* (MO, QCA); La Independencia-Río Caoni, 9.4 km E of Esmeraldas-La Concordia Hwy, 210 m, 0°09'N, 79°21'W, *Croat 55635* (MO); Santo Domingo de los Colorados-Esmeraldas, 8.8 km NW of Quinindé, 270 m,

0°26'N, 79°03'W, *Croat 55543* Río Blanco, at Valle Hermosa, 1.9 mi. N of Santo Domingo de los Colorados-Esmeraldas Hwy, 410 m, *Croat 72981* (MO); Centinela, 13 km E of Patricia Pilar, 1,000 m, 0°32'S, 79°11'W, *Croat 73038* (MO).

Anthurium pulverulentum Sodiro var. *pulverulentum*, Anal. Univ. Centr. Ecuador 15(108):11. 1901. Type: Ecuador. Pichincha: Volcán Atacazo along the Río Pilatón at 1,400–2,000 m, *Sodiro s.n.* (QPLS). Figures 79–80.

Terrestrial; stems elongate, to ca. 80 cm long; internodes 5–18 cm long, 2–2.5(4) cm diam., pale green, drying light brown to gray-brown, matte, closely ribbed longitudinally and closely transverse fissured; cataphylls 20–25 cm long, pale green, acuminate and aristate at apex, promptly weathering to fine fibers, persisting at upper nodes, eventually deciduous; petioles to 71 cm long, ca. 8 mm diam., equal to or shorter than the blades, briefly sheathed at the base, terete to subterete, weakly & obtusely sulcate to obtusely V-sulcate or narrowly and sharply sulcate, drying yellowish brown; geniculum 2.5–3 cm long, sulcate like the remainder of the petiole; blades narrowly ovate, (37)50–83 cm long, (18)23–47 cm wide, 1.5–2 times longer than wide, broadest somewhat above the petiole attachment, acuminate at apex, deeply cordate at the base, slightly bicolorous, thinly coriaceous, usually matte, sometimes subvelvety above, paler and matte or sometimes weakly glossy below; posterior lobes 15–18 cm long, slightly longer than broad; sinus spatulate, ca. 17 cm deep; midrib and basal veins acute to convex above, convex to round-raised below; primary lateral veins ca. 25 pairs, sunken above, convex to narrowly raised or round-raised below, arising 30–45 degree angle, almost straight to the collective veins; secondary and tertiary veins drying prominent below; basal veins 5–9 pairs, the 1st pair free to the base, the 2nd almost free, 5th and higher veins coalesced 6.5 cm; the posterior rib naked along the sinus about half its length; collective veins



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Fig. 77. *Anthurium pulverulentum* Sodiro var. *adsimile* (Sodiro) Croat & Rodríguez. ENDESA.

arising from one of the lowermost basal veins, 2–5 mm from the margins; tertiary veins in part raised below. Inflorescence with peduncles 11–47 cm long, sometimes angular; spathe reflexed, moderately thin,

pale green, linear-lanceolate 4–13 cm long, 1.2(2.4) cm wide, acuminate, brittle; spadix long-tapered, bluish green, matte, 12–20 cm long, 5–7 mm diam., somewhat pendulous; flowers rhombic, ca. 7 per spiral;



Fig. 78. *Anthurium pulverulentum* Sodirol var. *adsimile* (Sodirol) Croat & Rodríguez. Croat 73154. Habit.

pistils promptly exerted after anthesis; tepals matte; infructescence with spathe to 27 cm long, the spadix 30–52 cm long, 2.5 cm diam.; berries greenish.

Anthurium pulverulentum is known from Colombia (Chocó, Valle, and Nariño) and Ecuador, where it occurs along the western slopes of the Andes at 700 to 2,200 m elevation. The type was collected at Atacazo along the Río Pilatón at 1,400 to 2,000 m elevation. The species consists of two varieties, both of which occur at ENDESA. See discussion under var. *adsimile* for ways of distinguishing the two varieties.

Anthurium pulverulentum is a member of a group of species which share in common thin, prominently veined blades and bluish green, glaucous spadices. The group includes *A. coerulescens* Engl. and *A. argyrostachyum* Sodirol both of which have the blades markedly concave on the anterior lobe. *Anthurium adsimile* Sodirol, a species which is slightly concave on the



Figs. 79–80. *Anthurium pulverulentum* Sodirol var. *pulverulentum*. Croat 72347. Fig. 79. Habit. Fig. 80. Close up of lower leaf surface and young infructescence.

margins is deemed to be only subspecifically distinct and is reduced to a variety of *A. pulverulentum*. *Anthurium pulverulentum* is further recognized by its elongate internodes which dry light brown with longitudinal ridges and finely cracked transverse fissures.

An apparently undescribed species from northern Ecuador and southern Colombia has similar leaves but with internodes typically thicker than broad or as thick as broad, usually 3–6 cm diam. The species is represented by the following collections: Ecuador. *Madison & Besse 7231* (Carchí: El Paillón, 800 m), *Madison et al. 4602* (Carchí: Peñas Blancas), *Madison et al. 5145* (Esmeraldas: Lita, 600 m). Colombia. *Croat 71410* (Nariño: Ricaurte, Río Imbi, 1,100 m) and *Croat 72426* (Nariño: Junín, 1,130 m).

Specimens collected in upland Napo Province may be closely related to *A. pulverulentum*. This species, represented by *Croat 58729* and *Plowman et al. 3931* (32.8 and 28 km E of Baeza respectively) and *Harling & Andersson 16479* (Santa Rosa de Quijos, 1,500 m), differ in having more prominently raised tertiary veins and longer, more conspicuous pubescence on the lower veins.

ENDESA collections: *Jaramillo 6804* (QCA), *6810* (MO, QCA). Other collections seen: CARCHI: Chical-Peñas Blancas, 1100–1,250 m, *Gentry & Schupp 26471* (MO); Mira Cantón: N of Carmen, trail to Chical, 2000–2,200 m, 0°17'N, 78°13'W, *Palacios et al. 9744* (MO); Tulcán Cantón: Awá reserve, Gualpí Medio, 900 m, 0°01'N, 78°16'W, *Quelal et al. 607* (MO); El Baboso Community, 8 km N of Lita, 800 m, 0°50'N, 78°20'W, *Rubio et al. 2163* (MO); Parroquia Tobar Donoso: Sector Sabalera, 650–100 m, 1°0'N, 78°24'W, San Lorenzo Cantón: Lita-San Lorenzo, 37.8 km W of Lita, 0°56'N, 78°39'W, *Croat 72339, 72347* (MO). IMBABURA: Otavalo Cantón: Otavalo-Selva Alegre, 57.6 km W of PanAm. Hwy, 2,070 m, 0°16'N, 78°30'W, *Croat 72246* (MO). LOS RIOS: Caserío Palmar de Bimbe, E of Santo Domingo-Esmeraldas Hwy, 10.5 km N of Patricia Pilar, 550–575 m, 0°35'S, 79°12'30"W, *Croat 56986* (MO). PICHIN-

CHA: Cantón Calacalí, Reserva Geobotánica de Pululahua, Sta. Rita, 1,600 m, 0°05'N, 78°30'W, *Cerón et al. 4773* (MO); Santo Domingo de los Colorados-Puerto Limón, km 23 at Congoma Grande, (indigenous Colorado community), 100 m, 0°21'S, 79°22'W, *Kvist & Holm-Nielsen 40150* (AAU); Reserva Forestal La Favorita, Quito-Santo Domingo de los Colorados, vic. Chiriboga, 1,600–1,800 m, 0°16'S, 78°44'W, *Benavides & Peñafiel 32* (MO); *Cerón et al. 7960, 8594* (MO); Nono-Nanegal, 6 km from Tandayapa, 2,050 m, 0°03'N, 78°59'W, *Croat 50236* (MO); 1.5 km N of Tandayapa, 1,875 m, *Croat 49350* (MO); Tandayapa-Mindo, 15.1 km S. of Mindo, 2,400 m, *Croat 49373, 49380* (Pacto-Nuevo Azuay, 2.3 km N of Paraiso, 15.3 km N of Pacto, 1,320 m, 0°11'N, 78°04'W, *Croat 61452, 61634* (MO); Volcán Pichincha, *Sodirol s.n.* (Oct. 1906) (MO); Nanegal, *Sodirol s.n.* (May, 1901) (QPLS); Maquipucuna, 5 km E. of Nanegal, *Gentry et al. 69948* (MO); Río Guayllabamba, *Sodirol s.n.* (Aug., 1903); Río Pilatón, *Sodirol s.n.* (QPLS).

Anthurium pulverulentum* Sodiro, var. *ad simile (Sodirol) Croat & J. Rodríguez comb. nov. Figures 77–78.

A. ad simile Sodiro, Anturios Ecuatorianos. Monografía II. Contribuciones al conocimiento de la flora Ecuatoriana: 219. 1903. Type: Ecuador. Río Rircay, *Rimbach 75* (not seen).

Terrestrial or appressed-climbing near the ground; stems to 2 m long; internodes 3–12 cm long, 1–2.0 cm diam., dark green, semiglossy, turning light brown to gray-brown; cataphylls 22–25 cm long, green and promptly deciduous; leaves with petioles erect-spreading and blades pendent; petioles 40–70 cm long, ca. 8 mm diam., subterete, obtusely and narrowly sulcate, medium green, semiglossy, sheathed 8–10 cm; geniculum 1.8–3.5 cm long; blades oblong-triangular, 35–70 cm long, 20–40 cm wide, broadest at the point of petiole insertion or at base, acuminate at apex, cordate-sagittate at base (the lobes directed slightly outward), subcoriaceous, broadly undulate along margins especially in lower one-third;

upper surface dark green and semiglossy, drying chartaceous, dark yellow-brown to dark greenish brown; lower surface moderately paler and matte to semiglossy, drying yellow-brown; sinus spatulate to hippocrepiform, 12–15 cm deep; midrib acute and concolorous above, convex to rounded and slightly paler below; primary lateral veins 32–39, arising at 58–60 degree angle, narrowly sunken above, narrowly raised and acute below; basal veins 4–6 pairs; collective veins arising from the 3rd basal vein, 2–4 mm from the margin; tertiary veins in part raised below; Inflorescence erect to erect-spreading; peduncle 12–32 cm long, 3 mm diam., terete with 3–5 weak channels, up to one-half as long as the petioles; spathe linear-lanceolate, green to yellow-green, 14–23 cm long, 10–13 mm wide, membranaceous, inserted at a 45 degree angle, then reflexed; spadix bluish green, weakly glaucous, matte, 10–20 cm long, 5 mm diam., stipitate 1–2 mm; flowers rhombic, 2.0–2.3 mm diam., 4–6 visible per spiral; lateral tepals 1–1.3 mm wide; stamens 0.7–0.8 mm long (full length), positioned just above tepals; anthers creamy-orange; pollen white; pistils constricted apically, becoming weakly exerted after anthesis. Infructescence to 36 cm long, curved; berries ovoid, green, to 5 mm long; pericarp with raphides; mesocarp mucilaginous, translucent; seeds 3 mm long, 2.5 mm wide, green, 1 per locule.

Antburium pulverulentum var. *adsimile* is endemic to the western slopes of the Andes in Ecuador. It is characterized by its many-veined blade with straight or concave margins and numerous close veins mostly about 1 cm apart and numbering over 30 per side and bluish green spadix.

At ENDESA the taxon is most easily confused with another variety in the same species, var. *pulverulentum*, which also occurs at ENDESA. The var. *pulverulentum* is distinguished by having somewhat larger leaves that dry light yellowish green and have broadly rounded margins and more widely spaced (to 25 pairs) primary lateral veins. In contrast var. *adsimile* has leaves that dry somewhat darker, dark brown on the upper surface and yellowish brown on

the lower surface. For var. *adsimile* the primary lateral veins are more closely spaced and more numerous (32–38 pairs). The two varieties often occur together and sometimes are found in mixed collections.

Another species that can be confused with *Antburium pulverulentum* var. *adsimile* elsewhere is *A. argyrostachyum* Sodiro since it also has the lateral lobes concave. Though not currently known from ENDESA the species is common elsewhere on Volcán Pichincha at usually higher elevations. That species differs in having a proportionately longer blade with the posterior lobes convergent versus with the posterior lobes somewhat divergent for *A. pulverulentum* var. *adsimile*.

ENDESA collections: *Croat 73154*, *Croat & Rodríguez 61452* (B, CM, MO, QCA, QCNE); *Rodríguez 181* (MO), *328*, *267* (QCA), *353* (K, QCA), *399* (QCA). Other collections seen: ESMERALDAS: vic. Bourbón, *Cobb 58* (MO). GUAYAS: Río Rircay, *Rimbach 75* (QPLS). PICHINCHA: Tandayapa-Mindo, km 79, ca. 5 km S of Mindo, 1,770 m, 0°02'S, 78°44'W, *Croat 50272*.

Antburium rivulare Sodiro, Anales Univ. Centr. Ecuador 15(108):12. 1901. Type: Ecuador. Bolívar: San Miguel Cantón: Balsapamba, *Sodiro s.n.*, lectotype (G). Figure 81; photo front cover.

Terrestrial, rupicolous herb; internodes short, 1–4 cm diam.; cataphylls 8–10 cm long, persistent semi-intact at upper nodes, brown, soon pale-fibrous and semi-intact, sometimes in a net-like reticulum below; petioles terete to U-shaped, narrowly sulcate, (19)54–71 cm long, 1.1–1.5 times longer than the blades, semiglossy, medium green to moderately dark, drying light yellowish brown; blades ovate-cordate, (14)28–35 cm long, (10)19–26 cm wide, 1.1–1.3 times longer than wide, abruptly acuminate at apex coriaceous to subcoriaceous, dark green and semiglossy above, drying yellow-green to yellow-brown, paler and semiglossy below; sinus arcuate to hippocrepiform to rarely closed with the lobes overlapping, mostly 5–8 cm deep; midrib convex or narrowly raised in a valley above,

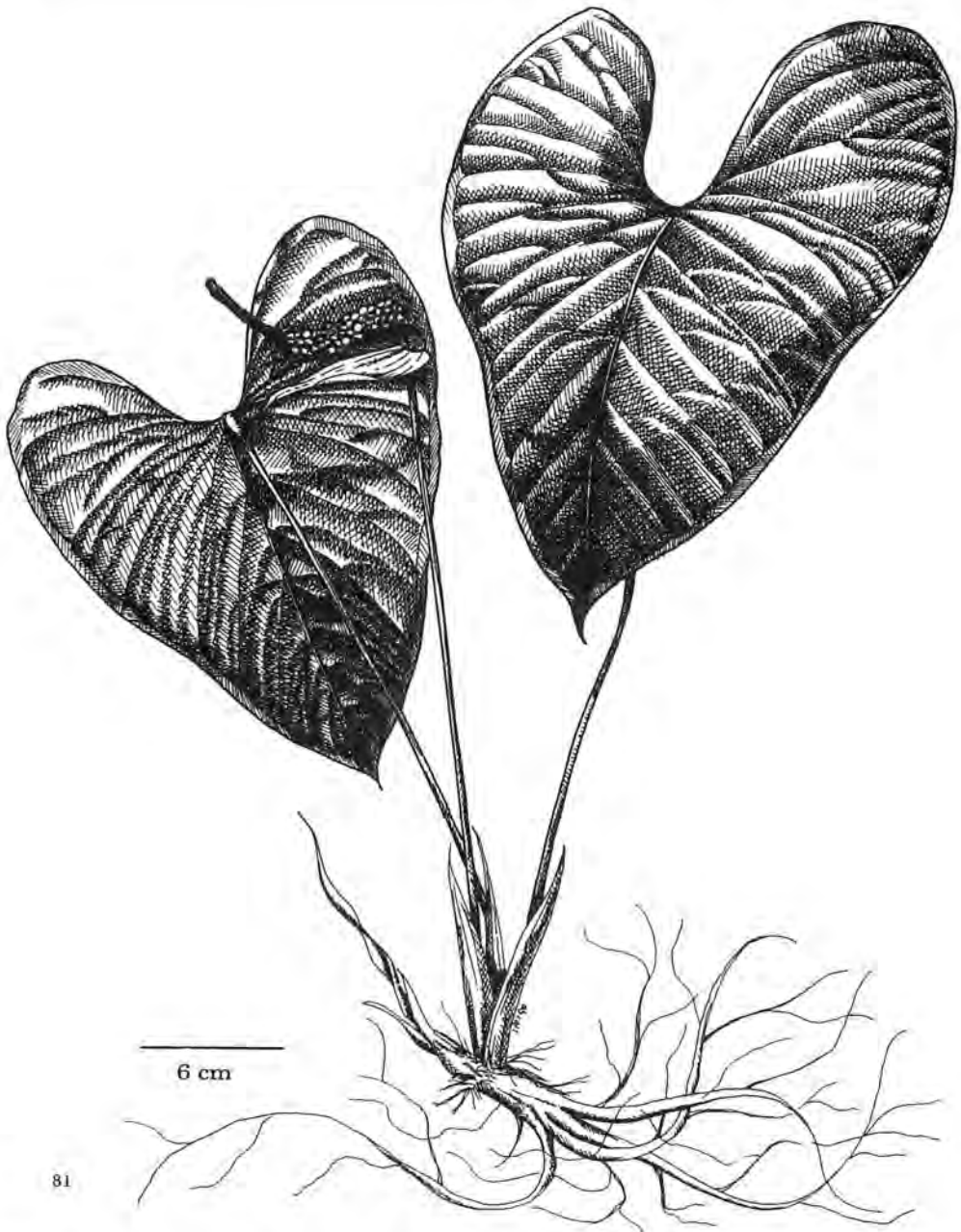


Fig. 81. *Anthurium rivulare* Sodiro. ENDESA.

convex or thicker than broad and paler below; primary lateral veins 5-7(8), narrowly sunken above, convex or narrowly raised and paler below, drying paler beneath; basal veins 5-8 pairs, 2-3 free to the base and

arising at an acute angle then promptly branching with subequal branches, the branches extending at 20-30° angle to the margin; collective veins arising from one of the upper basal veins, loop-connecting

and 1–3 mm from the margin; tertiary veins flat and darker than the surface, a few raised below; sinus arcuate to hippocrepiform, sometimes with decurrent petiole. Inflorescence erect; peduncle 19–62 cm long; spathe 3.5–7.5 cm long, 6–15 mm wide, green to greenish cream, sometimes heavily tinged purplish, reflexed-spreading; spadix dark violet-purple to purple, (3)6–13 cm long, 4–6 mm diam., stipitate 1–2 mm; 4–6 flowers visible per spiral, 1.8–2.8 mm long, 1.6–1.8 mm wide, tepals weakly glossy, lateral tepals with inner margin 1.3–1.5 mm wide; stamens held at the surface of the tepals; anthers orange; pollen golden. Berries red, obovoid, 5–7 mm wide.

Anthurium rivulare is known from northern Colombia (Chocó) and Ecuador, ranging from 100 to 1,800 m elevation. In Ecuador it has been found from Carchí to Chimborazo Provinces on the western slopes of the Andes. In Colombia it has been collected along the Río Nambí and the Río Imbí at about 1,100 m elevation.

The species is recognized by its terrestrial habit, apparently always found on rocks or rocky banks along streams or in streams, as well as by its short internodes, persistent semi-intact cataphyll fibers, subterete petioles, ovate-cordate blades with prominently paler major veins on the lower surface and with the basal veins prominently branching. Also characteristic is the dark purple spadix and the red berries.

Asplund 16418, from near Santo Domingo de los Colorados, is very similar to this species, differing only in being slightly larger (blades 42 × 31 cm with petiole to 89 cm) and being described as an epiphyte in a tree near the river. *Acosta Solís 10264* from Tungurahua Province is very similar to this collection and is also described as an epiphyte but is more doubtful since it was collected on the eastern slope of the Andes between Baños and Río Verde at 1,600 to 1,800 m elevation.

Anthurium rivulare is similar to another terrestrial herb which also occurs along streams in Esmeraldas and Carchí Provinces at 250 and 2,400 m, mostly 600–1,100 m. This apparently new species, represented by *Madison et al. 5189, 5283, Cobb 23,*

66, 67, and others, is distinguished by having a shorter spadix, and blades that are more narrowly ovate with a narrower sinus and primary lateral veins scarcely paler than the surface, not outstanding and much paler than the surface as in *A. rivulare*.

Madison 7178 refers to the flowers as smelling of a mixture of rotting fruit and cinnamon.

ENDESA collections: *Ayala 16* (QCA); *Jaramillo 6743* (QCA); *Rodríguez 223A*. Other collections seen: BOLIVAR: San Miguel Cantón, Balsapamba, *Sodirol s.n.* (not seen). CARCHI: San Marcos, 600 m, 0°08'N, 78°20'W, *Thompson et al. 778* (CM); Tulcán Cantón: Parroquia Tobar Donoso, Sector Sabalera, Awá Reserve, NE of Casa Comunal, 650–100 m, 1°N, 78°24'W, *Tipaz et al. 1501* (MO, QCNE); Parroquia El Chical, Centro San Marcos, 1°06'N, 78°14'W, *Méndez et al. 223* (MO, QCNE); Centro Gualpí Medio, Río Canumbí, 1°02'N, 78°15'W, *Grijalva et al. 596* (MO); 900 m, *Quelal et al. 615* (MO, QCNE); Comunidad Gualpí Alto, 1,800 m, 1°02'N, 78°14'W, *Rubio et al. 1541* (MO, QCNE). CHIMBORAZO: *Sodirol s.n.* (B, G). ESMERALDAS: San Lorenzo Cantón: Parroquia Alto Tambo, Sector El Cristal, 1.5 km, Finca Lalama, 650 m, 0°50'N, 78°30'W, *Quelal & Luteyn 516* (MO, QCNE); Río Cachabí, *Sodirol s.n.* (QPLS); Río Blanco, Chical-San Marcos; 01°04'N, 78°15'W, *Thompson et al. 803* (MO); vic. Lita, 550–650 m, *Madison et al. 4998* (US), *5248* (AAU, F, K, QCA, SEL, US); *Acosta Solís 12541* (F); Lita-San Lorenzo, km 25, *Morán & Rohrbach 5300* (MO). GUAYAS: Teresita, 3 km W of Bucay, 270 m, *Hitchcock 20525* (US). IMBABURA: vic. Lita, 600 m, *Eriksen 59278* (QCA). LOS RIOS: Motalvo, ca. 40 km E of Babahoyo, 100–200 m, *Holm-Nielsen et al. 2702* (F). PICHINCHA: Tinalandia, 9.6 km E of Santo Domingo de los Colorados, 700 m, 0°16'N, 79°07'W, *Croat 55732* (MO); Santo Domingo de los Colorados, *Asplund 16411* (S); Quito-Santo Domingo de los Colorados, 12 km from turn-off to San Juan off Interamerican Hwy, 2,500 m, 0°14'S, 78°44'W, *Croat 72413* (MO); Santo Domingo de los Colorados, 800 m, *Acosta Solís 10884* (F); 3 km W of bypass around Santo Domingo de los Colorados, 530 m,

Fallen 849 (MO); Santo Domingo-Puerto Limón road, Congoma Grande (Colorado community); 100 m, 0°21'S, 79°22'W, *Kvist & Holm-Nielsen 40129* (AAU, QCA); Santo Domingo-Queveda, km 7, 7 km E, Río Chiquilpe near jct with Río Baba, 420 m, *Dodson et al. 7893* (MO).

Anthurium rodrigueziae Croat, sp. nov.

Type: Ecuador. Pichincha: Reserva Endesa, 8 km N of km. 113 on Quito-Puerto Quito Highway, vic. of Río Cabuyales, ca. 700 m, 0°05'N, 79°02'W, 16 July 1986, *Croat & Rodríguez 61517* (holotype MO-3422810; isotypes, AAU, B, K, NY, QCA, US). Figures 82–85.

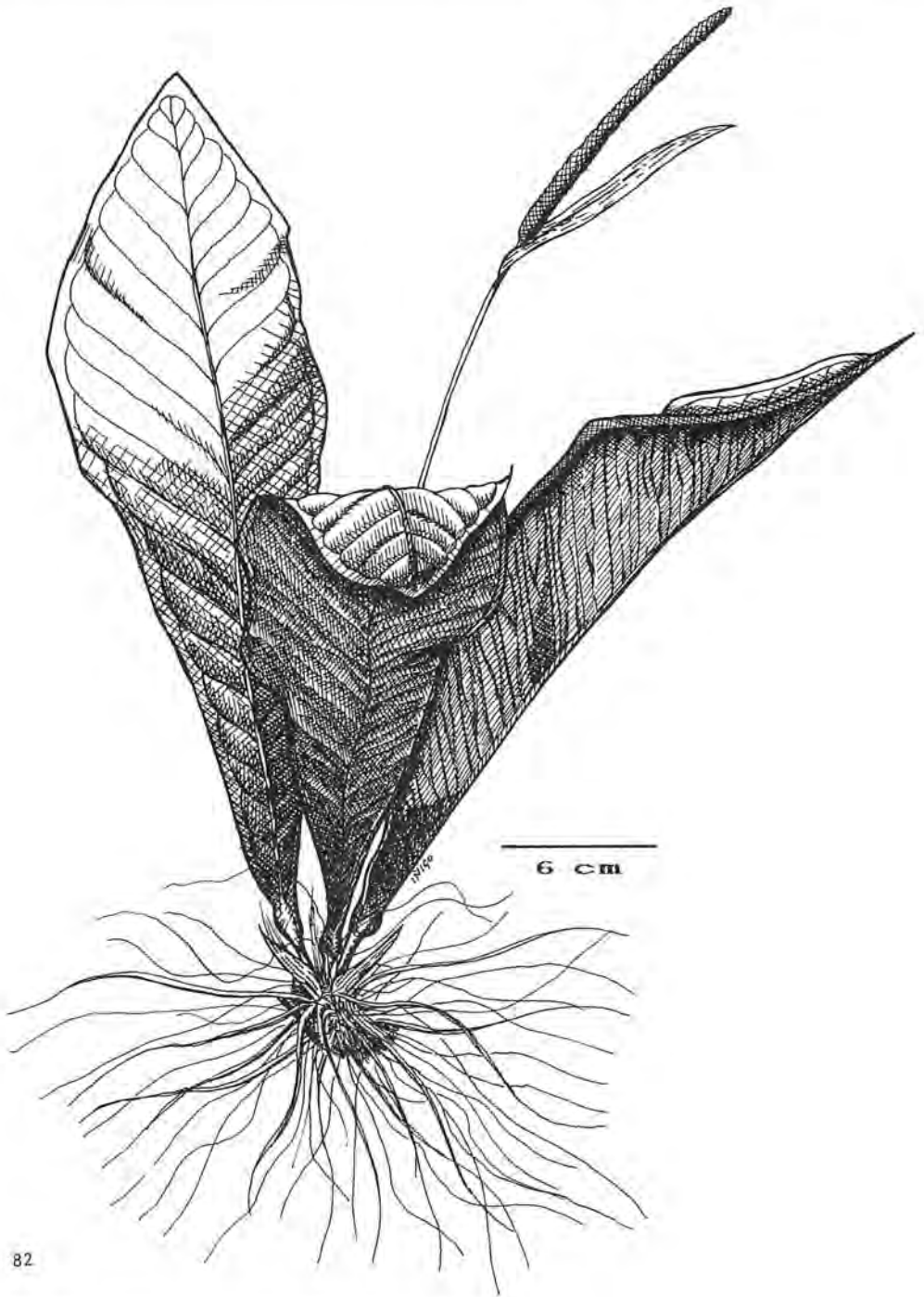
Planta epiphytica; internodia 1–2 cm diam.; cataphylla 2.5–4 cm longa; petiolus 3–7 cm longus, subteres, C-formatus, acute sulcata; lamina 20–40 cm longa, 6–13.5 lata, oblanceolata vel anguste obovata, glanduloso-punctata in superficibus ambabus; pedunculus (12)16–26(34) cm longus; spathe oblongo-lanceolata, subcoriacea, 5–7 cm longa, 4–5 mm lata, viridis; spadix (7)11–20 cm longus, 3–6(10) mm diam., cremeus vel palide viridis, palide canoviridis vel palide flavoviridis, sessilis aut subsessilis (usque 2 mm).

Epiphytic; stems short, 5–20 cm long; internodes short, 1–2.0 cm diam.; roots slender, in a dense, knarled mass, branched and tangled; cataphylls to 2.5–4 cm long, narrowly triangular, promptly deciduous or weathering to persistent reddish brown fibers; leaves in rosette, more or less erect; petioles 3–7 cm long, 4–5 mm diam., subterete, C-shaped, sharply sulcate, rounded at base, sometimes sharply angular adaxially toward apex, with purplish violet spots, sheathed from one-third to fully throughout its length, dark green and semiglossy; geniculum 5–15 mm long, sharply sulcate; blades 20–40 cm long, 6–13.5 cm wide, moderately coriaceous, weakly bicolorous, oblanceolate to narrowly obovate, acute to rounded and weakly cuspidate at apex, attenuate to acute at base, upper surface medium green with dark glandular punctations, slightly paler below with more con-

spicuous glandular punctations, both surfaces drying yellow-brown to gray-green; midrib flat to moderately prominent and concolorous or slightly paler above, sharply acute and concolorous or paler below, drying prominently raised on both surfaces; primary lateral veins 14–20 pairs, arising at an angle of 45–55 degrees, scarcely visible above, weakly visible on both surfaces, darker than surface below, drying scarcely more conspicuous than the frequent interprimary veins; tertiary veins below obscure; collective veins arising from the base or from one of the primary lateral veins in the lower one-fourth of blade, 3–9 mm from margin. Inflorescence erect to erect-spreading; peduncle (12)16–26(34) cm long, subterete with one prominent angle, 2–3 mm diam., 6–12 times longer than petioles, with sparse violet-purple spots; spathe linear-lanceolate, subcoriaceous, 5–7(10) cm long, 4–5(10) mm wide, green, sometimes tinged red or purple or with purplish violet lines, sometimes with whitish speckles on both surfaces, inserted at a 30 degree angle, spreading to recurved or reflexed-spreading, acute at apex, the margins meeting at 110 degrees at base; spadix (7)11–20 cm long, 3–6(10) mm diam., cream to pale green, pale gray-green to pale yellow-green, or rarely yellow, sessile or subsessile (to 2 mm), weakly curved; flowers rhombic, 1.3–2.3 mm long, 1.7–3 mm wide; tepals 1–1.3 mm wide, covered with violet-purple dots; stamens 1.2 mm long; anthers yellowish, to 0.8 mm long. Infructescence pendent, 18–25 cm long, tepals reddish; berries subglobose to broadly obovate, reddish, emerging from throughout the spadix.

The species is at present known only from the slopes of the western Andes in Ecuador at 100 to 800 m, but is expected in adjacent Nariño Department in Colombia.

It is recognized by its epiphytic habit, short, densely rooted internodes with branched roots, short, prominently sheathed petioles, more or less oblanceolate blades with obscure primary lateral veins and an acute lower midrib, an erect inflorescence with a long-pedunculate inflorescence, greenish spadix, and pendent infructescence with reddish berries. The



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Fig. 82. *Antburium rodrigueziae* Croat. ENDESA.



Figs. 83–85. *Anthurium rodrigueziae* Croat. Figs. 83–84. Croat & Rodríguez 61517. Fig. 83. Habit. Fig. 84. Inflorescence.



Fig. 85. *Croat 73153*. Inflorescence.

root mass of the species is sometimes inhabited by ant colonies.

Anthurium rodrigueziae is not confused with any other at ENDESA but it is very similar to another new species from the lowland Esmeraldas Province at 100 to 200 m elevation. That species, represented by *Harling 4577*, *Sparre 18156*, *18196*, *Kvist & Asanza 40363*, and *Palacios & Tirado 11273*, has similarly shaped leaf blades but they lack glandular punctations on the upper surface. It is perhaps most easily confused with *A. filiforme* Engl. from the Río Dagua in Valle Department of Colombia. That species differs in having a shorter yellow spadix (to 6 cm long), and acuminate blades which lack glandular punctations on the upper surface.

Anthurium rodrigueziae is also similar to an undescribed species from the Bajo Calima region of Valle Department Colombia. This species, represented by *Croat 61355*, *Croat & Watt 70296*, *Croat & Bay 75683*, also differs in lacking glandular

punctations on the upper surface of the blade and in having the primary lateral veins much more conspicuous, etched-sunken above and pleated-raised below.

For some unknown reason this species has long been confused with *A. guayaquilense* Engl., a quite unrelated species whose type is from Balao, in Guayaquil Cantón, in the Province of Guayas, south of Guayaquil. That species has long petioles, and oblong-oblancheolate, epunctate blades.

The species was first collected in 1959 by Gunnar Harling along the Río San Miguel in Esmeraldas Province and has been collected by many collectors since that time. It is named in honor of Jimena Rodríguez, coauthor of this paper, who first brought the plant to the attention of the senior author.

ENDESA collections: *Croat 73153* (MO, CAS, CM, K, QCNE); *Croat & Rodríguez 61517* (MO, QCA); *Grayum et al. 9356* (MO); *Rodríguez 172* (QCA), *311* (MO, QCA), *337* (MO, QCA), *412*, *422* (QCA).

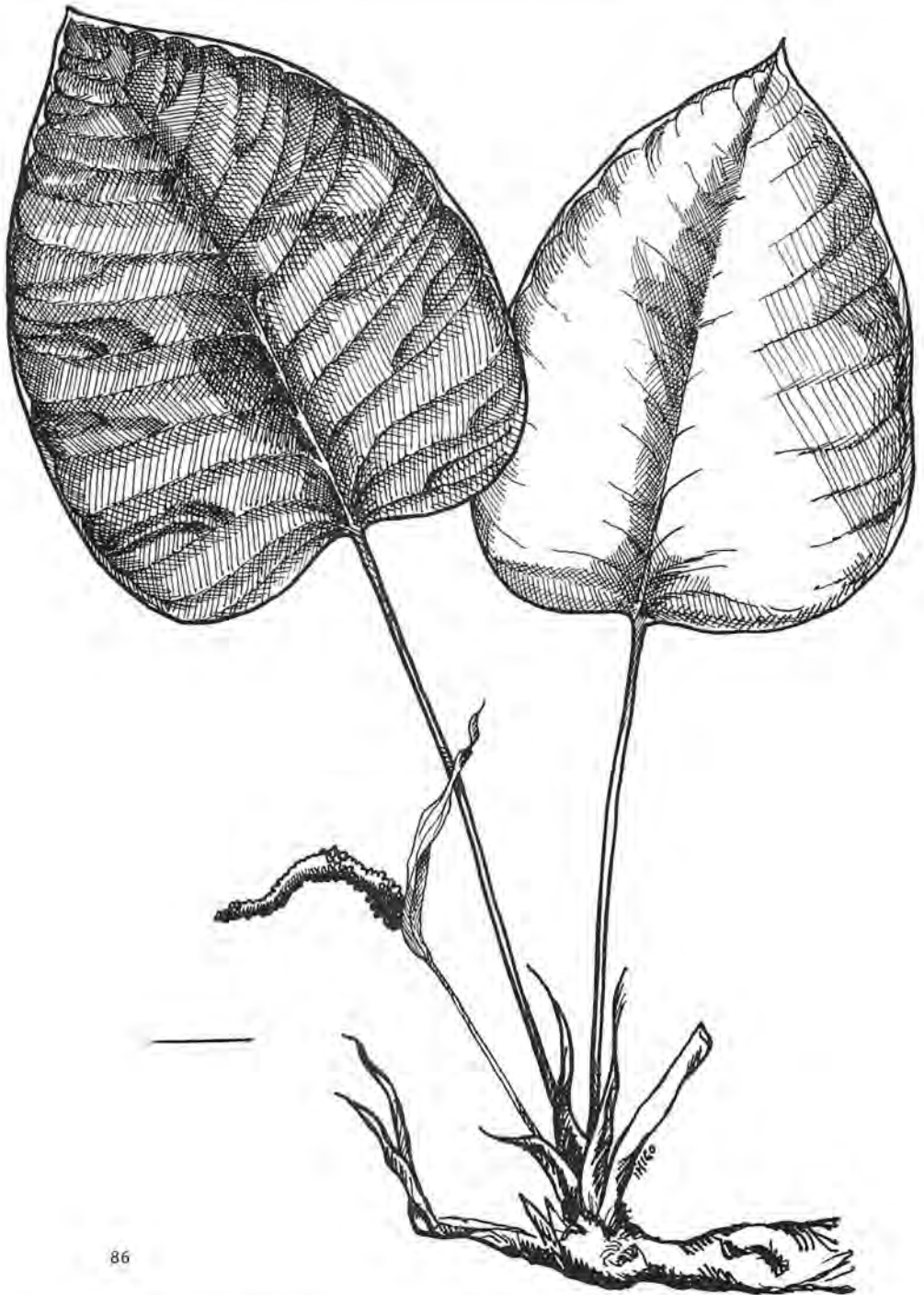
Other collections seen: CARCHI: trail along plain above Tobar Donoso and to Río Guape; 1°10'N, 78°18–31'W; 800–1,300 m, Hoover 1212 (MO). ESMERALDAS: Río San Miguel, Harling 4706 (S), upstream from Pueblo Cayapas, 200 m, 0°45'N, 78°54'W, Holm-Nielsen *et al.* 25370 (AAU); Pueblo San Miguel, 200 m, 0°45'N 78°54'W, 25380 (AAU); Río Cayapas, at Playa Grande, ca. 2 km SE of San Francisco de Cayapas, Sparre 18070 (S); Río Cayapa, Zapallo Grande, 100 m, 0°48'N, 78°55'W, Kvist & Azanza 40759 (AAU); San Lorenzo Cantón: Lita-San Lorenzo, 40.1 km W of Lita, 350 m, 0°56'N, 78°40'W, Croat 72315 (MO, QCNE); 32 km E of Lita, 250 m., 0°55'N, 78°38'W, Rubio & Quelal 721 (MO); 5 km W of Lita, 700 m, 0°51'N, 78°31'W, Lawesson *et al.* 44042 (AAU, QCA); Parroquia Ricaurte, Reserva Indígena Awá, Centro Guadualito, 1°15'N, 78°45'W, 80 m, Aulestia *et al.* 146 (MO, QCNE), 1°15'N, 78°40'W, 80 m, Aulestia *et al.* 284 (MO, QCNE); Awá Reserve, Comunidad Balsareño, Río Palabí, 01°09'N, 78°31'W, Rubio & Quelal 1315 (MO, QCNE); down Río Palabí from camp, 150–250 m, 1°07'N, 78°37'W, Hoover *et al.* 3785; Quinindé, NE of Golondrinas, Sitio La Bella Jungla, Cooperativa Unidos Venceremos, ca. 300 m, 0°20'N, 79°12'W, Palacios 11461 (MO, QCNE); Cooperativa 3 de Septiembre, sector San Isidro, near Río Jordán, 0°20'N, 79°12'W, 300 m, Palacios 11492 (MO, QCNE). PICHINCHA: Rancho Brahman, 10 km NW of Santo Domingo de los Colorados on road to Esmeraldas, 400 m, Sparre 15230 (S).

Anthurium silanbense Croat & J. Rodríguez, sp. nov. Type: Ecuador. Pichincha: Reserva ENDESA "Corporación Forestal Juan Manuel Durini", Quito-Puerto Quito, km 113, 10 km N of highway, 800 m, 0°05'N, 79°02'W, Rodríguez 322 (holotype, QCA; isotype, MO). Figure 86.

Planta usque epiphytica; internodia 4–6 cm longa, 1–1.5 cm diam.; cataphylla 12 cm longa, mox decidua; petiolus 78–88 cm longus, 7–9 mm diam., sulcatus; lamina anguste ovata, 34–45 cm longa, 30–32 cm

lata; sinus arcuatus; pedunculus 15–20 cm longus, 3–4 mm diam. (in sicu); spatha oblongo-lanceolata, viridis, 6.5–8.5 cm longa, 1.2–1.7 cm lata; spadix viridis, 7–14 cm longus, 5 mm diam.

Epiphytic; stems to 50 cm long; roots few per node, drying dark brown with grayish pubescence, long wooly-pubescent; internodes 4–6 cm long, 1–1.5 cm diam., promptly drying glossy, closely wrinkled (both vertically and transversely), thick, tan-brown; cataphylls subcoriaceous, sharply 1-ribbed, to 12 cm long, bluntly acute at apex, drying greenish gray, persisting intact at upper nodes, weathering somewhat as fine linear fibers, then promptly deciduous; petioles 78–88 cm long, 7–9 mm diam., sulcate, green, sheathed ca. 1 cm; geniculum 1.5–2 cm long, light green; blades narrowly ovate, 34–45 cm long, 30–32 cm wide, broadest just above the point of petiole attachment, narrowly rounded and cuspidate-acuminate at apex (acumen 7 mm long), subcordate at base, dark green and matte above, paler and semiglossy below, drying with a number of scattered, weakly raised bumps on lower surface; sinus arcuate, to ca. 2.5 cm deep; basal lobes broadly rounded; midrib convex and concolorous above, more prominent and slightly paler below, drying thicker than broad and faintly 3-ribbed; primary lateral veins 11–13, at least those in the lower half of the blade arising at an acute angle, then spreading at 30–50° angle, moderately straight to weakly curved to collective veins, drying raised near midrib, becoming sunken toward margins above, convex below, drying paler and thicker than broad below; interprimary veins almost as conspicuous as the primary lateral veins; tertiary veins drying weakly visible above, prominulous below; basal veins 4–5 pairs, essentially free to the base, the uppermost partly fused to the midrib, the 2nd and 3rd weakly fused ca. 1 cm; collective veins arising from the 1st basal veins (2nd & 3rd basal veins broadly and weakly loop-connected to the collective vein), loop-connecting the primary lateral veins, mostly 4–7 mm from margin (but up to 2 cm at the lower junctions with the



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Fig. 86. *Anthurium silanchense* Croat & Rodríguez. ENDESA.

primary lateral veins); tertiary veins drying moderately prominulous. Inflorescence shorter than the leaves; peduncle 15–20 cm long, 3–4 mm diam. (dried), less than one-fourth as long as the petioles; spathe oblong-lanceolate, green, 6.5–8.5 cm long, 1.2–1.7 cm wide chartaceous, acuminate, inserted at 50° angle, then recurved, the margins meeting at an obtuse angle at base; spadix green, cylindrical, barely tapered, 7–14 cm long, 5 mm diam., stipitate to 1.8 cm; flowers 4-lobed, 2.3 mm long, 2 mm wide; lateral tepals shield-shaped, 1.0–2.7 mm wide, with pale raphide cells and granular excrescences, outer margins 4-sided, inner margins rounded to obtusely angular; stamens to 2 mm long; anthers cream, drying broadly ovoid, 0.3 mm long, 0.4 mm wide; pistils weakly exerted, drying semiglossy. Infructescence to more than 1 cm diam.; berries red, globose, 2.5–3 mm long, pericarp with raphide cells toward apex, mesocarp mucilaginous; seeds 2 mm long, 1.5 mm diam., olive-green, 1 per locule.

Anthurium silanchense is known only from the type specimen collected at 800 m at the ENDESA reserve. It is even there relatively rare. It is characterized by having internodes longer than broad, long-petiole, subcordate, green-drying, ovate, subcordate blades with essentially free basal veins, by the short-pedunculate inflorescence, with a green, cylindrical, prominently stipitate spadix and red berries.

The species is probably most closely related to *A. sodiroanum* Engl. with which it shares similar stems, cataphylls and inflorescences. That species differs in having oblong to oblanceolate blades which are acute to narrowly rounded at the base.

The species may be confused with *A. pulverulentum* which differs in having stems drying matte (versus moderately glossy in *A. silanchense*), and more prominently cordate blades with the primary lateral veins more numerous and usually minutely puberulent (versus glabrous or minutely granular in *A. silanchense*).

Dried collections of the species may also be confused with *A. versicolor* but that species differs in having deeply cordate blades with a spatulate or hippocrepiform sinus

and with collective veins arising from one of the lowermost basal veins.

The species is named after the Río Silanche, which courses through the reserve.

Anthurium trinerve Miq. Linnaea 27: 67.

1843. Type: Suriname, Palmar Awara, *Forbe 120* (U). Figures 87–88.

Anthurium trinerve Miq. var. *obtusum*

Engl., Bot. Jahrb. Syst. 25: 357–358.

1898. Ecuador. Chimborazo: Valle Pallatanga, *Sodiro s.n.* (not seen).

Epiphyte, usually scandent; stems to 60 cm long; internodes 1–4 cm long; cataphylls 2.5 to 5 cm long, promptly weathering to fibers that envelope the stem; leaves erect; petioles 1–5 cm long, 1–3 mm diam., subterete, sulcate, sheathed 5–15 mm; geniculum 5–15 mm long, darker than the remainder; blades oblong-lanceolate to ovate-elliptic, 7–23 cm long, 3–8.5 cm wide, subcoriaceous, acuminate at apex, cuneate at base, dark green, semiglossy and sparsely glandular-punctate to epunctate above, light green, semiglossy and glandular-punctate below; midrib concolorous and raised on both surfaces; primary lateral veins 6–8 per side, arising at 20–25 degree angle; collective veins arising from the base, 2–12 mm from the margin; peduncles 2–7 cm long, 2 mm diam., subterete, sulcate adaxially, ca. 1½ times longer than the petioles; spathe linear-lanceolate, 1–3.5 cm long, 4–10 mm wide, green to pale green, inserted at 45 degree angle and held erect, acute to acuminate at apex, the margins meeting at an obtuse angle at base, then decurrent; spadix pinkish to cream, 2–10 cm long, 3 mm diam., sessile; flowers rhombic to quadrangular, about 2.2 mm diam., 3–4 visible per spiral; lateral tepals 2 mm wide, the inner margin convex; stamens 1 mm long, not exerted; infructescence to 13 cm long, erect; berries white to purplish, subglobose, 5–7 mm diam.; seeds oblong, 2 mm long, 2–4 per locule.

Anthurium trinerve is a member of section *Tetraspermium* and ranges from Guatemala to the Guianas, Brazil, and Bolivia. In Ecuador it is widely distributed on both slopes, ranging from Sucumbíos to Napo,

Pastaza, and Morona-Santiago Provinces east of the Andes and in Carchí, Esmeraldas, Manabí, Pichincha, Los Ríos, Cotopaxi, Guayas, and El Oro Provinces west of the Andes. Despite its wide-ranging nature it is nowhere particularly common. It is curiously absent in the southwest of the country, being replaced there by another species *A. pobliianum* Engl. It is also not known from the southeastern part of the country in Zamora-Chinchipe but is known from only a single collection in Morona-Santiago.

The species is characterized by its long internodes, short petiolate, more or less elliptic, glandular-punctate blades, erect spathe, and the berries having more than 2 seeds, usually 4 or more.

The species is uncommonly variable in terms of blade shape. Some collections from Guayas (e.g. *Harling & Andersson 19437*) and Los Ríos (*Gentry & Dodson 41297*) have broadly elliptic blades to 8 cm wide and about 2 times longer than broad, while some collections from Napo (e.g. *Neill et al. 1840*) have slender blades 10 or more times longer than wide.

Though not a member of the ENDESA flora *A. scandens* (Aubl.) Engl. is easily confused with *A. trinerve*. That species has typically smaller and typically more elliptic blades and tends to be more scandent, often hanging from trees. Still, both species are highly variable and share the same variation in blade shape in parts of their respective ranges. One definitive character which makes recognition easy is the nature of the spathe, always reflexed at anthesis in *A. scandens* and erect in *A. trinerve*.

Glandular punctations are apparently variable on the upper blade surface. While always fewer in number, they are sometimes apparently absent altogether such as with *Rodríguez 360* from ENDESA, *Gentry & Dodson 18002* from Los Ríos Province and *Anderson 2478* from Guayas Province.

ENDESA collections: *Jaramillo 7593* (QCA); *Rodríguez 215, 360, 368, 377, 400* (QCA). Other collections seen: Ecuador: EL ORO: ca. 6.8 km from Tahuin on road to Piedras, *Thompson 133* (MO). ESMERALDAS: 50 m, *Holm-Nielsen et al. 25935*



Figs. 87–88. *Anthurium trinerve* Miq. *Selby 78-2218*. Leaf and inflorescence.

(AAU); 100 m, *Kvist & Asanza 40808* (AAU); Montano Bajo, 800 m, *Escobar 849* (MO, TEX); Lita-San Lorenzo road, ca. 30 km NW of Lita, 300–500 m, 1°05'N, 78°40'W, *Gentry et al. 69999* (MO); Timbre, *Asplund 16456* (S); Río Cayapa: Zapallo Grande, 100 m, 0°48'N, 78°54'W, *Kvist 40465* (AAU, QCA); Río Santiago: Concepción, 30 m, 1°3'N, 78°50'W, *Holm-Nielsen et al. 25977* (AAU); Zapallo Grande: Río Grande, 100 m, 0°48'N, 78°55'W, *Kvist & Asanza 40808* (AAU, QCA); Eloy Alfaro, Reserva Ecológica Cotacachi-Cayapas: Reserva Ecológica Cotacachi-Cayapas, Charco Vicente, Río San Miguel, 10 Km al sur de San Miguel de Cayapas, Parcela Permanente # 8, 150 m, 0°43'N, 78°55'W, *Méndez et al. 66* (MO); Muisne: Esmeraldas-El Sucio, 2.3 km S of El Sucio, 18.6 km S of Atacames-Muisne Road, 180 m, 0°36'N, 79°54'W, *Croat 73083* (KYO, MO); San Lorenzo, Reserva Etnica Awá, Parroquia Alto Tambo, Centro de la Unión, Cantón del Río Mira, 250 m, 0°52'N, 78°26'W, *Aulestia & Aulestia 1355* (CAS, K, L, MO, QCNE, TEX); Reserva Etnica Awá, *Aulestia & Aulestia 1300* (MO). GUAYAS: Hacienda La Elvira, ca. 3 km W of Bucay, 500 m, 2°11'S, 79°07'W, *Loftmant & Molau 15547* (AAU, GB); Cooperativa 23 de Noviembre, ca. 5 km S of Naranjal, 50–100 m, *Harling & Andersson 19437* (GB, MO); 7 km ENE of Balao, 19357 (GB, MO); hills E of the Naranjal-Machala Road, ca. 13 km S of Naranjal, 50–150 m, 19386 (GB); Hacienda Botija ca. 8 km E of Naranjal, 250–350 m, 19484 (GB); Naranjal-Machala Road, ca. 13 km S of Naranjal, 50–150 m, 19323 (GB); Guayas-Cañar-Chimborazo-Bolívar, foothills of western cordillera near village of Bucay, 1,000–1,250 ft., *Camp E-3805* (NY); Río Valdivia drainage, on property of Richard Zeller near village of Loma Alta, ca. 10 km NE of coastal village of Valdivia, N of Santa Elena peninsula, 100 m, *Andersson 2478* (MO). LOS RIOS: Babahoyo-Guaranda, 250 m, *Holm-Nielsen et al. 22982* (AAU); Río Palenque Science Center, Quevedo-Santo Domingo de los Colorados, 150–200 m, *Gentry & Dodson 41297* (MO); Represa Daule-Peripa, Boca Pescadillo, *Valverde 531* (MO); Centro Científico Río Palenque, 210–250 m, *Croat 38690* (MO); Río Palenque Bio-

logical Center, Quevedo-Santo Domingo, 200 m, *Gentry & Dodson 18002* (MO); Montalvo, ca. 40 km E of Babahoyo, 100–200 m, 1°47'S, 79°17'W, *Holm-Nielsen et al. 2681* (AAU, F, GB, NY); Quevedo, Cerro Centinela, el Mirador, 12 km E Patricia Pilar and Centro Científico Río Palenque, 540 m, 0°37'S, 79°18'W, *Rubio & Alverson 423* (MO); Centro Científico Río Palenque, Santo Domingo de los Colorados-Quevedo, at km 47, 1.7 km S of Patricia Pilar, 220 m, 0°35'S, 79°21'W, *Croat 73818* (MO); Río Palenque Science Center, cultivated plants at Río Palenque Science Center in Cal Dodson's Plant House, 220 m, 0°35'S, 79°21'W, 73866 (MO). MANABI-GUAYAS: road from Puerto Lopez to S of Río Ayompe, 350 ft., 1°33–45'S, 80°40'W, *Thompson 376* (MO); Río La Morena, Chone-Santo Domingo Rd., ca. 15 km NNE of Flavio Alfaro, 100 m, *Harling & Andersson 18921* (GB). MORONA-SANTIAGO: La Misión Salesiano 5 km S of Río Bomboiza, 800 m, *Baker 6170* (QAME); Parroquia Bomboiza, Río Cuyes, (Comuna Shuar Santa Teresa), 800 m, 03°25'S, 78°35'W, *Cerón et al. 178* (MO); Misión Bomboiza, 800 m, 3°29'S, 78°34'W, *Holm-Nielsen et al. 4209* (AAU); Shuinia Nait, small mountain ridge ca. 8 km SE of Misión Bomboiza, 900–1,000 m, 3°30'S, 78°33'W, *Holm-Nielsen et al. 4375* (AAU). NAPO: Parque Nacional Yasuni, *Ollgaard et al. 39156* (AAU); Pozo petrolero Daimi 2, 200 m, 0°55'S, 76°11'W, *Cerón & Hurtado 4001* (MO), 4164 (MO); Anangu, 260–350 m, 0°31'S, 76°23'W, *Lawesson et al. 39529* (AAU); 260 m, 0°31'S, 76°23'W, 39663 (AAU); 220 m, 21426 (AAU); 250 m, 21733 (AAU); 250 m, *Brandbyge et al. 30282* (AAU); 260–350 m, *Ollgaard et al. 39156* (AAU); 260–350 m, *Lawesson et al. 39529* (AAU); 260 m, 39663 (AAU); 200 m, 43350 (AAU); Reserva de Producción Faunística Cuyabeno, N of Laguna Grande, 265 m, 0°00'S, 76°12'W, *Nielsen 76190* (AAU); Río Aguatico, 250 m, *Holm-Nielsen et al. 21733* (AAU); Río Cuyabeno, upstream from Río Aguatico, 21426 (AAU); Río Lagarto Cocha, vic. Redondo Cocha, 190 m, 0°33'S, 75°13'W, *Lawesson et al. 44467* (AAU); Río Napo, Lopuna Taracoa, *Plowman 14077* (F, SEL); Río Yasuni, Garza Cocha, 200 m, 1°05'S,

- 75°47'W, *Lawesson et al.* 43350 (AAU); Cantón Orellana, Sector Huashito, 20 km N of Coca, Propiedad de PALMORIENTE, 250 m, 0°20'S, 77°05'W, *Gudiño* 89 (MO); Estación Experimental INIAP-Payamino, Reserva Florística El Chunchu, 250 m, 0°26'S, 77°01'W, *Zaruma* 624 (MO); 2 km downstream from Punto Aguatico, 300 m, 76°59'W, 0°5'N, *Brandbyge et al.* 30480 (AAU, MO); Proyecto Buffalo-Proyecto INCRAE, ca. 12–13 km from Lago Agria on via San Miguel, 300 m, 0°10'N, 77°53'W, 30458 (AAU, MO); Estación Biológica Jatun Sacha, Río Napo, 8 km E of Misahuallí, 450 m, 1°04'S, 77°36'W, *Cerón* 3749 (MO); Reserva Biología Jatun Sacha, ca. 8 km ESE of Puerto Misahuallí, along Misahuallí-Coca road, 400 m, 1°04'S, 77°37'W, *Miller et al.* 2211 (MO); Coca-Loreto-Hollín, Sitio Huaticocha, 500 m, 0°45'S, 77°29'W, *Palacios et al.* 3563 (MO); 2 km downstream from Punto Aguatico, 300 m, 0°05'N, 76°59'W, *Brandbyge et al.* 30408 (MO); Cañon de los Monos, ca. 12 km N of Coca (Puerto Francisco de Orellana), ca. 350 m, *Harling & Andersson* 11721 (GB, MO); Jatun Sacha, 3 km S of Tena, 1°03'S, 77°50'W, 600 m, *Zaruma* 377 (MO); Estación Biológica Jatun Sacha, 8 km E of Misahuallí, 450 m, 1°04'S, 77°36'W, *Cerón & Iguago* 5625 (MO); Reserva Biológica Jatun Sacha, Río Napo, 8 km below Misahuallí, 450 m, 1°04'S, 77°36'W, *Cerón* 856 (MO); Cantón Tena, 8 km E of Misahuallí, 400 m, 1°04'S, 77°36'W, 6361A (MO); Reserva Biológica Jatun Sacha, Río Napo, 8 km below Misahuallí, 450 m, 1°04'S, 77°36'W, *Cerón* 888 (MO), 400 m, 5979 (MO), 450 m, 1757 (MO); 400 m, 6360 (MO); 450 m, 655 (MO); 450 m, *Cerón & Iguago* 5578 (MO); 450 m, 1°08'S, 77°30'W, *Palacios* 2844 (MO); 450 m, 1°04'S, 77°36'W, 2506 (MO); Río Coca, Cañon de los Monos, 15 km, N of Coca near Río Coca, 250 m, 0°20'S, 77°01'W, *Neill et al.* 6353 (MO), 6280 (MO); Río Napo, Laguna Taracoa, 250 m, *Christenson* 1585 (MO); Sumaco, Cantón Loreto, Huaticocha, Hollín-Loreto Rd., 20 km W of Loreto, 575 m, 0°45'S, 77°28'W, *Hurtado et al.* 1390 (MO); Cantón Archidona, Hollín-Loreto Rd., Km 17, near Río Hollín, 1,100 m, 0°41'S, 77°41'W, *Hurtado & Shiguango* 1679 (MO); Hollín-Loreto-Coca Rd., Loreto-Avila, 300 m, 0°39'S, 77°22'W, *Cerón et al.* 2837 (MO); Cantón Archidona, Hollín-Loreto Rd., Km 50, Comunidad Guagua Sumaco, Faldas al sur del Volcán Sumaco, 1,000 m, 0°38'S, 77°27'W, *Cerón & Hurtado* 6635 (MO); Yasuní, Parque Nacional Yasuní, Pozopetrolero Amo 2, 230 m, 0°57'S, 76°13'W, *Palacios* 2393 (MO); *Palacios* 2429 (MO); 200 m, 0°55'S, 76°11'W, *Cerón & Hurtado* 4091 (MO), 4164 (MO); 230 m, 0°52'S, 76°05'W, *Cerón & Coello* 3268 (MO), 3330 (MO), 3346 (MO), 3417 (MO); *Cerón & Hurtado* 3841 (MO); *Coello* 58 (MO); *Neill et al.* 8340 (MO); Aguatico, Reserva Etnica Huaorani, carretera y oleoducto de Maxus en construcción Km 75–76, 250 m, 0°50'S, 76°18'W, *Aulestia & Gonti* 1746 (IBE, MO, QCNE); Yasuní, Reserva Etnica Huaorani, km 67–69, 250 m, 4°09'S, 76°22'W, *Aulestia et al.* 1411 (QCNE, MO); km 72–75, 270 m, 5°0'S, 76°21'W, *Dik & Andi* 950 (L, QCNE, MO); Orellana, 250 m, 3°02'S, 76°31'W, *Pitman* 163 (MO, QCNE). PASTAZA: Curaray, 250 m, *Holm-Nielsen et al.* 21869 (AAU); 250 m, 21869 (AAU), 240 m, 22471 (AAU); 200 m, *Jaramillo et al.* 30728 (AAU); Valle de la Muerte, *Holm-Nielsen et al.* 22471 (AAU); ca. 35 km NE of Montalvo, 260 m, 1°49'S, 76°42'W, *Zak & Espinoza* 4493 (MO); *Hurtado & Neill* 1469 (MO); 1527 (MO); Curaray (Jesus Pitishka), 200 m, *Harling & Andersson* 17708 (GB); 17502 (GB); Ceilan, from Ceilan to Río Cononaco on S side of Río Curaray, 200 m, 1°36'S, 75°40'W, *Brandbyge & Asanza* 31784 (AAU, MO); Río Curaray, Finca El Valle de Muerte, ca. 10 km E of Curaray (Jesus Pitishka), 200 m, *Harling & Andersson* 17627 (GB); Río Pacayacu, vicinity of Canelos, *Lugo* 1601 (GB, MO); Río Pastaza, along rock road to Tarabita and portage over river, ca. 3 km from turnoff from main Puyo-Mera Rd., 1,000 m, *Croat* 49690 (MO); Mera, 1,100 m, *Lugo* 1161 (MO); 1,100 m, *Asplund* 18502 (S); Río Allpayacu, 1,000 m, *Harling & Andersson* 16963 (GB, MO); 40 km NNW de Montalvo, 400 m, 0°44'S, 76°52'W, *Gudiño* 297 (MO); 400 m, 1°25'S, 77°20'W, *Hurtado* 2970 (QCNE, MO). PICHINCHA: 100 m, *Kvist & Holm-Nielsen* 40141 (AAU); Finca la Carlita, W of Sto. Domingo de los Colorados,



Fig. 89. *Anthurium trisectum* Sodiro. Croat 72265. Habit.

road to Chone, 0°14'S 79°14'W, *Iltis & Iltis 248* (WIS); Santa Domingo-Puerto Limón Rd., in the Colorado community "Congoma Grande" at km 23, 100 m, 0°21'S, 79°22'W, *Kvist & Holm-Nielsen 40231* (AAU, MO); Santo Domingo de los Colorados-Chone, Finca Carlita, at km 13, 550 m, 0°15'S, 79°14'W, *Holm-Nielsen et al. 7016* (AAU); Centenela, Montañas de Ila, 12 km E of Patricia Pilar, 550–650 m, 0°34'S, 79°19'W, *Lojmant & Molau 15816* (AAU, GB); Quito-Puerto Quito, km 113 on road, 800 m, 0°05'N, 79°02'W, *Rodríguez 215* (CR, QCA), 360 (MO, QCA); 5 km S of Santo Domingo, at Hacienda San Fernando, *Hansen et al. 7847* (MO); Santo Domingo-Puerto Limón Rd., in the Colorado community "Congoma Grande" at km 23, 100 m, 0°21'S, 79°22'W, *Kvist 40652* (AAU); Indios Colorados near San Miguel, 300–400 m, *Jativa & Epling 411* (S); Río Blanco, Sto. Domingo-Rosa Zarate (Quinindé), ca. 180 m, *Harling et al. 9305* (GB, MO); Santo Domingo de Los Color-

ados, Finca La Carlita, 11 km W of Santo Domingo de los Colorados, on road to Chone, 0°14'S, 79°14'W, *Iltis & Iltis E-248* (WIS); Zamora-Chinchipec, La Saquea-Yacuambi, 1 km N Chapintza, 1,100 m, *Harling & Andersson 23877* (GB); Sucumbios, 265 m, *Balslev et al. 84507* (AAU); 265 m, 84760 (AAU); 265 m, 84864 (AAU); 265 m, 84875 (AAU); 265 m, 97335 (AAU); 265 m, 97477 (AAU); 265 m, 97481 (AAU); 265 m, 97483 (AAU); Lago Agrio-Puerto El Carmen de Putomayo (on Río Putomayo at Colombian frontier, 2.2 km SE of Guarumo, 48 km SE of Lago Agrio, 28 km W of Tараpoа, 240 m, 0°06'N, 76°33'W, *Croat 58604* (MO); Cantón Lago Agrio, Parroquia Dureno, Reserva Indígena Cofán-Dureno, 350 m, 0°02'S, 76°42'W, *Cerón & Cerón 3132* (MO); 3144 (MO); Cantón Lago Agrio, Dureno, comunidad indígena Cofán, 350 m, 0°02'S, 76°42'W, *Cerón 178* (MO); Reserva Faunística Cuyabeno, N of Laguna Grande, 265 m, 0°01'N, 76°11'W, *Balslev et al. 84507* (AAU); Laguna Canangueno-Río Cuyabeno, 265 m, 0°01'S, 76°11'W, 84875 (AAU); Río Cuyabeno from outlet of Laguna Grande and 5 km upstream, 265 m, 0°01'N, 76°11'W, 84760 (AAU); near Palma Roja in Laguna Grande, 265 m, 0°01'N, 76°11'W, 84864 (AAU); Río Conejo, 7.8–9.1 km W of Lago Agrio, 340 m, *MacBryde & Dwyer 1425* (MO).

Anthurium trisectum Sodiro, Anal. Univ. Centr. Ecuador 20:100. 1905. Type: Ecuador. Esmeraldas: banks of the Río San Antonio, *Sodiro s.n.* (Aug. 1904), (holotype, B). Figures 89–90.

Usually terrestrial; stems to 80 cm long; roots to 30 cm long, only a few per node; internodes 1–13 cm long, sometimes mostly short on flowering plants, drying smooth, pale greenish brown; cataphylls 2.5–8 cm long, promptly decomposing to fine tan to reddish brown fibers; leaves erect; petioles 21–37 cm long, 2–3 mm diam., subterete, weakly sulcate and striate, sheathed 1–2 cm; geniculum 5–10 mm long, prolonged to each of the leaflets; blades membranaceous, tripartite, semiglossy on both sur-



Anthurium trisectum

faces, dark green above, paler beneath; the median leaflet ovate-elliptic, 8–26 cm long, 6–10 cm wide, acute to acuminate at apex, acute at base; the lateral lobes to two-thirds as long as the medial lobes, ovate, rounded at apex, oblique-attenuate at base, the outer margins rounded to obtuse, the inner margin straight to attenuate, midrib paler than surface and prominent below; primary lateral veins 10–12, arising at 60 degree angle; interprimary veins 1–2 between each primary vein; tertiary veins moderately visible below; collective veins arising from one of the lower primary lateral veins, sometimes the lowermost, 5–7 mm from the margin. Inflorescence erect; peduncle 5–17 cm long, 3–5 mm diam., terete and striate, ca. three-fourths as long as petioles; spathe linear oblong-elliptic, pale green, 2–5 cm long, 1 cm diam., membranaceous, inserted at 60 degree angle, acuminate at apex, the margins meeting at an obtuse angle and decurrent at base; spadix creamy green, sessile, 2–7 cm long, 3–6 mm diam.; flowers quadrangular, 2 mm wide, 3–5 per spiral; lateral tepals 1 mm wide, inner margins straight to weakly convex; stamens 0.8 mm long; anthers yellow. Infructescence erect, to 9 cm long; berries red-carmine, ovoid, to 6 mm long, pericarp thin, with raphides, mesocarp mucilaginous, translucent; seeds oblong-ellipsoid, 3 mm long, 2 mm wide, cream, with raphides, 1 per locule.

Anthurium trisectum ranges from Costa Rica to western Colombia and Ecuador from sea level to 1,000 m elevation. The species is easily distinguished by its usually terrestrial habit, thin, 3-parted, veiny blades, creamy green to yellowish white spadix and carmine-red berries. At ENDESA the species is common. In Ecuador the species is restricted to the western slopes of the Andes, ranging from Carchí and Esmeraldas to Pichincha Provinces.

ENDESA collections: *Croat & Rodríguez* 61494 (MO, QCA); *Jaramillo* 6554, 6724 (QCA); *Rodríguez* 186 (K, MO, QCA), 305, 317, 401 (QCA). Other collections: CAR-CHI: Tulcán Cantón, Parroquia Tobar Donoso, Sector Sabalera, Awá reserve, NE Casa Comunal, 650–100 m, 1°N, 78°24'W, *Tipaz et al.* 1508. (MO). ESMERALDAS: vic. Lita,

560–650 m, *Madison et al.* 5004 (QCA); Awá reserve, Río Palaví to Río Matajé, 200 m, 1°07'N, 78°37'W, *Hoover et al.* 3867 (MO); Tobar Donoso-Río Guape, 800–1,300 m, 1°10'N, 78°18–31'W, *Hoover* 1296 (MO); San Lorenzo Cantón, Lita-San Lorenzo, ca. 30 km NW of Lita, 300–500 m, 1°05'N, 78°40'W, *Gentry et al.* 70002 (MO); Río Cayapa, Zapallo Grande, 200 m, 0°48'N, 78°54'W, *Kvist & Nissen* 48118 (AAU, MO); Eloy Alfaro Cantón, Reserva Ecológico Cotacachi-Cayapas, Charco Vincente, Río San Miguel, 150 m, 0°43'N, 78°53'W, *Palacios & Tirado* 11303 (MO). PICHINCHA: Santo Domingo de los Colorados Cantón, Centinela, 13 km E of Patricia Pilar, 1,000 m, 0°32'S, 79°11'W, *Croat* 73020 (MO).

Anthurium truncicolum Engl., Bot. Jahrb. Syst. 25:452. 1898. Type: Ecuador. Pichincha: forests of Nanegal and Mindo, *Sodirol* 44 (B). Figure 91.

Anthurium marginatum Sodirol, Anales Univ. Centr. Ecuador 20:97. 1905. Lectotype: Ecuador. Pichincha: Nanegal, *Sodirol* s.n. (QPLS).

Anthurium platyglossum Sodirol, Anales Centr. Univ. Ecuador 17:18. 1901. Type: Ecuador. Pichincha: Nanegal, *Sodirol* s.n. (holotype, QPLS).

Appressed climber or terrestrial and somewhat scandent; stems to 1 m or more long; internodes (1–5)7–30 cm long; cataphylls promptly deciduous; petioles 30–70 cm long, 4–6 mm diam., dark green, sheathed 9–11 cm long; geniculum 2–2.5 cm long, darker than the remainder; blades trilobate, 35–40 cm long, to 38 cm or more wide at the basal lobes, coriaceous, dark green and glossy above, drying blackened, paler and semiglossy below, drying grayish black, the medial lobe ovate-elliptic, 8–11.5 cm wide, acute to acuminate at apex, broadly confluent with the lateral lobes; lateral lobes ovate to oblong-elliptic two-thirds to three-fourths as long as the medial lobe, 21–28 cm long, 7–9 cm wide, acute to acuminate to narrowly rounded at apex, the lateral lobes markedly inequilateral tapered to a bluntly rounded apex, mostly more or less elliptic, rarely oblong, usually



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Anthurium truncicolum

Fig. 91. *Anthurium truncicolum* Engl. ENDESA.

several times longer than wide, rarely as little as 1.4 times longer than wide; midrib concolorous and weakly raised above, darker than surface and more prominently raised beneath; primary lateral veins 11–15 in medial lobe, arising at a 30 degree angle; basal veins 4–5 pairs, the 1st free to the base, the 2nd coalesced 1–2 cm, the 3rd & 4th coalesced 2.5–7 cm; collective veins arising from the 1st pair of basal veins; peduncle 40–80 cm long, 5–10 mm diam., terete, circumferentially striate, equal to or one-fourth longer than the petioles. Inflorescence spreading; peduncle 25–60 cm long; spathe linear-lanceolate, green, 13–28 cm long, 2–3 cm wide, subcoriaceous, inserted at 30 degree angle, acute at apex, the margins meeting at base at an acute angle, decurrent; spadix green, 10–23 cm long, 3–8 mm diam., stipitate 7–15 mm; flowers quadrangular, 3 mm diam., 9 visible per spiral; tepals 2 mm wide, the inner margins convex; stamens to 1.9 mm long, not exerted; anthers cream. Infructescence not seen.

Anthurium truncicolum ranges from Colombia to Peru (Amazonas, Loreto & Huanuco). In Ecuador it occurs in montane forests from (600)1,000 to 2,500 m and is one of the relatively few species that occur on both sides of the Andes. At ENDESA it is only rarely encountered. It is recognized by its generally sprawling habit, coriaceous 3-lobed blades with the inflorescence equalling or longer than the petioles.

On the eastern slopes of the Andes the typical variety ranges from Sucumbios in the north to Zamora-Chinchi in the south. On the western slopes the species ranges from Pichincha to Cotopaxi, Los Ríos, Bolívar, Chimborazo, and Azuay.

The species is highly variable throughout its range, especially in the degree of lobing of the blades. Generally the lateral lobes are somewhat falcate and directed toward the apex. The lobes may be slender and narrowly pointed to about equally wide throughout most of their length as in *Cerón et al.* 5818 from Napo and *Ollgaard* 74951 from Zamora-Chinchi or they may be broad and as little as 1.4 times longer than

broad with narrowly rounded apices in *Croat* 72517 from Sucumbios.

Sodirol (1905), in his description of *Anthurium marginatum* mentions Gualea and Nanegal as well as Masfa-Quijos. The only existing collection which mentions any of these is a collection from Nanegal housed at QCNE. It is, therefore, selected as the lectotype of *A. marginatum* Sodirol.

Two variations are worthy of varietal status. One occurs in Morona-Santiago (represented by *Croat* 50800 from Gualaquiza-Zamora, Río Bomboiza, 850 m and *Sparre* 19020 from Misión Bomboiza) and Zamora-Chinchi (represented by *Palacios et al.* 6478 & 8195 in Nangaritza Cantón at Pachicutza on the Río Nangaritza). This variety has scarcely any development of lateral lobes, sometimes represented by a bulging out of the blade margin about one-third the distance up from the base, sometimes with a short lobe about 5 cm long.

The other distinct variety, described as *A. platylobum* Sodirol has broadly rounded lobes that are directed outward and downward, not at all toward the apex. All three taxa have long internodes and black-drying blades. A treatment of these varieties will be dealt with in a later paper.

ENDESA collections: *Croat & Rodríguez* 61482 (MO, QCA); *Jaramillo* 6722 (MO, QCA); *Rodríguez* 240 (MO, QCA). Other collections: Ecuador: originally collected by M. Chaille (Goodwin's Greenhouses, Germantown, TN), *Croat* 73941 (MO); Nanegal-Gualea, *Sodirol s.n.* (MO); Gualea, *Sodirol s.n.* (SI-20260) (AAU); *Sodirol s.n.* (AAU). COTOPAXI: Quevedo-El Corozón, 1.9 km NW of El Corozón, 67.5 km SE of Quevedo, 1,225 m, 1°07'S, 79°06'W, *Croat* 55833 (MO); Quevedo-Latacunga, 55.5 km from Quevedo, 930–950 m, 23.5 km E of La Mana, 0°53'S, 79°04'W, 57020 (MO); La Mana, Guayacan-Monteneuro, between Guayacan (13.1 km N of La Mana) and Monteneuro (N of Pucayacu), vic. Escuela Quindigua, 10.7 km beyond the junction in road to Escuela Quindigua, 1,480–1,530 m, 73767 (MO); Pujilí, El Corazón-Angamarca, along side road to Yasaucho, 0.3–0.4 km off of main road, 3.1 km above main

square in El Corazón, 1,780 m, 1°08'S, 79°03'W, 73653 (MO). EL ORO: Sambotambo, ca. 5 km below Piñas, 1,450 m, 3°39'S, 79°43'W, *Madsen 86940* (AAU). MORONA-SANTIAGO: 1,200 m, 2°46'S, 78°06'W, *Madsen et al. 3242* (SEL); vic. Bomboiza, 600 m, *Jimpikit RBAE2004* (MO); Gualaquiza-Limón, vic. Tumbes, 39 km N of Río Bomboiza Bridge, 4.1 km S of Tucumbatza, 1520 m, 3°17'S, 78°31'W, *Croat 72771* (M, MO). NAPO: entre el Río Pucuno y el Río Guamaní, Hollín-Loreto-Coca, 1,100–1,200 m, 0°46'S, 77°26'W, *Cerón 2954* (G, MO); Cantón Lago Agrio, Parroquia Dureno, Comunidad indígena Cofàn-Dureno, 350 m, 0°02'S, 76°42'W, *Cerón & Cerón 3122* (MO); Quito-Baeza, on steep hills S of road above jct. of road to Baeza and to Lago Agrio, 1,800 m, *Croat 58490* (MO); Baeza-Lago Agrio, 39 km NE of jct. of road to Tena, 19.7 km NE of El Chaco, 141 km SW of Lago Agrio, 1,750 m, *Croat 58539* (MO); Lago Agrio-Coco on new CEPE, ferry road 7.2 km S of S bank of Río Aguatico, 0°02'N, 76°51'W, 270 m, *Croat 58640* (AAU, MO); Baeza-Tena, 45 km N of Archidona, 2,330 m, 49590 (CAS, MO); *Sodiro s.n.* (Q); Cantón Lago Agrio, Parroquia Dureno, Comunidad indígena Cofàn-Dureno, 350 m, 0°02'S, 76°42'W, *Cerón & Cerón 3122* (MO); Cantón Quijos, Cuyuja-Baeza, Río Quijos, 2,100 m, 0°27'S, 77°56'W, *Palacios & Freire 4973* (MO); Cantón El Chaco, along Río Quijos, Finca "La Ave Brava" de Segundo Pacheco, 1,800–1,900 m, 0°12'S, 77°39'W, *Palacios 5429* (MO); at Km 68, just a few km S of Baeza, 2,000 m, 0°30'S, 77°56'W, *Croat 50497* (MO); Baeza, 2,000 m, *Harling & Andersson 16148* (MO); Baeza-Tena Rd., Cosanga, 1,800–1,900 m, 16224 (MO); 46.8 km N of Archidona, 2,330 m, *Croat 49581* (MO). NAPO-PASTAZA: Cosanga, trail E of town, 1,900 m, *Boeke & McElroy 424* (AAU, MO). NAPO: Sumaco, 3 km E of Caserio de Huamani, N of Hollín-Loreto Rd., 1,200 m, 0°43'S, 77°36'W, *Hurtado & Alvarado 397* (MO); Hollín-Loreto, km 40–50, alrededores de la comunidad Huamani y del Río Pucuno, 1,200 m, 0°43'S, 77°36'W, *Hurtado 649* (MO); km 25, Centro Challuayacu, 1,230 m, 0°43'S, 77°40'W, *Hurtado & Alva-*

rado 1032 (MO); Cantón Archidona, Km 17, Río Hollín, 1,100 m, 0°41'S, 77°41'W, *Hurtado & Shiguango 1691* (MO); km 40–50, 1,200 m, 0°43'S, 77°36'W, *Hurtado 560* (MO); Km 17, 1,100 m, 0°41'S, 77°41'W, *Hurtado & Shiguango 1734* (MO); Río Pucuno-Río Guamaní, Hollín-Loreto-Coca Rd., 1,100–1,200 m, 0°46'S, 77°26'W, *Cerón 2954* (MO); via Hollín-Loreto, Km 40, 1,200 m, *Palacios 2209* (MO); Coca-Baeza-Tena Rd., between Coca (San Francisco de Orellana) and the Baeza-Tena road, via Loreto and Hollín, 82.5 km W of Río Payamino, 6 km W of Juticocha, 28.3 km W of Loreto, 58 km E of Tena-Baeza Highway, 925 m, 0°48'S, 77°31'W, *Croat 72611* (MO); El Chaco, Proyecto Hidroelectrico Coca, Punto ST3, Río Quijos, ca. 10 km al sur de Reventador, 1,500 m, 0°11'S, 77°39'W, *Palacios 5864* (MO); Quijos, Faldas occidentales de la Cordillera de Guacamayos, Río Cosanga, 2,400 m, 0°30'S, 77°50'W, *Palacios 6341* (MO). PASTAZA: Puyo-Diez de Agosto and Arajuno, 18 km NE of main Puyo-Macas road (beginning 3.7 km from center of Puyo at Hotel Europa), 8.2 km NE of Diez de Agosto, 970 m, 1°27'S, 77°51'W, *Croat 59044* (MO, QCA); Puyo-Puerto Napo, Colonia 24 de Mayo, 15–20 km NE of Puyo, *Lugo 436* (MO); Puyo-Macas Rd., at km 19 (S of Puyo), 1,200 m, 1°37'S, 77°53'W, *Croat 50564* (MO); Río Pastaza, road to Tarabita, ca. 3 km from turnoff from main Puyo-Mera Rd., 1,000 m, 49684 (MO). PICHINCHA: Nanegal, *Sodiro s.n.* (G 005799–000093); *Sodiro s.n.* (G 05799–000093); Río Pilatón, Toachi, *Sodiro s.n.* (G 005799–000049); Quito-Alluriquín via Chiriboga, 2–3 km from main Alóag-Santo Domingo de los Colorados road, 0°18'13"S, 78°54'30"W, *Croat 56980* (MO); Quito-Chiriboga-Empalme, Km 85, "Estacion Faisanes", 1,400–1,450 m, 0°15'S, 78°50'W, *Zak & Jaramillo 2287* (MO); Quito-Nanegalito; 3.4 km beyond Tandayapa (N of Tandayapa), 1,480 m, 0°02'N, 78°40'W, *Croat 61618* (MO); Pacto-Nuevo Azuay Rd., 5 km N of La Esperanza, 1,300 m, 0°11'N, 78°46'W, *Holm-Nielsen et al. 24540* (AAU, MO); Montañas de Ila, 13 km E of Patricia Pilar, ca. 54 km S of Santo Domingo, 600 m, 0°26'S, 79°30'W, *Hammel*

& *Trainer 15839* (MO); *Sodirol 147* (US); Tandayapa-Mindo Rd., 1.5 km above Tandayapa, 1,960 m, *Croat 50242* (MO); 19.5 km from Tandayapa, ca. 5.5 km from Mindo, 1,930 m, *49394* (MO); Nono-Nanegal, at km marker 64 Nanegalito-Tandayapa, 1,490 m, *38910* (MO); Quito-Santo Domingo de los Colorados, San Juan-La Palma via Chiriboga, 2 km NE of La Palma, 930 m, *38748* (MO); San Juan-Timon via Chiriboga 6 km NE of La Palma, 1,150 m, *38764* (MO); Quito-Puerto Quito Rd., Km 113, 10 km N of road, 800 m, 0°05'N, 79°02'W, *Rodríguez 240* (MO, QCA); Km 113, 800 m, 0°05'N, 79°02'W, *260* (MO); La Favorita, 1,600–1,800 m, 0°16'S, 78°44'W, *Benavides 99* (MO), *Benevides et al. 5* (MO); 2.4 km from main Quito-Chiriboga-Santo Domingo Road, departing main road 0.7 km S of village of Chiriboga, 1,800–1,830 m, 0°12'S, 78°47'W, *Croat 72142* (MO); Reserva Natural Río Guajalito, Quito-Santo Domingo, along main entrance from Quito-Chiriboga-Santo Domingo Road, 3.5 km from highway, departing highway at km 59, 1,800 m, 0°13'53"S, 78°48'10"W, *Croat 72035* (MO); km 59 de la carretera Antigua Quito-Santo Domingo de los Colorados, Volcán Pichincha, 1,800–2,200 m, 0°13'S, 78°48'W, *Zak & Jaramillo 2222* (MO); Quito, Chiriboga, Quito-Sto. Domingo, Río Saloya, 1,600–1,800 m, 0°12'S, 78°47'W, *Cerón & Iguago 8660* (MO); *8493* (MO); Montañas de Maquipucuna, Parroquia Nanegal, Cerro Sosa, 1,750 m, 0°05–06'N, 78°37'W, *Webster & Bittman 28730* (DAV); Marianitas-Nanegal, 1,200–1,250 m, 0°08'N, 78°39'W, *Webster & Rios 28543* (DAV); Santo Domingo de Los Colorados, Quito-Santo Domingo, 1,000 m, 0°16'S, 78°56'W, *Palacios & Freire 7476* (CAS, MO, OOM, QCNE). SUCUMBIOS: Gonzalo Pizarro, Río Tigre, 1,000 m, 0°05'S, 77°25'W, *Tipaz et al. 769* (MO); Cooperativa Santa Rosa Luz de Belen, Lago Agrio-Quito, km 73, 900 m, 0°01'S, 77°30'W, *Quelal et al. 386* (MO); Lago Agrio-Coca, Lago Agrio (Nueva Loja)-Coca (Pto. Francisco de Orellana), 26 km S of Lago Agrio, 4.6 km S of El Emo, then 2.8 km W of main Lago Agrio-Coca Road, along farm road, 355 m, 0°05'S, 76°54'W, *Croat 72517* (MO); Zamora-Chinchipe, Parque Nacional Podocarpus, Loja-Zamora, Quebrada Río San Francisco, 2,040–2,250 m, 3°58'S, 79°05'W, *Ollgaard 74951* (AAU, MO, QCA).

Anthurium versicolor Sodiro, in *Anales Univ. Centr. Ecuador* 15 (108):13. 1901. LECTOTYPE: Ecuador. Napo: Río Masfa, between Cuyuja and Baeza, *Sodirol s.n.* (QPLS). Figures 92–96.

Anthurium briosianum Sodiro, *Anturios Ecuatorianos, Monografía II. Contribuciones al conocimiento de la flora Ecuatoriana*. p. 222. 1903. Type: Ecuador. Pichincha: western slopes of Volcán Pichincha, 1,800 m, *Sodirol s.n.* (the only extant collection of this taxon is a collection at the Sodiro Herbarium (QPLS) labeled merely Pichincha, 7/903 but it must serve as the lectotype).

Anthurium livescens Sodiro, *Anales Univ. Centr. Ecuador* 17: 337. 1903. Type: Pichincha: at confluence of Río Toachi and Río Pilatón, *Sodirol s.n.* (G).

Appressed climber, rarely terrestrial at ENDESA, but more frequently in some places elsewhere; stems 30–40 cm long, soft and more or less fragile; internodes 3–8 cm long, semiglossy, drying with a pattern of both fine longitudinal ridges and fine transverse cracks; cataphylls 9–16 cm long, green, persisting semi-intact at upper node, weathering into thin, pale semi-intact fibers appressed to youngest cataphylls, but generally then deciduous; petioles 27–68 cm long, 3–5 mm diam., subterete (sometimes bluntly D-shaped elsewhere), obtusely to broadly and shallowly V-sulcate, the angles acute to slightly winged; leaves erect; blades ovate-cordate 25–61 cm long, 20–45 cm wide, acuminate to abruptly acuminate at apex, deeply lobed at base, thinly coriaceous to subcoriaceous, weakly bicolorous, moderately glossy to semiglossy above, much paler and semiglossy to matte beneath; sinus spatulate to hippocrepiform, 8–16 cm deep; posterior lobes 12–20 cm long, moderately rounded, directed some-

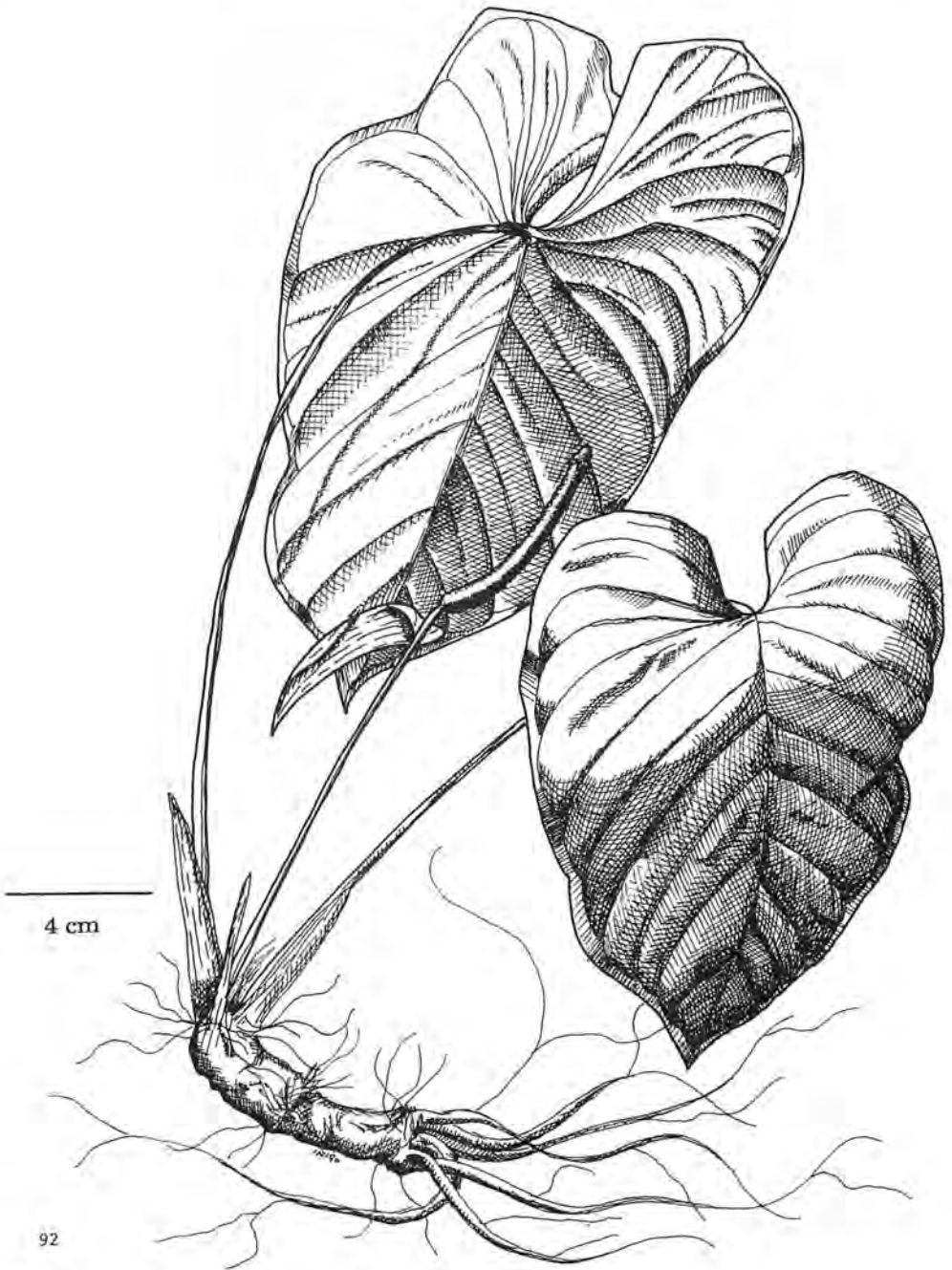
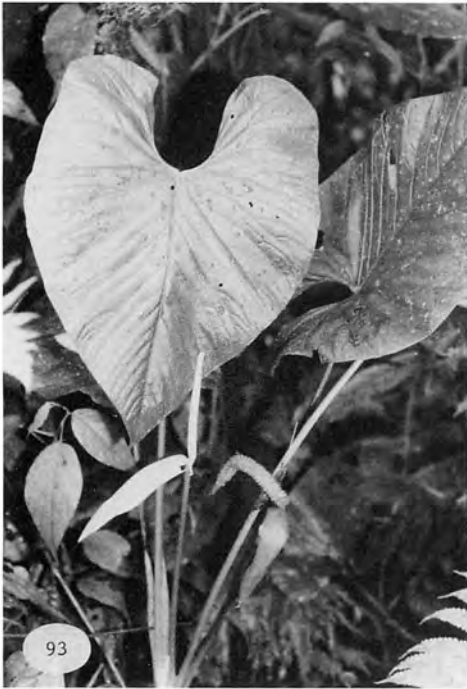


Fig. 92. *Anthurium versicolor* Sodiro. ENDESA.

what inward; midrib concolorous and convex to weakly raised, drying sometimes thicker than broad above, sometimes with all major veins and some secondary veins

prominently raised above darker than surface and less prominently raised below; primary lateral veins 10–13 pairs, departing midrib at an angle of 30–40 degrees, weakly



Figs. 93–96. *Anthurium versicolor* Sodiro. Fig. 93. Croat 55733. Habit. Fig. 94. Croat & Rodríguez 61443. Leaf. Figs. 95–96. Croat & Rodríguez 61632. Fig. 95. Stem showing smooth internodes with mostly deciduous cataphylls.



Fig. 96. Inflorescence.

to narrowly raised in valleys above, often drying thicker than broad; tertiary veins, sometimes prominently sunken above, slightly raised below; reticulate veins weakly visible above, obscure below; basal veins 6–9, all free to the base or variously coalesced 1–4 cm; posterior rib naked for much of its length; collective veins arising from the 2nd–6th basal vein, 2–4 mm from margin. Inflorescence erect, peduncle 14–37 cm long, 3 mm diam., terete, one-fourth to one-half as long as the petiole; spathe lanceolate, 6–19 cm long, 1–3 cm wide, subcoriaceous, green to pale green, spreading then drooping, inserted at an angle of 90°, weakly decurrent, acute to acuminate at apex, the margins meeting at an acute angle at the base; spadix cream at anthesis, soon medium green, almost matte, sometimes pale yellow, 10–16 cm long, 1–3 cm diam. at the base, 7–15 mm diam. near apex, stipitate 3–9 mm; flowers 5 per spiral, subquadrate, 2.1 by 2.3 mm; tepals 1.3–1.5 mm diam., the inner margins concave; the lateral margins with raphide cells; stamens 1.2

mm long; infructescence to 40 cm long, somewhat curved; pollen pale yellow; berries green, globose, 7–7.5 mm long, 7 mm wide; pericarp thin with raphide cells at the base; mesocarp mucilaginous, translucent; seeds 1.5–2 mm long, 1–1.5 mm wide, discoidal, olive-green, 1 per locule.

Anthurium versicolor occurs from Colombia (Chocó, Nariño) to southern Ecuador, perhaps ranging into Peru, ranging from 80 to 200 m and occurring on both sides of the Andes. On the Pacific slope in Ecuador the species ranges from 80 to 2,200 m elevation, primarily above 800 meters except in Esmeraldas. On the eastern slopes of the Andes it ranges all along the slopes of the Andes from Napo to Zamora-Chinchi at elevations of 250 to 1,600 m.

On Volcán Pichincha the species often forms dense stands along moist banks of ravines.

The species is recognized by its principally appressed-climbing habit, short thick internodes with persistent, semi-intact cataphylls weathering to thin, pale fibers, subterete, sulcate petiole, ovate-cordate yellow-green-drying blades with primary lateral veins convex to thicker than broad but not acute, as well as by the spadix which is cream or sometimes pale yellow at anthesis, soon medium green.

The species is represented by two forms though these might easily be elevated to varieties (or even species) once they have been more well studied. While plants of the species are typically epiphytic and have primary lateral veins merely thicker than broad to convex, some plants which occur terrestrially, have typically darker green leaves and have the primary lateral veins raised so prominently as to appear knife-edged. The latter plants usually dry with the blades markedly bicolorous, the upper surface dark green and the lower surface yellow-green. These two types of plants are readily distinguished in the field but are difficult to discern in dried condition. The typically terrestrial plants have short internodes, occur in the generally darker understory of the forest and have very dark green leaves with very prominently raised knife-like primary lateral veins on the up-

per surface and a spadix that is yellow at anthesis. In contrast, the epiphytic plants usually occur above 800 m in Pichincha Province and are appressed-climbing plants with longer internodes (3–10 cm long), medium green blades with the major veins usually convex to somewhat thicker than broad but never knife-edged. The blades dry somewhat yellowish green on both surfaces. The terrestrial form predominates at 100–800 m in Pichincha and Los Ríos Provinces and is especially prominent at the Río Palenque Biological Station. It is represented there by the following collections: *Acosta-Solís* 10888, *Croat* 38663, 38687, 50651, *Dodson* 5767, *Dodson & McMabon* 5097, *Fallen* 794, *Gentry* 9702, *Gentry & Dodson* 35729, 10200 *Hanson et al.* 7777, *Grayum & Zamora* 9400, *Pennington* 5066, *Sparre* 14066, 15178, and 15202, and *Vriese et al.* 4300. A few collections from ENDESA are somewhat intermediate between the two forms, making circumscription of them as varieties difficult. The epiphytic versus terrestrial character, in particular, breaks down and these specimens (*Grayum & Zamora* 9400, *Jaramillo* 6723, 6979, & 7059) are all terrestrial plants yet look like typical epiphytic plants from higher elevations. Further studies may reveal a better definition of this phenomenon.

Anthurium versicolor has been confused by many botanists with *A. hylaeum* Sodiro, a poorly known species which dries brown, not greenish and has the primary lateral veins barely raised, not prominently raised and thicker than broad as in *A. versicolor*.

Croat 72641 collected along the Hollín-Loreto road in Napo Province has very similar green-drying leaves but has a dark green semiglossy spadix. It is apparently a new species.

Acosta Solís 5609 might be this species but it differs in having a minute amount of puberulence on the primary lateral veins.

One Colombian collection, *Croat* 70087 from 1,800 m above Cali in Valle Department has orangish brown subglobular excrescences which are not apparent on Ecuadorian collections of the species. The collection also has a petiole which is sharply and narrowly many-ribbed circumferen-

tially. Otherwise the Colombian material matches well the material from Ecuador.

ENDESA collections: *Betancourt* 371 (NY, QCA); *Cerón & Benavides* 6207, *Croat* 73155 (B, CM, NY, QCA); *Croat & Rodríguez* 61443 (B, CM, COL, G, K, MO, QCA, US); *Jaramillo* 6710 (QCA), 6723 (MO, QCA), 6810 (QCA, MO), 6979, 7049, 7059 (QCA); *Grayum et al.* 9352 (QCA, MO); *Luteyn & Borchsenius* 13354 (MO); *Rodríguez* 184 (MO, QCA), 192, 193, 195, 196, 227, 232 (QCA), 302 (K), 307 (QCA). Other collections: CARCHI: Maldonado-Tulcán, 2,400 m, 0°53'N, 78°05'W, *Thompson & Rawlins* 887 (CM); San Marcos, 600 m, 1°08'N, 78°20'W, *Thompson et al.* 788 (CM); Chical, 1,200–1,250 m, 0°56'N, 78°11'W, *Thompson & Rawlins* 993 (MO); Tulcán Cantón, Awá reserve, Parroquia El Chical, Centro Gualpí Medio, Río Canumbí, 1,150 m, 1°02'N, 78°15'W, *Grijalva et al.* 491, 579 (MO, QCNE); Sector Sabalera, NE Casa Communal, 650–100 m, 1°N, 78°24'W, *Tipaz et al.* 1529 (MO), 1530 (QCNE). COTOPAXI: Río Guapara, 20 km NW of El Corózon, 250 m, *Sparre* 17092 (S), 17131 (S). ESMERALDAS: San Lorenzo Cantón, Awá reserve, Parroquia Ricaurte, Centro Pambilar, 500 m, 1°08'N, 78°36'W, *Aulestia & Aulestia* 1013 (MO); Río Lita, at Lita, 600–650 m, *Croat* 38946 (MO); Eloy Alfaro Cantón, Reserva Ecológica Cotacachi-Cayapas, Parroquia Luis Vargas Torres, Río Santiago, 250 m, *Tirado et al.* 508 (MO); Res. Ecol. Cotacachi-Cayapas, Río San Miguel, upstream from Pueblo Cayapas, 200 m, 0°45'N, 78°54'W, *Holm-Nielsen et al.* 25363 (AAU); Río San Miguel, San José de Cayapas, 80 m, 0°52'N, 78°57'W, *Holm-Nielsen et al.* 25679 (AAU); Cerro de Río Bravo de Cayapas, 250 m, 0°41'N, 78°56'W, Río Bravo Grande, 280 m, 0°40'N, 78°57'W, *Alvarez & Herrera* 695 (MO, QCA); *Holm-Nielsen et al.* 25532 (AAU); Río San Miguel, 1 hour upstream above San Miguel de Cayapas, 220 m, 0°43'N, 78°52'W, *Holm-Nielsen* 2543 (AAU); Pueblo San Miguel, 200 m, 0°45'N, 78°54'W, *Holm-Nielsen et al.* 25379, 25429 (AAU); Río Sapayo, 1 km upstream, 120 m, 0°50'N, 78°56'W, *Holm-Nielsen* 25602 (AAU); Santo Domingo-Esmeraldas, 8.8 km NW of Quindí, 270 m, 0°26'N, 79°03'W, *Croat* 5550.

IMBABURA: valley of Río Mira, 2.5 km E of Lita, 750–775 m, *Croat 38981* (MO). LOS RIOS: Río Palenque Biological Station, ca. Km 18, Santo Domingo-Quevedo Hwy., 250 m, 0°35'S, 79°25'W, *Croat 50651* (MO); Km 56, 220 m, *Vrieze et al. 4300A* (SEL); 150–220 m, *Dodson 5767* (US); *Dodson & McMahon 5097* (SEL, US); 200 m, *Gentry 9702* (MO), *10200* (MO); *Gentry & Dodson 35729* (MO); 220 m, *Fallen 794* (MO); 210–250 m, *Croat 38687* (MO), *38663* (MO). NAPO: Aguatico Cantón, Reserva Etnica Huaorani, Maxus oil pipeline, km 102–105, 248 m, 0°56'S, 76°13'W, *Dik 1485* (MO, QCNE); Río Masfa, Cuyuja-Baeza, *Sodiros s.n.*; near Río Masfa, *Sodiros s.n.* (QPLS); El Chaco Cantón, Proyecto Hidroeléctrica Coca, Punto ST3, Río Quijos, 10 km S of Reventador, 1,500 m, 0°11'S, 77°39'W, *Palacios 5806* (MO); Río Reventador, 1,600–1,850, 0°07'S, 77°36'W, *Palacios 6205* (MO); Cotundo-Coca, 15 km E of Baeza-Tena Road, slopes of Volcán Sumaco, 1,300 m, 0°40'S, 77°40'W, *Palacios & Neill 1553* (MO). PASTAZA: 15.6 km SE of cemetery in Puyo, up logging road past Veracruz, 920 m, *Kennedy 3906* (SEL); 5 km SE of Puyo, *Hudson 875* (MO); Puyo-Tena, 18 km N of Puyo, 1 km E of road, 1,100 m, 1°23'S, 77°57'W, *Ollgaard & Balslev 9213, 9218* (AAU). PICHINCHA: Quito Cantón, Quito-Sto. Domingo via Chiriboga, 2 km E of La Palma, 930 m, *Croat 38743* (MO); Reserva Forestal La Favorita, along Río Saloya, 1,600–1,800, 0°12'S, 78°47'W, *Cerón & Iguago 8589, Benavides & Guzman 3, Benavides & Padilla 39, Benavides & Meza 77, 86, Benavides & Torres 65* (MO); vic. Alluriquín, 800 m, *Madison 4024* (QCA); Alóag-Sto. Domingo, Toachi, confluence of Río Pilatón and Río Toachi, 850 m, *Sparre 13897* (S); Río Aluriquín-Río Toachi, 600 m, *Sparre 14772, 14773* (S); Santo Domingo de los Colorados, 600 m, 0°16'S, 79°14'W, *Cerón & Benavides 6207* (MO); 800 m, *Acosta-Solis 10888* (F); 37 km S of Santo Domingo, *Pennington 97* (NY); 10 km S of Santo Domingo, Rancho Brahman, 400 m, *Sparre 14066* (S); Santo Domingo, Hacienda Zaracay, 500 m, *Sparre 15178* (S), *1502* (S); Centinela, 10 km airline km SE of Patricia Pilar, 600–675 m, 0°37'S, 79°18'W, *Grayum & Zamora*

9400 (MO); 1,400 ft., *Hanson et al. 7777* (SEL); Gualea-La Armenia, 3 km from Armenia, 1,800 m, 0°6'N, 78°43'W, *Ollgaard et al. 37861* (AAU); 6 km NW of Nanegalito (10 km SE of Nanegal); 1,280 m, *Croat 38881* (MO); Nono-Pacto-Río Yacuambi, 5 km above Nanegalito, 1,700 m, 0°0'S, 78°40'W, *Holm-Nielsen et al. 24434* (AAU); Nono-Nanegal, km 64 marker between Nanegalito and Tandayapa, *Croat 38908* (MO); Nono-Nanegal, vic. Tandayapa, *Croat 49349* (QCA); Mindo-Tandayapa, 2,200 m, 0°00'N, 78°32'40"W, *Croat & Rodríguez 61541* (K, QCA, MO, US); Parroquia Nanegal, Río Umachaca, Hacienda El Carmen, 1,250 m, 0°07–07.5'N, 78°38'W, *Webster 28780* (DAV); Reserva Maquipucuna, Cerro de Sosa, ca. 5 km airline miles SE of Nanegal, ca. 1,750 m, 0°07'N, 78°38'W, *Webster 27552* (DAV); 1250 m, *Webster 27666* (DAV); 1,250–1,350 m, *Webster 27039* (DAV). ZAMORA-CHINCHIPE: 3 km E of Sabanilla near Río Zamora, 1,610 m, *Rawlins et al. 211* (CM); edge of Parque Nacional Podocarpus, Quebrada de Leon, tributary of Río Bombuscara S of Zamora, 1,100 m, 4°07'N, 78°58'W, *Madsen & Knudsen 86808* (AAU).

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ANNOUNCING: ELECTRONIC NEWSLETTER: AROID-L

by Phil Mueller

LET US ENTER THE 21st CENTURY!

“Recently, approximately 370,000 articles per week were distributed worldwide through Usenet. This traffic constituted roughly 50 megabytes per day of announcements, questions and answers, advice, and bits of program code, references, heated debates, and data in various formats. There are now nearly a million registered computers on the Internet . . .”
 —Una Smith, in “A Biologist’s Guide to Internet Sources”.

The International Aroid Society announces the debut of AROID-L, a new electronic discussion group set up to provide a forum for collectors, academics, and hobbyists interested in this fascinating group of plants.

AROID-L is a free international forum to promote the exchange of information on growing, collecting, and reproducing aroids. The primary purpose of AROID-L is to enable enthusiasts to easily communicate with each other electronically. We will feature show announcements, book reviews, papers from subscribers, and discussion. Since the list is affiliated with the International Aroid Society, we will post announcements and other communications from the society as well.

There are no dues or fees of any kind. Subscribers only need an address on Internet or Bitnet or a commercial service like Delphi or Compuserve. Delphi seems to work smoother with the Internet and is cheaper than most others.

AROID-L is co-edited by Steve Marak and myself. We will filter out extraneous messages and items that do not belong on AROID-L; some communications do not aid the dialog and may belong on another list. As editors, we will not alter the substance of anyone’s post. However, the subject line may be changed to facilitate ease of searching the log.

Contributions may vary in length. Please sign your name and e-mail address to each post. All posts must be signed, and we will add the address if it is not included. All contributions to AROID-L will be part of the public domain and can be freely used, printed, copied or retransmitted if credit is given to the original author.

TO SUBSCRIBE: Send a message to: listproc@mobot.org (no subject); Sub aroid-l, First Name Surname, affiliation (if any).

TO POST A MESSAGE TO AROID-L: Send your message to: aroid-l@mo.bot.org. Enter a subject on the subject line; this is important for searching the weekly logs for messages relating to a specific subject.

Please send all questions regarding AROID-L to: Phil Mueller (hi23ahg@mailhost.tcs.tulane.edu) or to Steve Marak (samarak@uafsysb.uark.edu).

Phil Mueller
 325 BURDETTE
 NEW ORLEANS, LA 70118
 (504) 866-1913