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IN MEMORIUM

MARK DOUGLAS MOFFLER
Editor of Adroideana 1985-1986

This issue of Aroideana, the final work of our devoted editor, Mark Moffler, is dedicated to him and his family. His wife, Mary, who translated the tragic news of his untimely death to me, said that Mark was happy to the end. He had recently submitted his thesis for his Master's Degree and had all but completed the editorial work on this, his final issue, when he was called. The nature of his death, through heart failure, was all the more surprising when one considers that he was believed to be in good health. I am among the many aroid lovers who was fortunate to call Mark a friend. Mark was an outstanding human being, always pleasant to be around, ever knowledgeable, always generous with his pruning knife when he knew there was a plant you wanted. Though we worked more closely than ever during the past year while Mark was editing this large issue, I never had the opportunity to visit his home in Indiana and see his now relocated collection, but it is a good one and I had the opportunity to see it on several occasions when I stayed with him and his family in Tampa, Florida. I am sure that I can speak for all aroid lovers who knew him that he will be missed dearly. We all express our sympathy to Mary and her daughter, Kirsten, and wish them all our best. Mark Moffler's final dedication to preserving the viability of the International Aroid Society though good editing of our journal was indeed the last true measure of his devotion. We must now all redouble our efforts to continue to make the Society grow, to sponsor increased membership in order to insure that the journal to which Mark devoted so much of his energy will continue to prosper.

—Tom Croat

Mark Douglas Moffler, born 3 January 1952, in Chicago, Illinois. Died 4 November 1986, in Evansville, Indiana. Survived by Mary Moffler and Kirsten Moffler.

The Araceae of Venezuela

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Abstract: An illustrated treatment of 171 Venezuelan Araceae taxa is provided. Discussion of range, species characteristics and distinction from similar or closely related species is made for each taxon. Sixteen species, three subspecies and one variety are described as new, and three new combinations are made.

Until recently the Araceae of Venezuela was very poorly known, but that has greatly changed with the publication of "Sinopsis de las Araceaes de Venezuela" by G. S. Bunting (Rev. Fac. Agron. (Maracay) 10:139-290. 1979). This great contribution to our understanding of the South American Araceae is the result of about 20 years of work by Bunting in Venezuela. Since the work was published in Spanish, lacks illustrations and is likely to be unavailable to most aroid enthusiasts, I will present here some needed commentary on the Venezuelan species and will illustrate many of them for the first time.

All described Venezuelan species are listed in appendix 1. When species are new to science or recently described elsewhere complete descriptions are provided. The species discussed in the text are generally only those for which illustrations were available. Where species were sufficiently known to provide commentary, but where no photographs of live material was available, photographs of typical herbarium material has sometimes been provided. While herbarium specimens are generally unsuitable for easy recognition by horticulturists, they at least provide some assistance in indentification.

Many of the Venezuelan species, including many poorly known or rare species described for the first time by Bunting, are very attractive and will be in demand by horticulturists. Several trips in recent years have enabled me to photograph a good percentage of the species in the Flora. These trips included a month long trip (July-August) in 1982 which took me more than 6,000 kilometers by car and 2,000 kilometers by air into many parts of the country. A second 3 week long trip to Cerro Neblina (Nov-Dec, 1985) in the Territorio Amazonas on the Brazilian border was followed by a trip to the Cordillera de la Costa and the Cordillera de Mérida during two weeks in March of 1986. In all, I was able to collect a high percentage of the 274 aroid taxa occurring there.

The aroid flora of Venezuela is interesting in several ways. It is apparently much richer in species than the Amazon basin to the south but less rich than the species-rich western Cordillera of Colombia to the west. The aroid flora of Venezuela is similar to the flora of the middle Amazon basin, however, in that it is substantially richer in species of *Philodendron* than *Anthurium*. In countries throughout most of the Western Andes, *Anthurium* species generally outnumber *Philodendron* species. For example, in Panama there are 158 known species of *Anthurium* and about 75 species of *Philodendron*. In contrast, a typical locality in Amazonian Brazil may have many species of *Philodendron* and no representation of *Anthurium*. Even when *Anthurium* are present they are often rare, most being members of section

Pachyneurium (bird's nest *Anthuriums*). The situation in Venezuela is not nearly as severe, but even so, 66 species of *Philodendron* are reported by Bunting while only 44 species of *Anthurium* were reported.

Venezuela is quite diverse geographically, with several distinct geological components appearing to have arisen at different times, or at least to have been isolated for a considerable time, resulting in distinct floristic regions. Bunting (1979) divided Venezuela into seven floristic zones (Fig. 1) in regard to the distribution of aroids. These were: 1. The Atlantic coast (territory of Delta Amacuro and the eastern extremes of Sucre and Bolívar States). 2. The Cordillera de la Costa of the Federal District and States of Miranda, Aragua and Carabobo with extentions or subzones in the eastern states of Sucre and Monagas, as well as the western states of Yaracuy and Falcón. 3. The Cordillera de Mérida and the Sierra de Perijá, the two mountain chains lying on either side of Lake Maracaibo. 4. The forested slopes below the Páramo de Tamá in SW Táchira (with a flora related to the western Andes of Colombia). 5. The Amazon lowland region. 6. The Guyana Highlands. 7. The Llanos (flat grasslands and savannas of the Orinoco drainage).

Relatively few Araceae occur in the Llanos, which are partially flooded during the rainy season and very dry during the dry season. The zone probably richest in Araceae per unit area is the Cordillera de Mérida, perhaps owing to its much more diverse array of elevations and habitats.

Appendix 1 lists the 275 taxa of Araceae from Venezuela. Each species has been assigned to one or more of these floristic regions by number only. In a few cases, name changes have been made or have been suggested. Some taxa have been added to the flora. These are preceded by an asterisk. The states or territories of Venezuela where the species is known to occur are also listed in an abbreviated manner according to the following:

Amazonas	Am
Anzoátegui	An
Apure	Ap
Aragua	Ar
Barinas	Ba
Bolívar	Bo
Carabobo	Ca
Cojedes	Co
Delta Amacuro	DA
Distrito Federal	DF
Falcón	Fa
Guárico	Gu
Lara	La
Mérida	Me
Miranda	Mi
Monagas	Mo
Nueva Esparta	NE
Portuguesa	Po
Sucre	Su
Táchira	Ta
Trujillo	Tr
Yaracuy	Ya
Zulia	Zu

The legend of those species chosen for illustration includes more specific information.

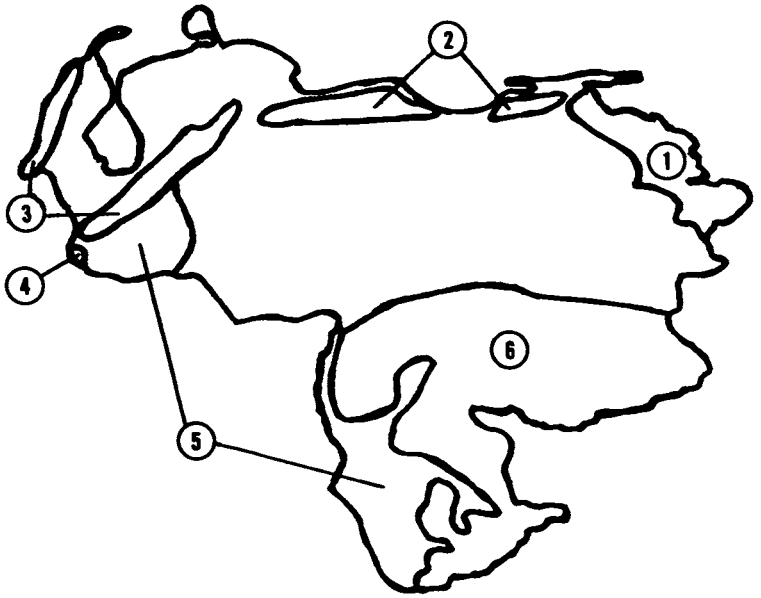


Fig. 1. the floristic regions of Venezuela: 1. the Atlantic coast 2. the Cordillera de la Costa 3. the Cordillera de Mérida and the Sierra de Perijá 4. SW Táchira below Tamá 5. the Amazon region 6. the Guyana highlands 7. the Llanos (not shown).

ANTHURIUM

Anthurium acrobates Sodiro, Anales Univ. Centr. Ecuador 16: 276. 1902.

Anthurium acrobates ranges from southern Colombia (Meta) along the eastern slopes of the Andes to Ecuador and Peru at elevations of 280-2,500 m. A recent outlying collection from southern Amazonas at Cerro Neblina indicates that at one time the species may have had a broader distribution. Figs. 2-3

The species is recognized by its appressed-climbing habit with elongate internodes, long-petiolate, narrow, ovate to ovate-triangular blades, and its long-pedunculate inflorescences with a green, lanceolate spathe and usually purplish, long-tapered spadix.

Anthurium amoenum Kunth & Bouché, Ind. Sem. Hort. Berol. 1848: 1. 1848.

Anthurium amoenum is apparently endemic to Venezuela, ranging from the Cordillera de la Costa (El Avila in the Distrito Federal to Alto de Choroní in Aragua) to the Cordillera de Mérida (from Barinas and Mérida (La Azulita) to Sierra de San Luis in Falcón) at 1,420-2,140 m, generally occurring in shady, wet undisturbed areas. Fig. 4

The species is characterized by its terrestrial habit, short internodes (6-20 mm diam.), deciduous cataphylls, and a subterete petiole that is weakly and narrowly flattened toward the apex, more consciously so on the geniculum. The blades are thin and veiny, elliptic to broadly elliptic, with the principal veins mostly sunken above and raised below. The secondary and tertiary veins are also raised on the lower surface and the lower midrib is often tinged red. The erect inflorescence has a green spadix with medium green tepals, a green reflexed spathe, and dark green, early emergent pistils.

Figs. 2-5. 2-3. *Anthurium acrobates* Sodiro. Ecuador. Napo: Baeza, 2500 m, *Croat 49437*. 2. Habit, x1/12. 3. Inflorescence, x3/10. ----4. *A. amoenum* Kunth & Bouché. Venezuela. Mérida: Mérida - La Azulita, 1590 m, *Croat 54875*. Habit, x1/5. ----5. *A. betanianum* Croat. Venezuela. Táchira: Tamá National Park, 2600 m, *Croat 60687A*. Inflorescence, x1/6.

Engler included *A. humile* Schott from Peru as a variety of this species. Despite the fact that the Schott drawings of *A. humile* look very similar to *A. amoenum*, it is unlikely, considering known distributional patterns, that the Peruvian plants are closely related to the Venezuelan species.

Anthurium apaporanum Schultes, Bot. Mus. Leafl. Harvard Univ. 18: 115, pl. 19. 1958.

Anthurium apaporanum ranges from southern Venezuela to southern Colombia (Vaupés) and south along the foothills of the Andes to Ecuador (Napo and Pastaza) and Peru (Amazonas, Loreto, Huanuco and Pasco) at 200-1,000 m. In Venezuela, it is known only from Cerro Neblina, but it is expected to range throughout the remainder of southern Venezuela. Fig. 6

The species is a member of section *Porphyrochitonium* and is distinguished by its usually epiphytic habit, short internodes, subterete petioles (ca. two-thirds as long as blades), oblong-elliptic blades, and whitish, slightly tapered spadix with tepals that dry with a minutely warty surface. Particularly characteristic are the blades, which dry yellowish green (with an almost golden cast) and are glandular-punctate below, have a straight collective vein near the margin and have about 20 primary lateral veins, which are scarcely or not at all more conspicuous than the numerous interprimary veins.

Anthurium bakeri Hook. f., Bot. Mag. t. 6261. 1876.

Anthurium bakeri ranges from Guatemala to Colombia, Venezuela and Guyana from sea level to 1,000 m. The species is rare in Venezuela, having been collected only in the forest around the base of Cerro Neblina. The species was first collected in Guyana by A. C. Smith (*3014*) in 1938. Material from eastern South America differs in superficial ways from that of Central America, but considering the widespread nature of the species in Central America, it is not surprising to find it in eastern South America.

The species is distinguished by its short internodes, long- petiolate, oblong-oblanceolate blades with a distinctive sunken collective vein, which is more conspicuous than the primary lateral veins. In this regard, the species is close to *A. angelorum* Bunting, having similar blades. That species, however, dries grayish green and is reported to have a greenish yellow spadix (*Davidse et al. 18530*), while *A. bakeri* has blades drying yellow-green and has a white spadix.

Perhaps the closest relative of *A. bakeri* in Venezuela is *A. apaporanum* Schultes. The latter species, represented by an outlying population in Venezuela at Cerro Neblina, ranges from Colombia to Peru. It differs from *A. bakeri* in having typically more elliptic blades drying more yellow-green and in having a spadix that is typically more long-tapered.

Anthurium bernardii Croat, Aroideana 8(4): 120. 1985 (1986).

Anthurium bernardii is endemic to Venezuela, occurring in the Cordillera de Mérida at 850-1,900 m in adjacent portions of the states of Barinas and Trujillo.

A member of the section *Porphyrochitonium*, it is distinguished by its long-petiolate, thick, ovate leaf blades that are dark glandular-punctate on both surfaces, by its slender stem with persistent cataphyll fibers and especially by its unusual flowers which, unlike any other known species of *Anthurium*, have opposing lateral tepals that are flattened and erect with their respective lateral margins very near one another in bud (much like a pair of folded hands held in prayer with the fingers extended) as in a much flattened bud. At anthesis, the tepals are fully extended or

Figs. 6-9. 6. *Anthurium apaporanum* Schultes. Peru. *Barrier s.n., Munich Bot. Gard. 79-1100.* Habit, x1/5. ----7-8. *A. betanianum* Croat. Venezuela. Táchira: Tamá National Park, 2600 m, *Croat 60687A.* 7. Habit, x1/38. 8. Blade, x1/12. ----9. *A. bonplandii* Bunting ssp. *bonplandii.* Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59258.* Inflorescence and leaves, x1/6.

nearly so, perhaps the full length of both the pistil and style, much as in most ordinary flowers. The extended flower parts and epecially the tepals (which are completely straightened and look like round-ended spades), give the entire spadix a very coarse, asperous appearance. For photos see Aroideana 8(4): 122.

Anthurium betanianum Croat, sp. nov.

Type: Venezuela. State of Táchira: Tamá National Park, along trail to summit beginning ca. 3 km from center of population of Betania (7.6 km S of Villa Páez, 25.7 km S of Las Delicias, 66.7 km S of Rubio) ca, 7° 28'N, 72°27' W, 2,600 m, *Croat 60687A* (MO 3234805-3234806, holotype; B, CAS, K, NY, US, VEN, isotypes). Figs. 5, 7-8, 10

Planta epiphytica aut terrestris; internodia brevia, 3.5-7 cm diam.; cataphyllum 3-30 cm longum, persistens en fibris tenuibus; petiolus teres aut subteres; lamina ovata, basiliter cordata, 54-87 cm longa, 36-66 cm lata; inflorescentia erecta; pedunculus 70-86 cm longus, 3-13 mm latus; spatha ovatolanceolata, viridus; spadix stipitatus, purpureus, 13-27 cm longus, 1-1.5 cm diam; baccae ignotae.

Epiphytic or terrestrial; stem ca. 3 m long; internodes short, 3.5-7 cm diam.; cataphylls coriaceous, 3-30 cm long, acuminate, drying reddish brown, persisting as fibers. LEAVES erect; petiole terete to subterete, obtusely 1-ribbed midway, obtusely flattened toward apex, ca. 1 m long, 1-1.5 cm diam., medium green tinged puplish; geniculum 4 cm long; blades moderately coriaceous, held perpendicular to petiole, ovate, acuminate at apex, cordate at base, 54-87 cm long, 36-66 cm broad, broadest at base, the margin broadly undulate; anterior lobe 38-60 cm long, the margin convex; posterior lobes 16-24 cm long, directed inward to overlapping, the sinus mitered to spathulate; upper surface semi-glossy, dark green, drying blackish; lower surface somewhat paler and almost matte to weakly glossy, drying reddish brown; midrib convex above, convex below with 2 sharp ribs on either side; basal veins 10-12 pairs, first-third pairs free to the base, 8th and higher order pairs coalesced 7.5-12 cm; posterior rib naked 7.5-12 cm; primary lateral veins 8-15 per side, departing from midrib at 50-55° angle, convex above, reddish and pale below, prominently raised with an acute rib, curved to collective vein, drying weakly to moderately raised above, prominently raised below; interprimary veins drying moderately raised below, inconspicuous above; tertiary veins in part sunken above, raised below, drying slightly raised below, inconspicuous above; collective vein arising from the primary lateral veins near middle of blade, running 3-7 mm from the margin. INFLORESCENCES erect, stout, slightly shorter than leaves; peduncle erect, 70-86 cm long, 3-13 mm diam. when dry, 1-1.5 times as long as petiole; spathe coriaceous, semi-glossy, medium green, outer surface tinged purple or pale brick-red suffused yellowish green, drying reddish brown, ovate-elliptic, 17-25 cm long, 3.5-6 cm broad, acuminate at apex, obtuse at base; stipe 1-2 cm long; spadix purplish, scarcely tapered, almost cylindrical, 13-27 cm long, 1-1.5 cm diam. at base, 4-9 mm diam. at apex, pendent, held at ca. 90° angle from peduncle. Flowers (dried) rhombic, 2.3-3 mm long, 1.7-2 mm wide, ca. 17 flowers visible in the principle spiral (when live), 11-14 flowers visible when dried; tepals held semi-erect, lateral tepals ca. 1.3 mm wide, the inner margin broadly rounded, straight or slightly concave on drying, the edge turned up, outer margin acute to obtusely rounded; pistils somewhat protrudant after anthesis (ca. 1.5 mm long on dried plant), ca. 1 mm wide; stigma button like with an oblong slit ca. 0.6 mm long; stamens ca. 0.7 mm long, the laterals preceding the alter-

Figs. 10-13. 10. *Anthurium betanianum* Croat. Venezuela. Táchira: Tamá National Park, 2600 m, *Croat 60687A*. Apex of stem, x1/6. ----11-12. *A. bonplandii* Bunting ssp. bonplandii. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59388*. 11. Leaves, x1/11. 12. Stem, x3/10. ----13. *A. bonplandii* Bunting ssp. *bonplandii*. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59260*. Infructescence, x1/5.

nates by ca. 5 spirals, the 3rd stamen preceding the 4th by 1-2 spirals; anthers ca. 0.7 mm long, 0.2-0.5 mm wide, oblong to triangular; thecae not at all divergent. INFRUCTESCENCE with the spathe present; spadix 26 cm long, 2.5 cm wide; stipe 1.5 cm long, berries not seen.

Anthurium betanianum is known only from Venezuela, on the forested slopes below the Páramo de Tamá in the southwestern corner of the state of Táchira, south of San Cristóbal near the Colombian border at 2,150-2,600 m. It is expected to also occur in Colombia.

The species is characterized by its large overall size, large coriaceous, reddish brown cataphylls (30 cm long) which weather to fibers, its ovate blades with a cordate base and a collective vein originating from the primary lateral veins near the middle of the blade and especially by its stout inflorescence, with the broad spathe erect and the purplish, scarcely tapered spadix turned forward at nearly a 90° angle.

There are noteworthy differences between the collection from near Betania (*Croat 60687A*), which reports the spathe to be medium green externally tinged purple and which has stamens appearing to have fallen off (or scarcely exserted) and the collection from Quebrada Agua Azul (*Steyermark & Liesner 118387*) with a younger inflorescence having a yellowish green spathe suffused with pale brick-red and exserted stamens.

VENEZUELA. TACHIRA: Quebrada Aqua Azul, S of El Reposo, 14 km SE of Delicias, 7°31'N, 72°24'W, 2,150-2,300 m, *Steyermark & Liesner 118387, 118620* (MO); Tamá National Park, along trail to summit beginning ca. 3 km from center of population of Betania (7.6 km S of Villa Páez, 25.7 km S of Las Delicias, 66.7 km S of Rubio), ca. 7°28'N, 72°27'W, 2,600 m, *Croat 60687A* (B, CAS, K, MO, NY, US, VEN).

Anthurium bonplandii Bunting, Acta Bot. Venez. 10: 267-268. 1975. ssp. ***bonplandii***

Anthurium bonplandii is known throughout the northern Amazon basin, ranging from southeastern Colombia to southeastern Venezuela and to the northwestern part of the Brazilian state of Pará. In Venezuela, it inhabits the middle and upper Río Orinoco drainage. It is predominently terrestrial in sandy areas or, less frequently, is found growing on rocks on in open savanna areas, or in partial shade of the primary forest. Figs. 9, 11-13

The typical subspecies is recognized by its elliptic or rarely oblanceolate, coriaceous blades with acute bases and by its flowers with raised, caviform stigmas. It is highly variable and overlaps considerably with two other taxa, which are probably only subspecifically distinct. One of these taxa, *A. guayanum* Bunting, occurs in the Guiana Highlands, usually at higher elevations (above 500 m) and has generally larger, often thicker blades, which are conspicuously glandular, dotted with plate-shaped glands. The second taxon, long confused with *A. bonplandii* ssp. *bonplandii*, is here described as a new subspecies of *A. bonplandii*.

Anthurium bonplandii ssp. ***cuatrecasii*** Croat, ssp. nov. Figs. 14-17

TYPE: Venezuela. Amazonas: Dept. Atabapo: vicinity of Puerto Ayacucho: along road from Puerto Ayacucho to Sanariapo, ca. 1 km S of airport road, near Río Cataniapo, growing on huge granite boulders, Aug. 14, 1982, *Croat 55065* (MO 2934844, holotype; B, DUKE, GH, NY, RSA, US, VEN, isotypes).

Discrepat cum specie typica habens folii basim truncatam vel gradatim rotundam, pedunculum longum et longum stipitem.

Terrestrial or epipetric, occasionally epiphytic; stem often caespitose, leaf scars obscured by root mass and cataphylls; internodes shorter than broad, 1-4 cm diam.; roots dense, descending, the uppermost ascending, grayish when dried, slender and elongate, to 25 cm long, 2-5 mm diam.; cataphylls coria-

Figs. 14-17. *Anthurium bonplandii*. Bunting ssp. *cuatrecasii* Croat. Venezuela. Amazonas: Puerto Ayacucho, 100 m, *Croat 55065*. 14. Habit, x1/12. 15. Habit, x1/8. 16. Stem, x3/10. 17. Inflorescence, x3/10.

ceous, 4-14 cm long, acute to weakly acuminate at apex, persisting more or less intact, eventually dilacerating into fibers at base. LEAVES erect; petioles 4-30 (40) cm long, drying 3-11 mm diam., erect, C-shaped or nearly D-shaped, broadly and sharply sulcate to nearly flat with prominently raised margins adaxially, smoothly rounded abaxially, sheathing 2-10 mm in the lowermost portion of petiole; geniculum terete, 0.5-2 cm long; blades coriaceous, oblanceolate, often more or less elliptic to slightly ovate-elliptic, rarely oblong-elliptic, acute at apex to weakly acuminate, mostly rounded at base, sometimes bluntly acute, (16)25-55(70) cm long, 4-25(32) cm wide, broadest mostly at or above middle, the margins weakly undulate; upper surface semi-glossy to glossy; lower surface semiglossy, medium to dark green above, light green, pustulate or glandular-punctate below; midrib scarcely raised at base, convexly raised toward the middle above, prominently, convexly raised below, departing midrib at (30)40-55(75)° angle, usually weakly arcuate-ascending to the margin, loop-connecting in the upper one-third of blades, convexly raised; interprimary veins occasionally visible; lesser veins weakly etched above, slightly raised or flat below, darker than surface; collective vein arising from near the apex, 2-10 mm from margin. INFLORESCENCES with peduncle (19)30-100 cm long, drying 5-10 mm diam., 1.3-7 times as long as petioles, terete; spathe coiled, recurled, pale yellowish green, sometimes suffused with reddish purple, linear-lanceolate, 5-20 cm long, 0.5-2.5 cm wide, broadest near base, the apex acuminate (the acumen ca. 5 mm long, inrolled), the base decurrent; stipe (10)15-40 mm long; spadix pale green, becoming pink to maroon at maturity, tapered, erect, (6)10-25 cm long, 5-15 mm diam. near base, 3-6 mm diam. near apex, broadest at the base; flowers rhombic to 4-lobed, drying 1.6-2.6(3) mm long, (1.2)1.5-2.6 mm wide, the sides smoothly sigmoid, (4)5-8 flowers visible in either spiral; tepals punctate, papillate, lateral tepals 1.2-1.8 mm wide, inner margins convex, outer margins straight to 3-sided; pistils more or less squarish, barely emergent or not at all emergent, stigma oblong, more or less rectangular, 0.6 mm long, densely papillate, the exposed portion of stamens to 1 mm long; anthers 0.4-1 mm long, 0.4-1.2 mm wide when dried, surrounding pistil; thecae drying more or less ellipsoid, 0.2-0.6 mm wide, divaricate. INFRUCTESCENCE with spathe withered or absent; spadix (5)10-22 cm long, 8-20 mm diam., bearing berries in the basal portion only, the apex often rotted away; stipe (2)20-35 cm long; berries green, grayish green or greenish, brown when young, obovoid, apex more or less truncate, 4-6 mm long, 3-5 mm diam.; pericarp thickened, with raphide cells; mesocarp dry; seeds 2, with raphides, broadly ellipsoid, 4-5 mm long, 1.8-3 mm thick, 1.2-1.4 mm diam. (rehydrated measurements), attached to apical end of carpel by strand of fibers.

Anthurium bonplandii ssp. *cuatrecasii* ranges from southeastern Colombia (from the Mesa de Yambí at ca. 1°25'N, 71°22'W) NE to the drainage of the middle and upper Río Orinoco and occurs at 75-380 m. Principally found on granitic boulders, it often has a caespitose habit, growing in humus tufts either on granitic outcrops or terrestrially on soils with a granite base.

The subspecies *cuatrecasii* differs from the other subspecies of *A. bonplandii* in having leaf bases that are rounded to narrowly truncate. It is also distinguished by its very long peduncles and by its unusually long stipe.

The taxon is named in honor of Dr. José Cuatrecasas of the Smithsonian Institution in Washington, D.C. He was one of the first collectors of the species while working in Colombia.

Anthurium bonplandii ssp. *cuatrecasii* is difficult to separate from ssp. *bonplandii* in regions of geographical

overlap such as the Mitú area of Vaupés in eastern Colombia or the middle Orinoco River Valley. *Schultes & Cabrera 19709*, from the Río Vaupés area near Mitú in Colombia, exemplifies such taxonomic difficulty. Representing both long and short stipitate inflorescences in the same collection, this specimen has been placed in ssp. *cuatrecasii*. It is possible that this collection, and others in this range of geographical overlap, is hybridized with ssp. *bonplandii*.

The species is also closely related to *A. guayanum* Bunting (See that species for noted differences). Both of these taxa will be dealt with in greater detail in an upcoming revision of *Anthurium* sect. *Pachyneurium*.

VENEZUELA. AMAZONAS: 10-15 km above mouth of Río Guayapo, tributary to Río Sipapo, 160 m, *Morillo & Ishikawa 3432* (VEN); 3 km N of Puerto Ayacucho, 140-180 m, *Morillo 6753* (MY, VEN); Caño Mosquito, Cano Marieta, *Lister 266* (K); Río Orinoco, between Sanariapo and San Pedro, *Bunting 4239* (MO); Río Orinoco between Santa Rosa and mouth of Río Vichada, Laja Picure, just below Raudal Picure, 100 m, *Maguire et al. 36194* (NY, VEN), *Maguire et al. 36197* (NY, US, VEN); Río Orinoco, La Esmeralda, *Medina 349* (VEN); middle and upper Orinoco, *Pannier-Schwabe 1160* (VEN); vic. of Puerto Ayacucho between Puerto Ayacucho and Sanariapo, ca. 1 km S of airport road near Río Cataniapo, 100 m, *Croat 55065* (MO); Dept. Atures, 23 km NE of Puerto Ayacucho, along the road to El Burro, 80-150 m, 5°51'N, 67°29'W, *Davidse & Huber 15282* (MO, VEN); Puerto Ayacucho, Río Cataniapo, 80 m from bridge to Samariapo, 37 m, 6°25'N, 67° 25'W, *Castillo 1237* (MO); vic. of Puerto Ayacucho, 8 km S, Estación de Piscicultura, 85 m, 5°36'N, 67° 37'W, *Davidse & Huber 14894* (MO); between Puerto Ayacucho and airport, 100 m, *Gentry & Barry 14438* (MO); vic. Puerto Ayacucho on banks of Rio Orinoco, 100 m, *Plowman 7742* (F, K, MO, SEL), *Williams 13446* (US, VEN); vic. Puerto Ayacucho, Samariapo Road, left bank of Río Cataniapo, *Trujillo & Pulido 14958* (MY); Sanariapo, 124 m, *Williams 16037* (F); 95 m, *Williams 18379* (VEN); vic. Puerto Ayacucho, 5°44'N, 67°38'W, *Wessels-Boer 1904*, (MO, U); 75 m, 5°37'N, 67°36'W, *Huber 612* (MO, VEN); Dept. Atabapo, Caño Cotúa (Yapacana), 3-6 m, *Huber 1778* (VEN): Río Ventuari, 20 km E of Río Orinoco junction, 98 m. 4°3'N, 66°49'. *Huber 1853* (VEN); BOLIVAR: Laja del Zamuro, mouth of the Parguaza, 150 m, *Trujillo 10756* (MY); Río Orinoco, rocky outcrops on Isla Sta. Elena, 100-150 m, *Wurdack & Monachino 39874* (F, NY, US, VEN); Río Parguaza, *Badillo 1451* (VEN); Dtto. Cedeño, 35 km SW of Caicara del Orinoco, 100-300 m, 7°30'N, 66°20'W, *Steyermark et al. 131274* (MO).

Anthurium bredemeyeri Schott, Oestr. Bot. Wochenbl. 7: 269. 1857.

Anthurium bredemeyeri is endemic to Venezuela, known only from the vicinity of the type locality in Aragua and the Distrito Federal near Colonia Tovar at 920-2,300 m.

A member of the section *Xialophyllium*, it is distinguished by its epunctate, more or less oblong, long-petiolate blades, its long internodes, persistent cataphyll fibers, and long pedunculate inflorescence. The species has long been confused with several members of section *Porphyrochitonium* in Venezuela. All of these can be distinguished by being glandular-punctate on at least the lower blade surface.

For a complete treatment of this species complex and for illustrations see Aroideana 8(4): 125. 1985.

These include *A. bernardii* Croat, *A. fernandezii* Croat, *A. gehrigeri* Croat, *A. gonzalezii* Croat and *A. smithii* Croat.

Anthurium caraboboense Croat, sp. nov.

TYPE: Venezuela. Carabobo: Guaremales, road from Puerto Cabello to San Felipe, 10-100 m, *H. Pittier 8805* (GH, holotype; MO 3229684, isotype). Fig. 18

Planta epiphytica; caulis brevis, ad 1 cm diam.; cataphyllum persistens, intactum; petiolus sulcatus, 1.4-3 cm longus; lamina oblanceolata aut obovata, 10-13.5 cm longa, 3.8-4.7 cm lata; pedunculus 7.5-8 cm longus; spatha oblongo-lanceolata, 3 cm longa; spadix luteus, 4-4.5 cm longus, 2.5-3 mm diam.

Probably epiphytic (description based on dried plants only); stems to 6 cm long, to 1 cm diam.; roots numerous; cataphylls moderately thin, 3-3.8 cm long, with pale raphides, acuminate and curved at apex, persisting intact. LEAVES erect-spreading; petiole obtusely sulcate, 1.4-3 cm long, ca. 1.5-2 mm diam., blades moderately coriaceous, oblanceolate to obovate, rounded to obtuse and apiculate or abruptly acumi-

Figs. 18-21. 18. *Anthurium caraboboense* Croat. Venezuela. Carabobo: Puerto Cabello - San Felipe, < 100 m, *Pittier 8805*. ----19-21. *A. caripense* Bunting. Venezuela. Monagas: Guácharo, 970 m, *Croat 54388*. 19. Leaf blade and inflorescence, x1/8. 20. Inflorescence, x1/5. 21. Stem, x1/6.

nate at apex, narrowly acute at base, 10-13.5 cm long, 3.8-4.7 cm broad, broadest well above the middle, 5-7 times longer than petiole, drying brown; both surfaces matte; midrib raised on both sides, probably convex; primary lateral veins 4-5 per side, moderately inconspicuous, weakly raised on both surfaces, departing the midrib at 35-40° angle, straight to the collective vein; interprimary veins almost as conspicuous as primary lateral veins; collective vein arising from the lower one-third to one-half of the blade, running 3-5 mm from the margin. INFLORESCENCE more or less as long as leaves; peduncle 7.5-8 cm long, 2.5-3.5 times longer than petioles; spathe moderately thick, oblong-lanceolate, weakly decurrent (7 mm), 3 cm long, acute at base and apex, inserted at ca. 45° angle; stipe 13-15 mm long, 1 mm diam.; spadix yellow, slightly to scarcely tapered to apex, 4-4.5 cm long, 2.5-3 mm diam.; flowers rhombic, 2.5-3.5 mm long, 2-3 mm wide, sides somewhat sigmoid, 2-3 flowers visible in the principle spiral; tepals with a few large, conspicuous raphides visible (at least when young), lateral tepals 1.5-3 mm wide, inner margin straight to broadly convex, the two outer margins somewhat unequal, usually convex; pistils weakly emergent; stigma oblong-linear, 0.5 mm long; stamens emerging in a prompt sequence beginning at the base, the laterals preceding the alternates by ca. 6 spirals, closely arranged around the pistil (the space between them less than their width); anthers broadly ovate, 0.4 mm long, 0.5 mm wide; thecae not at all divergent. FRUITS not known.

Anthurium caraboboense is endemic to Venezuela, known only from the type in the state of Carabobo, along the road between Puerto Cabello and San Felipe at 10-100 m. It is a member of section *Oxycarpium* and is not confused with any other species in Venezuela. It can be distinguished by its small size and by its more or less obovate, epunctate leaf blades and its prominently stipitate, yellowish spadix.

The species is probably related to *A. wedelianum* Croat from Panama, which has a similar inflorescence. That species differs in having larger, pale green leaves, and a longer, more slender spadix.

Anthurium caripense Bunting, Acta Bot. Venez. 10: 271. 1975.

Anthurium caripense is endemic to Venezuela, occurring in exposed areas on the hills around Caripe (N) Monagas), Guácharo, and the Peninsula de Paria (Sucre) at 800-1273 m. Figs. 19-22

The species is characterized by its epiphytic habit, short internodes, persistent cataphyll fibers, large, coriaceous, ovate and cordate blades with undulate margins, somewhat naked posterior ribs, and major veins, which are a deep rose color when young becoming pale green with age. The petiole is obtusely and narrowly sulcate, green tinged with red and speckled pale green. The very long-tapered, maroon-brown spadix deflexes at an angle to the peduncle with the short green or white spathe being tinged with maroon. The tepals are a pale violet, the pollen is orange, and the fruits are red.

Anthurium cartilagineum (Desf.) Kunth, Enum. Pl. 3: 79. 1841.

Anthurium cartilagineum is endemic to Venezuela, known from the cloud forest of the Cordillera de la Costa ranging from Cerro Naiguatá (Distrito Federal) to the Pittier National Park (Aragua) around 2,000 m. It has also been found in the Cerro de Huerro on the Peninsula de Paria (Sucre) around 1,200 m. Figs. 23-25

It is characterized by its terrestrial habit, its erect stem usually to 1 m long, its short internodes, its persistent cataphyll fibers, its more or less coriaceous, ovate blade with a cordate-sagittate base and a collective vein extending from the primary basal vein to the apex, running 1-3 cm from the margin. Its inflorescence has a green spathe with purple margins spreading approximately 90° from the spadix, which is dark violet or

Figs. 22-25. 22. *Anthurium caripense* Bunting. Venezuela. Monagas: Guácharo, 970 m, *Croat 54388*. Habit, x1/18. ----23-25. *A. cartilagineum* (Desf.) Kunth. Venezuela. Aragua: Colonia Tovar - Portachuelo, 2020 m, *Croat 60510*. 23. Habit, x1/9. 24. Inflorescence, 9/20. 25. Young infructescence, x1.

olive at anthesis and is bluntly tapered. It has large flowers (3.5-4 mm) and bright red berries.

Anthurium aripoense N. E. Brown, which is endemic to Trinidad, is closely related to *A. cartilagineum*, but differs by having a longer, more narrowly tapered spadix, light green-drying leaves (collections from the Cordillera de la Costa dry brown), and cataphylls remaining intact. Both species share similar leaves with remote collective veins. The collection of *A. cartilagineum* from the Peninsula de Paria in Sucre *(Steyermark 94893)* also dries light green, however, and further differs from the Cordillera de la Costa collections by its whitish spadix. Other confusing features of *A. cartilagineum* include its petiole shape, reported terete *(Croat 60510)*, level on the adaxial face or angular-canaliculate and convex on the abaxial face (Bunting, 1979) and its berries, which have been described as bright red (Bunting, loc. cit.) and purple *(Fendler 1334)*.

Anthurium cataniapoense Croat, sp. nov.

TYPE: Venezuela. Amazonas: Dept. Rio Negro, vicinity Cerro Neblina base camp, Río Mawrinuma, 40 m, 0°50'N, 66°10'W, *Croat 59319*, (MO, holotype; MY, VEN, isotypes).

Figs. 26-29

Planta epiphytica; internodia brevia, 1.5-2.5 cm diam.; cataphylla uncinata; petioli 7-13 cm longi, 11-14 mm diam., late sulcati adaxialiter cum costa mediana, uninervis-trinervis aut rotundati abaxialiter; lamina subcoriacea, 59-63 cm longa, 20-22 cm lata, elliptica-oblanceolata, acuta ad apicem; rotundata usque ad acutam ad basim; 11-16 nervi laterales utrinque; pedunculi 40-53 cm longi; spatha lanceolata, viridis suffusa purpurea, 13.5-26 cm longa, 1.5-3 cm lata; spadix atropurpureus-violaceus, longe protractus, 11.5-24.5 cm longus, 5-7 mm medius diam., baccae ignotae.

Epiphytic, stem erect, 1.5-2.5 cm diam., leaf scars obscured by root mass; roots dense at the nodes, spreading-ascending at apex of stem, ca. 3-12 cm long, ca. 3-4 mm diam.; cataphylls hook-shaped, acuminate, to 6 cm long, drying reddish brown, persisting as linear fibers. LEAVES erect-spreading; petioles 6-13 cm long, 11-14 mm diam., D-shaped, flattened when young, broadly sulcate with prominent medial rib adaxially, 1-3 ribbed or rounded abaxially; geniculum paler than petiole, thicker than petiole, 1-1.5 cm long; sheath to 5 cm long; blades subcoriaceous, broadly elliptic-oblanceolate, acute to obtuse at apex, (the acumen inrolled, 1 mm long), narrowly acute to rounded at base, 59-117 cm long, 20-50 cm wide, broadest above middle, the margins broadly undulate; both surfaces semi-glossy, green (B & K yellow-green 6/5); midrib acutely raised above, becoming higher than wide towards apex, same color as surface above, acutely raised below, paler than surface; primary lateral veins 11-16 per side, departing midrib at 40-60° angle, arcuate-ascending to the margin, rounded-raised and same color as surface above, obscurely raised and paler than surface below; lesser veins flat below, darker than surface. INFLORESCENCES pendent; peduncle 32-53 cm long, 3-4 mm diam., (3)5-6(8) times as long as petioles; spathe spreading, subcoriaceous, green, sometimes tinged brownish or purplish adaxially, lanceolate, 9-26 cm long, 1-2.5 cm wide; spadix maroon to dark purplish violet (B & K red purple 2/2.5), sessile, tapered-cylindroid, slightly curved, 11.5-24.5 cm long, 5-7 mm diam. midway, 3 mm diam. near apex; flowers rhombic, 1.5-2.3 mm long, 1-1.6 mm wide, the sides sigmoid, 8-12 flowers visible in principal spiral, 6-13 flowers visible in alternate spiral; tepals matte, smooth, lateral tepals 0.5-1 mm wide, the outer margins 2-sided, the inner margins straight to rounded; stigma linear-elliptic, 0.4-0.5 mm long; anthers 0.6-0.8 mm long, 0.6-0.8 mm wide, thecae oblong-obovoid, slightly divaricate.

Figs. 26-29. *Anthurium cataniapoense* Croat. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59319*. 26. Habit with pendent inflorescences, x2/5. 27. Leaf blade, x1/8. 28. Leaf bases, x3/10. 29. Inflorescence, x9/20.

Anthurium cataniapoense is endemic to the northern Amazon basin in Venezuela, in the basin of the Río Negro and the Río Orinoco in Amazonas and Bolívar at less than 150 m. A specimen from northern Pará in Brazil, in the Tumucumaque Mountains, also appears to belong here. The majority of collections were made either at Cerro Neblina or in the vicinity of the Río Cataniapo near Puerto Ayacucho, where I first collected the species. The species is named for the latter area.

It occurs as an epiphyte in the understory of mature, well shaded forests on white sand soils and is characterized by its broadly oblanceolate-elliptic, short-petiolate leaves, which dry greenish brown to brown below and grayish brown to almost black above, and have 1-3 pairs of primary lateral veins arising from the lower 1 cm of the base of the blades. Further characterizing the species are the obtusely D-shaped petioles, which are obtusely 1-ribbed adaxially and 1-3 ribbed or rounded abaxially.

The species was treated by Bunting (1979) as *A. jenmanii* Engl., a species with which it is not closely related. That species differs in having blades that dry mostly yellow-green and having a stout, erect inflorescence (rather than blades which dry blackened and pendent inflorescences for *A. cataniapoense*).

The species is closest to *A. loretense*, Croat, ined. from the western Amazon basin in northeastern Peru, with which it shares similar leaves, hook-shaped cataphylls, and a similar pendent inflorescence. That species differs, however, in having a much stouter spadix and a longer, stouter peduncle.

An aberrant specimen from Bolívar (*Delascio & Lopez 2812*) is tentatively placed here: it is relatively quite small (Leaves ca. 44 cm long, 11-12 cm broad vs 59-117 cm x 20-50 cm) and resembles *A. ernestii* somewhat. That species, however, reaches its northern limits in southwestern Colombia and southern Amazonas in Brazil.

VENEZUELA. AMAZONAS: Dept. Atures, 12 km E of highway, between Puerto Ayacucho and Sanariapo, less than 100 m, *Croat 55038* (MO); 45 km SE of Puerto Ayacrucho, 3 km downstream from damsite, Río Cataniapo, 200-300 m, 5°35'N, 67°15'W, *Steyermark et al. 122191* (VEN), *122268* (MO, VEN); Puerto Ayacucho, comunidad de las Pavas, Río Cataniapo, 37 m, 6°25'N, 67°25'W, *Castillo 1650* (MO); San Fernando de Atabapo, (from a cultivated plant), *Braun 5* (VEN); Dept. Río Negro, Cerro Nelina base camp, 140 m, 0°50'N, 66°10'W, *Croat 59319* (MO, MY, VEN); *Gentry & Stein 46520* (MO); *46862* (MO); *Liesner 15660* (MO); *Plowman & Thomas 13672* (MO). BOLIVAR: Pica Caicara del Orinoco, San Juan de Manapiare, Río Saupure. 202 km S of Caicara, 100-200 m, *Delascio & Lopez 2797* (VEN); 7°N, 67°W, *Delascio & Lopez 2812* (VEN).

Anthurium clavigerum Poepp. & Endl., Nov. Gen. Sp. Pl. 3: 84. 1845.

Anthurium clavigerum ranges from Nicaragua to the Guianas, Brazil and Bolivia from sea level to 1,250 m (mostly below 500 m). In Venezuela, it is known from the slopes of the Cordillera de Mérida in Zulia and Táchira, as well as in Apure. In the southeastern part of the country it is known from Bolívar (Sierra de Lema) and Amazonas.

The species is easily recognized by its compound leaves with deeply lobate margins on the leaflets. It can be confused in some cases with larger plants of *A. sinuatum*, a species with similar blades (albeit sinuate rather than lobate). The latter, however, differs in having shorter and narrower spadices, peduncle length proportionately longer than petiole length and longer internodes with cataphylls remaining entire rather than decomposing into fibers.

Figs. 30-31

Anthurium costatum C. Koch & Bouché, Ind. Sem. Hort. Berol. App. 6. 1853.

Anthurium costatum is endemic to the Cordillera de la Costa in Aragua and in the Distrito Federal, occurring in shaded, often steep slopes of cloud forest, at about 1,000 m. Figs. 32-35

The species is recognized by its huge ovate-corate, bicolorous, matte blades and by its short inflorescence with an erect, pale green to cream spathe and maroon spadix. It is a member of section *Cardiolonchium*, and according

Figs. 30-33. 30. *Anthurium clavigerum* Poepp. & Endl. Peru. Tocache Nuevo - Pulcache (not vouchered). Habit, x1/46. 31. *A. clavigerum* Poepp. & Endl. Cultivated at Selby Gardens (*SEL 78-831*). Leaf blade, x1/5. ----32-22. *A. costatum* C. Koch & Bouché. Venezuela. Aragua: Henri Pittier National Park, 970 m, *Croat 60581*. 32. Leaf blade, x1/9. 33. Inflorescences, x13/20.

to Bunting (1979), it may be the largest entire-leaved species in the flora, with a blade 123 cm long, by 78 cm wide.

The species is not easily confused with any other species.

Anthurium crassinervium (Jacq.) Schott, Melet. 1: 22. 1832.

Anthurium crassinervium (Jacq.) Schott ranges from northeastern Colombia to Venezuela. In Venezuela, it ranges through the Cordillera de la Costa from Miranda to Yaracuy and the Cordillera de Mérida (Lara, Trujillo, Mérida and Táchira), and the states of Falcón and Zulia (Mara) from sea level to 1,600 m. Figs. 36-38

It is terrestrial or epiphytic and is characterized by its bird's nest habit, the cataphylls persisting more or less intact and weathering to fibers and by its broadly and shallowly sulcate, quadrangular petioles. The large, coriaceous blade is oblanceolate with undulate margins and a collective vein arises in the upper one-third to one-fourth of blade. Its inflorescence, which is much shorter than the blade, has a long peduncle, a tapered, olive green spadix and a reflexed, often curled, lanceolate, green spathe. The berries are red.

It may be confused with *A. wagenerianum* (where they occur together in the Cordillera de la Costa and in Falcón and with *A. fendleri*, which shares most of the same range as *A. crassinervium*. *Anthurium wagenerianum* is distinguished by its proportionately shorter, blunter spadix and its broad lanceolate spathe. In addition it usually ranges to much lower elevations than does *A. crassinervium*.

Anthurium fendleri can be distinguished by its usually thinner, veinier blades with impressed tertiary veins, by the proportionately longer, more slender inflorescence, by its long-tapered, dark violet-purple to maroon spadix and especially by its thin, lanceolate spathe, usually withering promptly after anthesis.

Anthurium cubense Engler, Bot. Jahrb Syst. 25: 364. 1898.

Anthurium cubense ranges from Cuba to Central America and northern South America in seasonally dry areas. In Venezuela, it is known only in Zulia, (Distrito Mara, Distrito Perijá and the headwaters of Río Guasare) at 50-530 m.

The species is characterized by its bird's nest habit, short, densely rooted stem (to 3 cm diam.), its moderately short petioles (more or less quadrangular, usually sulcate above and rounded abaxially), its thick, rather oblanceolate-elliptic blades ending abruptly at base and having primary lateral veins extending mostly to the margins (collective in upper one-fourth to one-third). It is especially characterized by its short pedunculate inflorescences (usually less than one-fourth as long as the leaves) with the peduncles scarcely longer than the stubby spadix, which is ca. 10-12 times longer than wide. The berries are red. Fig. 42

Anthurium davidsei Croat, sp. nov.

TYPE: Venezuela. Táchira: Dtto. Junín, Cerro San Isidro, directly N of El Reposa, above Hacienda Bella Vista, Quebrada Agua Caliente and tributaries, 7°34'N, 72°25'W, 2,200-2,450 m, *Davidse & Gonzalez 22093* (MO 3234842-44, holotype; VEN, isotype). Figs. 39-40

Planta epiphytica; internodia brevia, ad 3 cm diam.; petiolus 71-73 cm longus, adaxialiter complanatus; lamina subcoriacea, ovate triangulata, 39-69 cm longa, 22-32 cm lata, basis cordata; pedunculus 39-71 cm longus; spatha reflexa, subcoriacea, viridis, oblonge-oblanceolata; spadix viridis ante anthesin, sessilis, pendens, 10-22 cm longus, 5-8 mm diam.

Epiphytic appressed-climber; stem relatively thick, less than 30 cm long, leaf scars obscured by cataphyll fibers, internodes shorter than broad, to 3 cm diam.; roots brown when dried, pubes-

Figs. 34-37. 34-35. *Anthurium costatum* C. Koch & Bouché. Cultivated by Luis Bueno, Miami, FL. 34. Leaf blade, x1/9. 35. Stem with inflorescence, x1/5. ----36. *A. crassinervium* (Jacq.) Schott. Venezuela. Mérida: Mérida - La Azulita, 1590 m, *Croat 54856*. Habit, x1/23. ----37. *A. crassinervium* (Jacq.) Schott. Venezuela. Aragua: Maracay - Choroní, *Croat 54499*. Plant in flower, x1/15.

cent, thick, 3-4 mm diam.; cataphylls drying reddish brown, persisting as a disorganized mass, occasionally with intact fragments toward the apex. LEAVES clustered at end of stem, spreading; petioles 71-73 cm long, 2-7 mm diam. on drying, erect-spreading, D-shaped, surface green tinged with maroon in parts, drying maroon-brown to brown, sulcate medially with the margins almost acute at base, scarcely sulcate toward the apex; geniculum thicker than petiole, 1.5-3 cm long; sheath to 7 cm long; blades moderately coriaceous, ovate-triangular to oblong-triangular, cordate, gradually acuminate at apex, 39-69 cm long, 22-32 cm wide, broadest at base, the margins broadly convex to slightly concave; anterior lobe 29-52 cm long, 18-20 cm wide, broadest at the base; posterior lobes 12-18 cm long, 8-15 cm wide, directed downward and inward, sometimes overlapping, rounded at apex; sinus hippocrepiform to closed and subcircular, 9.5-16 cm deep; both surfaces semiglossy, moderately bicolorous, drying brown; midrib convexly raised above, darker than surface, round-raised below, drying higher than broad to strongly convexly raised; basal veins 5-9 pairs, 1st to 2nd free to base, (5th)6th and 7th remaining coalesced up to 8 cm, weakly raised above, somewhat sharply raised below; posterior rib naked, straight or curved; primary lateral veins 5-6 per side, departing midrib at 40-55° angle, straight, ascending or arcuate-ascending, raised and in valleys above, round-raised below, weakly raised when dried; interprimary veins almost as conspicuous as primary lateral veins, weakly raised; lesser veins raised on drying, tertiary veins in part sunken above, raised below; reticulate veins visible on drying; collective vein arising from one of the uppermost basal veins or one of the uppermost primary lateral veins, 2-4 mm from margin. INFLORESCENCES erect-spreading; peduncle 39-71 cm long, 4-10 mm diam. when dried and brown to brownish gray; spathe moderately subcoriaceous, green tinged with maroon on midrib, sometimes dark pink to red, brown when dried, oblong-lanceolate, 11.5-16 cm long, 1.2-2 cm wide, the apex gradually acuminate, becoming reflexed with margins turned under; spadix green pre-anthesis, brownish post anthesis, sessile, tapered toward the apex, pendent, held at ca. 70° angle from peduncle, 10-22 cm long, 5-8 mm diam. near base, 2-5 mm near apex, broadest at the base. INFRUCTESCENCE with spathe persisting; spadix 27 cm long, 1.3 cm diam. at the base, 0.9 cm diam. at the apex, with berries scattered throughout; berries with apex somewhat mammilliform, often sunken in on drying, 1.5-2 mm diam.

Anthurium davidsei is known only from the southwestern corner of the state of Táchira at 2,200-2,600 m in a montane forest life zone.

It is characterized by its epiphytic habit, short internodes, persistent reddish brown cataphyll fibers (often with intact fragments), by its triangular-ovate to oblong-triangular blades drying brown, its long-pedunculate inflorescence with an oblong-lanceolate spathe and a tapering, sessile spadix with flowers having lateral tepals overlapping and becoming prominently upturned against the pistil on drying.

The description was based on only two collections *(Davidse & Gonzalez 22093* and *Croat 60687),* differing from each other in some notable details. One of the main differences is the appearance of a posterior rib, which in *Croat 60687* is relatively smooth with basal veins coming off it gradually in more or less regular intervals. In the second collection *(Davidse & Gonzalez 22093),* the posterior rib appears to be composed of a sharply raised cluster of not completely fused veins splayed out at nearly the same place. The collections differ also in the origin of the collective vein, arising from the lowermost primary lateral vein on *Croat 60687* and

from one of the uppermost primary lateral veins on *Davidse & Gonzalez 22093*. Another minor difference is that the latter collection has an ovate-triangular blade, while the Croat collection has an oblong-triangular blade with somewhat concave margins.

Anthurium davidsei is named in honor of Dr. Gerrit Davidse of the Missouri Botanical Garden, who collected the type specimen.

VENEZUELA. TACHIRA: Tamá National Park, along trail to summit beginning ca. 3 km from center of Betania (7.6 km S of Villa Páez, 25.7 km S of Las Delicias, 66.7 km S of Rubio), 7°28'N, 72°27'W, 2,600 m, *Croat 60687* (MO, VEN); Dtto. Junín, southern slopes of Cerro San Isidro, directly N of El Reposa, 7°34'N, 72°25'W, 2,200-2,450 m, *Davidse & Gonzalez 22093* (MO).

Anthurium digitatum (Jacq.) Schott, Wiener Zeitschr. Kunst 3: 828. 1829.

Anthurium digitatum is known only from Venezuela, principally in the Cordillera de la Costa from Falcón, Aragua and Miranda, but also in the hills in the northeastern corner of the country in Anzoátegui and Sucre, with a disjunct population south of the Orinoco basin in the Serranía de Imataca, Altiplanicie de Nuria in the state of Bolívar. It ranges from near sea level to 1,800 m.

The species is characterized by having leaves divided palmately into 5-11 segments, a peduncle less than one-half the petiole length, a spadix 10-15 cm long, and a thick, brittle, lanceolate, reflexed and promptly deciduous spathe that is white or green, suffused with purple. Figs. 41, 43

It may be confused with *A. pentaphyllum*, ranging from Trinidad and Tobago, NE Venezuela (Sucre) to the Guianas, Brazil and Amazonian Bolivia, Peru and Colombia. *Anthurium pentaphyllum* is distinguished by being a less robust plant with usually 5 blade segments (usually thinner) and by having the spathe usually persistent in fruit. The only material definitely attributed to *A. pentaphyllum* by Bunting (1979) has proven to be *A. kunthii*. The latter species is represented by *Bunting 3675* and *4440* from Siguita along the Río Orinoco in the Department of Atures.

Madison (1978) treated *A. digitatum* as a variety of *A. pentaphyllum* in his palmate-*Anthurium* revision. Subsequent studies at the University of Hawaii by Richard Scheffer (pers. comm.), indicate that Madison's *A. digitatum* var. *digitatum* will not cross with the other 2 varieties (var. *bombacifolium* and var. *pentaphyllum*), suggesting that it does deserve separate species recognition.

Anthurium digitatum is also confused with *A. eminens*, which differs by having a proportionately much longer spadix elsewhere throughout its range. Confusion still exists in the distinction of Venezuelan representatives of the two species. See *A. eminens* for a discussion.

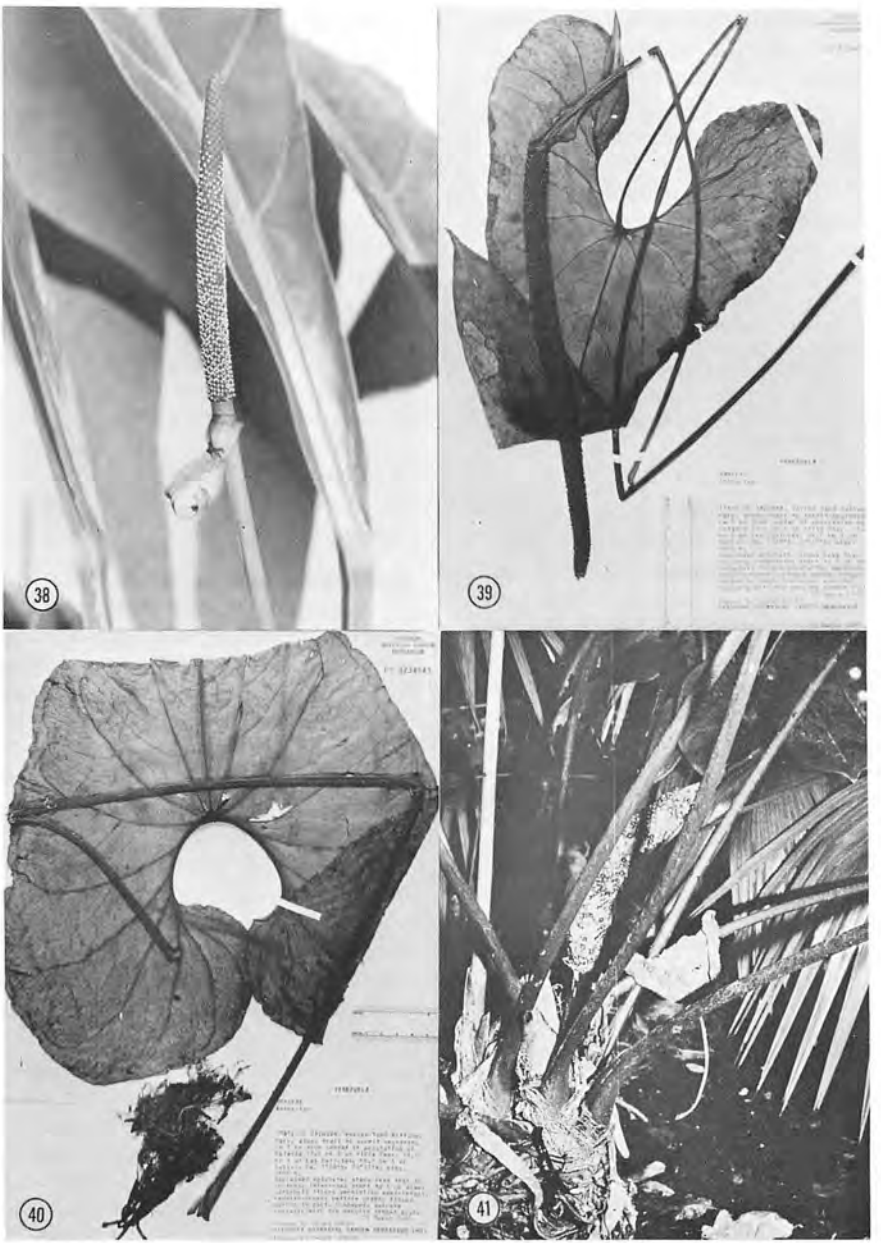
Anthurium eminens Schott, Oestr. Bot. Wochenbl. 5: 273. 1855.

Anthurium eminens (treated as *A. wittianum* Engl. by Bunting, 1979) is found in the Amazon basin ranging from Colombia to Bolivia east to Brazil and the Guianas at 100-900(1,400) m. In Venezuela, it is found in Lara, Portuguesa, Miranda and Amazonas at (200)1,000-1,650 m. Figs. 44, 46

The species is characterized by its palmately divided leaves with oblong leaflets having long petiolules and regular parallel lateral veins. The inflorescence has a long spathe and spadix (9)20-50 cm long and relatively short peduncles.

The collections from Venezuela differ in occurring outside of the Amazon basin at higher elevations, having darker drying, generally narrower leaves and shorter spadices (9-14 cm long in contrast to 25-45 cm long, as described in Madison's 1978 revision of palmate *Anthurium*). All but one collection have unusual punctations on their lower surface that do not appear glandular.

There appears to be considerable variation in the Amazonian collections of *A. eminens*.



Figs. 38-41. 38. *Anthurium crassinervium* (Jacq.) Schott. Venezuela. Táchira: Las Dantas - Las Adjuntas, *Steyermark 120173* (cultivated at MO). Inflorescence, x3/10. ----39-40. *A. davidsei* Croat. Venezuela. Táchira: Tamá National Park, 2600 m, *Croat 60687*. ----41. *A. digitatum* (Jacq.) G. Don. Cultivated, Missouri Botanical Garden, (*accession no. U-1251*). Stems and infructescence, x1/6.

Anthurium expansum Gleason, Bull. Torrey Bot. Club 56: 8. 1929.

Anthurium expansum is endemic to the Guiana highlands in Venezuela, Surinam and Brazil at 150-1300 m. In Venezuela, it is known from the Gran Sabana in Bolívar and from Cerro Sipapo and Cerro Marahuaca and Cerro de la Neblina in Amazonas. Fig. 50

The species is a member of section *Schizoplacium*, and is recognized by its deeply 7-9 pedatifid blades with the outer segments basally connate and the inner segments connate or free, as well as by its purple cylindric spadix and purple ovoid berries. In Venezuela, it might be confused only with *A. longissimum* Pittier from the Cordillera de la Costa and the Cordillera de Mérida, but that species is distinguished by its longer inflorescence having a spadix 40-60 cm long (versus less than 25 cm long for *A. expansum*).

Anthurium fendleri Schott, Prodr. Aroid. 468. 1860.

Anthurium fendleri ranges throughout the Cordillera de la Costa and Cordillera de Mérida in Venezuela, north along the eastern Andes of Colombia and south to Apure in Venezuela, and Meta, Vaupés, and Vichada in Colombia. Disjunct populations also occur in western Colombia (Chocó) and in Panama.

It occurs usually in moderately dry habitats at 60-1,000(1,450) m. It is characterized by its bird's nest habit, short, densely rooted stem, persistent, semi-intact cataphylls, sulcate, moderately elongate petioles and moderately thin blades that are sometimes somewhat rounded or even subcordate at the base, and often have the smaller veins conspicuously sunken. Figs. 45, 47-48

The inflorescence has a slender purple spadix and a thin, green to purplish spathe which soon withers and is often deciduous. The berries are violet-purple.

Anthurium fernandezii Croat, Aroideana 8(4): 124. 1985(1986).

Anthurium fernandezii is endemic to Venezuela, occurring in cloud forests at 1,200-2,380 m in the western end of the Cordillera de la Costa and in the Cordillera de Mérida in Trujillo. Most of the collections have been made in Aragua at Altos de Choroní or in the Henri Pettier National Park.

A member of the section *Porphyrochitonium*, it is distinguished by its elongate stem (with internodes up to 4 cm long on the lower portions of the stem) bearing semi-intact, pale brown cataphylls, ovate to narrowly ovate blades that are dark glandular-punctate on both surfaces and the long-pedunculate inflorescence with a narrowly lanceolate, green to purplish spathe and a long, slender, purplish spadix with only 3-4 flowers per spiral. It is closest to *A. gehrigeri* from Mérida, which differs in having longer internodes (up to 3.5 cm long or more near the apex), petioles shorter than (rarely as long as) the blades and only 2-3 flowers usually visible per spiral.

The species has also been confused with both *A. bredemeyeri* and *A. smithii*, which have similar long-petiolate leaves and elongate stems with persistent cataphylls. *Anthurium bredemeyeri* differs in having blades entirely epunctate, while *A. smithii* has blades punctate on the lower surface only. Both *A. bredemeyeri* and *A. smithii* also differ in having 4-6 flowers visible per spiral, versus 3-4 flowers visible per spiral in *A. fernandezii*.

Anthurium fernandezii has been confused with *A. bernardii*, which is distinguished by having 4-5 flowers visible per spiral, tepals drying straightened and fully erect at anthesis and in fruit, and by having stamens and pistils mostly fully visible.

See the discussion for *A. gehrigeri*. For illustrations and a treatment of *A. fernandezii* and its relatives see Aroideana 8(4): 125. 1985(1986).

Figs. 42-45. 42. *Anthurium cubense* Engler. Venezuela. Zulia: *Bunting* (vouchered?). Plant with inflorescences, x1/9. Photo: Bunting. ----43. *A. digitatum* (Jacq.) G. Don. Cultivated, Missouri Botanical Garden, (*accession no. U-1251*). Leaf blade, x1/8. ----44. *A. eminens* Schott. Venezuela. Lara: Humocaro Alto - La Palma, 1650 m, *Croat 60634*. Plant removed from tree, x1/9. ----45. *A. fendleri* Schott. Venezuela. Barinas: Altamirara, 850 m, *Croat 60761*. Habit with immature infructescence, x1/8.

Figs. 46-49. 46. *Anthurium eminens* Schott. Ecuador. Napo: Tena - Puyo, 500 m, *Croat 49652*. Stem, x3/10. ----47. *A. fendleri* Schott. Colombia. Antioquia: Puerto Triumfo - Medellín, *Croat 56578*. Inflorescences, early fruiting spadices and leaves, x3/10. ----48. *A. fendleri* Schott. Venezuela. Yaracuy: above Salom, *Croat 54612*. Leaf blade, x1/8. ----49. *A. formosum* Schott. Venezuela. Mérida: La Azulita - El Vigia, 760 m, *Croat 54871*. Habit, x1/12.

Anthurium formosum Schott, Oesterr. Bot. Z. 181. 1858. Figs. 49, 54-55

Anthurium formosum Schott ranges from Nicaragua to Panama, Colombia, Ecuador, Venezuela and Peru (Huánuco) from about sea level to 1,500 m. In Venezuela, it has been found in SW Zulia (Distrito Colón) and in Mérida.

The species is characterized by its mostly terrestrial habit, large size, cataphylls persisting intact at the upper nodes and as fibers at the base, partially deciduous lower down, and by its petioles usually conspicuously marked with lenticels. Its large, ovate blades have prominently sunken secondary and tertiary veins, a collective vein usually originating from one of the lowermost basal veins and running along most of the margin and a prominently naked posterior rib (4-11 cm). Its inflorescence has a large spathe that is pink when juvenile becoming white or green as it matures, a slightly tapered, stipitate spadix and sharply and early emergent pistils. The fruits are long-tapered to the apex, violet-purple to reddish violet, often reddish orange at the base.

Anthurium formosum may be confused with *A. nymphaeifolium,* which is differentiated by its intact cataphylls and by its collective vein originating at the uppermost basal vein or primary lateral veins and running only along the upper half of the anterior lobe; it also has its tertiary veins not conspicuously sunken and a posterior rib that is naked for less than 4 cm. The spathe of *A. formosum* is usually larger and thinner than that of *A. nymphaeifolium,* and is always erect, in contrast to the latter, which is sometimes reflexed.

Anthurium gehrigeri Croat, Aroideana 8(4): 129. 1985(1986).

Anthurium gehrigeri is endemic to Venezuela, occurring in the state of Mérida at 500-2,800 m along the northern slope of the Sierra Nevada.

A member of the section *Porphyrochitonium,* it is distinguished by its climbing stem with long internodes (3.5-8.5 cm long), persistent cataphyll fibers, petioles that are shorter than the more or less ovate blades (glandular-punctate on both surfaces), by its long-pedunculate inflorescence with a purple spathe and spadix and by its large flowers, usually only 2-3 of which are visible per spiral.

Anthurium gehrigeri is similar to *A. fernandezii* and *A. bernardii,* which are distinguished by their shorter internodes and by having petioles longer than (rarely equal to) the blades. *Anthurium bernardii* is also distinguished by having 4-5 flowers visible per spiral. For illustrations and a treatment of *A. gehrigeri* and its relatives see Aroideana 8(4): 129. 1985(1986).

Anthurium ginesii Croat, sp. nov.

TYPE: Venezuela. Táchira: along highway between Tovar (Mérida) and Pregonero, 12 km below (S of) junction with road to La Grita, 8° 7'N, 71°55'W, 2,665 m, Aug. 9, 1982, *Croat 54927* (MO 3000491, holotype; B, K, RSA, US, VEN, isotypes). Figs. 51-53, 56

Planta terrestris aut raro epiphytica; caulis ad 30 cm longus, 1-3.5 cm diam.; internodia brevia; petiolus basaliter teres, apicaliter sulcatus, 25-79 cm longus; lamina basiliter cordata; inflorescentia erecta; pedunculus 25-56 cm longus; spatha ovato-lanceolata, 3.5-8 cm longa; spadix viridis aut marroninus, 3.5-8 cm longus, 2-10 mm diam.

Terrestrial or sometimes epiphytic. Stems ca. 30 cm long, reddish; internodes 5-20 mm long, 5-15 mm diam.; cataphylls moderately coriaceous, 4-9 cm long, gradually acuminate at apex, drying reddish brown, persisting intact and weathering to fibers. LEAVES erect; petiole terete midway, obtusely flattened and narrowly sulcate towards apex, 25-79 cm long, 1.5-4.5 mm diam., tinged with purple; geniculum 1-2.5 cm long; blades subcoriaceous, triangular,

Figs. 50-53. 50. *Anthurium expansum* Gleason. Venezuela. Bolívar: El Dorado - Sta. Elena, Gran Sabana, 990 m, *Croat 53991*. Leaves, x1/15. ----51-52. *A. ginesii* Croat. Venezuela. Mérida: Pregonero - Tovar, 2770 m, *Croat 60714*. 51. Habit, x1/6. 52. Leaf blade and inflorescence, x1/6. ----53. *A. ginesii*. Venezuela. Táchira: Tovar - Pregonero, 2665 m, *Croat 54927*. Leaves and inflorescence x1/6.

cordate at base, gradually to abruptly acuminate at apex, (14)20-44 cm long, (6)10-35 cm wide, broadest at the posterior lobes; anterior lobe (15)20-37 cm long, margins concave; posterior lobes 4-15 cm long, 4-9.5 cm broad, longer than broad, spreading; sinus obovate to hippocrepiform to parabolic; upper surface glossy, dark green, lower surface moderately paler; midrib narrowly raised in a shallow valley above, round-raised and paler below; basal veins 4-6 pairs, first pair usually free to base, the second pair free or coalesced 0.5-3 cm, the remaining pairs coalesced 1-5 cm; posterior rib naked; primary lateral veins 3-6 per side, departing midrib at (30)40-50° angle, slightly curved to the collective vein, raised in valleys above, sharply raised below, drying weakly raised above, conspicuously raised below; interprimary veins drying raised below, weakly raised above; tertiary veins weakly sunken above, raised below, drying distinctly visible; collective vein usually arising from first basal vein, 2-6 mm from margin. INFLORESCENCE usually erect, shorter than leaves; peduncle 25-56 cm long, 1.5-3.8 cm diam.; spathe moderately coriaceous, erect-hooded, olive green, tinged with maroon on margins, ovate-lanceolate, 3.5-8 cm long, 0.7-3 cm wide, broadest at or below middle, acute to sharply acuminate at apex, obtuse at base; spadix sessile or stipitate 5-15 mm, green to maroon, scarcely to slightly tapered, 3.5-8 cm long, 2.5-10 mm diam.; flowers rhombic, (dried) 3-4 mm long, 2.5-4 mm wide, sides straight to somewhat sigmoid, 5-8 visible in the principal spiral; lateral tepals often shield-shaped, 1.7-2.7 mm wide, inner margins turned up and straight to concave (from above), outer margins with sides concave to convex (when convex distal edges of each side concave); pistils green, early emergent; stigma 0.2-0.6 mm long, broadly elliptic; stamens emerging in a regular sequence, beginning from the base, completely exserted, the laterals preceding the alternates by ca. 5 spirals; anthers white to pale yellow, 0.6 mm long, 0.4-1 mm wide; thecae weakly divergent; pollen white.

Anthurium ginesii is endemic to Venezuela and ranges from Zulia (Serranía de Perijá) to Trujillo in the Cordillera de Mérida at 1,800-3,800 m.

A member of the section *Belolonchium*, it is distinguished by its narrowly triangular blade with broadly concave lateral margins and posterior lobes, which are longer than wide. Also characteristic are partly weathered, reddish brown cataphylls, a generally broad spathe, exserted stamens and its generally terrestrial habit. The species is named in honor of Brother Gines, who collected in Venezuela from 1948 through 1950.

In Venezuela, *A. ginesii* is most similar to *A. tachiranum*, which occurs in similar regions of Táchira but at generally lower elevations than *A. ginesii*. That species differs in having proportionately longer, narrower, more conspicuously constricted posterior lobes, in drying blackish green, in having major veins not drying acute, in having the stamens barely exserted at the edge of the tepals (rather than prominently exserted as in *A. ginesii*), and especially in having flowers with the tepals drying cucullate at the apex (rather than erect, as in *A. ginesii*).

VENEZUELA. LARA: Dtto. Morán, trail from Humocaro to Caserío Buenos Aires below Páramo Las Rosas, 2,285-3,290 m, 9°40'N, 70°5'W, *Liesner et al. 8156* (MO, VEN); LARA-TRUJILLO: Páramo de Los Nepes, ridge above La Peña, ca. 2,700 m (not páramo vegetation), *Barclay & Juajibioy 10271* (MO). MERIDA: trail from cabin at La Escalera to Puente de la Escalera, 2,250-2,950 m, *Luteyn et al. 622* (MO, NY, VEN); Dtto. Libertador, Sierra de Culata, 18 km NE of Mérida, 2,000-3,800 m, *Pipoly et al. 6501* (MO, NY, VEN); Sierra Nevada, Trail to La Laguna Coromoto, *Barclay & Juajibioy 9938* (MO, NY, VEN). TACHIRA: Dtto. Junín, Páramo Pata de Judío, *Fernandez 1945* (MY); Hwy. between Tovar (Mérida) and Pregonero, 12 km below (south of) jct. with road to La Grita, 8°7'N, 71°55'W, 2,665 m, *Croat 54927* (B, K, MO, RSA, US, VEN); *60714* (MO, VEN). TRUJILLO: Cerro Guaramacal, Boconó,

9°15'N, 70°13'W, ca. 2,000 m, *Stergios et al. 6564* (MO, PORT). ZULIA: Serranía de Perijá, *Gines 2017* (US).

Anthurium gonzalezii Croat, Aroideana 8(4): 131. 1985(1986).

Anthurium gonzalezii is endemic to Venezuela, probably occurring at about 1,000 m (exact range uncertain as only two collections exist and one has a range of 1,200-1,800 m, while the other ranges from 750-1,000 m), in the Cordillera de la Costa in the states of Yaracuy (Sierra de Aroa) and Carabobo.

A member of the section *Porphyrochitonium*, it is distinguished by its moderately short, slender stem with short internodes and long petiolate leaves with small, mostly ovate-elliptic blades (9-16 cm long, 3.5-7.5 cm wide), which are inconspicuously subcordate at the base, glandular-punctate on both surfaces and have 6-7 moderately inconspicuous primary lateral veins.

It is related to several other species (all once considered *A. bredemeyeri*), including *A. bredemeyeri* and *A. smithii*, which are easily distinguished by their epunctate upper surfaces. Also included in this complex is *A. fernandezii*, which differs in having blades usually greater than 20 cm long and 7 cm wide with 9 or more conspicuous primary lateral veins and *A. bernardii*, which differs in having a much larger leaf blade (19-26 cm long, 13-18 cm wide) with prominent primary lateral veins and especially by its markedly projecting "spathe shaped" tepals on the infructescence giving the spadix a roughened appearance.

For illustrations and a complete discussion of species related to *A. gonzalezii* see Aroideana 8(4): 131. 1985(1986).

Anthurium guayanum Bunting, Acta Bot. Venez. 10: 268. 1975.

Anthurium guayanum ranges throughout the Guiana Highlands from eastern Bolívar state of Venezuela and the southern Guianas (Guyana, Surinam and French Guiana) to the northern parts of the territory of Amazonas in Venezuela at (100)400-1,400 m. It occurs on sandstone outcrops, sandstone boulders or in pure white sand deposits in open areas or in partial shade.

The species is distinguished by its coarse, oblanceolate to obovate, conspicuously punctate leaves (the result of plate shaped gland-like structures on the lower surface). It is easily confused with *A. bonplandii*, which differs in having typically elliptic and generally less conspicuously punctate (or altogether eglandular) blades. Further studies will probably prove the two taxa to be only subspecifically distinct.

Fig. 58

Anthurium hookeri Kunth, Enum. pl. 3: 74. 1840.

Anthurium hookeri ranges from Surinam and northeastern Venezuela to Trinidad and the Lesser Antilles (St. Kitts, Nevis, Monserrat, Guadeloupe, Dominica, St. Lucia, St. Vincent and Grenada), at 200-1,450 m. In Venezuela, it ranges from Bolívar north to Sucre.

The species is characterized by its bird's nest habit, supervolute vernation, scalariform venation (tertiary veins extending in a more or less parallel, ladder-like fashion between the primary lateral veins) and by having glandular punctations on both surfaces. Though it closely resembles other rosulate anthuriums in section *Pachyneurium*, the latter all have involute vernation (both margins of blade rolled in toward midrib in bud), regular net-reticulate tertiary veins and lack glandular punctations.

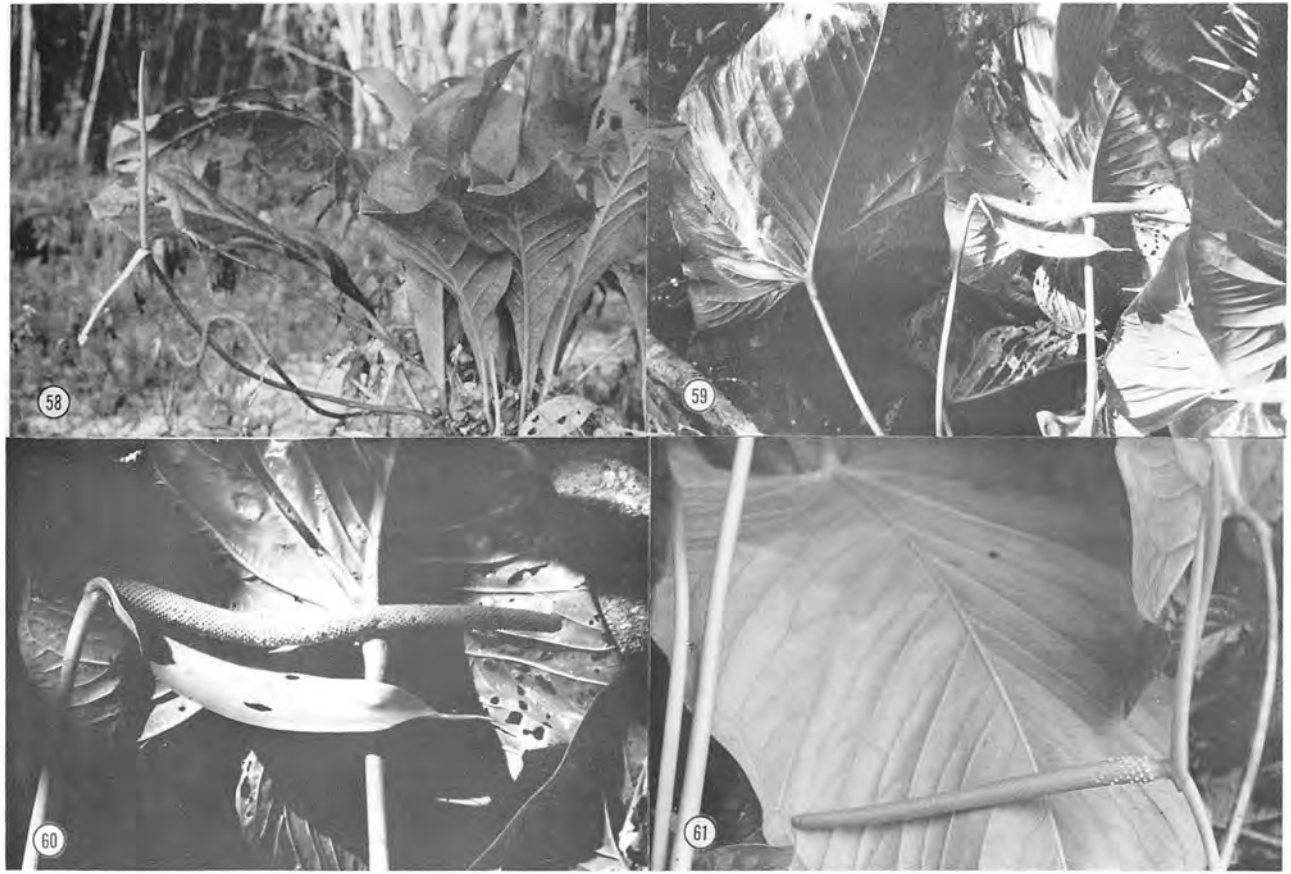
Fig. 57

Anthurium humboldtianum Kunth ssp. ***humboldtianum***, Enum. Pl. 3: 78. 1840. Figs. 59-60, 62-63

Anthurium humboldtianum ssp. *humboldtianum* is endemic to the Cordillera de la Costa in Venezuela, ranging from the Sierra de Aroa in Yaracuy to Carabobo, Aragua and the Distrito Federal from 700-2,380 m, generally occurring in cloud forest.

The species is characterized by its

Figs. 54-57. 54-55. *Anthurium formosum* Schott. Venezuela. Mérida: La Azulita - El Vigia, 760 m, *Croat 54871.* 54. Leaf blade and inflorescences, infructescence at left, x1/6. 55. Leaf blade x1/8. ----56. *A. ginesii* Croat. Venezuela. Táchira: Tovar - Pregonero, 2665 m, *Croat 54927.* Leaf blade, x1/6. ----57. *A. hookeri* Kunth. Trinidad. Valencia, 200 m, *Croat 53916.* Habit, x1/31.



Figs. 58-61. 58. *Anthurium guayanum* Bunting. Venezuela. Bolívar: Sta. Elena - Icabarú, 750 m, *Croat 54062.* Habit, x1/12. ----59-60. *A. humboldtianum* Kunth ssp. *humboldtianum.* Venezuela. Aragua: vi. Colonia Tovar. *Croat 60514.* 59. Leaves and inflorescence, x1/9. 60. Leaf and inflorescence, x6/25. ----61. *A. humboldtianum* Kunth ssp. *viridispadix* Croat. Venezuela. Lara: Sanare - Yacambú, 1790 m, *Croat 54687.* Leaf and inflorescence, x3/10.

large size, generally terrestrial habit (often reclining on trees), short internodes, persistent cataphyll fibers, its bluntly and narrowly sulcate petiole, its more or less ovate, cordate, weakly quilted, glossy blades with a usually hippocrepiform sinus and 10 or more primary lateral veins. The inflorescence generally has a purplish to reddish violet, pendent, slightly tapered spadix (both spathe and spadix generally deflected at ca. 90° angle to peduncle), and a green, lanceolate spathe (often with purple margins) which is slightly shorter than the spadix; the pistils are reddish. The fruits, previously not seen, are narrowly obovoid, 8-10 mm long, green, tinged with red-purple near base (*fide Liesner 9902*), beaked at the apex and display a dense layer of raphide cells. Seeds are 1-2 per berry, 3.5-4.0 mm long, 2.2-2.5 mm diam., with a sticky appendage on one end.

Anthurium humboldtianum Kunth ssp. ***viridispadix*** Croat, ssp. nov.

TYPE: Venezuela. Lara: Parque Nacional Yacambú, ca. 9 km S of Sanare, 1 km inside entrance to Park; primary cloud forest, ca. 9°43'N, 69° 37'W, 1,790 m, *Croat 54687* (MO 2934936, holotype; B, COL, F, K, MY, NY, RSA, US, VEN, isotypes).

Differt a subspecie typica, in quantum spadicem longum, erectum, viridem habet.

Anthurium humboldtianum ssp. *viridispadix* is endemic to western Venezuela in the Cordillera de Mérida at 1,300-2,300 m in cloud forests. It is currently known only from the States of Lara and Mérida. Figs. 61, 64-66

The subspecies is similar to the typical subspecies in its general habit, persistent cataphyll fibers, the size, shape and texture of its blade, its weakly sulcate petiole and its long-pedunculate inflorescence with a green, lanceolate spathe. Both subspecies share blades with a hippocrepiform sinus, a naked posterior rib and sunken primary lateral veins. Subspecies *viridispadix* differs, however, in having the spadix green at anthesis (versus purple to reddish violet in ssp. *humboldtianum)* and typically erect, with a reflexed spathe (both spadix and spathe rather prominently deflected at an angle to the peduncle and usually more or less pendent in ssp. *humboldtianum).* It also has the collective vein usually much more remote from the margin than the typical subspecies, and has 6-9 flowers visible per spiral versus usually 12-14 visible per spiral in the ssp. *humboldtianum.* The two subspecies inhabit different ranges, since the typical subspecies is restricted to the Cordillera de la Costa.

VENEZUELA. LARA: Parque Nacional Yacambú, 9 km SE of Sanare, ca. 1 km inside of Park entrance, 9°43'N, 69°37'W, 1,790 m, *Croat 54687* (B, COL, F, K, MO, MY, NY, RSA, US, VEN); ridges of Fila Potreritos, between Alto del Viento and El Volcán, 9°41-42'N, 69°37-35'W, 1,800-2,100 m, *Davidse & Gonzalez 21264* (MO, VEN). MERIDA: Mérida-La Azulita, Hwy 4, 9 km SE of La Azulita, 2,070 m, *Croat 54858* (MO, VEN); 15 km SE of La Azulita, 8°43'N, 71°25', *Croat 54828A* (MO, VEN); Hwy 4, 1 km NW of La Carbonera, 8°37'N, 71°21'W, 2,300 m, *Croat 54807* (MO, VEN); La Carbonera, 2,300 m, *Steyermark & Wiehler 106597* (MO, VEN). TACHIRA: vic. Betania, at base of Páramo de Tamá, ca. 7°28'N, 72°27'W, 2,300 m, *Croat 60681* (MO); along road from Santa Ana to Río Negro, Cerro Las Minas, 15.3 km beyond plaza in Santa Ana, 7°37'N, 72°13'W, 1,230-1,330 m, *Croat 60657* (MO, VEN).

Anthurium humoense Croat, sp. nov.

TYPE: Venezuela. State of Sucre: Peninsula de Paria, Cerro de Humo, virgin cloud forest at the summit, NE of Irapa, between Roma and Santa Isabel, approximately 12 km N of the town of Río Grande, 1,273 m, *Steyermark 94893* (US 2583836, holotype; VEN, isotype). Fig. 67

Planta terrestris; internodia brevia; cataphyllum 9 cm longum, persistens in fibris tenuibus; petiolus 49 cm longus, 6 mm diam.; lamina

Figs. 62-65. 62-63. *Anthurium humboldtianum* Kunth ssp. *humboldtianum*. Venezuela. Aragua: Colonia Tovar - Portachuelo, 2020 m, *Croat 60514*. 62. Habit, x1/12. 63. Infructescence, x1/5. ----64-65. *A. humboldtianum* Kunth ssp. *viridispadix* Croat. Venezuela. Lara: Sanare - Yacambú, 1790 m, *Croat 54687*. 64. Habit, x1/18. 65. Leaf blade, x1/8.

basiliter cordata, 41.5 cm longa, 29 cm lata; pedunculus 43.5-50 cm longus; spatha pallide viridis, oblongo-triangulata; spadix olivaceus, 11-16.5 cm longus, 4.7-5.8 mm diam.; baccae ignotae.

Terrestrial; (description from dried specimen); stem short; internodes short, ca. 1.5 cm diam.; cataphylls 9 cm long, drying reddish brown, weathering to fibers (periderm semi-intact especially toward middle). LEAVES with petiole 49 cm long, 6 mm diam., obtusely sulcate adaxially, rounded abaxially; blades coriaceous, ovate, acute at apex with a short apiculum, cordate at base, 41.5 cm long, 29 cm wide, widest above petiole attachment; anterior lobe 31 cm long, the margins convex; posterior lobes 14.5 cm long, directed straight back, ca. 12 cm wide; sinus hippocrepiform; upper surface with faint short raphide cells and brown punctations (punctations surrounded by a paler area), rich green; lower surface brown-punctate; both surfaces drying gray-green; midrib convex on both surfaces; basal veins 6 pairs, first and second pair free to the base, the third pair coalesced 5-10 mm, the remaining pairs coalesced to 2.5 cm; posterior rib naked 2.5 cm; primary lateral veins 3-4 pairs per side, departing midrib at 45-55° angle, curved to collective vein, drying raised on lower surface, slightly raised on upper surface; interprimary veins drying slightly raised on lower surface, scarcely raised on upper surface; tertiary veins drying visible on lower surface; primary collective vein arising from the first basal vein, mostly 9-18 mm from the margin; secondary collective vein arising from the second basal vein, joining the margin very near the apex. INFLORESCENCES with peduncle 43.5-50 cm long, 3-5 mm diam., more or less equal to the petiole; spathe subcoriaceous, pale green, oblong-triangular, 10-10.5 cm long, 1-1.5 cm wide, broadest near the base, reflexed, abruptly short-acuminate at apex, truncate to rounded at base, inserted at ca. 45° angle; spadix subsessile, long-tapered, olive green becoming whitish, 11-16.5 cm long, drying 5.5-6 mm diam. at base, 4.7-5.8 mm diam. midway, 2 mm diam. near apex (8-15 mm diam. when fresh) held at 180° angle from the peduncle; flowers rhombic, 2-3.5 mm long, 2.3-3 mm wide, 5(6) flowers per spiral; tepals drying matte, weakly granular, grayish, lateral tepals 1.3-2.6 mm wide, the inner margin slightly convex, the outer margin obtusely triangular; pistil not emergent; stigma ellipsoid, 0.6-1.2 mm long; stamens emerging in a regular sequence from the base, the laterals preceding the alternates by at least 10 spirals; anthers 0.4-0.6 mm long, (0.6)0.8-0.9 mm wide; thecae not at all divergent. INFRUCTESCENCE not seen.

Anthurium humoense is known only from the type specimen from the Peninsula de Paria in the state of Sucre at 1,273 m elevation.

It is characterized by its persistent reddish brown cataphyll fibers, by its long-tapered, white (drying gray) spadix and oblong-triangular spathe, but especially its gray-drying blades with two pairs of collective veins and brownish gland-like punctations on both blade surfaces.

It appears to be related to *A. aripoense* N. E. Brown of Trinidad, which has a similar gray drying blade and long tapered spadix, but which lacks punctations on both surfaces. Its sectional placement is uncertain. Perhaps it will be placed with a small cluster of principally Mexican species including *A. chiapasense* Matuda, *A. verapazense* Engler and *A. lucens* Standl. ex Yuncker, which also have punctations; these Mexican species have punctations of a different type, however, appearing more typically gland-like. The punctations of *A. humoense* are less gland-like, appearing to be only brownish, rounded mounds.

Anthurium humoense also resembles the gray-drying *A. nymphaeifolium* spe-

cimens discussed with that species, which differ in having a short, stubby spadix and a broad, ovate coriaceous spathe.

The species is named for the type locality of Cerro de Humo.

Anthurium jenmanii Engler, Pflanzenreich, Arac.-Poth. IV. 23B: 72. 1905.

Anthurium jenmanii ranges from northeastern Venezuela (Bolívar, Sucre and Monagas) and Trinidad to the Guianas and Brazil (Amapá) principally in the lowland coastal forests, and open woodlands. The species is found mostly at less than 100 m but ranges up to 970 m in the mountains in the south of its range. Fig. 68

The species, a typical member of section *Pachyneurium*, is characterized by its bird's nest habit, its more or less coriaceous, usually oblanceolate blades with mostly free-ending primary lateral veins and impressed tertiary veins, as well as by its purple spadix, early deciduous spathe and its lavender berries. The blades usually dry yellowish green and are highly variable, ranging from acute to subcordate at the base.

It is most easily confused with *Anthurium guayanum* Bunting, which differs in having conspicuously plate-shaped gland-like structures on the blade surfaces.

Anthurium julianii Bunting, Acta Bot. Venez. 10: 272. 1975.

Anthurium julianii is endemic to Venezuela but should be expected in adjacent areas of Colombia. In Venezuela, it is known in the cloud forests of the Cordillera de Mérida (Táchira, Mérida, Trujillo and Lara) at 2,000-3,300 m. Figs. 69-72

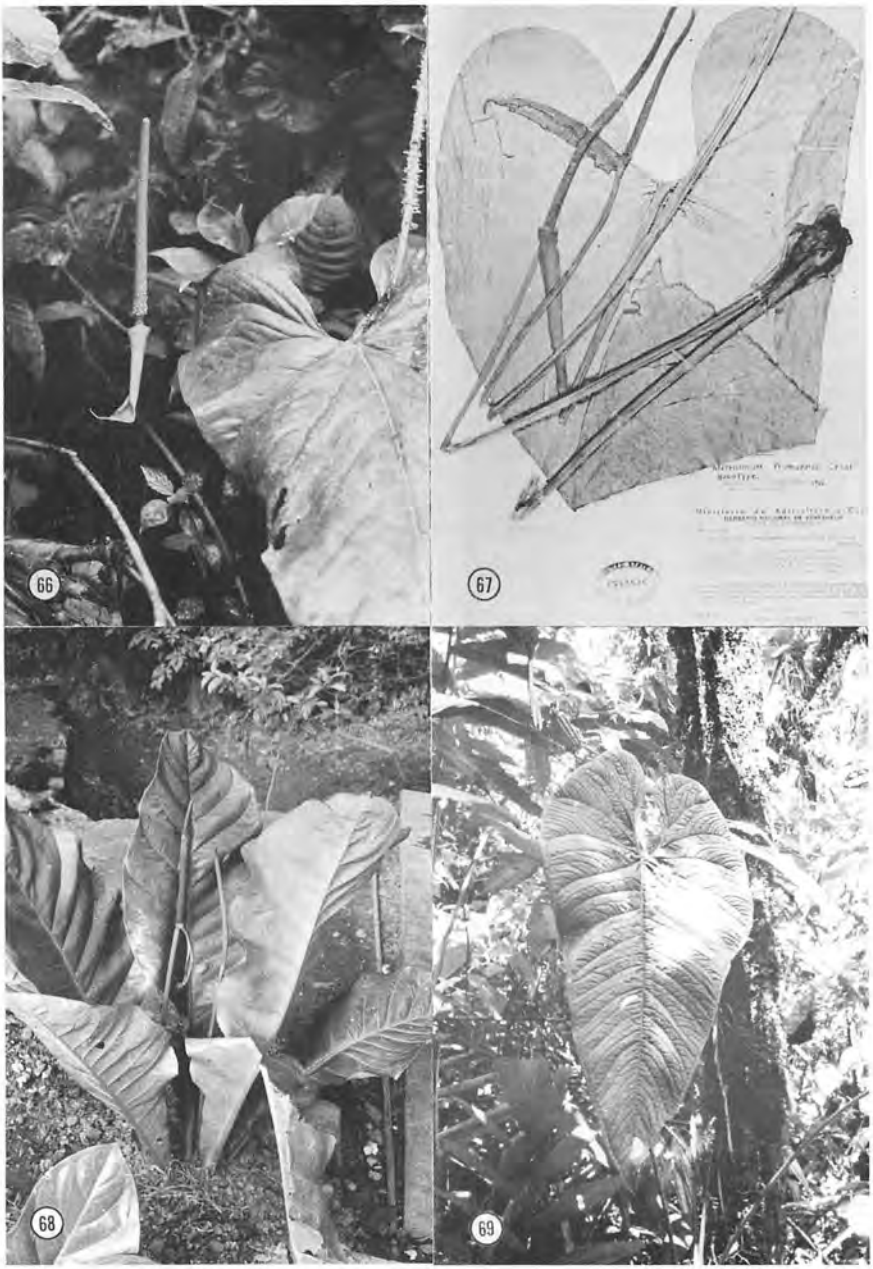
The species is characterized by its more or less large size, short internodes (2-5 cm diam.), persistent cataphyll fibers, and by its terete or narrowly and obtusely sulcate petiole, which is greater or equal to the blade length. The blades are sagittate and subcoriaceous with tertiary veins prominently sunken on the upper surface and prominently raised on the lower surface; the primary veins are raised in valleys on the upper surface, forming a collective vein running close to the margin (2-3 mm). The inflorescence is distinguishable by its broad, brick red, spreading spathe and its long, slightly tapered, green (at anthesis) spadix. The spathe persists throughout the development of the pale green fruits, but may turn green. The pollen is white.

A noteworthy collection from Táchira at the base of the Páramo de Tamá *(Croat 60681)* has internodes up to 12 cm long and has a relatively remote collective vein. The dried specimens, however, match *A. julianii* relatively well. Perhaps it represents a somewhat juvenile stage of growth of *A. julianii* (see photo).

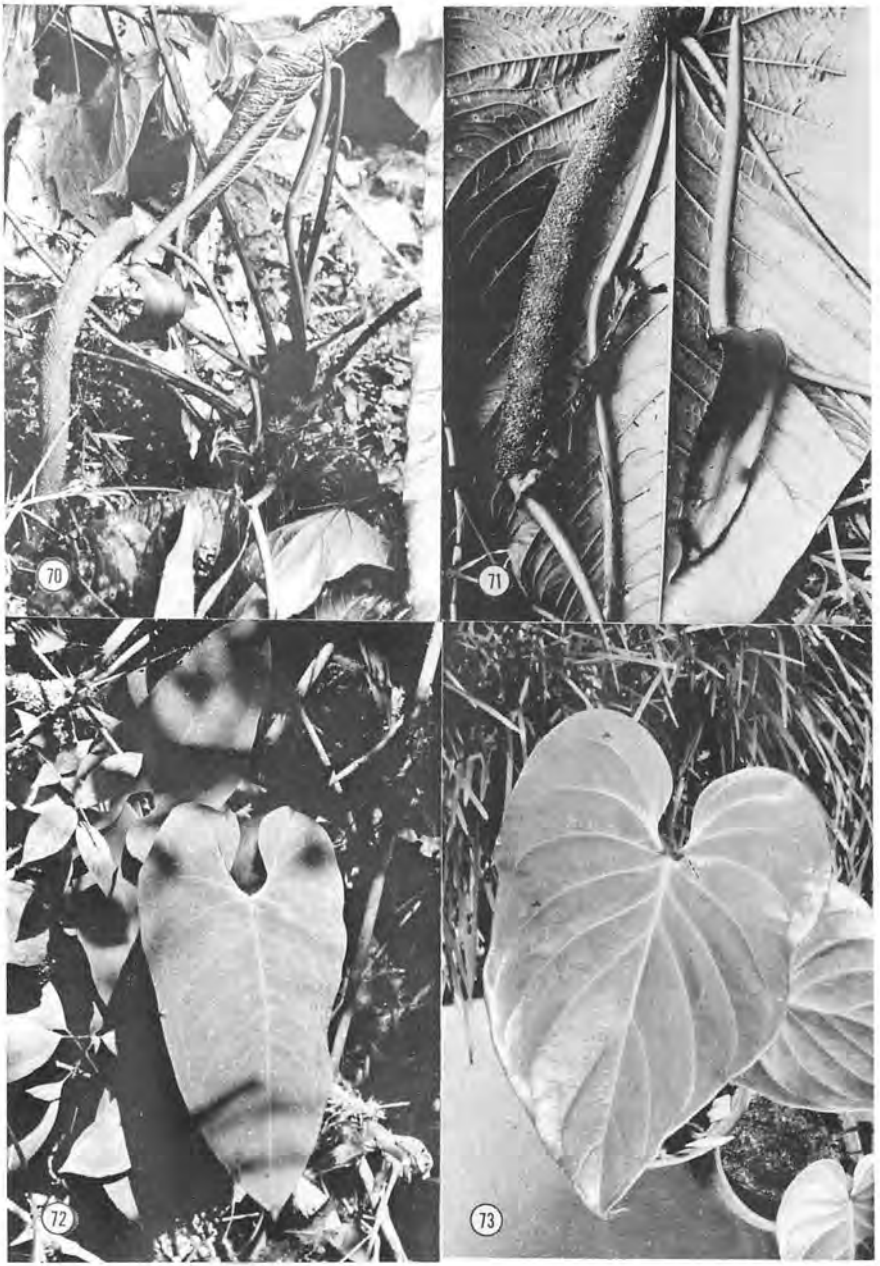
Anthurium kunthii Poeppig in Poeppig & Endl., Nov. Gen. Sp. Pl. 3: 84. 1845.

Anthurium kunthii ranges from Costa Rica and Panama to Amazonian Bolivia, Brazil, Peru, Ecuador, Colombia and Venezuela. Venezuelan specimens differ from those in Brazil and Peru, but material collected in the territory of Amazonas *(Bunting 4440* and *Davidse et al. 17192)* are believed to be this species. The principal difference in Venezuelan specimens is a thinner cataphyll that more quickly weathers to fibers.

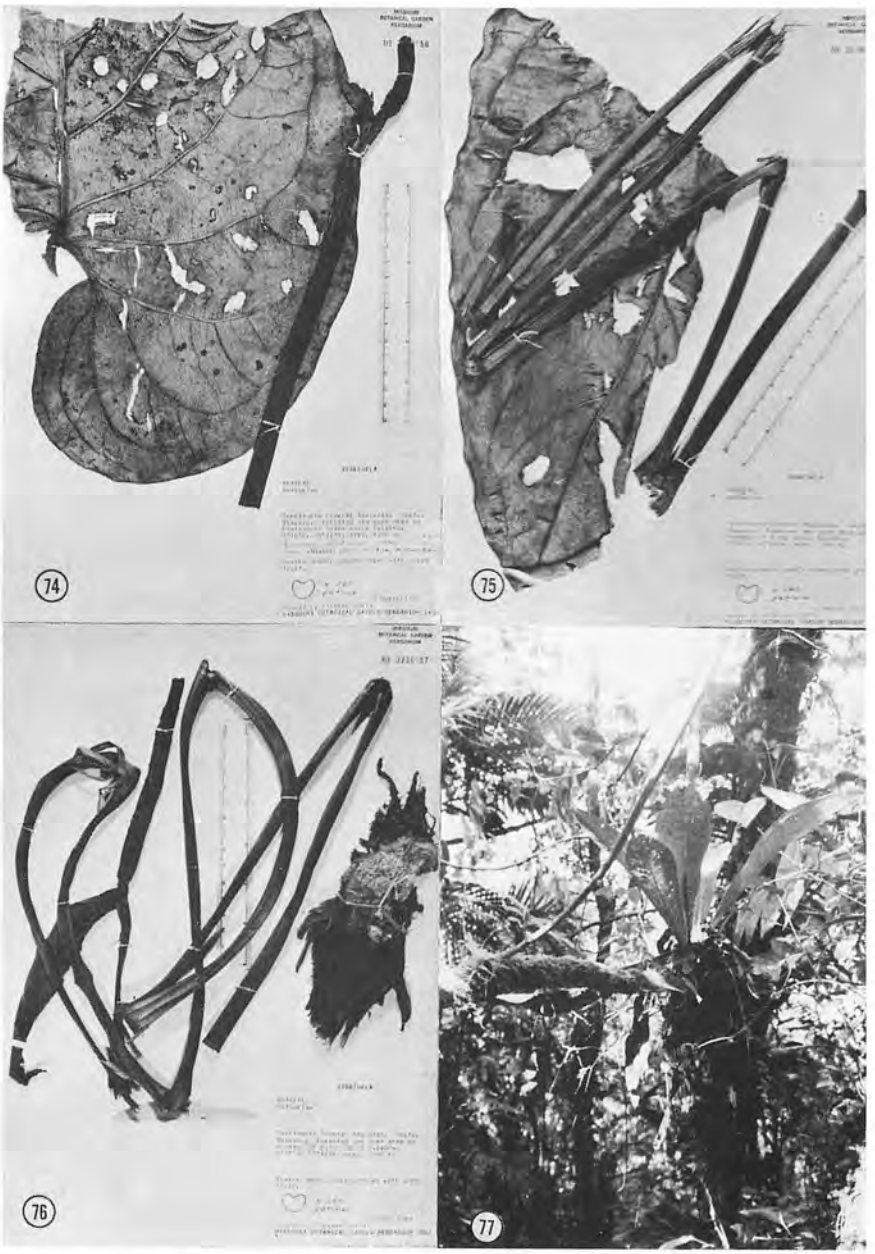
The species is distinguished by its compound leaf blades (with the lowermost pair only slightly inequilateral at base) and long-pedunculate, long-tapered, purple to brown spadix (about three-fourths as long or longer than petiole). It might be confused with *A. pentaphyllum* var. *pentaphyllum* if the ranges should overlap in the Guianas,



Figs. 66-69. 66. *Anthurium humboldtianum* Kunth ssp. *viridispadix* Croat. Venezuela. Lara: Sanare - Yacambú, 1790 m, *Croat 54687*. Habit, x1/5. ----67. *A. humoense* Croat. Venezuela. Sucre: Peninsula de Paria, Cerro de Humo, 1273 m, *Steyermark 94893*. ----68. *A. jenmanii* Engler. Venezuela. Monagas: above Guácharo, 970 m, *Croat 54389*. Habit, x1/15. ----69. *A. julianii* Bunt. Venezuela. Lara: Humocaro Alto - La Palma, *Croat 6040*. Habit, x1/15.



Figs. 70-73. 70-71. *Anthurium julianii* Bunt. Venezuela. Lara: Humocaro Alto - La Palma, 2050 m, *Croat 60640.* 70. Young infructescence and inflorescences, x1/6. 71. Same, x1/2. ----72. *A. cf. julianii* Bunting. Venezuela. Táchira: Volcán Tamá, 2300-2400 m, *Croat 60681.* Habit, x1/5. ----73. *A. liesneri* Croat. Venezuela. Amazonas: Atabapo, Plateau of Duida, 1250 m, *Liesner 18174.* Cultivated plant (leaves smaller than normal, x1/5.



Figs. 74-77. 74-76. *Anthurium liesneri* Croat. Venezuela. Amazonas: Atabapo, Plateau of Duida, 1250 m, *Liesner 18174*. ----77. *A. lilacinum* Bunting. Venezuela. Aragua: Henri Pittier National Park, 1060 m, *Croat 60558*. Habit, x1/31.

but the latter has distinctly short, stout peduncles and a pale lavender, conical spadix. Fig. 78

Anthurium liesneri Croat, sp. nov.
TYPE: Venezuela. Amazonas: Dpto. Atabapo, Plateau of Duida above Culebra, 3°37'N, 65°42'W, 1,250 m, March 2, 1985, *Liesner 18174* (MO 3236055-56-57, holotype; VEN, isotype). Figs. 73-76

Planta terrestris; internodia brevia; cataphyllum tandem in fibras lineares totum solutae; petiolus 50-128 cm longus, (5)7-11 mm diam., sulcatus; lamina grandis, 33-61 cm longa, 22-38 cm lata, coriacea, profunde lobata, abaxialiter glandifere-punctata, in sicco flavidus; spatha ca. 19 cm longa, lanceolata, ad angulum 90° ad pedunculum affixa; spadix stipitatus, ca. 18.5 cm longus.

Terrestrial; stem 15-45 cm long; internodes shorter than broad, to 7 cm diam.; cataphylls drying reddish brown, persisting as linear fibers. LEAVES erect; petioles 50-128 cm long, (5)7-11 mm diam., surface weakly roughened with somewhat raised areas, with raphide cells near base, obtusely and shallowly sulcate; geniculum shaped like petiole, slightly paler, somewhat swollen, 2.2-3 cm long; blades coriaceous, prominently cordate, bluntly to gradually acuminate and down-turned at apex (the acumen with margins turned up), 33-61 cm long, 22-38 cm wide, broadest just above point of petiole attachment; anterior lobe 25-46 cm long, margins convex, prominently revolute, sometimes broadly undulate; posterior lobes (8)11-16.5 cm long, directed inward or overlapping; sinus spathulate or closed to rhombic, rarely oblong; upper surface semiglossy, drying weakly glossy, yellowish green, lower surface weakly glossy, drying conspicuously dark glandular-punctate, glands inconspicuous on live plants, at least when young; midrib slightly paler than surface, broadly convexly raised except when weakly sunken near the apex above, convexly raised below; basal veins 3-5 pairs, 1st (or rarely all when young) free to base, 2nd coalesced for 1.5-3.8 cm, those remaining coalesced for 5 cm; posterior rib naked, (1) 2.5-5 cm long; primary lateral veins (5)6-7 per side departing from midrib at 45-60° angle, arcuate to the margin, convexly raised and in valleys on upper surface, conspicuously raised below; interprimary veins lacking; tertiary veins weakly etched, drying weakly raised on upper surface; collective vein usually arising from 3rd to 4th basal vein, a secondary collective vein arising from the next lower primary lateral vein, 4 mm from margin. INFLORESCENCE with peduncle to 1.7 m long, 7-14 mm diam., 1-2 times longer than petiole; spathe coriaceous, green, lanceolate, 19 cm long, 2.1 cm wide, broadest in lower third, gradually acuminate at apex, acute at the base, inserted at ca. 80-90° angle on peduncle; stipe 4-5.6 cm long in front, 4-10 mm long in back; spadix brown post anthesis, long-tapered, 18.5 cm long, 1-1.1 cm diam. near base, 7 mm diam. near apex; flowers rhombic to square, 2.8-3.5 mm long, 2.3-3 mm wide, ca. 9 flowers visible in principal spiral; tepals drying matte, lateral tepals 1.1-2 mm wide, turned up against pistil, the inner margins concave, at times convex; stigma ellipsoid to almost rectangular, 0.5-1 mm long, 0.7-1 mm wide; anthers conspicuously absent from post anthesis spadix. INFRUCTESCENCE inadequately known, young berries green.

Anthurium liesneri is known only from the type specimen from Venezuela, Plateau of Duida in the territory of Amazonas at 1,250 m.

It is characterized by its large size, its yellowish drying, coriaceous, deeply lobed blades with glandular punctations present on the lower surface and by its stipitate spadix and lanceolate spathe inserted on the peduncle at an angle

close to 90°.

Anthurium liesneri resembles *A. roraimense*, which also has punctate, cordate blades, but that species differs in having longer internodes, cataphylls persisting intact, blades usually drying reddish brown, an ovate spathe and subsessile spadix. *Anthurium roraimense* is a member of section *Calomystrium*, whereas *A. liesneri* is tentatively placed in section *Belolonchium*.

The species is named in honor of Ron Liesner, who collected the type specimen and introduced living material to the Missouri Botanical Garden.

Anthurium lilacinum Bunting, Acta Bot. Venez. 10: 273. 1975.

Anthurium lilacinum Bunting is endemic to Venezuela and ranges from Sucre throughout the Cordillera de la Costa to Falcón at 20-1,400 m. Epiphytic or terrestrial, it is characterized by a bird's nest habit, cataphylls persisting as fibers and a D-shaped, shallowly sulcate, short petiole. The coriaceous blades are usually oblanceolate, sometimes elliptic, with a collective vein usually originating at the middle or upper one-third of the blade, or at times from the base of the blade. Its delicate inflorescence has a slender peduncle (often mottled with purple), a weakly coriaceous, green tinged with purple, reflexed-spreading, inrolled spathe and a sessile, green to greenish brown spadix. The berries are lavender. Figs. 77, 82

Anthurium lilacinum can be confused with *A. crassinervium* Schott, which is differentiated by its shallowly sulcate, quadrangular petiole, a more coriaceous blade with undulate margins, a collective vein always arising in the upper one-third to one-fourth of the blade and red berries.

Anthurium longissimum Pittier, Bol. Soc. Venez. Ci. Nat. 11: 13. 1947.
ssp. ***longissimum***.

Anthurium longissimum is known from Colombia and Venezuela at 1,200-1,500 m. In Venezuela, it is known throughout the Cordillera de la Costa (Miranda, Distrito Federal, Aragua, Carabobo and Yaracuy) as well as Falcón and Mérida (Bunting reports a dubious collection from Anzoátegui based on a specimen resembling *A. expansum*). The Colombian collection *(Kalbreyer 853)*, made somewhere between Ocaña and Pamplona, is a new report for Colombia. The species is an appressed climber characterized by its short internodes (1-6 cm long, 2.5-3.5 cm thick), deciduous cataphylls and a narrowly and obtusely sulcate petiole, but especially by the deeply pedatifid blade (with 7-11, narrow, obovate segments, each with a collective vein running along its margins). Its inflorescence has a peduncle that is one-fourth to one-half the petiole length and a lanceolate, reflexed green spathe 40-60 cm long. The berries are purple. Figs. 79-81

A Croat collection *(57919)* from Peru (Huánuco, Tingo Maria to Monzón) is similar in most respects to *A. longissimum* but differs in having a terete petiole and blades that are matte on the lower surface. It is probably a new species.

Anthurium longissimum Pittier subsp. ***nirguense*** Bunting, Phytologia 60:295-296. 1986.

Anthurium longissimum ssp. *nirguense* is endemic to Venezuela, in Yaracuy, known only from the cloud forest along the summit of the Cordillera de la Costa north of Nirgua at 1200 to 1360 m. It differs from the typical subspecies in having the peduncle longer than the petiole and in having proportionately broader leaf segments. Also characteristic is the spathe which is coppery-red purple on the abaxial surface and creamy, suffused on the adaxial surface.

Anthurium marinoanum Croat, sp. nov.
TYPE: Venezuela. Sucre: Dtto.

Figs. 78-81. 78. *Anthurium kunthii* Poepp. Panama. Canal Area: Barro Colorado Island, *Croat 7090*. Habit, x1/8. ---- 79. *A. longissimum* Pittier. Venezuela. Aragua: Henri Pittier National Park, 1060 m, *Croat 60561*. Habit, x1/23. ----80. *A. longissimum* Pittier. Venezuela. Aragua: Maracay - Choroní, 1280-1300 m, *Croat 54492*. Leaf, x1/15. ----81. *A. longissimum* Pittier. Venezuela. Yaracuy: Salom - Candelaria, 1200 m, *Croat 54631*. Leaf and inflorescence, x1/6.

Mariño, Cerro de Humo or Terrón de Azucar, NE of Irapa, Municipio of Irapa, *Fernandez 3128* (MY 50020, holotype). Fig. 83

Planta epiphytica; internodia brevia, 1.5 cm diam.; cataphyllum persistens in fibris tenuibus; petiolus 40-62 cm longus, 4-10 mm diam., sulcatus; lamina coriacea, ovata-triangulata, 39-42 cm longa, 19-30 cm lata, basiliter cordata; pedunculus 33-48 cm longus; spatha subcoriacea, oblongo-lanceolata, 10 cm longa, 1.5 cm lata; spadix albus, subsessilis, 11 cm longus, 6.5-7.5 mm latus; baccae ignotae.

Epiphytic; internodes shorter than broad, 1.5 cm diam.; cataphylls at least 10 cm long, drying brown, persisting as coarse linear fibers. LEAVES with petioles 40-62 cm long, 4-10 mm diam., sulcate adaxially; blades coriaceous, ovate-triangular, acute at apex, cordate at base, conspicuously lobed, 39-42 cm long, 19-30 cm wide, broadest above point of petiole attachment, margins convex; anterior lobe 31-35 cm long; posterior lobes 11-15 cm long, directed slightly outward, bluntly acute to narrowly rounded; sinus broadly parabolic, 5-6 cm deep; both surfaces drying yellowish green; midrib drying convexly raised, sharply ridged above, raised below; basal veins 4-5(6) pairs, 1st and sometimes 2nd pair free to base, 3rd and 4th pairs remaining coalesced for 1-1.5 cm, 4th and 5th pairs remaining coalesced for 1.5-4 cm; posterior rib naked 1-4 cm; primary lateral veins 4-5 per side, departing midrib at 45-50° angle, scarcely arcuate to the collective vein, drying slightly raised; interprimary veins slightly raised below, semi-raised above; lesser veins drying visible; collective vein arising from 1st basal vein, 15-20 mm from margin. INFLORESCENCE with peduncle 33-48 cm long, 5-7 mm diam., more or less equalling petioles; spathe subcoriaceous, oblong-lanceolate, 10 cm long, 1.5 cm wide, broadest at or near middle, probably spreading, inserted at 45° angle on peduncle; spadix white, subsessile, scarcely tapered, held at 180° angle from peduncle, 11 cm long, 7.4 mm diam. near base, 6.6 mm diam. near apex; flowers rhombic, 2-2.5 mm long, 1.4-2.8 mm wide, 10-16 flowers visible in principal spiral; tepals drying matte, lateral tepals 1.2-1.6 mm wide, the inner margins concave, prominently turned up against pistil, straight, spade-shaped in age (on drying), the outer margins 3-sided; pistils not emergent; stigma raised, oblong-elliptic, +/- bilabiate, 0.3 mm long, in age becoming capitate to subglobular, 0.4-0.5 mm wide. INFRUCTESCENCE not seen.

Anthurium marinoanum is known only from the Venezuelan state of Sucre at the type locality in the Distrito of Mariño, NE of Irapa, and at Cerro Azul, Distrito Valdez; no elevation was given on either collection.

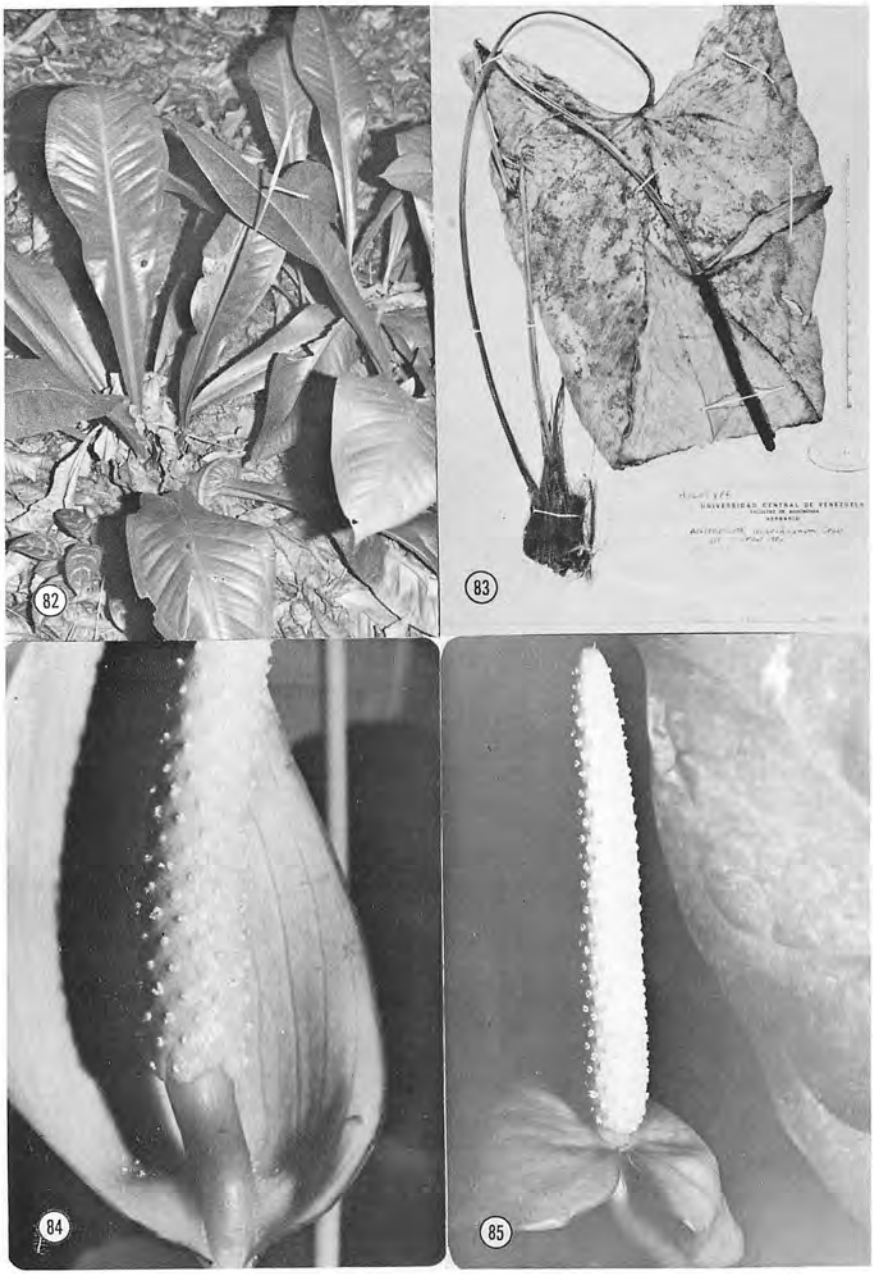
It is characterized by its short internodes, persistent cataphyll fibers, its creamy white subcylindrical spadix and its acuminate blades which dry yellowish green and have a collective vein rather remote from the margin (1.5-2 cm).

Anthurium marinoanum superficially resembles *A. cartilagineum*, but has pointed, outward directed posterior lobes and anterior lobe acute rather than obtusely apiculate at the apex; furthermore, it has 10-16 flowers visible in the principal spiral compared to ca. 6 in *A. cartilagineum*.

VENEZUELA. SUCRE: Dtto. Mariño, Mun. Irapa, NE of Irapa on Cerro de Humo or Terron de Azucar, *Fernandez 3128* (MY); Dtto. Valdez, Cerro Azul, *Fernandez 3774* (MY).

Anthurium nymphaeifolium C. Koch & Bouché, Ind. Sem. Hort. Berol. App. 6. 1853. Figs. 84-86

Anthurium nymphaeifolium, a member of the section *Calomystrium*, is known only in the forests of Venezuela



Figs. 82-85. 82. *Anthurium lilacinum* Bunting. Venezuela. Distrito Federal: Cultivated at Jardin Botanico, *Croat 54414.* Habit (inflorescence normally pendent), x1/15. ----83. *A. marinoanum* Croat. Venezuela. Sucre: Distrito Mariño, vic. Irapa, *Fernandez 3128.* ----84-85. *A. nymphaeifolium* C. Koch & Bouché. Venezuela. Cultivated, Caracas, *Croat 38341* and *38343*, respectively. 84. Inflorescence, x4/5. 85. Inflorescence, x13/20.

Figs. 86-89. 86. *Anthurium nymphaeifolium* C. Koch & Bouché. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60793*. Habit, x1/8. ----87. *A. puberulinervium* Croat. Venezuela. Táchira: San Cristóbal - Delicias, 1300 m, *Croat 55033*. Habit x1/8. ----88. *A. signatum* C. Koch & Mathieu. Venezuela. Táchira: Pregonero - La Fundación, 1200 m, *Croat 54953*. Leaves, x1/12. ----89. *A. signatum* C. Koch & Mathieu. Venezuela. Táchira: San Cristóbal - Delicias, 1300 m, *Croat 55026*. Inflorescence, x1/5.

but probably also occurs in adjacent Colombia. In Venezuela, it ranges from Anzoátegui to the Cordillera de la Costa (Miranda, Distrito Federal and Aragua) to the Cordillera de Mérida (Yaracuy, Lara, Trujillo, Portuguesa, Barinas, Mérida, Táchira and Zulia) at 600-2,650 m.

It is characterized by its frequently colonial habit, long stem (0.5-2 m long), intact, reddish brown cataphylls, and by its long, more or less terete petiole ranging from green to reddish. The blade is coriaceous, ovate and has a collective vein running along the upper half of the anterior lobe, usually originating at the uppermost basal vein or at a primary lateral vein along the midrib. The prominent posterior lobes are overlapping or separated by a sinus ranging from parabolic to hippocrepiform. The inflorescence has a short, stipitate, slightly tapered spadix varying in color from green or white to pink or purple and a spathe that is usually ovate to lanceolate, usually varying from green to white in the Cordillera de la Costa and usually from white tinged with red, to pink, to almost red in the Cordillera de Mérida. The fruits range from white to red or purple.

Some noteworthy material tentatively determined as *A. nymphaeifolium* ranges from Yaracuy and Zulia to the Cordillera de Mérida (Lara, Trujillo, Mérida and Táchira) at 1,300-2,100 m. These collections are distinguished by their large gray-drying ovate blades and large obovate spathes ranging in color from white to pink. Two specimens from the outer limits of the range, Yaracuy *(Steyermark et al. 100321)* and Zulia *(Steyermark et al. 105684)*, appear to be transitions to more typical material of the taxon. The specimen from Yaracuy has a lanceolate, green spathe but large blades similar to this collection, while the specimen from Zulia has a narrowly ovate triangular blade and a damaged spathe that is white with pink margins.

Anthurium nymphaeifolium closely resembles *A. roraimense* N. E. Brown (also in section *Calomystrium)*, which has only been found in Bolívar and Amazonas and is differentiated by having a collective vein usually originating at the third basal vein and running along most of the margin and by having distinct dark punctations on the lower surface (visible with some magnification).

There are 2 other species in section *Calomystrium* in Venezuela. *Anthurium nubicola*, occurring at 2,400-3,000 m in Mérida, differs in having an angular, sulcate petiole. See *A. formosum*, another *Calomystrium*, for its distinguishing features.

Anthurium pentaphyllum (Aubl.) G. Don var. ***pentaphyllum,*** Hort. Brit. 3: 633. 1834.

Anthurium pentaphyllum var. *pentaphyllum* is known from Venezuela only in the NE corner of the country in Sucre near the Gulf of Paria *(Trujillo 14288,* MY).

It is distinguished by its palmately divided leaf blades (with long petiolulate leaflets), by its short peduncle (ca. 7 cm), and short spadix with a persistent spathe.

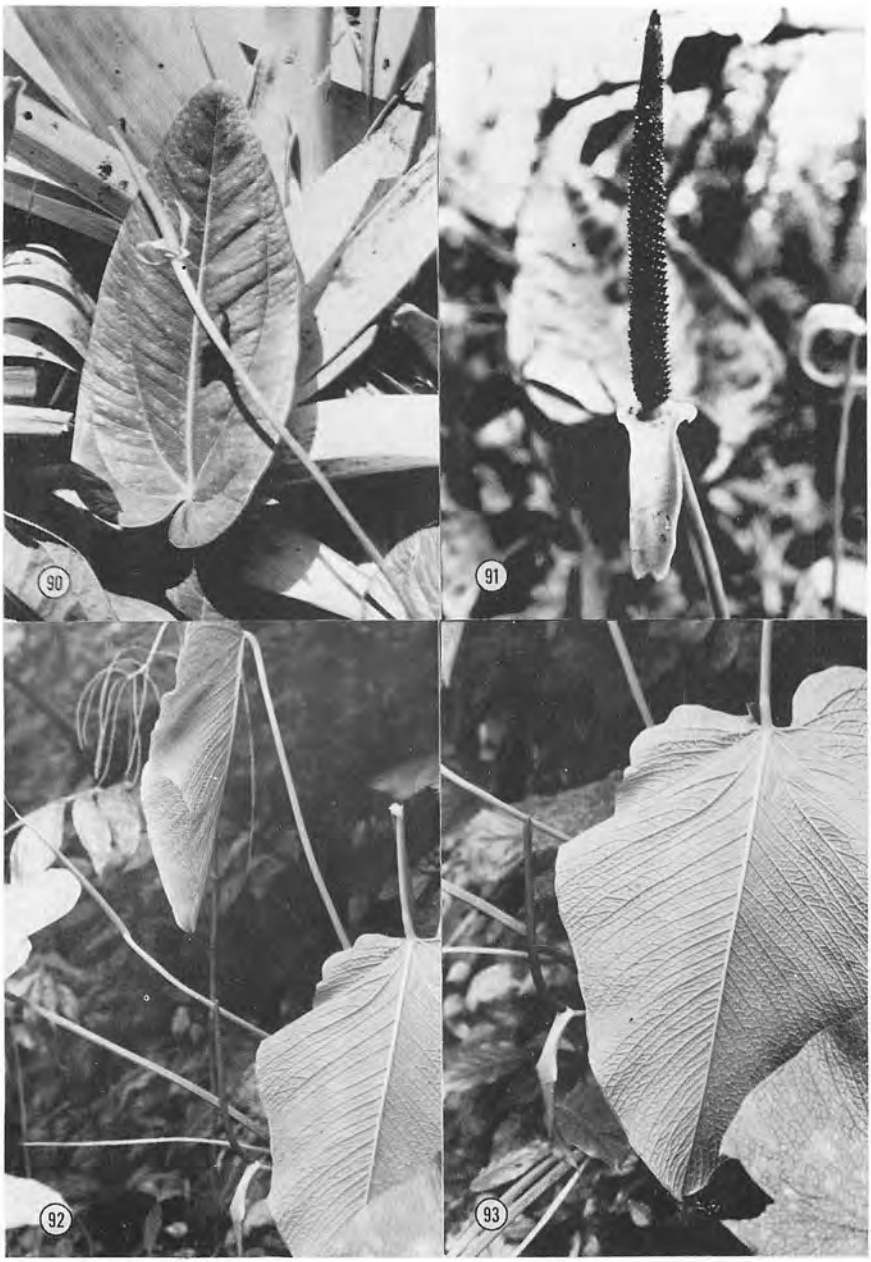
The species has a second variety in Central America. The variety *bombacifolium* was reported by Madison (1978) to range from Mexico to Panama. Madison (loc. cit.) also included *A. digitatum* in this species, but that taxon is not so closely related.

See also discussions under *A. kunthii* and *A. digitatum*.

Anthurium ptarianum Steyermark, Fieldiana, Bot. 28(1): 94, fig. 12. 1951.

Anthurium ptarianum Steyermark is endemic to Venezuela and is known only from the states of Bolívar and Amazonas at 500-2,200 m. Figs. 90-91

It is usually terrestrial and is characterized by its large triangular-ovate, coriaceous blades which are conspicuously punctate on the lower surface and have a collective vein arising from the uppermost basal vein and running far



Figs. 90-93. 90. *Anthurium ptarianum* Steyermark. Venezuela. Amazonas: Cerro Neblina, 1900 m, *Croat 59395*. Habit, x1/5. ----91. *A. ptarianum*. Venezuela. Bolívar: Sta. Elena - El Dorado, 1070 m, *Croat 54296*. Infructescence, x1/2. ----92-93. *A. puberulinervium* Croat. Venezuela. Táchira: San Cristóbal - Delicias, 1300 m, *Croat 55033*. 92. Habit, x1/6. 93. Habit, x1/5.

from the margin to the obtuse to retuse apex. Its inflorescence has a long, pale green to dull maroon, slightly tapered spadix and a recurled, green tinged with purple or tawny-brown spathe. The fruits are purplish.

Anthurium puberulinervium Croat, sp. nov.

TYPE: Venezuela. Táchira: along highway between San Cristóbal and Delicias, 45 km SW of bus terminal in San Cristóbal, 21 km S of Delicias turn-off in Rubio, 19 km N of Delicias, 9°42'N, 72°25'W, 1,300 m, disturbed primary forest on steep slopes along small intermittent stream, 10 Aug 1982, Croat *55033* (MO 3000470, holotype; B, COL, K, MY, NY, US, VEN, isotypes).

Figs. 87, 92-93

Planta terrestris aut epiphytica; internodia, 2-9 cm longa, 5-28 mm diam.; cataphylla semi-intacta ad nodos superos, fibrosa ad nodos inferos; petioli (13)20-63 cm longi; laminae ovatae usque ad ovatas-triangulares, bullatae usque ad rugatas, hebetatae, (13)20-57 cm longae, (7)26-39 cm latae; nervi paginae inferioris saepe puberuli; lobi posteriores (3)14-20 cm longi; sinus hippocrepiformis usque ad observe-ovatum; pedunculi 25-45 cm longi; spatha viridis, lanceolata, 11-17.5 cm longa, 8-16 mm lata, spadix maroninus, 10-29 cm longus, 3-7 mm diam. (siccatus).

Appressed-climber or terrestrial; stem erect if terrestrial, slender and elongate, 50-200 cm long; internodes longer than broad, of varying lengths, (1)2-9(12) cm long, 5-28 mm diam., matte, light green to greenish gray when fresh, drying yellowish green to brownish gray; roots moderately numerous, drying dark brown to brownish gray, pubescent or smooth, slender and elongate, tapered at apex, 3.5-30 cm long, 0.2-2 mm diam. when dried; cataphylls probably subcoriaceous, faintly 1-ribbed, ca. 6.5-20 cm long, green, acuminate at apex, drying green to yellowish green to brownish green, persisting semi-intact, mostly deciduous but sometimes persisting as fine linear fibers at the upper nodes. LEAVES with petioles (13)20-63 cm long, 3-10 mm diam. when dried, stiff, C-shaped to V-shaped, sometimes terete, sharply sulcate adaxially with the margins narrowly winged, rounded and weakly to strongly multiribbed abaxially; geniculum subterete with deep angular-concave channel, narrower than petiole when dried, 2-3 cm long; blades chartaceous to subcoriaceous, oblong-obovate to oblong ovate-triangular, abruptly acuminate to acuminate at apex, (the acumen 10-25 mm long), cordate at base, (13)20-57 cm long, (7)26-39 cm wide, broadest at point of petiole attachment or at base; anterior lobe (26)31-42 cm long, broadest at or near the base; posterior lobes (3)14-20 cm long, (9)12.5-19 cm wide, directed downward and inward (in most of the young blades, downward and somewhat outward), the apex rounded; sinus hippocrepiform to parabolic or spathulate, sometimes closed with overlapping lobes, 8.5-16 cm deep; upper surface weakly glossy, weakly to prominently bullate, lower surface matte, medium green above, yellowish green to brownish green when dried, light green to olive below; midrib above more or less concolorous with the surface when dried, convexly raised below, drying prominently raised, paler than surface when fresh and on drying; basal veins 7-8 pairs, 1st and 2nd, rarely 3rd, free to base, the remaining coalesced for up to 4-6.5 cm, sunken above, prominently raised below, when dried flat to weakly raised above, raised below; posterior rib naked, curved; primary lateral veins 9-12 per side, departing midrib at 40-55° angle, more or less straight-ascending to the collective vein, sunken above, prominently raised below, paler than surface with short puberulous pu-

bescence below and occasionally above; interprimary veins almost as conspicuous as primary lateral veins, sunken above, raised below; reticulate veins prominulous, raised when dried below, visible above; collective vein arising from usually one of the uppermost basal veins, sometimes one of the lowermost basal veins or the 1st of the primary lateral veins, sunken above, drying flat to weakly raised above, raised below, less prominent than primary lateral veins to equally as prominent as primary lateral veins, 1-15 mm from margin. INFLORESCENCES more or less erect; peduncle 25-45 cm long, 2-7 mm diam., green to greenish brown when dried, flattened adaxially; spathe erect becoming spreading and recurled, subcoriaceous, semiglossy, green to dull yellowish, greenish to yellowish green when dried, linear-lanceolate, 11-17.5 cm long, 0.8-1.6 cm wide, broadest near base, the apex acuminate; stipe 2-4 mm long in front; spadix dark violet fading to dull brownish wine to dark maroon (B & K red purple 2/2.5) sessile or subsessile, oblong-cylindroid, 10-29 cm long, 3-7 mm diam.; flowers rhombic, 2.4-2.6 mm long, 1.8-2.2 mm wide, 8-10 flowers visible in principal spiral, 5-7 flowers visible in alternate spiral; lateral tepals 1.3-1.7 mm wide, the outer margins angled, 2-3-sided, the inner margins concave; pistils raised, ca. 0.4-0.5 mm long, the ovary with pale linear raphides embedded in its walls.

Anthurium puberulinervium is known only from Venezuela in Táchira in the area between San Cristóbal and the Colombia border at 1,300-2,000 m. It is to be expected in Colombia.

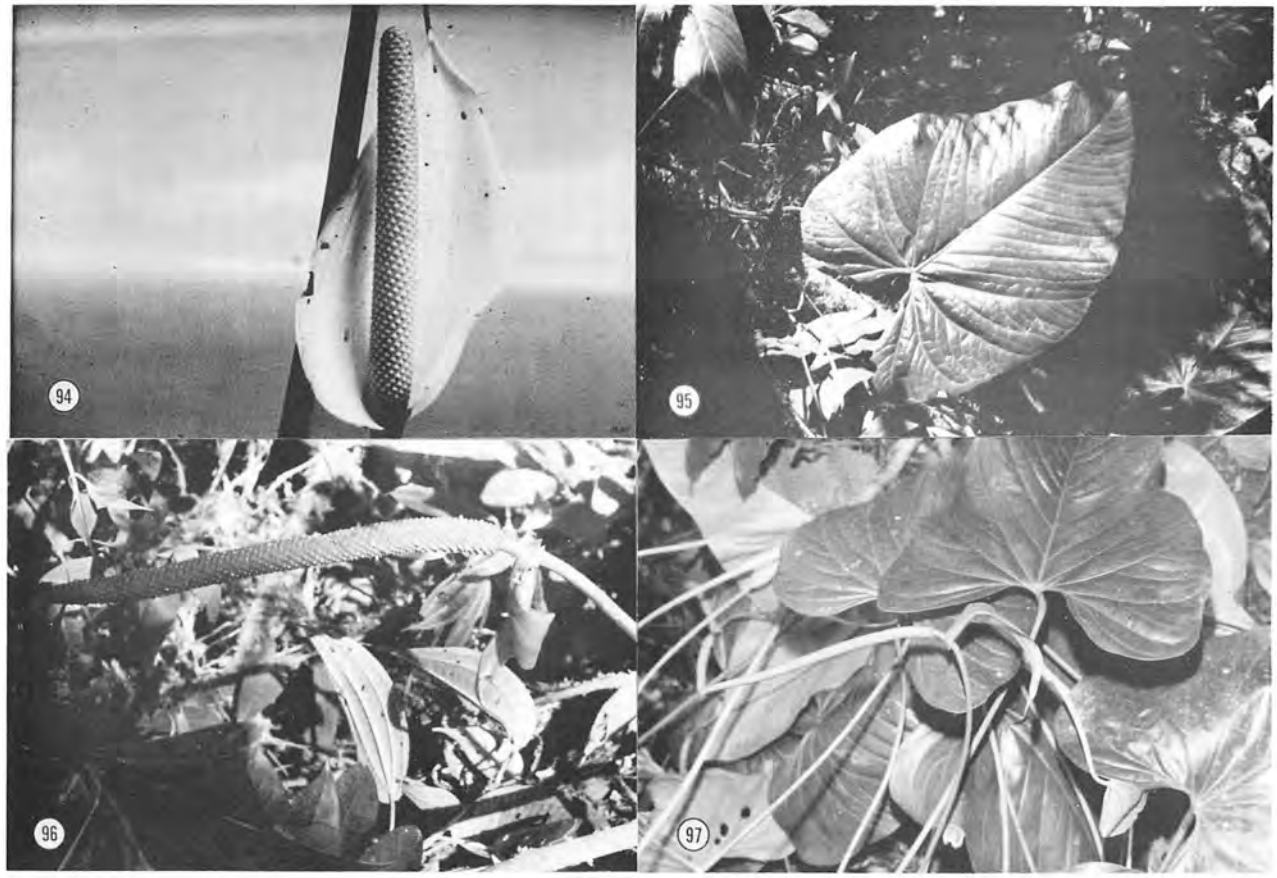
The species, a member of sect. *Polyneurium*, is characterized by its elongate internodes, thin cataphylls (which persist semi-intact at upper nodes and as sparse fibers lower down on the stem), by its thin, ovate-cordate to ovate-triangular, bullate leaf blades, which dry green and by its more or less sessile, dark maroon spadix. Especially characteristic is the frequent presence of a short, puberulous pubescence on the veins of the lower surface (sometimes on the upper surface as well), for which the species is named.

The species inhabits relatively shady areas of the understory on usually steep, rocky slopes and may occur as an erect, free-standing plant or it may lean on or climb tree trunks.

The species was questionably treated by Bunting (1979) as *A. crassivenium*, but that species, from the western Andes of Colombia, differs in having a prominently stipitate spadix and thicker blades, lacking raphides. On the other hand, *A. puberulinervium* has a sessile or subsessile spadix and stout, pale raphides clearly visible on both surfaces. The species is highly variable in the degree to which the leaves are bullate and the degree to which they are pubescent, with the pubescence varying from densely to sparsely puberulent on the lower veins to puberulent or totally glabrous on the upper surface. Some specimens are particularly unusually in being noticeably pubescent on the upper surface, with the veins raised (see *Bunting 4390)* while most have the veins on the upper surface flat and glabrous.

VENEZUELA. TACHIRA: between Mérida and La Azulita, Hwy. 4, 18 km SE of La Azulita, 8°37'N, 71° 23'W, 2,070 m, *Croat 54819* (MO, VEN); between Rubio and Las Delicias, 20-30 km SW of Rubio, 1,850-2,000 m, *Croat 38477, 38497* (MO, VEN); Quebrada Agua Blanca, *Davidse & Gonzalez 22320* (MO); above Las Delicias, *Steyermark et al. 98303* (NY); above Aldea de Tronjál, *Bunting 2323* (MY); 15 km above Diamante, 2 km above Matamulas *Bunting 2463* (MY); 8 km above Diamante, 23 km above Rubio, *Bunting 4390* (MY); between San Cristóbal and Delicias, 11 km N of Delicias, 21 km S of Bramón, 30.5 km S of Rubio, 7°37'N, 72°27'W, 1,850 m, *Croat 55011* (MO); 21 km S of Delicias turnoff in Rubio, 19 km N of Delicias, 9°42'N, 72°25'W, 1,300 m, *Croat 55033* (B, COL, K, MO, MY, NY, US, VEN).

Anthurium roraimense N. E. Brown ex Oliver, Trans. Linn. Soc. London, Bot. 2: 286. 1887.



Figs. 94-97. 94. *Anthurium roraimense* N. E. Br. Venezuela. Photo copied from *Steyermark* slide without collection number. Inflorescence, x1/2. Photo: Steyermark. ----95-96. *A. smaragdinum* Bunting. Venezuela. Lara: Humocaro Alto - La Palma, 530 m, *Croat 60631.* 95. Habit, x1/8. 96. Inflorescence, x1/5. ----97. *A. subsagittatum* Kunth. Venezuela. Táchira: San Cristóbal - Delicias, 1850 m, *Croat 55012.* Inflorescence and leaves, x1/6.

Anthurium roraimense is limited to the Guiana highlands at 700-1,500 m (at Sierra de Lema known at 300-500 m). In Venezuela, it ranges from Cerro Neblina and Cerro Marahuaca in Amazonas to Bolívar. Figs. 94, 98

It is characterized by its coriaceous, cordate blade with usually free basal veins and a collective vein originating at the second or third (sometimes first) basal vein and running along almost the entire margin. The lower surface is obscurely glandular-punctate. (Some specimens are punctate on both surfaces.) Its inflorescence has an erect white spathe (reflexed in fruit) and a white spadix (both becoming green). The fruits are purple.

One specimen *(Steyermark & Dunsterville 104337)* is unique in drying gray as opposed to the usual reddish brown. This specimen is also punctate on both surfaces and has a naked posterior rib (i.e., lacking free basal veins). This must be more thoroughly studied to determine its true relationships.

Anthurium signatum C. Koch & Mathieu, Ind. Sem. Hort. Berol. App. 8. 1855.

Anthurium signatum has been found only in Venezuela in the state of Táchira at 900-2,800 m, but probably ranges to Colombia. One specimen *(Schunke 5942)* from San Martín, Peru closely resembles *A. signatum,* but is placed there with reservation, since it is far beyond the known range. Figs. 88-89

Anthurium signatum is epiphytic or terrestrial and is characterized by its short internodes, its cataphylls persisting intact and weathering to fibers, and by its delicate, terete to narrowly and obtusely sulcate petiole. The chartaceous blades are deeply 3-lobed and usually dry brown (sometimes green), have collective veins originating along the midrib or from a basal vein, and have posterior ribs that are conspicuously naked (3-10 cm). Its inflorescence has a narrow, slightly tapered, usually purple (sometimes green) spadix, with an oblong-lanceolate, reflexed, green tinged with red spathe. The pistils are sharp and purplish; stamens and pollen are white.

The species is not easily confused with any other in Venezuela.

Anthurium smaragdinum Bunting, Acta Bot. Venez. 10: 278. 1975.

Anthurium smaragdinum is endemic to Venezuela, known in the Cordillera de Mérida (Táchira, Mérida, Trujillo and Portuguesa) at 1,300-2,500 m.

It is characterized by its epiphytic habit, long internodes (4-12 cm long, 4-6 cm diam.), persistent cataphyll fibers and a petiole ranging from terete to broadly sulcate. The rugose, ovate blades have a cordate-sagittate base with a collective vein usually originating at the uppermost basal vein and running about 5-10 mm from the margin to the apex; interprimary veins are usually not present, while reticulate veins are raised on the lower surface. Its inflorescence has a long, narrow, scarcely tapered, prominently stipitate (0.5-3 cm long), green spadix and a lanceolate, spreading, green spathe. The fruits are green.

Anthurium smaragdinum closely resembles *A. julianii* but is differentiated by its green spathe (as opposed to bright red in *A. julianii)* and in having a collective vein running further from the margin. Figs. 95-96, 99, 100

Anthurium smaragdinum can also be confused with *A. puberulinervium,* which is distinguished by its purple spadix, ribbed petiole and peduncle, shorter stipe and by having primary veins considerably closer together with distinct interprimary veins. One collection of *A. smaragdinum, Croat 38458,* is described as having a petiole that is faintly and obscurely ribbed.

Anthurium smithii Croat, Aroideana 8(4): 134. 1985(1986).

Anthurium smithii is known from Colombia and Venezuela, occurring at (900)1,300-3,200 m. In Venezuela, it

Figs. 98-101. 98. *Anthurium roraimense* N. E. Br. Venezuela. Photo copied from *Steyermark* slide without collection number. Habit, x1/15. Photo: Steyermark. ----99-100. *A. smaragdinum* Bunting. Venezuela. Lara: Humocaro Alto - La Palma, 530 m, *Croat 60631*. 99. Leaf, x1/5. 100. Stem showing weathered cataphylls, x3/10. ----101. *A. subsagittatum* Kunth. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60780*. Habit, showing infructescence, x1/12.

ranges from Táchira to Trujillo in the Cordillera de Mérida as well as in the Serranía de Perijá (Zulia).

A member of section *Porphyrochitonium,* it is distinguished by having glandular punctations only on the lower surface of the leaf. The only other member of the section *Porphyrochitonium* with an epunctate upper surface in Venezuela is *A. angelorum,* which is distinguished by having short internodes, comparatively few, persistent cataphyll fibers, proportionately shorter petioles and a collective vein that is conspicuously more prominent than the primary veins.

For an illustration and a complete revision of this species and its relatives see Aroideana 8(4): 134, 1985(1986).

Anthurium subsagittatum (HBK) Kunth, Enum. Pl. 3:79. 1841.

Anthurium subsagittatum is endemic to Venezuela, ranging from the Cordillera de la Costa (Distrito Federal, Aragua and Yaracuy) to the Cordillera de Mérida (Falcón, Mérida and Táchira) at 650-2,000 m. Figs. 97, 101, 106

This usually epiphytic species rarely reaching 1 m in height is characterized by its long internodes (1-8 cm long, 5-8 mm diam.), its cataphylls persisting semi-intact at upper nodes and a thin petiole more or less equal to the blade length and ranging from terete to narrowly and obtusely sulcate. The blades are thin with rounded, divergent posterior lobes, and an anterior lobe with deeply concave margins and a collective vein originating at the uppermost basal vein and running near the margin to the apex. Its inflorescence has a peduncle longer than the petiole, a long narrow, scarcely tapered, prominently stipitate, green spadix (the stipe generally greater than 0.5 cm) and a spreading, green, lanceolate spathe. The green fruits become cream-colored.

A noteworthy collection *(Steyermark & Dunsterville 100601)* from Táchira, below the Páramo de Judio, SE of Santa Ana, is unusual in having a shorter spadix and occurs at 2,400 m. It is probably also *A. subsagittatum.*

Anthurium tachiranum Croat, sp. nov. TYPE: Venezuela. State of Táchira: along road between San Cristóbal and Delicias, 11 km N of Delicias, 21 km S of Bramón, 30.5 km S of Rubio, disturbed forest on steep rocky slopes, 7°31'N, 72°27'W, 1,850 m, *Croat 55007* (MO 2990730, holotype; VEN, isotype). Type plant live at MO). Figs. 102-103

Terrestris; internodia brevia, 7-25 mm diam., cataphyllum ca. 8 cm longum, persistens fibris; petiolus sulcatus, 59-65 cm longus, 3-5 mm diam., lamina sub-3-lobata, 29-45 cm longa, 24-28 cm lata; pedunculus 37-50 cm longus, ca. 3-6 mm diam.; spatha viridis, oblonga ad lanceolata; spadix viridis, ca. 8.5 cm longus, ca. 7 mm diam.

Terrestrial; internodes short, 0.7-2.5 cm diam.; cataphylls ca. 8 cm long, drying reddish brown, persisting as fibers. LEAVES with petiole narrowly sulcate, 59-65 cm long, 3-5 mm diam.; blades subcoriaceous, sub-3-lobed, acuminate at apex (the acumen 3-4 cm long), cordate at base, 29-45 cm long, 24-28 cm wide, broadest at base; anterior lobe 23-33 cm long, the margins convex; posterior lobes 14-16 cm long, directed outward; sinus hippocrepiform; upper surface semi-glossy with raphide cells usually visible, drying green or brown; midrib raised above (drying +/— acute), convex below; basal veins 5-6 pairs, first pair free to base, the second pair coalesced to posterior rib for 1.5-4.5 cm, those remaining coalesced to 6 cm; posterior rib naked 4-6 cm; primary lateral veins 5-6 pairs, departing midrib at 40-50° angle, raised above in valleys, curved to collective vein, drying slightly raised above, raised below; interprimary veins drying scarcely raised above and below; tertiary veins visible beneath, drying visible below; collective vein arising from the second primary lateral vein, mostly 3-6 mm

from the margin. INFLORESCENCES with peduncle 37-50 cm long, ca. 2-3 mm diam.; spathe subcoriaceous, oblong to lanceolate, green, spreading, 5 cm long, 1.2 cm wide, broadest at base, acuminate at apex, rounded at base, spreading, inserted on peduncle at 45° angle; spadix subsessile, green toward apex, yellowish green toward base, ca. 8.5 cm long, ca. 7 mm diam. midway, ca. 3 mm diam. near apex, held at 180° angle from peduncle, tapered toward apex; flowers (when dry) rhombic, ca. 2.5-3.2 mm long in direction of axis of spadix, ca. 2 mm wide perpendicular to axis of spadix, 6-7 flowers visible in the principal spiral; tepals semi-glossy, lateral tepals 1.2-2 mm wide, the inner margin straight to slightly convex, outer margins obtusely triangular; pistil weakly emergent; stigma 0.3 mm long, broadly elliptic; stamens emerging from the base in a prompt regular sequence, laterals preceding alternates by possibly 2-3 spirals; filaments emerging briefly, retracting to level of tepals; anthers 0.3-0.5 mm long, ca. 0.6 mm wide; thecae ellipsoid, weakly divergent; pollen white.

Anthurium tachiranum is endemic to Venezuela, known only from Táchira between Las Delicias and Bramón at ca. 1,850 m.

It is a member of section *Belolonchium* and is characterized by its terrestrial habit, short internodes, persistent reddish brown cataphyll fibers, its almost 3-lobed blades with slender, spreading, prominently constricted posterior lobes (3.3-3.8 times longer than the narrowest portion) and by its narrowly tapered green spadix with the stamens disposed just above the tepals.

It is similar to *A. ginesii*, which dries brown, has tepals drying erect with exserted stamens, and posterior lobes which are 1.2-2.2 times longer than broad (length measured petiole apex to farthest point of lobe; width measured at narrowest point). In contrast, *A. tachiranum* dries blackish green and has posterior lobes (2.3)3.2-3.8 times longer than broad.

Anthurium signatum, another decidedly 3-lobed species in the region, differs in being more robust, in drying reddish brown, by having broadly spreading, less constricted lobes with an arcuate to hippocrepiform sinus and by having stamens exserted at anthesis.

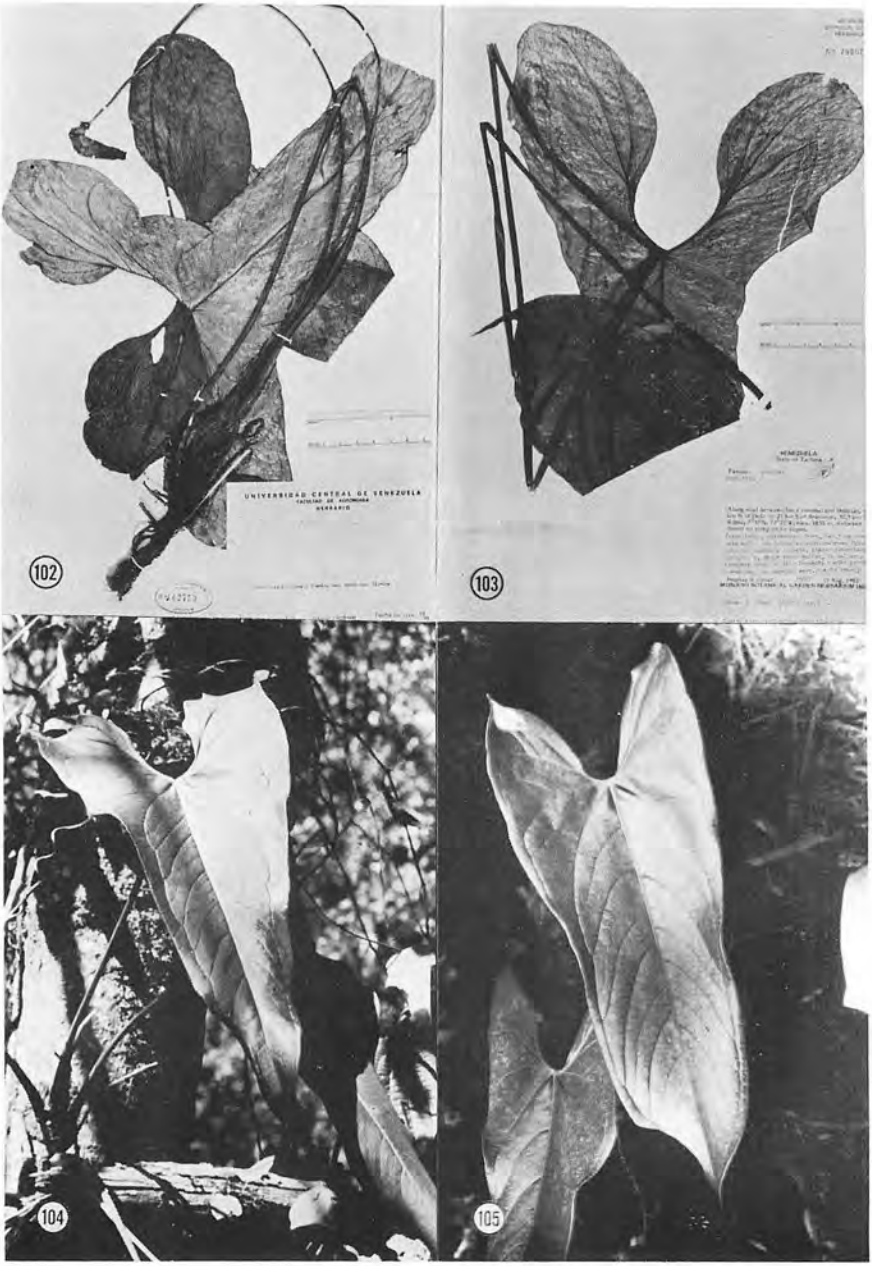
VENEZUELA. TACHIRA: along highway between Santo Domingo and Las Delicias, 21 km S. of Rubio, 9°42N, 72°25'W, 1,300 m, *Croat 55026A* (MO, VEN); 30.5 km S of Rubio, 7°37'N, 72°27'W, 1,850 m, *Croat 55007* (MO, VEN); 27 km S of Rubio, ca. 2,000 m, *Croat & Bunting 55007* (MO); Dtto. Junín, between Las Delicias and Bramón, *Fernandez 2139* (MY).

Anthurium tamaense Bunting, Acta Bot. Venez. 10: 278. 1975.

Anthurium tamaense is known only from Venezuela in the State of Táchira, on the forested slopes below the Páramo de Tamá at 2,400-3,200 m (though infrequent above 2,500 m).

It is characterized by its long internodes (4-4.5 cm long), its terete petioles about equalling the blades, and by its ovate-triangular blades, which dry black and have elongate posterior lobes directed usually toward the base and collective veins arising from the first basal vein. Also characteristic is its oblong-lanceolate green spathe, and dark purple, prominently stipitate spadix (stipe 3-17 mm long). Figs. 104-105

It is not easily confused with any other species in Venezuela, and though it might be expected in adjacent Colombia, little forest remains in the adjacent areas of that country. Bunting (1979) compares it to *A. lehmannii* Engl., which differs in having short internodes and a much broader spathe, and with *A. cundinamarcense* Engl. from central Colombia, to which *A. tamaense* is possibly related. A comparison of the types of the two plants with *A. tamaense* indicates that the many general features the three share in common, i.e., habit, internode length, petiole and blade length, blade shape, inflorescence size and



Figs. 102-105. 102. *Anthurium tachiranum* Croat. Venezuela. Táchira: Las Delicias - Bramón, *Fernandez 2139*. ----103. *A. tachiranum* Croat. San Cristóbal - Delicias, 1850 m, *Croat 55007*. ----104-105. *A. tamaense* Bunting. Venezuela. Táchira: base of Tamá, vic. Betania, 2300-2400 m, *Croat 60680*. 104. Habit, x1/6. 105. Leaves, x1/4.

shape, are upon close inspection coincidental. *Anthurium lehmannii* and *A. cundinamarcense* differ remarkably in the thickness, texture, coloration and venation of their leaf blades. Also, *A. cundinamarcense* is known only from central Colombia in the Central Cordillera in the Department of Cundinamarca.

Anthurium triphyllum Brongn. ex Schott, Prodr. Aroid. 548. 1860.

Anthurium triphyllum occurs principally on the eastern slopes of the Andes from Ecuador to Bolivia at (600) 1,000-2,000(2,980) m.

A member of section *Dactylophyllium*, it is distinct in Venezuela in having 3 lobes dissected completely to the base. Figs. 107-108, 110

Maguire, Wurdack & Bunting 36993, the type of *A. neblinae* according to Bunting (1975), is here recognized as a range extension for *A. triphyllum* (Terr. Amazonas: Cerro de la Neblina, Río Yatua, Camp 4 at 1,250 m). The specimen is well within the range of variation of *A. triphyllum*.

Anthurium wagenerianum C. Koch & Bouché, Ind. Sem. Hort. Berol. App. 7. 1853.

Anthurium wagenerianum is endemic to Venezuela and Curaçao, and is mostly restricted to dry, northern slopes in the Cordillera de la Costa from Miranda, Aragua and Carabobo states, as well as in Zulia and the Sierra de San Luis in the state of Falcón, from sea level to 600 m. Figs. 109, 111-112, 114

It is characterized by having a petiole one-third as long as the blade, flat or sulcate above, squared or sub 3-angled below, a very short-cuspidate blade with a narrow base and a round to obtuse apex and 4-7 primary lateral veins. The inflorescence has a peduncle as long or longer than the leaves, a decurrent, oblong-lanceolate spathe persistent in fruit, and a stipitate, cylindric spadix (6-7 cm long), which is considerably longer than the spathe. The tepals are 2 times as long as broad and the red fruits are obovoid.

Anthurium wagenerianum is closely related to *A. crassinervium*, but is distinguished by its cylindrical, generally much shorter spadix and generally much broader, shorter spathe, in contrast to the generally long-tapered spadix and lanceolate spathe of *A. crassinervium*. The leaves of *A. wagenerianum* dry with raphides readily visible under low magnification, whereas in *A. crassinervium*, raphides are hard to detect even under magnification. Furthermore, the berries of *A. wagenerianum*, though attached to the spadix by four tepalar threads as in *A. crassinervium*, are much dryer upon rehydration of specimens; they not only lack the abundant mesocarp found in *A. crassinervium*, but their seeds are attached at their apical ends to the inner carpel wall by a thick strand of fibers running midway down the carpel toward the basal end of the fruit. This is in contrast to the seeds of *A. crassinervium*, which attach themselves to the carpel wall by a mucilaginous appendage. *Anthurium wagenerianum* also ranges to much lower elevations than does *A. crassinervium*, which may range up to 1,500 m.

CALADIUM

Caladium bicolor (Aiton) Vent., Jard. Cels. t 30. 1800.

Caladium bicolor occurs at elevations from near sea level to 830 m, ranging from Panama south to Bolivia, east to Brazil and Guyana. In Venezuela, it ranges from Amazonas to the Delta Amacuro and Sucre, from Carabobo to Portuguesa, and is also found in Aragua, Miranda, northern Guarico, Mérida, Táchira and Zulia. Fig. 115

It is characterized by its terrestrial habit, yellow corm, petiole 30-95 cm long, and its peltate, ovate to elliptic blades (18-46 cm long, 12-25 cm broad)

Figs. 106-109. 106. *Anthurium subsagittatum* Kunth. Venezuela. Táchira: San Cristóbal - Delicias, 1850 m, *Croat 55012*. Inflorescence and leaf, x1/12. ----107. *A. triphyllum* Brongn. Ecuador. Pastaza: Puyo - Macas, *Croat 50549*. Habit, x1/5. ----108. *A. triphyllum* Brongn. Ecuador. Morona-Santiago: Yangzatza, *Croat 50781*. Inflorescence, x9/20. ----109. *A. wagenerianum* C. Koch & Bouché. Venezuela. Zulia: E of Río Guasare, 660 m, *Steyermark 123258A*. Inflorescence, x6/25.

Figs. 110-113. 110. *Anthurium triphyllum* Brongn. Ecuador. Morona-Santiago: Yangzatza, *Croat 50781*. Habit, x1/9. ----111. *A. wagenerianum* C. Koch & Bouché. Venezuela. Carabobo, Las Trincheras - El Cambur, 500 m, *Croat 54543*. Habit, showing infructescence, x1/15. ----112. *A. wagenerianum* C. Koch & Bouché. Venezuela. Zulia: E of Río Guasare, 660 m, *Steyermark 123258A*. Flowering plant, x1/8. ----113. *Caladium smaragdinum* C. Koch & Bouché. Venezuela. Miranda: Cerros del Bachilleros, 50 m, *Croat 53953*. Leaf, x1/5.

with rounded, divergent posterior lobes, often with white, pink or purplish spots and a glaucous lower surface. Its inflorescence has a green peduncle 16-60 cm long, a green spathe tube and a white blade 4-8 cm long.

Caladium bicolor is closely related to *C. humboldtii*, which differs by its small size, its freely suckering habit and its lack of inflorescences.

See also *C. smaragdinum* for a comparison.

Caladium humboldtii Schott, Oestr. Bot. Wochenbl. 4: 417. 1854.

Caladium humboldtii has been collected in Brazil and in adjacent Venezuela in the Casiquiare District (Amazonas). It is rare in the wild, but has been extensively cultivated. It is known by its long petioles (10-24 cm long) and by its ovate, small, mebranaceous, peltate blades (5-9 cm long, 2-4.5 cm broad), which are dull green with white blotches and spots above, and paler below. The inflorescences are unknown.

See *C. bicolor* for a comparison.

Fig. 116

Caladium picturatum C. Koch & Bouché, Ind. Sem. Hort. Berol. App. 6, 1854.

Caladium picturatum is known in Amazonian Peru, Brazil and Venezuela. In Venezuela, it is found in Bolívar at 600 m and in Amazonas at 100-150 m. It is characterized by its white corm and its peltate, generally oblong-triangular blades, which are 2-3 times longer than broad (broadest at the base) with a triangular sinus and posterior lobes that are directed outward and fused (1)2.5-5 cm.

Fig. 117

Caladium smaragdinum C. Koch & Bouché, Ind. Sem. Hort. Berol. App. 13. 1853.

Caladium smaragdinum is endemic to Venezuela and known only from the Cordillera de la Costa in Miranda, Distrito Federal and Carabobo at low elevations. It is characterized by its ovate to broadly ovate, solid green blade with posterior lobes united for one-half or more of its length, and by its totally white spathe.

It differs from *C. bicolor*, which often has multicolored leaves and a green spathe tube with a white blade.

Figs. 113, 118-119

DIEFFENBACHIA

Dieffenbachia liesneri Croat, sp. nov. TYPE: Venezuela. Amazonas: Dpto. Río Negro, lower part of Caño Baria above Río Baria, above point of Tambores of Comisión de Limite and Camp of Comisión at Boca de Secha going to Brazil, ca. 1°00'N, 66°20'W, 130 m, *Liesner 17073* (MO 3248498, holotype; K, VEN, isotypes).

Fig. 122

Petiola usque ad 35 cm longa, 6 mm diam. ad apicem, laminae subcoriaceae, late oblanceatae-ellipticae, ad basim attenuatae usque ad 42 cm longae, 18 cm latae; inflorescentia 4 (quatuor) unicuique axillae; pedunculus 6-8 cm longus, 2-4 mm diam.; spatha viridis, 8-14 cm longa, 3-5 cm lata, 7-8 mm diam., stigma subdiscoidium, 1.5 mm longum.

Terrestrial; stem elongate, light brown when dried; roots brown when dried, short pubescent, elongate, more than 10 cm long, 2-5 mm diam., on drying. LEAVES with petioles 35 cm long, 10 mm diam. near base, 6 mm diam. at apex, surface drying yellowish brown, shiny, longitudinally fissured, sheathing through lower two-thirds, sheath cracking on drying; blades (dried) subcoriaceous, reportedly smelling of skunk when crushed, broadly oblanceolate-elliptic, acute at apex, attenuate at base, to 48 cm long, ca. 18 cm wide, broadest in the upper third; upper surface weakly glossy, lower surface matte, yellowish brown; midrib weakly raised to flat above, weakly, convexly raised below; primary lateral veins ca. 11-13 per side,

Figs. 114-117. 114. *Anthurium wagenerianum* C. Koch & Bouché. Venezuela. Carabobo, Las Trincheras - El Cambur, 500 m, *Croat 54543.* Part of infructescence, x5/10. ----115. *Caladium bicolor* (Ait.) Vent. Puerto Rico: Río Abajo State Forest, 360-390 m, *Croat 60868.* Habit, x1/8. ----116. *Caladium humboldtii* Schott. Cultivated. Habit, x1/8. ----117. *Caladium picturatum* C. Koch. Venezuela. Bolívar: vic. Icabarú, 600 m, *Croat 54080.* Habit, x1/6.

Figs. 118-121. 118-119. *Caladium smaragdinum* C. Koch & Bouché. Venezuela. Miranda: Cerros del Bachilleros, 50 m, *Croat 53953.* 118. Plant with infructescences, x1/6. 119. Habit showing inflorescence, x1/8. ----120-121. *Dieffenbachia parvifolia* Engler. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59599.* 120. Leaves, x3/10. 121. Young plants, x3/10.

departing midrib at 40-50° angle, weakly arcuate to the margin, flat above, raised below; interprimary veins flat above, weakly raised below. INFLORESCENCES (dried) 4 per axil; peduncle ca. 6-8 cm long, 2-4 mm diam., dark brown to black; spathe coriaceous, green, dark brown to black on drying, 8-14 cm long, acuminate at apex, weakly constricted more or less midway; tube 3-5 cm long, 7-8 mm diam.; spathe blade elliptic; stigma subdiscoid, 1.5 mm long; ovary ovoid, 2 mm diam.

Dieffenbachia liesneri is endemic to Venezuela, known only from Amazonas at the type locality between Cerro de la Neblina and San Carlos de Río Negro, at 130 m. It is named in honor of Ronald Liesner, who has made great contributions to Venezuelan botany during his many collecting trips to that country.

The species is distinguished by its oblanceolate-elliptic leaf blades drying yellow-green beneath and gray-green above, with distinct primary lateral veins in the lower part of the blade arising at ca. a 40° angle; its petioles dry shiny yellowish brown and are sharply ridged. It shares with *Dieffenbachia bolivarana* Bunting characteristics such as shiny petioles, somewhat elliptic blades, and clusters of small, long-pedunculate inflorescences. The latter differs, however, in having petioles that dry darker, a glossier upper blade surface (especially the midrib) and especially by having primary lateral veins in the lower half of the blade arising at ca. a 90° angle.

Dieffenbachia longipistila Croat, sp. nov. TYPE: Venezuela. Amazonas: Dpto. Río Negro, Caño Baria, "Swampy" area between Río Mawarinuma and headwaters of Río Baria, 130 m., ca. 0°53'N, 66°15'W, *Liesner 17037* (MO 3248464, holotype; K, US, VEN, isotype). Fig. 123

Internodia ca. 1.5-3 cm longa, 4.5-5 cm diam.; petiolus 26-53 cm longus, vaginans ca. 3/4 longitudinis petioli; lamina moderate coriacea, anguste obovata usque ad obovatum-ellipticam, 50-61 cm longa, 14-17 cm lata. Pedunculus usque ad 14.5 cm longus,6-15 mm diam.; spatha viridis, medius constrictus, tubus oblongus, ca. 13 cm longus, 20-25 mm diam.; lamina naviculaformis; spadix 15.5-18.5 cm longus, pars pistillata 12.5-15 cm longa, 5.7 mm diam.; pars staminalis 6.5 cm longa, ca. 7 mm diam.; pars staminata sterilis 4-5 mm diam.; pistilla conspicue elevata; stigma circularis 2-2.3 mm diam.

Terrestrial; stem thick and stout, with irritating sap; internodes shorter than broad, ca. 1.5-3 cm long, 4.5-5 cm diam., drying yellowish brown to brown. LEAVES with petioles 26-53 cm long, 1.5-3.5 cm diam., more or less terete, surface drying dark brownish green; sheathing for about three-fourths of the petiole; blades (dried) moderately coriaceous, narrowly obovate to obovate-elliptic, acute at apex, 50-61 cm long, 14-17 cm wide, broadest above middle, both surfaces matte when dried with a bumpy epidermis, which has an almost leather-like appearance, with more or less circular raphide cells on the surface; midrib convexly raised at base, becoming flat toward the apex above, same as surface, convexly raised below, concolorous or slightly darker than surface; primary lateral veins 5-6 per side, departing midrib at 20-40° angle, straight-ascending to the margin or arcuate, flat on both surfaces, very weakly visible on the upper surface, visible and darker than surface below; interprimary veins flat on both surfaces, obscure above, visible below; lesser veins moderately obscure. INFLORESCENCES with peduncle to 14.5 cm long, 6-15 mm diam., much shorter than petioles, drying greenish brown, presumably spongy; spathe moderately coriaceous, green when fresh, finely striate, drying brown-

Figs. 122-125. 122. *Dieffenbachia liesneri* Croat. Venezuela. Amazonas: Dpto. Río Negro, Caño Baria, 130 m, *Liesner 17073*. ----123. *D. longipistila* Croat. Venezuela. Amazonas: Dpto. Río Negro, Ríos Mawarinuma -Baria, 130 m, *Liesner 17037*. ----124. *D. parvifolia* Engl. Venezuela. Amazonas: Río Pacimoni, 100 m, *Steyermark & Bunting 102475*. ----125. *D. seguine* (Jacq.) Schott. Venezuela. Yaracuy: Sierra de Aroa, Marín - Aroa, *Croat 60613*. Habit, x1/6.

ish green outside, yellowish brown inside, 22.5-28 cm long, the spathe constricted about midway, spathe tube oblong, 13-13.5 cm long, 20-25 mm diam., spathe blade boat-shaped, lanceolate when flattened, drying slightly darker inside; spadix 15.5-18.5 cm long, 5-7 mm diam., staminate portion oblong, tapering at the base, more than 6.5 cm long, ca. 7 mm diam., the sterile staminate portion narrower than the fertile staminate portion, 0.6-0.7 cm long, 4-5 mm diam.; pistils conspicuously raised, drying with dark stigma; stigma circular, 2.2-3 mm long, depressed medially; ovary ovoid, when soaked 4 mm diam. fertile staminate flowers irregularly 5-6 sided, becoming irregularly elongate toward the base, 4 per spiral, 1.5-3 mm long, in both directions; staminodia truncate, discoid at apex, shorter than pistils, surrounding pistil in clusters of 4-5, 1.5-2 mm long (dried).

Dieffenbachia longipistila is known only from the territory of Amazonas near the base of Cerro Neblina (close to the Brazilian border). It occurs at less than 150 m. Only three collections are known, all collected in a swampy area.

The species is characterized by its stout habit, a more or less terete petiole, its narrowly obovate to obovate-elliptic blades drying matte with the minor veins moderately obscure, and by its long, medium green, finely striated spathe; especially characteristic is its stalked or conspicuously raised stigma, which is much broader than the main body of the pistil (at least on drying). The name of the species refers to the elongate pistil.

Perhaps the closest species to *D. longipistila* is *D. paludicola*, which differs in having a blade 6-7 times longer than broad (versus 3.5-4.5 times longer than broad in *D. longipistila*).

VENEZUELA. AMAZONAS: Dept. Río Negro, Caño Baria, between Río Mawarinuma and headwaters of Río Baria, 130 m, 0°53'N, 66°15'W, *Liesner 7037* (K, MO, US, VEN); 140 m, 0°52'N, 66°15'W, *Gentry & Stein 47263* (B, MO, NY, VEN); Río Baria, 80 m, 0°19'N, 66°23'W, *Miller 1795* (MO, VEN).

Dieffenbachia parlatorei Linden & André, Ill. Hort. 24: 152 t. 291. 1877.

Dieffenbachia parlatorei is known from Colombia and Venezuela. In Venezuela, it ranges from Zulia and Barinas to Mérida, Táchira and Apure, from 100-600 m.

It is distinguished by its moderately large size, short stem, compact leaves with short petioles sheathed to the middle or to near the apex. Its coriaceous, elliptic to obovate blades characteristically dry bicolorous, usually light green below; also characteristic are its moderately large inflorescences (20-37 cm long) with bilocular ovaries and staminodia drying much broader than long.

Dieffenbachia parvifolia Engler, Engl. Pflanzenr. Pflanzenr. IV 23Dc (Heft 64) 59. 1915.

Dieffenbachia parvifolia ranges from southern Venezuela to Brazil in the Río Negro drainage, occurring at less than 200 m. In Venezuela, it is known from the Río Pacimoni, Río Baria and Río Mawarinuma near the base of Cerro de le Neblina in southern Amazonas, all tributaries of the Río Negro. The species forms large stands on sand deposits along rivers.

It is characterized by its small stature, usually less than 50 cm tall, as well as by its small elliptic blades (less than 25 cm long and 7.5 cm wide). It is not at all confused with any other species in Venezuela. Figs. 120-121, 124

Dieffenbachia seguine (Jacq.) Schott, Melet. i 20. 1832.

Dieffenbachia seguine is a wide-ranging polymorphic taxon, perhaps consisting of several elements. As defined by most taxonomists, it ranges throughout the West Indies and Central America to the Guianas, Brazil and Ecuador. In Venezuela, the species occurs in a broad arc from Apure and Táchira in the southwest through Barinas, Trujillo, Portuguesa, Lara, Yaracuy,

Figs. 126-129. 126. *Dieffenbachia seguine* (Jacq.) Schott. Venezuela. Miranda: Cerro del Bachiller, *Croat 53956.* Inflorescence and leaves, x1/6. ----127-128. *Dracontium changuango* Bunting. *Bunting s.n.,* cultivated at Munich Bot. Gard. 127. Leaf segment x1/4. 128. Apex of petiole, x3/10. ----129. *Heteropsis flexuosa* (H.B.K.) Bunting. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59646.* Sterile shoot, x1/5.

Falcón, Carabobo, Aragua, Miranda, Monagas and Sucre in the northeast of the country, usually at elevations from near sea level to 1,200 m.

The species is distinguished by its moderately large size, ovate-elliptic blades, truncate to rounded or subcordate at the base and by its unilocular pistils, subtended by several club-shaped white staminodia.

The species is most easily confused with the *D. maculata* (Lodd.) G. Don complex, best represented by *Maguire & Wurdack 36461* from Amazonas. Like *D. seguine*, that species also has blades broadest below the middle, but it differs in having bilocular pistils. It is apparently not contiguous with *D. sequine*, since in Venezuela it occurs only in Bolívar and Amazonas at 120-1,000 m.

Noteworthy is a collection *(Croat 21412)* from Aragua along the summit of the divide in Parque Nacional Henri Pittier, which lacks the typical clavate staminodia, but instead has a ring-like disk of staminodal tissue surrounding the pistils. The plant otherwise looks like typical *D. seguine*, and thus is included here, though the matter bears further investigation.

Figs. 125-126, 130

DRACONTIUM

Dracontium changuango Bunting.

Dracontium changuango is endemic to northern Venezuela at 100-500 m in seasonally dry forests. It is currently known from Carabobo (S of Valencia) and in Portuguesa (Dtto. Guanare) as well as Bolívar (vic. Río Parguaza) and Guárico.

This species is closest to *D. dressleri* of Central America and is perhaps only subspecifically distinct from that species. Based on study of herbarium specimens only, the two taxa have very similar leaves and a sessile to short pedunculate inflorescence of similar shape and size. In addition, they have nearly identical seeds. However, *D. changuango* differs from *D. dressleri* by having the inner surface of the spathe blade matte, as a result of a covering of minute excrescences, whereas *D. dressleri* has the inner surface of the blade glossy, smooth and glabrous. Both species are variable in the production of free tepals at the tip of the spadix, in that they may be present or absent (in the same populations apparently). For a photograph of the spadix of *Dracontium changuango*, see the front cover of Aroideana 8(3). 1985(1986).

Figs. 127-128, 131-132

HETEROPSIS

Heteropsis flexuosa (H.B.K.) Bunting, Revista Fac. Agron. (Maracay) 10: 201. 1979.

Heteropsis flexuosa is known from Brazil, Venezuela, Surinam and French Guiana (and probably also occurs in Guyana) at 100-1,000 m. In Venezuela, it is found in the states of Bolívar and Amazonas. Fig. 129

It is characterized by its usually spinelike axillary buds, short petioles (up to 1.5 cm but usually less than 1 cm long), coriaceous, narrowly obovate to oblong-elliptic blades (up to 27 cm long, 3-4 times longer than broad) and by its inflorescence, with a green to white or cream spadix and a green or cream spathe. The fruits are white, becoming green.

The species is most easily confused with *H. tenuispadix* Bunting, a species that may occur with *H. flexuosa*, but which is distinguished by its more slender stems, thinner blades, smaller inflorescences and lack of the prominent spine-like axillary buds.

At the Cerro Neblina base camp (Río Mawarinuma), *H. flexuosa* occurs with *H. spruceana* and *H. melinonii*, and all three species are about equally abundant. See the description of *H. spruceana* Schott for a comparison with *H. flexuosa*.

Figs. 130-133. 130. *Dieffenbachia seguine* (Jacq.) Schott. Venezuela. Aragua: Henri Pittier National Park, 1030-1060 m, *Croat 60567*. Inflorescence and petioles, x1/6. ----131. *Dracontium changuango* Bunting. Venezuela. Zulia: Bogner photo. Inflorescence, x3/10. ----132. *Dracontium changuango* Bunting. *Bunting s.n.*, cultivated at Munich Bot. Gard. Petioles, x9/20. ----133. *Heteropsis melinonii* (Engl.) Jonker & Jonker. Venezuela. Amazonas: Cerro Neblina, *Croat 59335*. Habit, x1/6.

Heteropsis melinonii (Engl.) Jonker & Jonker, Acta Bot. neerl. 2: 356. 1953.

Heteropsis melinonii is known only from southeastern Venezuela and French Guiana (surely to be found in Surinam). In Venezuela, it occurs at 120-1,330 m in Bolívar (Cerro Uori) and Amazonas (San Carlos de Río Negro, Cerro Neblina, Río Yatua at Cerro Arauicaua, and in the region of Cerro Yapacana). Fig. 133

It is characterized by its long petioles (3.5-8 cm long), and especially by its gray-drying blade which is glaucous on the lower surface, up to 40 cm long, and 9 cm wide. Its inflorescence has slender peduncles 0.7-1.5 cm long, a light green stipitate spadix (2.5-6.5 cm long) and a spathe with a cream interior and greenish yellow exterior. The stipe is 0.7-1.3 cm long, more or less equalling the peduncle.

Jonker-Verhoef & Jonker (1953) in the 'Flora of Surinam', report a reddish yellow spathe and a reddish spadix, but all Venezuelan collections seen report red coloration in neither structure. Since the species was not actually collected in Surinam (only known from the border along the Marowijne River) these references probably are from collections made in French Guiana.

Heteropsis spruceana Schott, Aroid. 1: 27. t 60. 1853.

Heteropsis spruceana Schott ranges from Venezuela to southern Colombia, northern Brazil (Amazonas) and Guyana at 50-1,095 m. In Venezuela, it is known from Bolívar and Amazonas.

The species is characterized by its vining habit and delicate stem and especially by its small, moderately thin, narrowly lanceolate, gradually long-acuminate blades (15 cm long or less), which are almost sessile. Its inflorescence is also small, with a 2-5 cm long peduncle, a white to cream-colored spathe, and a yellow to cream-colored spadix (to ca. 1.5 cm long). Its fruits are bright orange. Fig. 134

Similar to *H. flexuosa* (H.B.K.) Bunting, which has longer (up to 27 cm long), coriaceous blades that are generally broader (3-4 times longer than broad), *H. spruceana* has blades generally 4-5 times longer than broad, and are more abruptly acuminate.

MONSTERA

Monstera adansonii Schott var. ***klotzschiana*** (Schott) Madison, Contr. Gray Herb. 207: 40. 1977.

Monstera adansonii var. *klotzschiana* ranges from southern Venezuela and the Guianas south to Peru, Bolivia and Brazil (to Paraná) at 100-1,000 m. In Venezuela, it occurs in Bolívar and Amazonas. Figs. 135-137

It differs from var. *laniata* in having pistils acute at apex (rather than truncate as in var. *laniata)* and petiole sheaths with their margins persistent (versus deciduous in var. *laniata).* In addition, var. *klotzschiana* has the leaf blade less than twice as long as wide with the base unequal, with one side truncate to subcordate and the other side cuneate to acute. Furthermore, the primary lateral veins arise from the midrib at an angle greater than 60°. In var. *laniata*, the blade is frequently more than twice as long as broad with the base subequal and the primary lateral veins arising at less than a 60° angle (Madison, 1977).

Monstera adansonii Schott var. ***laniata*** (Schott) Madison, Contr. Gray Herb. 207: 38. 1977. Fig. 138

Monstera adansonii var. *laniata* ranges from Nicaragua to the Guianas, Brazil (Amapá) and Peru at sea level to 1,400 m, occurring principally in tropical moist forest life zones. In Venezuela, it is widespread, occurring in most forested parts of the country, usually at less than 350 m, sometimes as high as 600 m and rarely to higher elevations. It occurs in all political units of Venezuela except

Figs. 134-137. 134. *Heteropsis spruceana* Schott. var. *spruceana*. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59323*. Fruiting shoots, x3/10. ----135-137. *Monstera adansonii* Schott var. *klotzschiana* (Schott) Madison. French Guiana. Cayenne, vic. O.R.S.T.O.M. Research Station, sea level, *Croat 53808*. 135. Habit, x1/15. 136. Preadult leaves, x1/15. 137. Apex of flowering stem, x1/5.

the states of Falcón, Carabobo, Guárico, Cojedes and Sucre.

It is distinguished by its entire to irregularly pinnatifid leaf blades, often with perforations in 1-3 rows on each side of the midrib. Blades are generally somewhat thinner than for most species of *Monstera*. The species is in section *Monstera*, with the juvenile leaves exserted and conspicuously petiolate (more than one-third as long as the blade). It is closest to *M. lechleriana* in the same section, but that species is distinguished by having a much thicker, generally larger blade and a larger flowering spadix (more than 15 cm long in flower and 20 cm long in fruit, versus less than 13 cm long and less than 17 cm long in fruit for *M. adansonii*).

Monstera lechleriana Schott, Prod. Aroid. 366. 1860.

Monstera lechleriana is known from Mexico and Costa Rica and ranges from Costa Rica to Venezuela, Brazil (Amapá and Pará) Peru and Bolivia, mostly at elevations of 800-1,200 m (rarely 250-1,800 m). Figs. 139-141

In Venezuela, it is known from Apure and Táchira in the southwest, but principally in the Cordillera de la Costa from Yaracuy, Aragua, the Distrito Federal, Miranda, Anzoátegui, Monagas and Sucre. It was collected more recently in Amazonas on the Cerro de la Neblina at 1,250 m, and in Bolívar in the Gran Sabana at 990 m.

The species was treated as *M. henripittieri* Bunting by Bunting (1979). It is similar to *M. adansonii* (see that species for a discussion of their differences).

Monstera spruceana (Schott) Engler, Fl. Bras. 3(2): 115. 1878.

Monstera spruceana ranges from Honduras to Colombia and Ecuador on the Pacific slope and to Venezuela, Guyana, Brazil and Peru on the Atlantic slope, occurring at 20-600(1,400) m. In Venezuela, the species is widespread but little collected, known from Táchira on the western side of the Cordillera de Mérida, Zulia, west of Lago Maracaibo, from Yaracuy and Aragua in the Cordillera de la Costa, from northern Bolívar (Altiplanicie de Nuria in the Sierra de Imataca) and the Amazonas (Cerro de la Neblina). Fig. 142

The species is a member of section *Marcgraviopsis* with appressed "shingle" leaves and is characterized by its regularly pinnate leaf blades. The blades are basally truncate with wide pinnae arising at a broad angle to the midrib and the petioles are one-third to two-thirds as long as the blade. In addition, the peduncle is terete and shorter than the spadix. Especially characteristic is the stout spadix, which is 4-6 cm diam. and 16-36 cm long in fruit.

It can be confused with *M. dilacerata* (also occurring in Venezuela), which differs in having a peduncle 4 cm or more longer than the spadix (about equalling one another in *M. spruceana*). The only other Venezuelan species with appressed "shingle" leaves in Venezuela is *M. dubia* (H.B.K.) Engl. & Krause, which differs in having perforated as well as pinnately lobed blades.

The species was treated as *M. steyermarkii* Bunting by Bunting (1979), and though Madison (1977) does not include that name in his revision, it is clear that it is synonymous with *M. spruceana*. As defined by Madison, *M. spruceana* certainly contains several distinct elements, with the Venezuelan material appearing to be more closely related to that of Central America than that of Amazonian Peru, where leaf blades dry a characteristic yellowish brown color (more typically grayish to somewhat blackened in Venezuela). Still, the type of *M. spruceana*, having been collected in Amazonian Brazil, may be closer to Venezuelan material than it is to Peruvian material. Certainly, more studies must be made of this complex thoughout its range.

Figs. 138-141. 138. *Monstera adansonii* Schott var. *laniata* (Schott) Madison. Venezuela. Barinas: Altamira - Calderas, 975 m, *Croat 60757*. Habit, x1/62. ----139-141. *Monstera lechleriana* Schott. Venezuela. Aragua: Henri Pittier National Park, 1150-1200 m, *Croat 60594*. 139. Habit, x1/12. 140. Leaf blade, x1/5. 141. Stem, x1/5.

MONTRICHARDIA

Montrichardia arborescens (L.) Schott, Araceen Betreff. 1: 4. 1854.

Montrichardia arborescens ranges from Guatemala and Belize to the Guianas and the Lesser Antilles, usually from sea level to 210 m. In Venezuela, the species is common in the northeast from Monagas, Sucre and Delta Amacuro, and it also occurs in Guárico, ranging into the Amazon Basin through the Orinoco River drainage to Bolívar, Amazonas and Apure. Fig. 145A

It is confused with *M. linifera* Schott. See that species for details and for key separation.

Montrichardia linifera (Arruda) Schott, Araceen Betreff. 1: 5. 1854.

Montrichardia linifera ranges from Venezuela to Guyana, Colombia, Ecuador, Peru and Brazil, occurring at 0-350 m, principally in the Amazon basin, but also along the Bahian coast. In Venezula, the species occurs in Apure and Bolívar in the south, but ranges up the Orinoco basin to Guárico, Monagas and Sucre.

The species is distinguished from other genera by its usually rooted aquatic habit with woody stems, conspicuous leaf scars and large ovate-sagittate blades, as well as by the convolute spathe, which falls free after anthesis. The staminate portion of the spadix also falls free. The fruit cluster is large, green and subglobose.

The species is easily confused with *M. arborescens*, which also occurs in Venezuela, principally on the northern coast in the delta of the Río Orinoco. The latter species does, however, range well to the south in the Orinoco basin and their ranges do overlap. It is even possible that they hybridize, as some specimens are difficult to identify. Generally, however, the two species are very distinct. The following key is provided for separation. Figs. 145B-145D

1a. Blades sagittate, generally conspicuously longer than broad; sinus frequently open; cusp of the leaf sheath 0.5-1.5 cm; stems usually moderately slender and armed with sharp spines (at least near the base). . . . *M. arborescens* (L.) Schott.

1b. Blades cordate, generally about as broad as long; sinus frequently closed; cusp of the leaf sheath 3-7 cm long; stems usually thick, bamboo-like, smooth (or at most with minute, blunt projections) . . . . . *M. linifera* (Arr.) Schott.

In addition to the characters listed in the key, there are other characters less easily quantified, such as the fact that *M. linifera* usually dries darker with more pronounced reticulate venation, that help distinguish the species.

PHILODENDRON

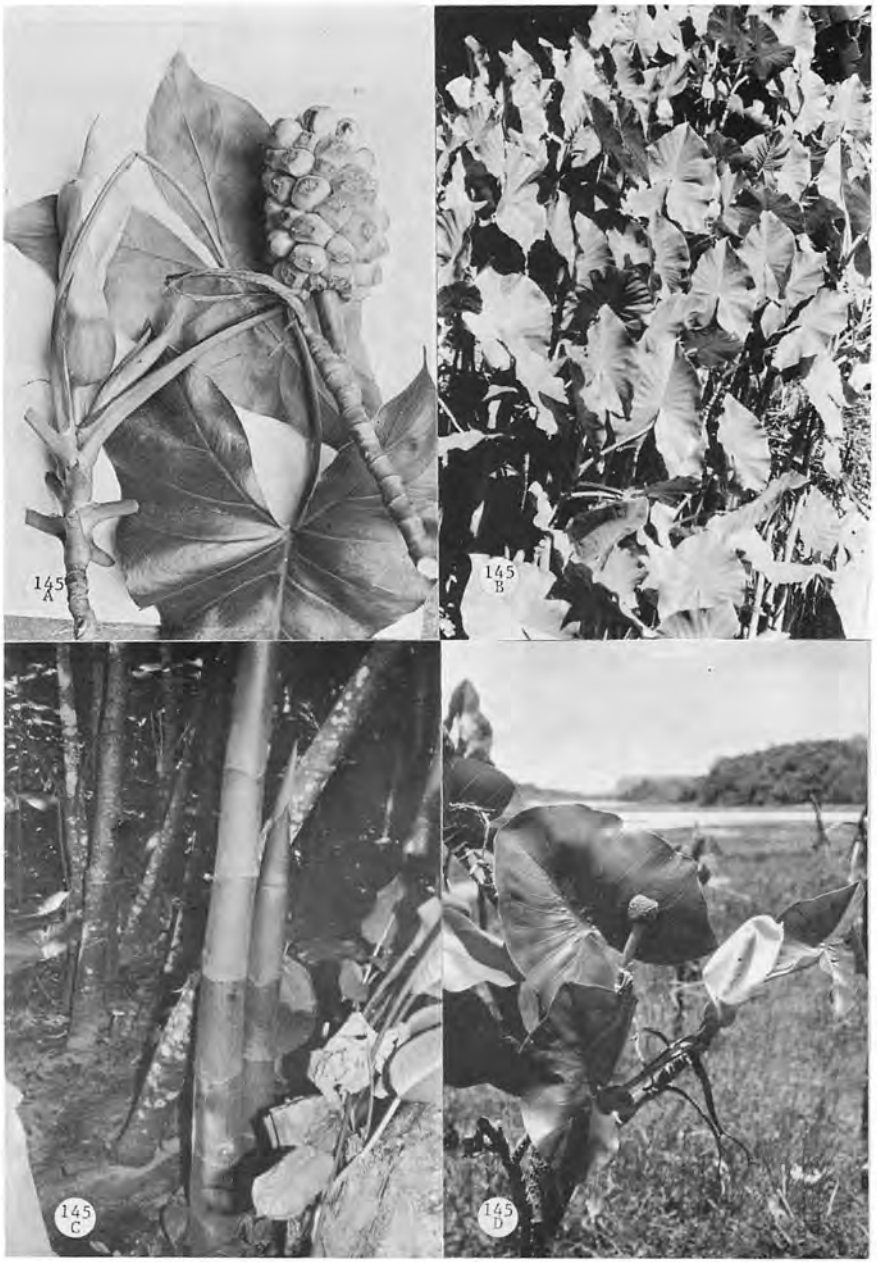
Philodendron acutatum Schott, Syn. Aroid. 94. 1986. Figs. 143-144, 146

Philodendron acutatum ranges from Trinidad and Venezuela to the Guianas, northern Brazil and southeastern Colombia (possibly also Peru in Loreto). In Venezuela, it is widespread, extending from Amazonas, Bolívar and Delta Amacuro in the east to Sucre, Monagas, Distrito Federal, Guárico, Miranda, Lara, Trujillo, Zulia and Apure, at mostly less than 500 m.

It is characterized by its scandent habit, long internodes (drying light brown and coarsely fissured), long, subterete petioles (about as long as the blades), and by its narrowly-ovate to ovate-triangular blades (drying mostly green) with 4-5 pairs of primary lateral veins broadly spreading from the midrib and with a posterior rib usually only briefly naked near the petiole (but the naked part sometimes up to 4 cm). The species has one or two, generally long-pedunculate, greenish inflorescences.

Brazilian specimens identified as *P. acutatum* (Pará, Mato Grosso, Bahia,

Figs. 142-145. 142. *Monstera spruceana* (Schott) Engl. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59358*. Habit, x1/69. ----143-144. *Philodendron acutatum* Schott. French Guiana. Cayenne, 10-20 m, *Croat 53853*. 143. Habit, x1/25. 144. Leaves, x1/6. ----145. *P. ampullaceum* Bunting. Venezuela. Táchira: San Cristóbal - Delicias, 1850 m, *Croat 55013*. Habit, showing inflorescences, x1/12.



Figs. 145A-D 145A. *Montrichardia arborescens* (L.) Schott. Panama. Canal Area: Barro Colorado Island, *Croat 6164.* Whole plant x6/25. ----145B. *Montrichardia linifera* Schott. Cultivated by R. Burle Marx, Brazil. Habit x1/31. 145C. Stems x1/12. 145D. Venezuela. Bolívar: Canaima, photo by A. Graf. Whole plant x1/12.

Figs. 146-149. 146. *Philodendron acutatum* Schott. Trinidad: Matura - Valencia, 150 m, *Croat 53910*. Habitat x1/12. ----147-149. *P. aristeguietae* Bunting. Venezuela. Aragua: Henri Pittier National Park, 1030-1060 m, *Croat 60559*. 147. Habit, x1/9. 148. Habit, x1/6. 149. Leaves, x1/5.

Goiás) have leaves drying unusually brown and inflorescences drying reddish brown, and have generally shorter peduncles. They probably represent a distinct species.

One collection from the state of Guarico in Venezuela *(Davidse 4245)* is unusual in having smaller leaves (ca. 20 cm long) and stems with large pieces of the tan epidermis falling free on drying.

Philodendron acutatum can be confused with *P. atabapoense*, but the latter has thinner leaf blades that are proportionately longer and narrower and which are violet-purple on the lower surface when young. According to Bunting (1979) the species also differs in having only four locules per ovary versus 6-10 locules per ovary in *P. acutatum*.

Philodendron ampullaceum Bunting, Acta Bot. Venez. 10: 289. 1975.

Philodendron ampullaceum is endemic to Venezuela, known only from the state of Táchira at 1,800-2,000 m.

The species is characterized by its 3-6 inflorescences per axil with short, green, ellipsoid spathes and with the pistillate portion of the spadix equal to or longer than the staminate portion. The pistillate flowers have elongate styles.

Figs. 145, 150-152

Philodendron aristeguietae Bunting, Acta Bot. Venez. 10: 290. 1975.

Philodendron aristeguietae is endemic to the Cordillera de la Costa in Venezuela, occurring in Distrito Federal (Cerro Naiguatá) and Aragua in the Parque Nacional Henri Pittier at 1,000-1,200 m in cloud forest life zones.

It is distinguished by its ovate blade and by petioles broadly winged to the base of the blade. It is similar to *P. venosum* and *P. inaequilaterum*, both of which have more elliptic blades. In addition, the latter occurs only below 500 m and has interprimary veins connected by numerous cross-veins, while *P. venosum* occurs mostly farther to the east in Monagas and Sucre.

Figs. 147-149, 153

Philodendron atabapoense Bunting, Acta Bot. Venez. 10: 291. 1975.

Philodendron atabapoense is endemic to Venezuela, known only from the state of Amazonas at Yavita, along the Río Temi, at Siquita on the upper Río Orinoco and at San Carlos de Río Negro. Juvenile plants are often abundantly found over the sandy soil in disturbed areas of the forest near San Carlos, having blades conspicuously violet-purple. At later stages the plants can be confused with *P. acutatum*. (See that species for comparison).

Figs. 154-155, 158

Philodendron auyantepuiense Bunting, Acta Bot. Venez. 2: 142 fig 5. 1967.

Philodendron auyantepuiense is endemic to Venezuela, known until recently only from the state of Bolívar on the Gran Sabana and from Cerro Jaua and the Auyan-tepuí at 1,100-1,850 m. Recently it was collected on Cerro Neblina (at 1,850 m) in Amazonas near the Brazilian border.

The species is characterized by its more or less narrow, triangular blade with narrow, spreading posterior lobes, by its generally terrestrial, creeping habit, its internodes (1.5-2.8 cm diam. and 5.8 cm long), its sharply 2-ribbed cataphylls which persist semi-intact (or with fibers at the base) and its petioles, which are subterete at the base and obtusely flattened toward the apex.

Although the specimens from Bolívar have decidedly triangular leaves even as adults, the plants from Cerro Neblina are more nearly ovate and much larger in age. It is possible that the type specimen represents an usually young flowering stage of the plant.

Figs. 156-157

Philodendron azulitense Croat, sp. nov. TYPE: Venezuela. State of Mérida: along highway between La Azulita and junction with highway #1 (between El Vigia and Capazón), less than 5 km below La Azulita (N of), on large boulder near edge of a stream which empties onto high-

way, just N of large waterfall in a sharp curve, 8°41'N,71°25'W, 900 m, Croat *60728* (MO 3234845, holotype, B, CAS, COL, F, K, MY, NY, US, VEN, isotypes).
Figs. 159-160, 162

Planta epilithica; internodia usque 10 cm longa; cataphyllum deciduum; laminta ovata, 12-33 cm longa, 7.5-19 cm lata; inflorescentia 2 per axillae; pedunculus 4.5-7 cm longus, 2.5-5.2 mm diam.; tubus spathae viridis; lamina spathae cremea; spadix 8-10 cm longus; pars pistillata pallide viridis, 3-4 cm longa, 8 mm diam.; pars staminata cremea, 3.7-4 cm longa, basi 9 mm diam.

Epipetric; internodes up to 10 cm long, 1-1.5 cm diam., olive-green to brownish, semiglossy, more or less terete; cataphylls green, unribbed, deciduous. LEAVES erect-spreading; petioles 12-33.5 cm long, 11 mm diam. (dry), moderately spongy, obtusely flattened near base, terete midway, weakly flattened near apex, weakly short, dark-lineate, semiglossy; blades ovate, weakly coriaceous, 12-33 cm long, 7.5-19 cm broad, broadest at base, acute at apex, cordate at base; anterior lobe 16-28 cm long, the margins convex; posterior lobes 5.5-8.5 cm long, directed slightly outward to straight back; sinus parabolic; upper surface semiglossy, dark green, paler below; midrib flat and concolorous above, convex and concolorous below, drying broadly raised above, convex below with minute ridges; basal veins 3 pairs, the first free to base, the second and third basal veins coalesced 8-20 mm; posterior rib naked 8-20 mm; primary lateral veins 3-4 per side, narrowly sunken above, convex below, departing midrib at 60-70° angle, scarcely curved to margin, drying slightly raised below, flat but visible above; interprimary veins drying barely visible above, inconspicuously raised below; secondary veins distinct, drying visible on both surfaces. INFLORESCENCES 2 per axil; peduncle dark green, 4.5-7 cm long, 2.5-5.5 mm diam. spathe coriaceous, 8-12 cm long (twice as long as tube), moderately glossy, medium green on outer tube, merging imperceptibly with cream on blade, inner surface pale greenish white throughout; spadix 8-10 cm long; pistillate portion pale green, 3-4 cm long, 8 mm diam.; staminate portion scarcely constricted; 3.7-4 cm long, 9 mm. diam. at base; flowers (dried, 13-14 per spiral; pistil ellipsoid with fibrillate skirt beneath the stigma, 0.6-1.2 mm diam.; stigma round to ellipsoid, ca. 0.3 mm wide ca. 1 mm long, drying black with a depression at center.

Known only from the type locality of La Azulita in the state of Mérida, at 900 m, *Philodendron azulitense* is characterized by its long internodes, deciduous cataphylls, its ovate, cordate blade drying brownish green and its paired inflorescences with the spathe light greenish white within, and the outside medium green on the tube and cream on the blade.

The species is similar to *P. lindenii*, which differs in having a solitary inflorescence with a green tinged reddish violet spathe tube which is dark red-violet on the inner surface. In addition, *P. lindenii* has the pistillate portion of the spadix creamy white while in *P. azulitense* it is pale green.

Philodendron barrosoanum Bunting, Ann. Mo. Bot. Gard. 50. (23) fig. 1. 1964. Figs. 161, 163

Philodendron barrosoanum, described only recently from Venezuela, is now known to be widespread throughout the northern Amazon Basin and ranges from Venezuela to Colombia (Meta, Huila, Vaupés and probably Vichada and Guiana as well), Ecuador (Napo) and Peru (Loreto, Huánuco and Amazonas). It ranges from 100 to nearly 1,000 m. In Venezuela, it is known from eastern Venezuela in Amazonas and in the west it ranges from Trujillo to

Figs. 150-153. 150-151. *Philodendron ampullaceum* Bunting. Venezuela. Mérida: Mérida - La Azulita, 2030 m, *Croat 60725.* 150. Habit, x1/18. 151. Leaf, x1/8. ----152. *P. ampullaceum* Bunting. Venezuela. Táchira: San Cristóbal - Delicias, 1850 m, *Croat 55013.* Leaf (view at acute angle) x1/8. ----153. *P. aristeguietae* Bunting. Venezuela. Aragua: Henri Pittier National Park, 1030-1060 m, *Croat 60559.* Leaf blade, x1/2.

Figs. 154-157. 154-155. *Philodendron atabapoense* Bunting. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59256*. 154. Habit, x1/12. 155. Leaf blade, x1/6. ----156-157. *P. auyantepuiense* Bunting. Venezuela. Bolívar: Santa Elena - El Dorado, 1070 m, *Croat 54301*. 156. Habit, x1/6. 157. Leaf, x6/25.

Figs. 158-161. 158. *Philodendron atabapoense* Bunting. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59256*. Stem and inflorescence, x3/8. ----159-160. *P. azulitense* Croat. Venezuela. Mérida: Mérida - La Azulita, 2030 m, *Croat 60728*. 159. Flowering shoot, x1/6. 160. Flowering shoot, x1/5. ----161. *P. barrosoanum* Bunting. Venezuela. Mérida: La Azulita - El Vigia, 760 m, *Croat 54870*. Habit, x1/23.

Barinas, Mérida, Táchira and Apure.

It is recognized by its scandent habit with moderately long internodes, its large, deeply 3-lobed blades and more or less terete petioles equallying or longer than the blades.

The short-pedunculate inflorescences are borne in clusters of up to 5 per leaf axil. The spathe tube is green or greenish white, sometimes tinged reddish to purplish, and is purplish within. The blade is white at anthesis.

Philodendron benitezii Croat, sp. nov. TYPE: Venezuela. Táchira: Dtto. Junín, Quebrada El Libano, about 800 m, *Benitez de Rojas 1241* (MY, holotype; F, isotype). Fig. 164

Planta epiphytica; caudex scandens, internodia 1.5-6 cm longa, ad 5 mm lata, modice laevia; petiolus 10-14.5 cm longa, vagina extensa ad 1 cm petiolum apicis; lamina anguste, oblonga-elliptica vel oblonga-oblanceolata, 11-19 cm longa, 3-5.5 cm lata; nervi primari 7-9, modice obscuri; inflorescentia solitaria, pedunculus 2 cm longus; spatha 8 cm longa, tubus oblongus-ellipticus, 1.7 cm latus, lamina alba; baccae ignotae.

Scandent hemiepiphyte; internodes 1.5-6 cm long, ca. 5 mm wide, moderately smooth, drying green, striate, matte, bearing a few short roots on the flowering branches; cataphylls absent; petioles sheathing stems, 10-14.5 cm long, sulcate and less than 2 cm diam. at apex; sheath narrow and inconspicuous, extending to within 1 cm of the apex, the end narrowly rounded; blades narrowly oblong-elliptic to oblong-oblanceolate, 11-19.5 cm long, 3-5.5 cm wide, narrowly acuminate at apex, acute at base, drying green; midrib sunken above, raised beneath; primary lateral veins 7-9 pairs, obscure above, weakly visible on lower surface on drying; interprimary veins about as conspicuous as the primary lateral veins; minor veins weakly visible (drying weakly wrinkled); blade margins drying minutely revolute. INFLORESCENCE solitary, drying reddish brown; peduncle to 2 cm long, less than 5 mm diam.; spathe tube oblong-elliptic, to 1.7 cm diam. (dried); spathe blade white; pistillate spadix ca. 3.5 cm long, ca. 1.5 cm diam.; stigmas drying conspicuously bowl-shaped, brown, 0.7-0.9 mm. diam.; male spadix ca. 3.5 cm long (the apex lost). FRUITS not seen.

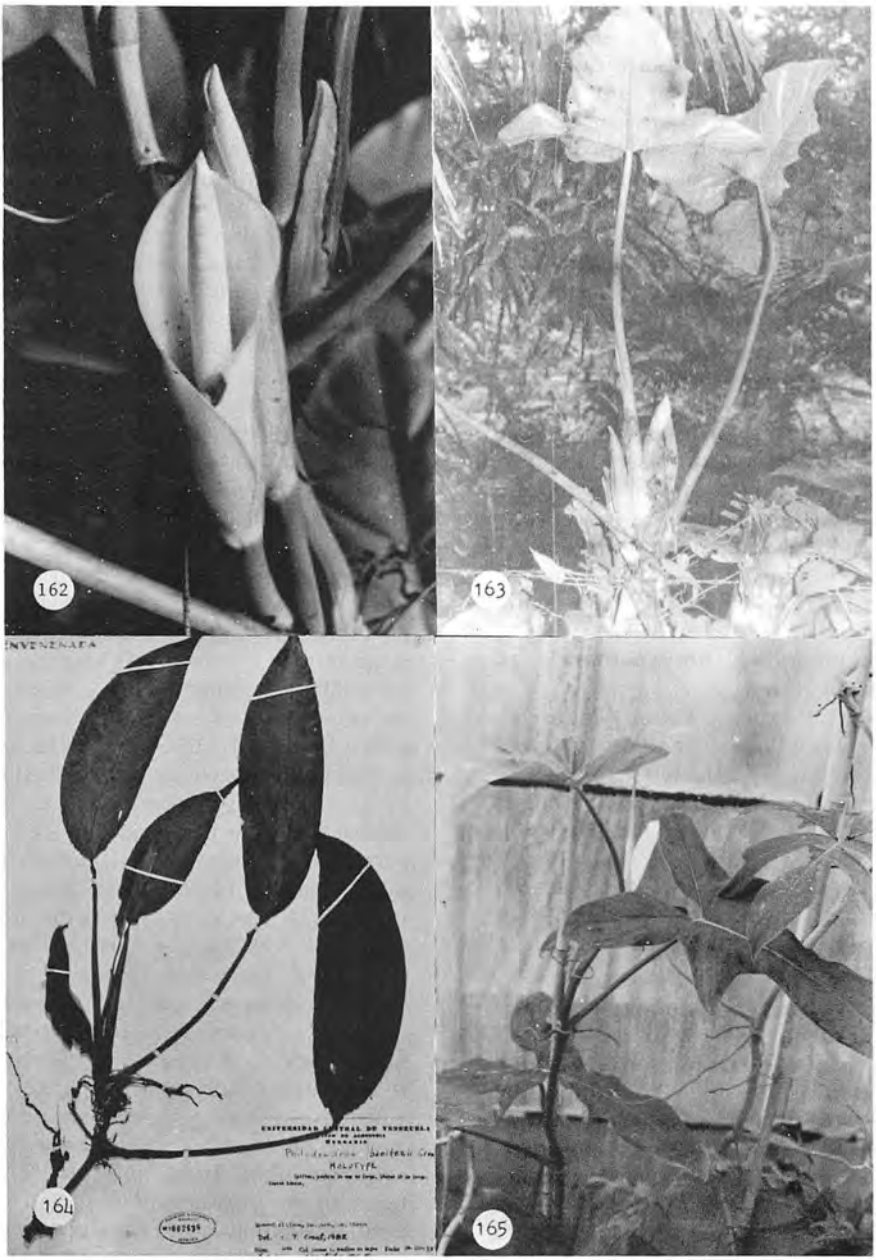
Philodendron benitezii is apparently endemic to Venezuela, where it is known only from the type collection in Táchira at 800 m. It is named in honor of the collector Carman Emilia Benitez de Rojas from the Instituto de Botánica Agricola in Maracay, Venezuela.

The species is a member of section *Pteromischum* and is characterized by a slender, green striate stem, small, narrow, conspicuously acuminate leaves with an inconspicuous petiolar sheath extending to within 1 cm of the base of the blade, and by its small, solitary inflorescence. It is closest to small-leaved plants of *P. inaequilaterum*, which may have leaf blades of similar shape and a similar inconspicuous sheath, but that species has conspicuous primary lateral veins arising at 65-80° angle from the midrib. In contrast, *P. benitezii* has inconspicuous primary lateral veins arising at a 45-50° angle from the midrib.

Philodendron bipennifolium Schott, Oestr. Bot. Wochenbl. 5: 289. 1855.

Philodendron bipennifolium ranges from southern Venezuela to southern Brazil. In Venezuela, the species is known only from Amazonas in the vicinity of Yavita along the Rio Temi, but it is expected to be much more widespread. Figs. 165-166

The species is a hemiepiphytic vine to 2 m long or more, with internodes 8-15 cm long and 6-20 mm diam., more or less terete petioles 25-37 cm long, a green spathe tube that is pale and short-lineate, and a spathe blade only slightly paler than the spathe tube.



Figs. 162-165. 162. *Philodendron azulitense* Croat. Venezuela. Mérida: Mérida - La Azulita, 2030 m, *Croat 60728*. Inflorescence, x9/20. ----163. *P. barrosoanum* Bunting. Peru. Junín: San Ramón - Oxapampa, 700 m, *Croat 57719*. Habit, x1/15. ----164. *P. benitezii* Croat. Venezuela. Táchira: Junín, *Benitez de Rojas 1241*. ----165. *P. bipennifolium* Schott. Cultivated at Kew. Habit, x1/5.

The species was confused by Engler and Krause (1913) with *P. panduriforme* (see that species for discussion) but the two are not very similar. The former is distinguished by its more or less panduriform blades with a hippocrepiform sinus, the anterior lobe having a single pair of lateral lobes that are more or less truncate at the apex.

Philodendron bipennifolium is also similar to *P. quinquelobum* Krause, which sometimes has a similar leaf blade. However, that species differs in having a deep, narrow sinus in the middle of the anterior lobe and in having the anterior lobe divided almost to the midrib near the base. In contrast, the anterior lobe of *P. bipennifolium* has no narrow sinus midway and is only weakly constricted near the base.

Philodendron brevispathum Schott, Bonplandia 29. 1859.

Philodendron brevispathum var. ***brevispathum***

TYPE: Panama, Canal Zone: at Chagres River, *Fendler 431* (K, holotype; MO, isotype).

Philodendron arcuatum Krause, Pflanzenreich IV. 23 Db (Heft 60): 72. 1913.

TYPE: Bolivia. Pando: Río Acre, at Cobija (on Brazilian border SW of Río Branco, 11°2'S, 68°44'W), *Ule 8819* (B).

P. holmquistii Bunting, Acta Bot. Venez. 10: 297. 1975.

TYPE: Venezuela. Amazonas: Pueblo Viejo, open zone between the Río Pacimoni and the forest, 1°50'N, 66°30'W, 100 m, *Steyermark & Bunting 102495* (VEN, holotype; MY, isotype).

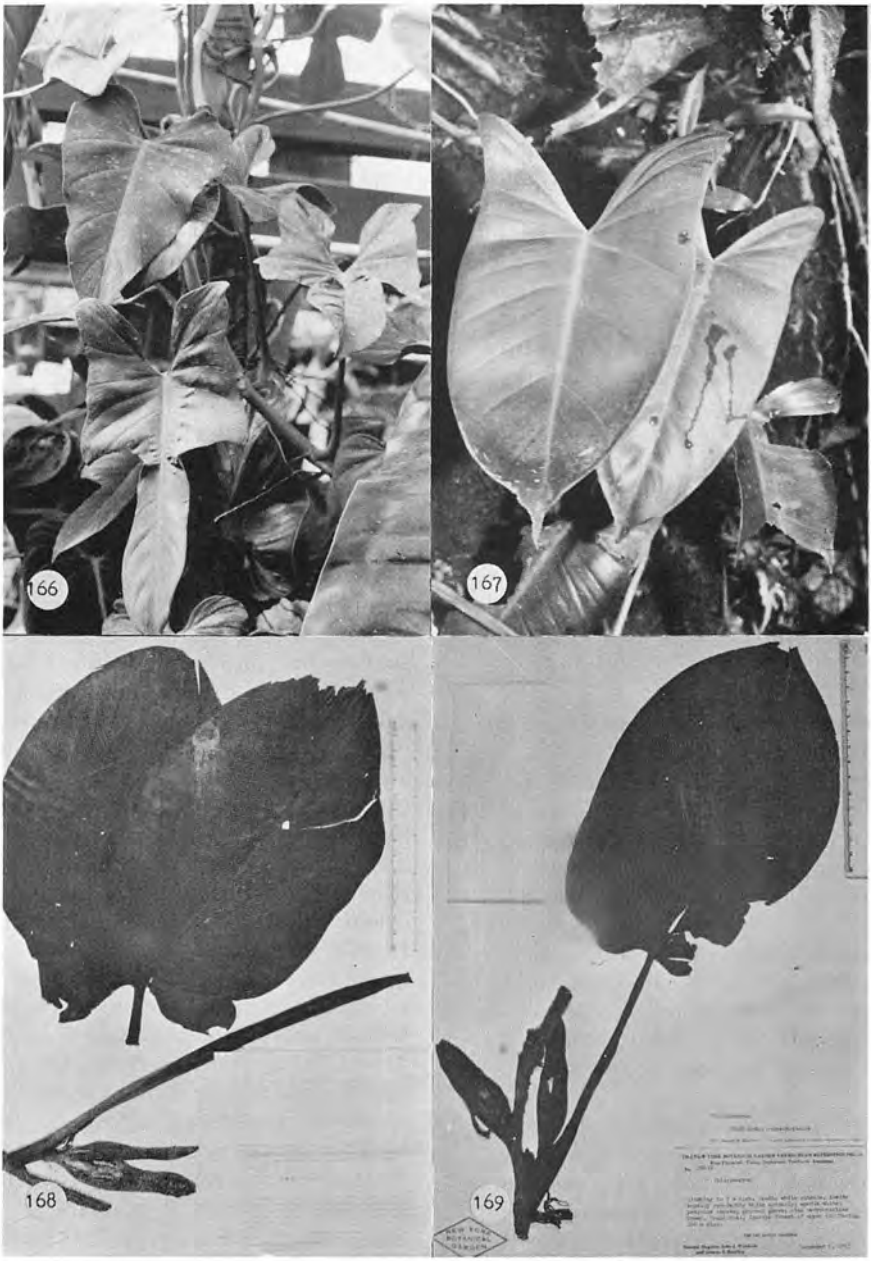
Figs. 167, 170

Philodendron brevispathum Schott, long known only from the Caribbean coast of Panama, is now known to be a locally rare but more widespread species with special ecological requirements. It is now known to range from Nicaragua to Panama with disjunct populations in South America, where it ranges from Venezuela to Colombia (Vichada, Meta) Ecuador (Napo), Peru (Loreto) and Bolivia (Pando). It is certainly to be expected in Brazil. It occurs at elevations of 60-230 m. In Venezuela, it occurs in Guárico, Anzoátegui, Bolívar, Amazonas and Apure.

The species is a low hemiepiphyte or, in drier areas, a terrestrial herb growing usually along stream and on river banks. *Maguire et al. 3615* (F) is unusual in being reported as a vine growing to 13 m in trees.

The species was re-described by Bunting (1979) as *P. holmquistii,* but the Venezuelan material differs in no important way from that of Central America. It is recognized by its scandent habit, its thin ovate to ovate-triangular leaf blades with round to hastate posterior lobes and a generally narrow (sometimes V-shaped) sinus, but especially by the stems, which are densely covered with trichome-like, often branched scales and which dry with a flaky brown periderm (typically more reddish brown in Central America). While the posterior lobes are commonly somewhat triangular (and may even be narrowly triangular and subacute at apex), they may be nearly round as well on the same collection *(Davidse & Gonzalez 12973).*

The species is closest to *P. muricatum* and may not be separable from that earlier-described species. That species is distinguished by having densely verrucose-warty petioles and usually smaller blades, with usually more rounded lobes. However, some collections of *P. muricatum* with verrucose petioles, such as *Steyermark et al. 115076* and *Liesner 9056,* from Delta Amacuro and *Krukoff 7250* from southern Amazonas State of Brazil (the type of *P. amplectens* A. C. Smith, a synonym) have narrow, more or less triangular blades like *P. brevispathum.* On the other hand, the lobes of *P.*



Figs. 166-169. 166. *Philodendron bipennifolium* Schott. Cultivated by Curt Pederson, San Diego, CA. ----167. *P. brevispathum* Schott var. *brevispathum*. Colombia. Meta: Villavicencio - Granada, 530 m, *Croat 55516*. Leaves, x1/5. ----168-169. *P. brevispathum* Schott var. *wurdackii* Croat. Venezuela. Amazonas: Ríos Pacimoni - Yatua, 100-140 m, *Maguire et al. 36692*.

brevispathum are also somewhat variable throughout its range. Central American, material commonly has more rounded lobes or elongate lobes which are turned somewhat inward, but some sheets *(Burger & Antonio 11236)* have blades identical to those of South American plants. In addition, some South American collections *(Grant 58586, Davidse 42940)* have the posterior lobes noticeably rounded, scarcely longer than broad. Despite this variation, the verrucose petiole character is adequate to separate *P. muricatum* from *P. brevispathum.*

Philodendron brevispathum has also been confused with *P. hederaceum,* but that species has stems that are merely puberulent (the trichomes simple and unbranched), more broadly ovate leaves (often also puberulent on the petiole and lower midrib) and a conspicuously bulging spathe tube with much elongated styles on the pistils.

Philodendron brevispathum Schott var. ***wurdackii*** Croat, var. nov.

TYPE: Venezuela. Amazonas: Río Pasimoni-Río Yatua drainage, along igarape forest of upper Río Yaciba, 160 m, *Maguire et al. 36692* (NY. holotype). Figs. 168-169

Discrepat cum varietate typica habens: lamina subcordata, lobi posteriori subrotundati, petiolus latus, furfuraceus, inflorescentia 2 per axillae, brevior.

Hemiepiphyte, climbing to 2 m; internodes drying yellowish brown (B & K yellow 6/5), to 8 cm long, 1 cm diam. on flowering branches, densely covered with conspicuous, branched scales 1-3 mm long; roots moderately few at each node; cataphylls not seen. LEAVES with petioles 17-32 cm long, to 1 cm wide, terete and sulcate adaxially, drying black with elongated patches of epidermis (this apparently exfoliating altogether in time) with short raphide cells visible at base; blades ovate to ovate-elliptic, 24-25.5 cm long, 15-17 cm wide, broadest at or above the middle, rounded to acuminate at apex, weakly subcordate at base, the posterior lobes rounded or sometimes slightly longer than broad, weakly turned outward; midrib drying weakly raised above, raised beneath; primary lateral veils 4-5 pairs, weakly raised below, departing midrib at ca. 55° angle, straight or weakly curved to the margin; minor veins prominulous on drying. INFLORESCENCES 1-2 per axil, peduncles ca. 3.5 cm long, partly enclosed in the sheath, sheath 5-7 cm long; spathe 8-9 cm long, moderately coriaceous, scarcely constricted above the tube, abruptly acuminate at apex, white throughout on outside, red within at base, fading to white on the blade, the tube drying with short linear raphide cells; spadix sessile to weakly stipitate, white, slightly shorter than the spathe, the pistillate portion 3.5-4 cm long, 9-13 mm diam. (dried); pistils 2.5-2.8 mm long; stigma 1-1.5 mm diam., drying with 3-5 shallow depressions around the middle; sterile staminate portion ca. 7 mm long, conical, tapering from ca. 6 mm diam. at base to 3 mm diam. just below fertile staminate flowers; fertile staminate portion cylindrical, 3.5-4 cm long, to 1 cm diam. FRUITS not seen.

Philodendron brevispathum var. *wurdackii* is endemic to Venezuela, known only from the type locality. It differs from the var. *brevispathum* in having subcordate blades with almost rounded posterior lobes, a much broader petiole with a scurfy epidermis (but not verrucose or warty as in *P. muricatum)* which disappears in age, and in having smaller, paired inflorescences. The petioles of var. *brevispathum* are slender, (drying less than 5 mm diam. midway) and dry minutely striate. Variety *wurdackii* might be confused with *P. muricatum,* which has conspicuously and persistently muricate-warty petioles, not merely

scurfy and exfoliating as in var. *wurdackii*.

The new variety is known only from the type locality and is described in honor of one of the collectors, Dr. John Wurdack, now on the staff of the U.S. National Herbarium.

One sheet of the type specimen is unusual in having the blade divided on one side to the lower one-fourth of the blade, with the lobe of nearly the same shape and size as the principle lobe. It is assumed that this represents an aberration and that it is not typical of the species.

Philodendron buntingianum Croat, sp. nov. Figs. 171-176

TYPE: Venezuela. Mérida: along highway between La Azulita and jct. with Highway 1 (between El Vigia and Capazón), less than 5 km below La Azulita (N of La Azulita), on large boulder near edge of a stream which empties onto highway, 8°41'N, 71°25'W, 900 m, *Croat 60727* (MO, holotype); AAU, B, CAS, COL, F, GH, K, MY, NY, PMA, PORT, RB, RSA, US, VEN, isotypes).

Internodia 2-6 cm longa, 1-1.8 cm lata; cataphyllum 14-17 cm longum, deciduum; petiolus subteres, 12-22 cm longus, 1-1.5 cm latus; lamina ovato-elliptica ad elliptico-oblanceolata, 24-65 cm longa, 8-14 cm lata, ad basim subcordata; inflorescentia 1-2; pedunculus 7-13 cm longus; spatha 12.5-14 cm longa, viridis, tubus ca. 6 cm longus; spadix femininus ca. 6-7 cm longus, 1.2 cm diam.; spadix masculinus (3)5-7 cm longus; baccae ignotae.

Epipetric vine; internodes 2-6 cm long, 1-1.8 cm diam, green soon turning gray-green, somewhat flattened on one side, drying light brown and deeply fissured longitudinally with sharp ridges, the epidermis thin, often cracking loose; cataphylls green, 14-17 cm long, sharply 2-ribbed, soon deciduous. LEAVES with petioles 12-22 cm long, 1-1.5 cm diam., spongy, terete to obtusely flattened adaxially or sometimes with a faint, medial sulcus *(Liesner & Guariglia 11526)*, drying blackened with an even darker black ring around apex of petiole; blades moderately thin, ovate-elliptic to elliptic-oblanceolate, 24-45 cm long, 8-14 cm wide, broadest at or above the middle, drying usually blackened, long-acuminate at apex, gradually narrowed in the lower one-fourth and subcordate at the base, the lobes rounded, extending 1-3 cm below the apex of the sinus, the latter acutely to obtusely V-shaped; both surfaces semi-glossy, dark green above, slightly paler beneath; midrib broadly convex above, more prominently raised beneath; primary lateral veins 8-10 pairs, arising at 55-65° angle, almost straight to the margins, sunken above, raised beneath; minor veins distinct beneath, all major veins usually drying black, darker than the surface. INFLORESCENCES 1-2 per axil; peduncles 7-13 cm long, slightly shorter than or longer than the spathe; spathe 12.5-14 cm long, greenish (all seen post-anthesis), not abruptly constricted, but narrowing gradually about midway; spathe tube ca. 6 cm long, oblong-ellipsoid, spathe blade abruptly acuminate; spadix 0.5 cm shorter than the spathe; pistillate portion ca. 6-7 cm long, 1.2 cm diam. at anthesis, to 7 cm long, 3.5 cm diam. in fruit; pistils (dried) 1.5 mm long, the stigma button-shaped with small pit-like depressions in a small circle at the center, subtended by an irregularly shaped, 4-5 lobed apron 0.7-1.4 mm diam.; sterile staminate section 4-5 mm long, ca. 5 mm wide; fertile staminate portion more or less cylindroid, gradually tapered to its broadest point about midway on the spadix, (3)5-7 cm long, ca. 9 mm diam., bluntly tapered to the apex. INFRUCTESCENCE not seen.

Philodendron buntingianum is known only from Venezuela in the Cordillera de Mérida ranging from

Figs. 170-173. 170. *Philodendron brevispathum* Schott var. *brevispathum*. Ecuador. Napo: Lago Agrio - Puerto el Carmen de Putumayo 230 m, *Croat 58586*. Stem and inflorescence, x1/5. ----171-173. *P. buntingianum* Croat. Venezuela. Mérida: La Azulita, 900 m, *Croat 60727*. 171. Leaves, x1/5. 172. Cataphylls and emerging inflorescence, 3/10. 173. Base of leaf blade, x13/20.

Figs. 174-177. 174-176. *Philodendron buntingianum* Croat. Venezuela. Mérida: La Azulita, 900 m, *Croat 60727.* 174. Habit, x1/15. 175. Flowering shoot, x1/6. 176. Inflorescence, x3/10. ----177. *P. calatheifolium* Bunting. Venezuela. Táchira: La Fundación - Pregonero, 1350 m, *Croat 60705.* Leaves, x9/32.

Mérida to Táchira at 600-1,000 m.

The species is a member of section *Oligospermium*, series *Belocardium* and has been confused with *P. macroglossum* Schott from the Cordillera de la Costa but differs chiefly in having more primary lateral veins arising at a higher angle and in having only 1-2 inflorescences per axil. The species is perhaps most closely related to several undescribed Panamanian species, such as the one represented by *Croat 38098*. That species has a similar circumferential ring at the apex of the petiole, which is purple and conspicuous on drying. While none of the Venezuelan collections recorded this feature, it was apparent, at least on drying, on *Croat 54872*.

Two collections of *P. buntingianum* (*Liesner & Guariglia 11526* and *Liesner & Gonzalez 10747*) from Táchira are unusual in having leaf blades that dry less blackened and in having longer inflorescences; these are presumably *P. buntingianum*.

The species is named in honor of George S. Bunting, who has contributed much to our knowledge of Mexican and, in particular, Venezuelan Araccae, especially *Philodendron*.

VENEZUELA. MERIDA: between La Azulita and El Vigia, ca. 10 km N of La Azulita, 8°45'N, 71°25'W, 830 m, *Croat 54872* (MO); between La Azulita and jct. with highway #1 (El Vigia - Capazón), less than 5 km below La Azulita, 8°41'N, 71°25'W, 900 m, *Croat 60727* (AAU, B, CAS, COL, F, GH, K, MO, MY, NY, PMA, PORT, RB, RSA, US); between Tovar de Mérida and Panamericana road, 2 km above Zea, 975 m, *Bunting 2576* (MY); between Caño Zancudo and La Azulita, 4 km below La Azulita. *Bunting 2803* (MY). TACHIRA: road from San Cristóbal to Sto. Domingo del Táchira to Barinas, near El Piñal, 300-350 m, *Bunting 2392* (MY); between La Fria and Las Pavas, near Caño Agua Caliente, 200-250 m, *Bunting 2499* (MY); 125-200 m, *Bunting 13378* (MO); around Repressa Dorada, 10 km E of La Fundación, 600-1,000 m, *Liesner & Gonzalez 10440* (MO); 450-650 m, *Liesner & Guariglia 11526* (MO); La Buenaña, 6-12 km W of Quebrada Colorado, ca. 35 km SSE of San Cristóbal, 7°28'N, 72°9'W, 600-1,000 m, *Liesner & Gonzalez 10747* (MO).

Philodendron calatheifolium Bunting, Phytologia 60(5): 311. 1986.

Philodendron calatheifolium is endemic to Venezuela, known only from Táchira at 1,100-1,350 m. Collections have been made between La Fundación and Pregonero at Repressa Dorado *(Croat 60705)* and between San Cristóbal and Chorro del Indio at La Florida *(Bunting 13404)*. Figs. 177-178

A member of section *Pteromischum*, it is characterized by its long internodes drying sharply ridged and yellowish, and by its petiole, sheathed about four-fifths of the way to the apex and broadly sulcate on the free portion, and by its ovate, matte blade which is velvety above.

In terms of habit and blade shape, the species is similar to *P. zulianum*, but that species occurs at a lower elevational range (less than 500 m); furthermore, the minor veins of its lower blade surface dry prominulous, with conspicuous cross-veins extending between the minor veins (anastomosing rather than perpendicular, as in *P. inaequilaterum* Liebm., another relative). *Philodendron calatheifolium* has distinct minor veins lacking any sign of cross-veins. *Philodendron zulianum* also differs in having the surface minutely bumpy with occasional, short, pale raphide cells interspersed between the minor veins. Both features are lacking in *P. calatheifolium*.

Philodendron callosum Krause, Pflanzenreich IV. 23Db (Heft 60): 28. 1913. Figs. 179, 182-183

Philodendron callosum, though described originally from British Guiana (Guyana), is locally common in the Gran Sabana (Bolívar State) of Venezuela. It ranges from Venezuela to the Guianas and northern Brazil (Amapá and Amazonas) at 250-1,300 m. The type specimen, as well as other material from French Guiana, typically has leaves gradually acuminate at the apex, whereas the Venezuelan material is typically obtuse to rounded and abruptly acuminate at the apex.

The species is characterized by its thick, more or less oblong blades which are finely rugose on the upper surface, with both the minor veins and "cross-veins" conspicuously sunken and smooth on the lower surface and with the primary lateral veins obscure, scarcely apparent. The moderately long petioles are coarsely roughened and often dry conspicuously warty. In Venezuela and at high elevations in the Guianas, plants are typically terrestrial, usually well rooted and often growing among rocks, with a prostrate stem bearing erect leaves. The inflorescences are much shorter than the petioles and have a dark maroon to white spathe tube. Where I collected the species in French Guiana at 250 m, the plants were epiphytic in fairly dense forest. In the Gran Sabana, the species often grows in open areas among small shrubs in full sun. A collection from Brazil in Amapá is especially unusual. In addition to being epiphytic, it has a blade which is narrowly acuminate, dries somewhat blackened and is proportionately longer (six and one-half times longer than wide). Typically, highland material has blades 4-5 times longer than broad drying yellow-green, with a rounded, briefly acuminate tip. The lowland and highland plants may prove to be at least subspecifically distinct.

Philodendron callosum can be confused with *P. ptarianum*, which has a similar habit and similar leaves. The latter differs in having glaucescent blades which are smooth on the upper surface, and petioles drying merely weakly verrucose.

Philodendron cataniapoense Bunting Phytologia 60(5): 314. 1986.

Hemiepiphytic vine; stem slender and elongate; internodes with tan, cracked, peeling epidermis, longer than broad, 4.5-6 cm long, 0.6-1.5 cm diam., light brown when dried; roots few at the nodes, tan when dried (B & K yellow 05/05), smooth, with peeling epidermis, slender and elongate, tapered, 10-70 cm long, 1-4 mm diam.; cataphylls membranous, 2-ribbed, 5.5-6.5 cm long, drying brown (B & K yellow 4/2.5), persisting intact, eventually deciduous. LEAVES with petioles 39-51 cm long, 4-8 mm diam., surface light green, sheathing from 2.5-4 cm; blades subcoriaceous, deeply 3-lobed, the median lobe equilateral, elliptic to broadly oblanceolate, 26-30 cm long, 10.5-13 cm wide, gradually acuminate at apex, the lateral lobes inequilateral, oblong-elliptic to broadly elliptic, 14-17 cm long, 3-7.5 cm wide, bluntly acute at apex, directed prominently outward; sinus broadly parabolic to arcuate with blade decurrent on petiole; upper surface weakly semiglossy when dried, lower surface matte, drying dark greenish brown to brownish, bicolorous; midrib flat above, same as surface, convexly raised below, paler than surface; basal veins 5-7 pairs, 5th and 6th coalesced for 5-7 cm, flat above, raised below; posterior rib not naked, straight, sometimes curved; primary lateral veins 4-6 per side, departing midrib at 60-80° angle, arcuate, flat above, raised below, paler than surface when dried; interprimary veins almost as conspicuous as primary lateral veins, raised below; lesser veins visible above on drying, prominulous below. INFLORESCENCES up to 4 per axil; peduncle 6-11.5 cm long, 4-5 mm diam., drying black; spathe strongly subcoriaceous, green, 9 to more than 13 cm long, weakly constricted about midway; spathe tube red inside, oblong ellipsoid to cylindroid, 4-7 cm long, 8-18 mm diam.; spathe blade oblong-lanceolate; spadix slightly exserted after anthesis, 8-13 cm long, the pistillate portion oblong, narrower than base of staminate portion, 3-6 cm long, drying 4-7 mm diam., staminate portion oblong, bluntly acute at apex, ca. 5.5 cm long (12 mm when fresh), drying 6-9 mm diam.; female flowers 0.8-1.4 mm in both directions, 9-10 per spiral; stigma (pre- or

Figs. 178-181. 178. *Philodendron calatheifolium* Bunting. Venezuela. Táchira: La Fundación - Pregonero, 1350 m, *Croat 60705.* Leaf blades, x1/5. ----179. *P. callosum* Krause. Cultivated at Selby Gardens. Leaves, x1/4. ----180-181. *P. chimantae* Bunting. Venezuela. Bolívar: Icabarú - Sta. Elena, 750 m, *Croat 54232.* 180. Habit, x1/13. 181. Same, x1/6.

at anthesis) flat, 0.4-0.6 mm diam., with thin, obscurely fimbriate apron, post anthesis 0.2-0.3 mm long, becoming donut-shaped, distinctly raised, ovary 5-locular, locules uniovulat; fertile staminate flowers irregularly shaped, 11-16 per spiral, 0.8-1.2 mm long. INFRUCTESCENCE not seen. Figs. 184-185.

Philodendron cataniapoense is known for certain only from southern Venezuela in Amazonas, in the vicinity of Puerto Ayacucho at 100-300 m.

It is characterized by its deeply 3-lobed blades drying blackened with lanceolate-elliptic to broadly elliptic medial lobes, which are generally markedly broader than the prominently spreading posterior lobes. A member of section *Tritomophyllum*, it is perhaps closest to *P. effusilobum*, which is restricted to the Cordillera de la Costa of Venezuela at 800-1,200 m. The latter differs in having the medial lobes narrowly oblanceolate and not appreciably broader than the lateral lobes. See that species for additional differences.

Philodendron cataniapoense is also closely related to an unidentified species from Amazonas, Brazil, along the Rio Javarí *(Gentry & Revilla 20545)*. That species has similarly shaped blades which dry blackened, but it differs in having weakly raised cross-veins between the minor veins and in having pistils with a donut-shaped style subtended by a thin, subcircular apron. In contrast, *P. cataniapoense* lacks such cross-veins on drying, and has stigmas crowned with a smaller fimbriate apron which, in time, deliqueses, exposing the raised, donut-shaped body of the stigma.

A Peruvian collection from Loreto near the mouth of the Rio Napo *(Croat 20199)* is perhaps *P. cataniapoense*. Though not at a directly comparable stage, it differs in having a pistillate spadix longer than the staminate spadix, whereas in Venezuelan collections the pistillate spadix is only about one-third as long as the staminate spadix.

VENEZUELA. TERR. FEDERAL AMAZONAS: Depto. Atures, along Río Cataniapo, 48 km SE of Puerto Ayacucho, 5°35'N, 67°15'W, 200-300 m, *Steyermark et al. 122235* (holotype, VEN; isotype, MO); 30 km E of Puerto Ayacucho, road to Sanariapo, near La Culebra, caserío before Gavilán, 100 m, *Truillo & Pulido 15029* (MO).

Philodendron chimantae Bunting, Acta. Bot. Venez. 10: 292. 1975.

Philodendron chimantae, endemic to Venezuela in southeast Bolívar and Amazonas, is known in Bolívar only from Perai-tepuí and Cerro Guaiquinima at 400-1,130 m and in Amazonas on Cerro Arauicaua at 550 m. It has been collected as an epiphyte in dense woods in both flat areas and on steep slopes but also in open, herb-covered slopes bordering rocky banks.

The species is recognized by its generally coriaceous, ovate to ovate-triangular blades (especially on younger plants), which typically dry brown and especially by its petioles, which are flattened adaxially with marginal wings, and sometimes conspicuously triangular with the adaxial surface sharply ridged (especially on younger plants). The spathe tube is maroon-red while the spathe blade is pale creamy green.

The species is similar to *P. fragrantissimum* and would appear to be closely related to that species. Both species share a short stem with short internodes, large leaves with prominent posterior lobes and petioles frequently of similar D - shaped to obtusely V-shaped cross-sections. *Philodendron fragrantissimum*, a wide ranging species, differs in occurring usually below 200 m in eastern Venezuela, or up to 900 m in western Venezuela (and also in Panama), as well as in having petioles with merely erect marginal ribs (not at all winged), cataphylls that promptly weather into a dense mass of reddish brown fibers and broadly ovate leaf blades. *P. chimantae* may have a broad, open sinus when young (when the blades are also broadly triangular) but develop a narrow sinus in age, and

Figs. 182-185. 182-183. *Phildendron callosum* Krause. Venezuela. Bolívar: Gran Sabana, El Dorado - Sta. Elena, 500-1000 m, *Croat 54013.* 182. Habit, x1/11. 183. Flowering stem, x1/5. ----184-185. *P. cataniapoense* Bunting. Venezuela. Amazonas: Río Sipapo, 120 m, *Croat 60818.* 184. Preadult leaves, x1/6. 185. Same, x1/5.

cataphylls which persist intact at least at the apex and are ultimately deciduous. The cataphyll fibers, when visible, are pale, and not at all reddish brown. In addition to the above differences, the inflorescences of *P. chimantae* are more long-pedunculate than those of *P. fragrantissimum*. Figs. 180-181, 186

Philodendron craspedodromum Schultes, Rhodora 66: 118, figs. 1-9. 1964. Figs. 187-188

Philodendron craspedodromum is known from southern Venezuela (Amazonas) and southern Colombia (Vaupés) at 100-800 m. In Venezuela, it is known only from the Department of Atabapo at Cucurital de Caname and in the Serranía Yutaje on the Río Manapiare.

The species is recognized by its thick, long-petiolate, ovate-elliptic blades, having a prominent midrib with little or no evidence of primary lateral veins. Also characteristic is the long-pedunculate inflorescence (the peduncles equalling or exceeding the spathe in length) and the long, thick cataphylls which persist intact at the upper nodes.

Schultes (1964) states that the species is always epiphytic in the type locality in Colombia (Vaupés: Río Apaporis vicinity) but Venezuelan plants, almost certainly the same species, are terrestrial. They may be erect, creeping or trailing.

The species is most similar to *P. dyscarpium* Schultes from Venezuela and Colombia (Vaupés and Caqueta), which also has blades lacking any obvious primary lateral veins. That species differs in having smaller, more narrow blades, typically less than 15 cm wide (versus 18-26 cm wide for *P. craspedodromum*).

The species is also similar to *P. pulchrum* Barroso, but that species differs in having primary lateral veins conspicuously more prominent than minor veins.

Philodendron dunstervilleorum Bunting, Acta Bot. Venez. 10: 294. 1975.

Philodendron dunstervilleorum is endemic to the southeastern part of Bolívar State of Venezuela at about 1,000 m. Figs. 190-191

The species, though still poorly known, is characterized by its thick, short internodes, unribbed green cataphylls which fall off intact, its subcoriaceous, semiglossy, elliptic to ovate-elliptic blades with conspicuous primary lateral veins and its long-pedunculate inflorescences with the spathe green on the outside and maroon throughout within.

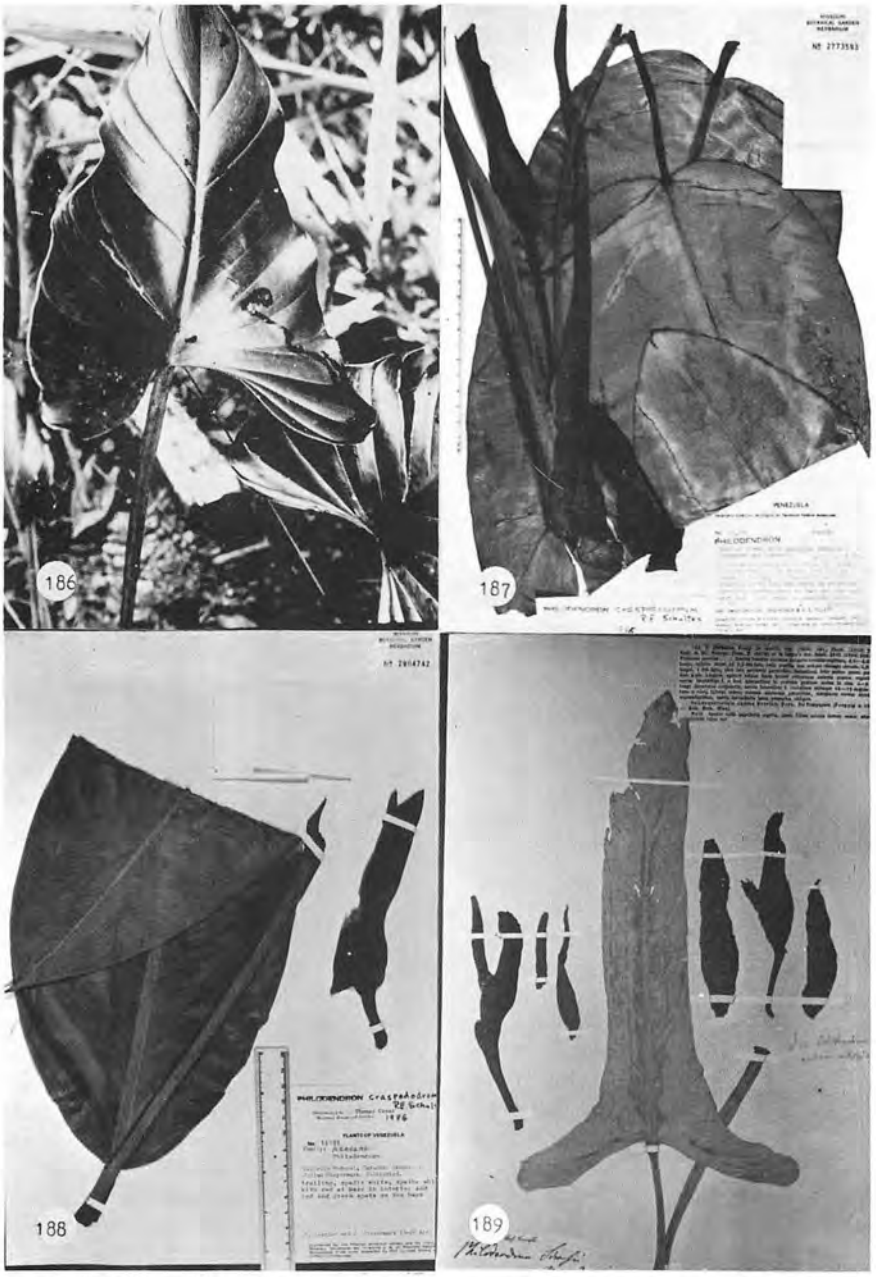
The species is closely related to *P. pulchrum* and perhaps not separable from that species. See that species for additional discussion.

Philodendron dyscarpium Schultes, Lloydia 26: 69, tab. 2,3. 1963.

Philodendron dyscarpium ranges from southern Venezuela, to southern Colombia, occurring on white sand savannas at low elevations (95-700 m in Venezuela). In Venezuela, the species is known from the Río Orinoco in the Department of Atabapo in northeastern Territorio Amazonas. Figs. 192-194

The species is recognized by its terrestrial, erect habit, terete to weakly sulcate petiole and moderately small, narrowly ovate-elliptic blades lacking any obvious sign of primary lateral veins. It is highly variable in size and habit.

The species is no doubt related to *P. craspedodromum*, reported by Schultes (1964) to be epiphytic and compared (loc. cit.) with the terrestrial *P. remifolium* (here synonymous with *P. pulchrum*). Schultes neglected to compare *P. craspedodromum* with *P. dyscarpium*, which he had described a year earlier. Both *P. dyscarpium* and *P. craspedodromum* were described from the Department of Vaupés in Colombia and herbarium material of the two taxa appears very similar, with both sharing



Figs. 186-189. 186. *Philodendron chimantae* Bunting. Venezuela. Bolívar: Icabarú - Sta. Elena, 750 m, *Croat 54232*. Leaf, x1/6. ----187. *P. craspedodromum* Schultes. Venezuela. Amazonas: Caño Caname, 100 m, *Davidse et al. 16881*. ----188. *P. craspedodromum*. Venezuela. Cultivated, Caracas, *Liesner & Steyermark 11491*. ----189. *P. deflexum* Poepp. ex Schott. Peru. *Poeppig 1281*. (See discussion of this species under *P. megalophyllum*).

inconspicuous primary lateral veins. While *P. dyscarpium* is described as terrestrial, growing on quartzite xerophytic savannas and *P. craspedodromum* is described as an epiphyte, this difference may not be taxonomically significant. Further, *P. craspedodromum* is described as having a button-like, elevated stigma, while *P. dyscarpium* is reported to have an undifferentiated, pilose stigma; this character, seemingly so important, may be merely a matter of age. Investigations with a Venezuelan specimen *(Davidse et al. 16881)* from Territorio Amazonas in Venezuela and *Schultes & Cabrera 14246* from Vaupés Department, Colombia. both closely matching *P. craspedodromum*, show evidence that the button-like stigma is at least initially densely pilose. Thus, the differences illustrated by Schultes are perhaps only stages in the development process of the flowers before and after anthesis.

Discovery of *P. dyscarpium* and *P. craspedodromum* growing sympatrically (see, for example, *Davidse et al. 16881* and *Davidse et al. 17042* collected at Cucurital de Caname, Department of Atabapo in the Territorio Amazonas of Venezuela) has lent little credibility to the separation of these two species on the criterion of rounded versus subcordate leaf bases. Further field studies may prove the two taxa to be synonymous.

Philodendron effusilobum Croat, sp. nov. Figs. 195, 198-200

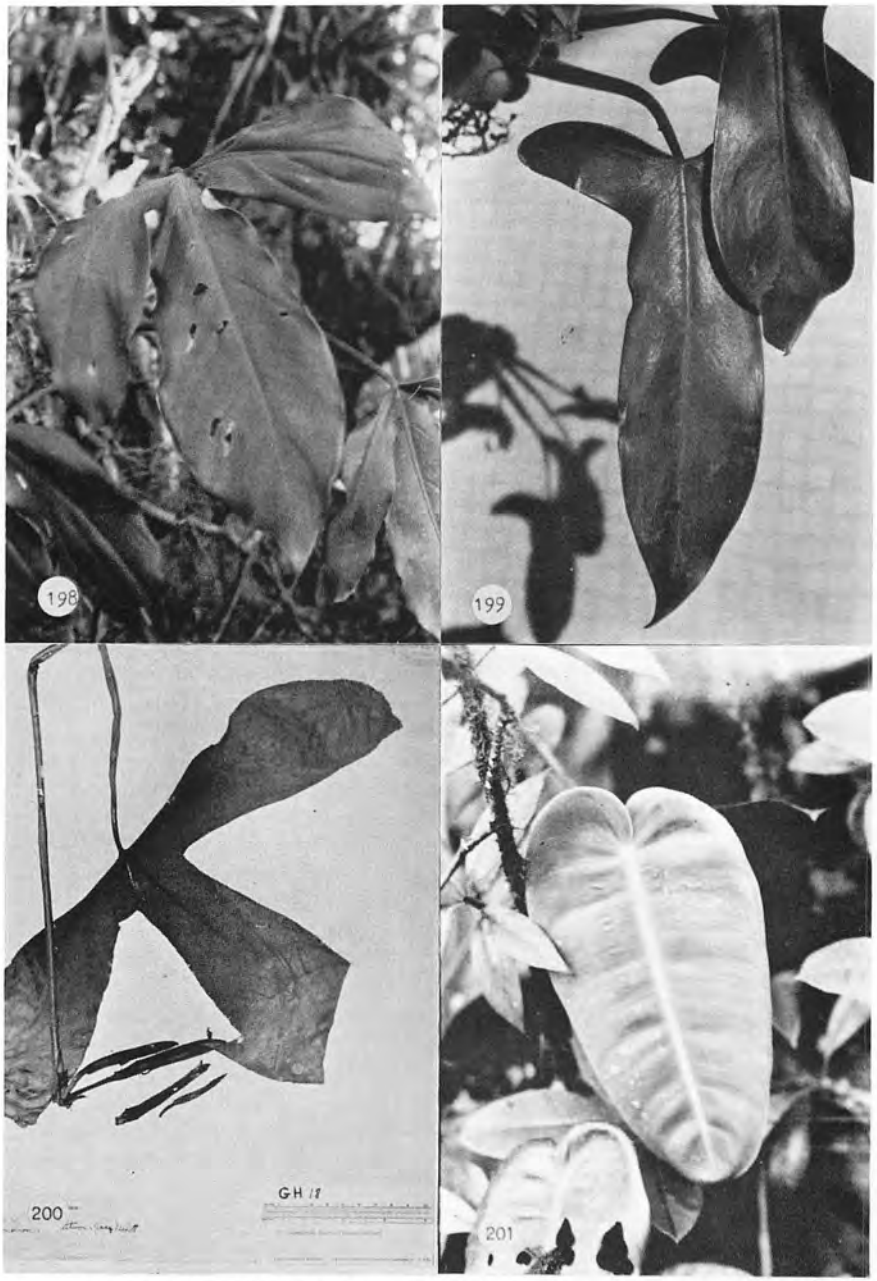
TYPE: Venezuela. Aragua: Colonia Tovar, *Fendler 2573* (GH, holotype).

Hemiepiphytica; internodia 4-7.5 cm longa, 1-1.5 cm diam.; cataphyllum deciduum; petiolus teres, 21-46 cm longus, 4-7 mm diam.; lamina subcoriacea, tripartita, pars media anguste oblanceolata ad oblanceolate-elliptica, 17-25 cm longa, 5-8 cm lata; pedunculus 2-3.5 cm longus, 3-4 mm diam.; spatha 6-7.2 cm longa, ca. 1 cm diam.; inflorescentia feminina 1.7-2.4 cm longa, 4.5-5 mm diam.; inflorescentia masculina 4.5-5.3 cm longa, 6-7 mm diam.; baccae ignotae.

Hemiepiphytic appressed climber; stems with internodes 4-7.5 cm long, 1-1.5 cm diam, green, soon turning light brown to tan, sometimes drying irregularly cracked, longitudinally and deeply fissured or with minute, scurfy ridges perpendicular to the axis, sometimes flaking off the stem in large patches; roots usually 6-10 at each node, 15-20 cm long, 2-3 mm diam., drying light brown; cataphylls slender, thin, to 17 cm long, promptly deciduous. LEAVES with petioles terete, 21-46 cm long, 4-7 mm diam. midway; blades deeply 3-lobed to within 2-4 cm of the base, 7-25 cm long, 22-35 cm wide at the lateral lobes, subcoriaceous, dark green and semi-glossy above, paler beneath (drying moderately thin, greenish brown to olive-green); medial lobe narrowly oblanceolate to oblanceolate-elliptic, 17-25 cm long, 5-8 cm wide, broadest well above the middle (usually drying folded where joined to the lateral lobes); primary lateral veins 3-4 pairs, obscure above, weakly raised and moderately obscure beneath, arising at 35-45° angle from the midrib and moderately straight to the margins; minor veins obscurely visible on drying; lateral lobes moderately straight or weakly falcate, usually spreading at a 90° angle from the midrib, sometimes slightly arcuate-ascending, 11-19 cm long, 2.9-6.7 cm wide, broadest well beyond the middle, 1.2-2.6 cm wide near the base, narrowly rounded to bluntly acute at the apex, the posterior rib almost straight to weakly curved, 6-9 cm long; lower edge of the lateral lobes lacking any obvious lobe; the first pair of basal veins usually free to the base, 3-5 additional basal veins coalesced to 4.5-8.5 cm from the base, nearly all of these departing toward the upper (distal) half

Figs. 190-193. 190-191. *Philodendron dunstervilleorum* Bunting. Venezuela. Bolívar: Icabarú - Sta. Elena, 790 m, *Croat 54250.* 190. Habit, x1/12. Inflorescence, x1/6. ----192. *P. dyscarpium* Shultes var. dyscarpium. Colombia. Vaupés: vic. Mitu, *Zarucchi et al. 1128.* Flowering plant, x1/5. ----193. *P. dyscarpium* Schultes var. *dyscarpium.* Venezuela. Amazonas: Atabapo, 120 m, *Davidse et al. 17474.*

Figs. 194-197. 194. *Philodendron dyscarpium* Schultes var. *dyscarpium*. Colombia. Vaupés: vic. Mitú, *Zarucchi et al. 1128*. Habit, x1/20. Photo: Zarruchi. ----195. *P. effusilobum* Croat. Venezuela. Lara: E of Duaca, 1200 m, *Croat 60615*. Habit, x1/11. ----196. *P. englerianum* Steyermark. Cultivated by Julian Steyermark. Leaves, x1/6. ----197. *P. fendleri* Krause. Trinidad. Blanchisseuse Road. Cultivated by Conrad Flemming. Plant, x1/15.



Figs. 198-201. 198. *Philodendron effusilobum* Croat. Venezuela. Lara: E of Duaca, 1200 m, *Croat 60615*. Leaves, x3/10. ----199. *P. effusilobum*. Venezuela. Aragua: Henri Pittier National Park, 350 m, *Croat 60819*. Juvenile leaves, x1/2. ----200. *P. effusilobum*. Venezuela. Aragua: Colonia Tovar, *Fendler 2573*. ----201. *P. englerianum* Steyermark. Venezuela. Bolívar: Sta. Elena - El Dorado on Gran Sabana, 1040 m, *Croat 54319*. Leaf, x3/10.

of the lobe (which is usually somewhat broader than the lower half). INFLORESCENCES paired, slender; peduncles 2-3.5 cm long, 3-4 mm diam.; spathe color not reported, presumably green, apparently not at all constricted above the tube; pistillate portion of the spadix 1.7-2.4 cm long, more or less cylindrical, 4-5.5 mm diam.; pistils 0.7 mm long, closely packed (about 20 spirals), the apex irregularly hemispherical, 0.7-1 mm diam., the stigma generally bearing 3-6 pale, wart-like structures, these irregularly spaced but generally crowded together; staminate portion 4.5-5.3 cm long, 6-7 mm diam., cylindroid, weakly tapered to the apex in distal one-third; sterile staminate section not readily apparent, 5-6 mm broad; staminate flowers very irregularly 4-5 sided, 0.4-1 mm diam., truncate at apex. FRUITS not seen.

Philodendron effusilobum is endemic to Venezuela in the Cordillera de la Costa at 800-1,200 m in evergreen to deciduous humid to subhumid forest life zones. One collection from 50 m *(Steyermark 124716),* having leaves with proportionately shorter medial lobes, is possibly this species.

The species is characterized by its deeply 3-lobed blades with broadly spreading lateral lobes and by its small, paired inflorescences.

The species was treated by Bunting (1979) as *P. holtonianum,* a species from western Colombia (in Cauca Department at Paila, along the Río Cauca, 5°19'N, 76°04'W). *Philodendron holtonianum* differs from *P. effusilobum* in having leaves with an acuminate, oblong-elliptic, medial lobe, 3-3.5 times longer than broad and arcuate-ascending lateral lobes which are two-thirds as broad as the medial lobe and which are bluntly rounded at apex. In contrast, *P. effusilobum* has an abruptly acuminate, oblanceolate-elliptic to broadly elliptic medial lobe, usually 2-2.5 times longer than broad, (rarely to 3), and broadly spreading to weakly falcate lateral lobes usually only one-half to one-third as broad as the medial lobe. *Philodendron holtonianum* also differs from *P. effusilobum* in having a much larger spathe (to 12 cm long and 2 cm wide) and has the pistillate and staminate portions of th spadix of equal length (versus the staminate twice as long in *P. effusilobum).* In addition, *P. holtonianum* has a distinct button-shaped stigma with a distinct medial depression, whereas *P. effusilobum* has an indistinct stigma (merely a mound atop the pistil, with 3-6 irregularly spaced, subglobular whitish structures over its surface).

In Venezuela, *P. effusilobum* can be confused only with *P. cataniapoense* from Amazonas. That species differs in blades that typically dry blackened and have a more developed sinus on mature leaves with the posterior lobe frequently not at all naked. In addition, the stigma of *P. cataniapoense* is raised and donut-shaped, at least initially topped by a thin, deliquescent subrounded disk-shaped apron. In contrast, the stigma of *P. effusilobum* is irregularly hemispherical and warty.

The name of the species "effusilobum" derives from the Latin effusus (meaning "spread out") and lobus (lobes), referring to the broadly spreading lateral lobes of the blade.

VENEZUELA. ARAGUA: Tovar, *Fendler 2573* (GH). FALCON: Sierra de San Luis, near Puente de Jobo, between Curimagua and San Luis, 800-900 m, *Steyermark 99259* (NY). LARA: Dtto. Urdaneta, 2 km from Copayal on way to Churuguara, *Rivera & Ortega 310* (MO); hills 17 km E of Duaca, 10°17'N, 69°2'W, 1,200 m, *Croat 60615* (MO, VEN). YARACUY: Sierra de Aroa, Cerro Tigre, 10 km E of Aroa, Río Carabobo and adjacent slope, 10°26'N, 68°49'W, 800-1,000 m, *Liesner & Gonzalez 9681* (MO); Dtto. Urachiche, Quebrada Higueronal, W of Urachiche near Sabana de Mendez, 10°10'N, 69°2'W, 50 m, *Steyermark et al. 124716* (MO).

Philodendron englerianum Steyermark, Fieldiana, Bot. 28(1): 96. 1951. *P. duidae* Steyermark.

Philodendron englerianum is endemic to the Guiana Highlands of Venezuela and is known from central Bolívar (Carrao-tepuí, Cerro Guaiquinima), southern Bolívar in the Gran Sabana near the Guyana frontier (Cerro Guanoco, Cerro Marutani) as well as in the southern half of Amazonas (Cerro Duida) and as far south as the Serranía del Vinilla and Cerro Aracamuni. The species is certainly to be expected in adjacent Brazil and Guyana. It occurs at 600-1,680 m elevation and may be either terrestrial, epipetric or epiphytic. In the Gran Sabana, it was found growing in a low, swampy forest moderately open to sunlight. Figs. 196, 201

The species is characterized by its short, thick stems with persistent, sharply 2-ribbed, intact, reddish-brown cataphylls, by its terete, glaucous petioles usually much longer than the blades, and its glaucous, thick, ovate blades which are frequently peltate. The primary lateral veins may be 3-5 pairs and broadly spreading from the midrib, but they are frequently not at all apparent or scarcely more visible than the minor veins. The fleshy spathe is rose-red to white on the outside and deep red to maroon within. The fruits are described as scarlet and 6-angled *(Steyermark & Nilsson 230).*

Philodendron fendleri Krause, Pflanzenreich VI. 23 Db (Heft 60): 118. 1913.

Philodendron fendleri ranges from Trinidad to northeastern Venezuela (Sucre), at 50-750 m. It is characterized by its thick, elongate stems with deciduous, green, unribbed cataphylls, its somewhat spongy, more or less terete (somewhat flattened adaxially toward the apex) petioles, which are somewhat longer than the blade and its large, deeply pinnatifid leaves (with 6-9 lobes), which are ovate to broadly ovate in outline and clustered at the apex of the stem. There are up to 4 inflorescences per axil, having peduncles about equalling the spathe. The spathes are green outside, often heavily tinged with purple, and are dark maroon-purple within at the base, paler violet-purple on the inner surface of the blade. Mayo (Flora of Trinidad & Tobago, in press) reports that the species generally only flowers on trees, but may be found sprawling on the ground in its adult form. Figs. 197, 202-205

The species is similar to *P. radiatum,* a species ranging from Mexico to Ecuador, but that species has shorter internodes and more highly divided leaf blades with the larger segments lobed to lobate.

The species is closely related to both *P. pinnatifidum* and *P. lacerum* (Jacq.) Schott. The former species occurs in the Cordillera de la Costa of Venezuela and differs in having short stems, even shorter internodes, a dense mass of cataphyll fibers around the base of the petioles (deciduous in *P. fendleri),* and a flattened-canaliculate petiole with raised, angulate margins. *Philodendron lacerum,* from Cuba and Jamaica differs in having longer, more slender internodes, relatively longer peduncles and a less deeply incised blade with subtriangular lobes (Mayo, loc. cit.).

Philodendron fragrantissimum (Hook.) Kunth, Enum. Pl. 3: 49. 1841.

Philodendron fragrantissimum ranges throughout Central America along the Caribbean coast from Belize to Panama, and in South America to Venezuela, the Guianas, northern Brazil (Roraima and Amazonas), southern Colombia (Meta) and Peru (Amazonas, Loreto, Ucayali and Madre de Dios). It also occurs in Trinidad and Cuba in the West Indies. It is to be expected in Ecuador and in western Brazil. In Central America and in the Andes of South America, the species ranges from almost sea level to 900 m, but in eastern Venezuela, the species ranges no higher than 300 m. In Venezuela, the species is disjunct, occurring in Bolívar and Amazonas in the east as well as Zulia, Apure, Táchira, and Mérida in the west.

Figs. 202-205. 202-203. 202. *Philodendron fendleri* Krause. Trinidad: Matura - Valencia, 150 m, *Croat 53913. Habit*, x1/15. 203. Leaf and inflorescence, x1/8. ----204. *P. fendleri*. Trinidad. Blanchisseuse Road. Cultivated by Conrad Flemming. Stem, showing cataphylls and inflorescences, x1/5. ----205. *P. fendleri*. Trinidad: Matura - Valencia, 150 m,*Croat 53913*. Inflorescence, x3/10.

The species is a rosulate, short-stemmed epiphyte, characterized by broadly ovate blades about 2/3 as broad as long with broad, rounded posterior lobes and a broad, arcuate sinus, a petiole prominently flattened adaxially with stout, erect margins, persistent reddish brown cataphyll fibers, and a cluster of short-pedunculate inflorescences with bright red spathe tubes and whitish blades. In eastern Venezuela it can be confused with *P. chimantae*, but the two species never occur together (see that species for separation). Figs. 206-207, 210-211

In Central America, the petiole of *P. fragrantissimum* is D-shaped, whereas it is often more narrowly rounded abaxially in South America (but never acute or winged abaxially). *Philodendron fragrantissimum* is unusual among species of *Philodendron*, because in the adult rosulate growth stage, it frequently produces a slender, elongate branch which may extend out or down to reach other trees. This is an uncommon method of vegetative propagation.

Philodendron fraternum Schott, Bonplandia 7: 29. 1859.

Philodendron fraternum is known only from Venezuela, where it occurs at 900-2,300 m, ranging from the Distrito Federal to Aragua, Miranda, Yaracuy, Lara and Falcón in the Cordillera de la Costa and from Portuguesa, Trujillo, Barinas, Mérida and Táchira in the Cordillera de Mérida. It also occurs in the Serranía de Perijá near the Colombian border and conceivably also occurs in adjacent Colombia in the northern part of Norte de Santander and eastern César. Figs. 208-209, 214-216

It is characterized by its scandent, slender stems with internodes generally elongate, even on flowering stems, its moderately coriaceous, ovate to narrowly ovate blades which are prominently lobed at the base with an ovate to hippocrepiform (horseshoe shaped) sinus (the posterior rib slightly naked or not), a subterete, often somewhat sulcate petiole (about as long as the blade) and especially by the 2-3 inflorescenses per axil which have a maroon to purplish spathe tube coloration (outside), and a greenish to yellow-cream to faintly reddish spathe blade. The spathe is wine-red within the tube and cream on the blade.

Another unusual feature of the species is that the pistillate portion of the spadix is often nearly as long (or even longer than) the staminate portion. In this respect its spadix is similar to *P. krugii* and *P. lindenii*, both having a longer pistillate portion than staminate portion. In addition, all three species have leaves which have the posterior rib scarcely or not at all naked. These species would thus appear to be related. Sterile material of *P. fraternum* is especially difficult to determine, while fertile specimens of *P. fraternum* can be distinguished from either of the other two species by its purplish spathe tube. For separation of *P. fraternum* and P. *lindenii*, see discussion following *P. lindenii*.

A noteworthy collection to be tentatively included is *Croat 54946*, from near Pregonero in Tachira State. It differs from typical *P. fraternum* in having more elongate, ovate-triangular blades than is typical for *P. fraternum*. In addition, its immature spathe tube is green on the outside and tinged maroon within only near the base.

The collection has a strong resemblance to *P. sagittifolium* Liebm., a species which ranges from Mexico to Colombia and may prove to be that species.

Philodendron giganteum Schott, Syn. Aroid. 89. 1856.

Philodendron giganteum ranges from the Greater Antilles (Puerto Rico) and throughout most of the Lesser Antilles to Trinidad and Venezuela. It occurs only in the northeastern part of

Figs. 206-209. 206. *Philodendron fragrantissimum* (Hook.) Kunth. Trinidad. Matura - Valencia, 150 m, *Croat 53912*. Stem, showing cataphylls, x1/6. ----207. *P. fragrantissimum*. Peru. San Martín: Yurimaguas - Tarapoto, 460 m, *Croat 58105*. Infructescence, x3/10. ----208. *P. fraternum* Schott. Venezuela. Mérida: Mérida - La Azulita, 1590 m, *Croat 54859*. Habit, x1/18. ----209. *P. fraternum*. Venezuela. Aragua: Maracay - Choroní, 1280-1300 m, *Croat 54491*. Leaves, x1/8.

Figs. 210-213. 210. *Philodendron fragrantissimum* (Hook.) Kunth. Trinidad. Matura - Valencia, 150 m, *Croat 53912*. Habit, x1/12. ----211. *P. fragrantissimum*. Panama. Panamá: Cerro Azul, *Croat 11526*. Stem with cataphylls and inflorescence, x1/6. ----212-213. *P. giganteum* Schott (photo John Criswick). Cultivated by John Criswick, Grenada. 212. Leaves, x1/23. 213. Inflorescences, x1/4.

Venezuela, in the states of Monagas and Sucre. Figs. 212-213, 217, 222-223

It is characterized by its huge size, its terrestrial or epipetric habit, its thick stems (4-8 cm diam.) with moderately short internodes and persistent cataphyll fibers, and its long petioles exceeding the length of the blade, which are obtusely flattened laterally toward the apex. Also characteristic is its bright red spathe tube. Bunting (1979) describes the spathe as bright red outside on the tube and white on the blade. Live material seen from the Lesser Antilles (St. Georges) had a spathe blade which was more typically reddish green on the outside.

The species is most easily confused with *P. henri-pittieri* Bunting, which shares similar habit, petioles, leaf blades and inflorescences. It differs in having longer internodes and mostly deciduous cataphylls.

Mayo (Flora of Trinidad & Tobago, ined.) treats *P. giganteum* as a synonym of *P. simsii* (Hook.) G. Don. Monroe Birdsey (pers. comm.) believes the species on Trinidad differs from that in Puerto Rico. Perhaps there are two distinct taxa involved. If so it is more likely that the Venezuelan material represents *P. simsii* because of its proximity to Trinidad.

Philodendron glanduliferum Matuda, Bol. Soc. Bot. Mexico 27: 47. 1962.

Philodendron glanduliferum has a disjunct distribution, with the typical subspecies known only from Mexico in the Sierra de Juárez, in the state of Oaxaca (all known collections having been made along Highway 175 between Valle Nacional and Oaxaca, between 6 and 14 miles from Valle Nacional at 580-1,165 m) and a new subspecies *camiloanum* occurring in western Venezuela. The two subspecies can be distinguished by the following key:

Key to subspecies of *Philodendron glanduliferum*

A. Petioles bearing conspicuous, green to whitish, trichome-like, terete scales on the geniculum or slightly below it, the geniculum noticeably swollen; blades with the sinus normally V-shaped, the edges not overlapping where they meet; cataphylls not noticeably 2-ribbed; Sierra de Juárez, Oaxaca State, Mexico. ..... *P. glanduliferum* Matuda ssp. *glanduliferum*

B. Petioles bearing conspicuous trichome-like scales (or at least wart-like projections) throughout most of the petiole, the geniculum not conspicuous; blades with the sinus closed or nearly so, the margins of the blade often overlapping at least near the base where the edges meet; cataphylls noticeably 2-ribbed; Cordillera de Mérida in southwestern Venezuela..... *P. glanduliferum* Matuda ssp. *camiloanum* Croat

Philodendron glanduliferum Matuda ssp. ***camiloanum*** Croat, ssp. nov.

TYPE: Venezuela. Apure: Reserva Forestal San Camilo, Cerro Nulita, W of the road, 4.5-5 km N of Caserío San Camilo (El Nula), along S side of Río Nulita, evergreen forest, 280 m, *Steyermark et al. 101804* (MO 2673978, holotype; NY, VEN, isotypes). Figs. 218-220

Philodendron glanduliferum ssp. *camiloanum* differt a ssp. *glanduliferum* glandibus petiolorum omnino pro parte petioli.

Terrestrial, usually creeping over surface of ground; internodes 2.5-4 cm long, 1.7-2 cm diam., light grayish brown, moderately smooth; cataphylls to 13 cm long, sharply 2-ribbed (the ribs low, ca. 1 mm high), promptly turning brown (B & K yellow 5/5), weathering to

Figs. 214-217. 214. *P. fraternum*. Venezuela. Lara: Humocaro Alto - La Palma, 1650 m, *Croat 60633*. Leaves and cataphyll, x1/5. ----215-216. *P. fraternum*. Venezuela. Táchira: La Fundación - Pregonero, 1350 m, *Croat 60702*. 215. Leaf, x1/8. 216. Inflorescence, x3/10. ----217. *P. giganteum* Schott. Venezuela. Aragua: Maracay - Ocumare de la Costa, 1150-1200 m, *Croat 60582*. Leaves, x1/6.

Figs. 218-221. 218-220. *Philodendron glanduliferum* Matuda ssp. *camiloanum* Croat. Cultivated, originally collected by *Steyermark. Croat 55073.* 218. Leaves, x1/6. 219. Petiole and leaves, x2/5. 220. Inflorescence, x3/10. ---- 221. *P. goeldii* G. M. Barroso. Cultivated in Costa Rica: Las Cruces Botanical Garden, Habit, x1/38.

straw-colored, reticulate fibers adaxially and a thin epidermis abaxially, persisting semi-intact at upper nodes except at their base, more weathered at the lower nodes. LEAVES with petioles much longer than blades, erect or spreading, 50-60 cm long, 5-8 mm diam. midway, terete, obscurely flattened near apex, medium green with punctiform to raised paler green striations throughout and with pale green to white trichome-like projections throughout much of the length, especially in the apical half of the petiole; geniculum not at all apparent (at least when fresh); blades ovate-cordate, 27-30.5 cm long, 19-22 cm wide, broadest at lower third or slightly below the middle, semi-glossy, medium green above, moderately paler beneath; midrib above broadly convex, pale green streaked; primary lateral veins 2-4 pairs, weakly sunken in valleys, arising at 45-55° angle, weakly curved to the margin, slightly paler than the surface above, matte and darker than surface beneath; minor veins in part moderately distinct. INFLORESCENCES erect; the following measurements are from dried material only: peduncles 5-13 cm long, 5-7 mm diam.; spathe coriaceous, 10-16 cm long, constricted above the sterile staminate flowers; tube (3.5)5-7 cm long, moderately inflated, light red (B & K red 7/7.5) to red-purple within and without, blade broadly lanceolate, pale green; pistillate portion of spadix 2.5 cm long, 8 mm diam. (2 cm diam. in fruit); stigma 0.6-0.7 mm diam. (in fruit), disk-like, with a pale margin and covered by a wafer-like disk which gradually decomposes; ovary 4-6 locular; sterile staminate portion 1 cm long, 8 mm diam.; fertile staminate portion 5 cm long, 10-12 mm diam. INFRUCTESCENCE with seeds ellipsoid, ribbed, 1 mm long, 0.5-0.6 mm diam., 40-50 per berry.

Philodendron glanduliferum ssp. *camiloanum* is endemic to Venezuela and is known only from Táchira and Apure at 250-1,200 m. A live but unvouchered Dodson & Blazer collection at Selby Gardens (SEL 90-75-20) was purportedly collected in Amazonas, but there are no other indications that it occurs in Amazonas.

The species is characterized by its terrestrial habit, prostrate stems with short internodes, reddish brown cataphylls, subcoriaceous, broadly ovate blades which are dark green and glossy to semiglossy above, silvery green below with broadly rounded lobes and a narrow spathulate or closed sinus. Especially characteristic are the petioles, which are densely covered in at least the upper half by short, pale, hair-like processes and its inflorescence, which is reddish on the tube and pale green on the blade. It differs from the typical subspecies by the characters listed in the key.

CULTIVATED. Originally collected in Venezuela. Apure: San Camilo, 250 m, *Croat 55073 (MO)*.

VENEZUELA. APURE: Reserva Forestal San Camilo, Cerro Nulita, 4.5-5 km N of Caserío San Camilo (El Nula), 280 m, *Steyermark et al. 101804* (MO, NY, VEN).

TACHIRA: road from San Cristóbal-Santo Domingo del Táchira-Barinas, near El Piñal, 300-350 m, *Bunting 2383* (MY); 35 km SSE of San Cristóbal, La Buenana, 6-12 km W of Quebrada Colorado, 7°28'N, 72°9'W, 600-1,200 m, *Liesner & Gonzalez 10868* (MO, NY, VEN); Cerro de Cuite, Quebrada La Colorado, 4-6 km S of Campamento La Colorado, 7°29-30'N, 72°5'W, 450-630 m, *Steyermark et al. 119624* (MO, VEN); *Steyermark et al. 119769* (MO, VEN).

Philodendron goeldii G. M. Barroso, Arch. Jard. Bot. Rio de Janeiro 15: 95, tab. 10. 1957. Fig. 221

Philodendron goeldii ranges from southern Venezuela and Colombia to Brazil (Amazonas) and Peru (Loreto). In Venezuela, it occurs only in Amazonas along the Ríos Negro, Casiquiare, Pacimoni, Yatua, Guainía and Temi, growing at less than 200 m, primarily in white sand soil areas.

It is a large terrestrial plant with stems to 5 m or more long and palmately divided leaf blades with 7-15 oblong-elliptic to broadly obovate leaflets to 70 cm long, arranged on an

arcuate to semi-circular rachis.

The species was treated by Bunting (1979) as *Thaumatophyllum spruceanum*, and is not confused with any other species.

Philodendron grandifolium (Jacq.) Schott, Wiener Z. Kunst 3: 780. 1829.

Philodendron grandifolium ranges from northern and western Venezuela to the Guianas, ranging from sea level in the eastern part of its range to 1,260 m in the Andes. In Venezuela, the species is known from Táchira, Mérida and Yaracuy in the western Andes, throughout most of the Cordillera de la Costa (Aragua and the Distrito Federal) as well as in the Delta Amacuro.

The species has leaves similar to *P. acutatum* Schott, but differs in being a much more robust plant with shorter, thicker internodes on flowering plants and by having stouter, more numerous inflorescences (up to 6 per axil). The generally large leaf blades are much longer than broad, typically somewhat triangular with conspicuously naked posterior ribs. Figs. 224-228

The species is also similar in many respects to *P. barrosoanum* Bunting, but in that species the leaf blade is more decidedly 3-lobed.

Philodendron hederaceum (Jacq.) Schott, Wiener Z. Kunst 3: 780. 1829.

Philodendron hederaceum ranges from Mexico to Panama on both slopes of the Continental Divide and to northern Colombia, Venezuela and the Guianas, occurring in seasonally dry habitats from sea level to 1,500 m. In Venezuela, it is restricted to areas with deciduous forest, principally in the northern half of the country. It has been collected in Bolívar as well as all states north of 90° latitude except Delta Amacuro, Cojedes and Zulia, where it is certainly to be expected as well.

It is distinguished by its scandent, hemi-epiphytic habit, slender green stems (often with a papery-thin periderm which may peel off on drying), slender, terete petioles about as long as the blades, its thin, ovate blades and solitary inflorescences with a much-inflated spathe tube enclosing much-elongated styles. Perhaps the most important recognition feature is the short puberulence on stems, petioles and lower midribs. The species may lose its leaves altogether during the dry season, when plants are generally in fruit. At that time one may see only the fruiting spadix, now devoid of its spathe, exposing the fleshy greenish-white berries (see Croat, 1978, fig. 110). Figs. 229, 234

Philodendron henri-pittieri Bunting, Acta. Bot. Venez. 10: 295. 1975.

Philodendron henri-pittieri is endemic to Venezuela, known only from the Cordillera de la Costa in Aragua (Pittier National Park) and in Mérida in the Cordillera de Mérida in the vicinity of La Azulita at 750-1,500 m. It generally occurs creeping up rock outcrops in full shade. The much-elongated stems are 6-8 cm diam. when mature. Fig. 230

The species is characterized by its often huge, moderately thin, ovate leaf blades (which may be 125 cm long and 1 meter wide), its bluntly 2-ribbed, green, deciduous cataphylls, and by its petioles, which are longer than the blades (to 140 cm long) and terete midway (obtusely flattened toward the apex). According to Bunting (1979), the inflorescences have red tubes and white blades.

The species is very similar to *P. giganteum* (especially West Indian forms of the species) in terms of leaf size and shape, petiole shape and the inflorescence color. That species differs, however, in having the cataphyll fibers persisting in a dense mass at the apex of the stem (see fig. 220-223 for West Indian form of *P. giganteum*).

Philodendron hylaeae Bunting, Acta Bot. Venez. 10: 298. 1975.

Figs. 222-225. 222-223. *Philodendron giganteum* Schott (photo John Criswick). Cultivated by John Criswick, Grenada. 222. Inflorescences, x1/8. 223. Inflorescence, x3/10. ----224. *P. grandifolium* (Jacq.) Schott. Venezuela. Yaracuy: Marín - Aroa, 180-270 m, *Croat 60604*. ----225. *P. grandifolium*. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60800*. Habit, x1/28. ----225. Leaf, x1/5.

Figs. 226-229. 226. *Philodendron grandifolium* (Jacq.) Schott. Venezuela. Mérida: La Azulita - El Vigia, 830 m, *Croat 54870*. Leaf, x1/5. ----227. *P. grandifolium* (Jacq.) Schott. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60800*. Stem, showing petioles and cataphyll, x1/6. ----228. *P. grandifolium* (Jacq.) Schott. Venezuela. Mérida: La Azulita - El Vigia, 830 m, *Croat 54870*. Inflorescences, x1/6. ----229. *P. hederaceum* (Jacq.) Schott. Panama. Canal Area: Escobal, *Croat 12458*. Flowering shoot, x3/10.

Figs. 230-233. 230. *Philodendron henri-pittieri* Bunting. Venezuela. Mérida: vic. La Azulita. *Croat 54866.* Habit x1/92. ----231-233. 231. *P. hylaeae* Bunting. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59360.* Habit, x1/11. 232. Leaves, x1/15. 233. Inflorescence, x3/10.

Figs. 234-237. 234. *Philodendron hederaceum* (Jacq.) Schott. Panama. Canal Area: Chiva Chiva, *Croat 14911*. Infructescences, x3/10. ----235. *P. hylaeae* Bunting. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59360*. Inflorescence, x3/10. ----236. *P. inaequilaterum* Liebm. ssp. *inaequilaterum* Venezuela. Barinas: vic. Altamira, 850 m, *Croat 60763*. Habit, x1/9. ----237. *P. insigne* Schott. Colombia. Vaupés: vic. Mitú, 200 m, *Croat 56802*. Habit, x1/26.

This recently published species (Bunting, 1975) is widespread in the northern and western Amazon Basin, ranging from southern Bolívar State and Amazonas in Venezuela to Guyana (Rupununi River), Brazil (Roraima; Amapá, Rio Oiapoque; Amazonas, Manaus, São Paulo de Olivença); Colombia (Putumayo, Vaupés & Amazonas), Ecuador (Napo) and Peru (Loreto and San Martín) usually at less than 200 m, but reaching nearly 1,000 m in southern Bolívar State near the Brazilian border. In Venezuela, the species is known from Bolívar (near Santa Elena and the Río Pacairao Basin), Delta Amacuro (Sierra Imataca) and in Amazonas (Río Orinoco, Río Yatua, San Carlos de Río Negro and around the base camp at Cerro Neblina near the Brazilian frontier). Figs. 231-233, 235

The species is a scandent, semi-epiphytic vine in pre-adult stages, but becomes an appressed climber by the time it flowers with short internodes up to 6 cm diam.

It is characterized by its deeply 3-lobed leaves divided almost to the base, its deciduous cataphylls, its moderately spongy, long, subterete to convex, angular petioles (1 cm long on adults) almost twice as long as the blades, and its 2-3 inflorescences, which are greenish white on the tube outside, cherry-red within and white on both surfaces of the blade.

Peruvian collections differ from those of Venezuela and Colombia, the leaves drying usually reddish brown on the lower surface and ash-gray above (in contrast to more typically gray-brown to green below and gray-green above).

Philodendron inaequilaterum Liebm., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 16. 1849.

Philodendron inaequilaterum ranges from Mexico to Colombia and Ecuador and west to Venezuela, where it occurs in the Cordillera de la Costa in the Distrito Federal, Carabobo, Yaracuy and Mérida and along the Cordillera de Mérida in Barinas, Táchira and Apure, at less than 500 m. Fig. 236

A member of section *Pteromischum*, it is characterized by its ovate-elliptic leaf blades with the minor lateral veins interconnected by numerous cross-veins. It is most clearly related to *P. zulianum* (formerly considered a subspecies of *P. inaequilaterum*), which differs in having very broadly ovate leaf blades with the cross-veins between the minor veins directed at an angle to the minor veins, whereas in *P. inaequilaterum* they are more or less perpendicular to the minor veins. *Philodendron zulianum* is apparently restricted to the slopes on either side of Lake Maracaibo in Zulia, Mérida and Táchira.

Philodendron insigne Schott, Synop. Aroid. 73. 1856.

TYPE: Brazil. Pará: *Wullschlaegel 865* (collected in 1851, now destroyed; Schott's Aroid drawing *2369* serves as the type. See also Field Museum photo *29850* for a fertile sheet prepared by Schott).

= *P. calophyllum* Brongn. ex Linden & André, Ill. Hort. 18: 172. t. 76. 1871.

TYPE: Brazil. Roraima: Rio Branco, *Wallis* (The illustration in Ill. Hort. serves a the type).

= *P. haematinum* R. E. Schultes, Rhodora 66: 120, figs. 1-10. 1964.

TYPE: Colombia. Amazonas: Río Caqueta, La Pedrera and vic., Oct. 12, 1952, *Schultes & Cabrera 17804* (ECON). Figs. 237-238, 246-247

Philodendron insigne is widespread along the northern edge of the Amazon Basin, ranging from Bolívar (Gran Sabana) and Amazonas (Cerro Neblina base camp), in Venezuela to Surinam (Brownsberg Park), French Guiana (St. Elie track, W of Sinnamary), to southern Colombia (Amazonas). It ranges from

about 100-1,230 m and occurs in dense, primary forest life zones.

In Venezuela, the species is distinguished by its short, densely-rooted stem, its rosulate habit, its very short, bluntly D-shaped to sharply C-shaped petioles (8.5 cm long and only a small fraction of the length of the blade), its long, oblanceolate, coriaceous leaf blades with the primary lateral veins distinctly more apparent than the minor veins and by its reddish to maroon spathe (also colored similarly within). The inflorescences are so long-pedunculate that at anthesis they are arched outward and are later pendent. The species is generally an epiphyte though it has been seen growing terrestrially in white sand around Iquitos and also on the Gran Sabana.

It may be confused with *P. linnaei*, which shares a frequently similar rosulate habit, short petioles and long oblanceolate blades. That species differs in being a generally much smaller plant with leaves usually less than 80 cm long and less than 15 cm wide (versus often to 1 m or more long and 17-26 cm wide in *P. insigne*), and in having the primary lateral veins of the blade generally not at all apparent. In addition, *P. linnaei* is more frequently a scandent plant with both long and short internodes (see that species for further comparison).

Philodendron krauseanum Steyermark, Fieldiana, Bot. 28(1): 98. 1951.

Philodendron krauseanum, currently known for certain only from Venezuela, in the state of Bolívar and in Brazil (Amazonas, Rio Japurá, vicinity of Maraã) but several collections from Ecuador and Peru are very similar. These collections dry the same dark brown color and have broadly winged petioles. These collections (*Croat 49607* and *Harling & Andersson 17048* — Ecuador; *Schunke 3743* — Peru) differ however in having blades more markedly inequilateral and abruptly-acuminate, petioles usually winged closer to the base of the blade and often overlapping the base of the blade and in having a more narrowly tapered spadix. Fig. 239

Philodendron liesneri Bunting, Phytologia 60(5): 320. 1986.

Appressed climbing hemiepiphyte; internodes short, to 7 cm long, 0.8-3.5 cm diam.; cataphyll green, moderately thin, sharply 2-ribbed, 16.5 cm long, persisting semi-intact at upper nodes, weathering to fibers below. LEAVES with petioles 20-24 cm long, thicker than broad, to ca. 1 cm thick, deeply and narrowly sulcate adaxially, rounded abaxially, the margins rounded adaxially; blades moderatly coriaceous, oblong-elliptic to oblong-oblanceolate to ovate-elliptic, 29-32 cm long, 11-14.5 cm wide, acuminate, obtuse to rounded or subcordate at base, dark green and semi-glossy above, much paler and matte beneath, drying green; midrib discolorous along its margin, narrowly sunken above, raised beneath, drying paler than the surface; primary lateral veins 6-8, narrowly sunken above, raised below, arising at 70-75° angle, (the lowermost often at a broader angle than those in the middle of the blade) weakly arcuate to the margin, drying paler than the surface; interprimary veins present; minor veins moderately distinct, fine and close. INFLORESCENCES paired; peduncle terete, 2 cm long; spathe (immature) to 9.5 cm long, wine colored outside on spathe tube, green on spathe blade; pistillate flower with 7-8-locular ovary. INFRUCTESCENCE not seen. Figs. 240-242

Philodendron liesneri is known only from the type, from Amazonas state in southern Venezuela, in the Rio Casiquiare and the Rio Orinoco drainages in the vicinity of San Carlos de Rio Negro.

The species is characterized by its appressed-creeping habit, (internodes short or to 7 cm long, 0.8-3.5 cm diam.), its slender, sharply 2-ribbed cataphylls persisting semi-intact at upper nodes, (weathered to fibers at base), its long petioles (ca. two-thirds as long as

Figs. 238-241. 238. *Philodendron insigne* Schott. Colombia. Vaupés: vic. Mitú, 200 m, *Croat 56802*. Flowering plant, x1/5. -----239. *P. krauseanum* Steyermark. Venezuela. Bolívar: Gran Sabana, vic. Misión de Santa Teresita de Kanavayen. *Steyermark et al. 115539*. ----240-241. *P. liesneri* Bunting. Venezuela. Amazonas: vic. San Carlos de Río Negro, 100 m, *Croat 59629*. 240. Plant, x1/9. 241. Leaves, x1/8.

blades) which are thicker than broad and obtusely, deeply and narrowly sulcate adaxially, and by its oblong, basally subcordate blades with prominent, broadly spreading, primary lateral veins. Also characteristic are the paired inflorescences with a purplish violet spathe tube.

The species is closest to *P. buntingianum,* but that species differs in having blades with 8-10 primary lateral veins drying black.

Philodendron lindenii Schott non Wallis, Synop. Aroid. 89. 1856.

Philodendron lindenii is known for certain only from Venezuela. Schott (Synop. Aroid. 89, 1856) described the species as from "Gran Colombia" which included at least western Venezuela, where the species is common. Later, in his Prodromus (Schott, 1860), he mentions Venezuela specifically. In Venezuela, the species ranges throughout the Cordillera de Mérida in most humid areas from Yaracuy, Lara, Trujillo and Portuguesa to Barinas, Mérida and Táchira from 50-1,790 m (only the Yaracuy collection, *Steyermark et al. 124680,* is below 450 m). Figs. 243-244, 248

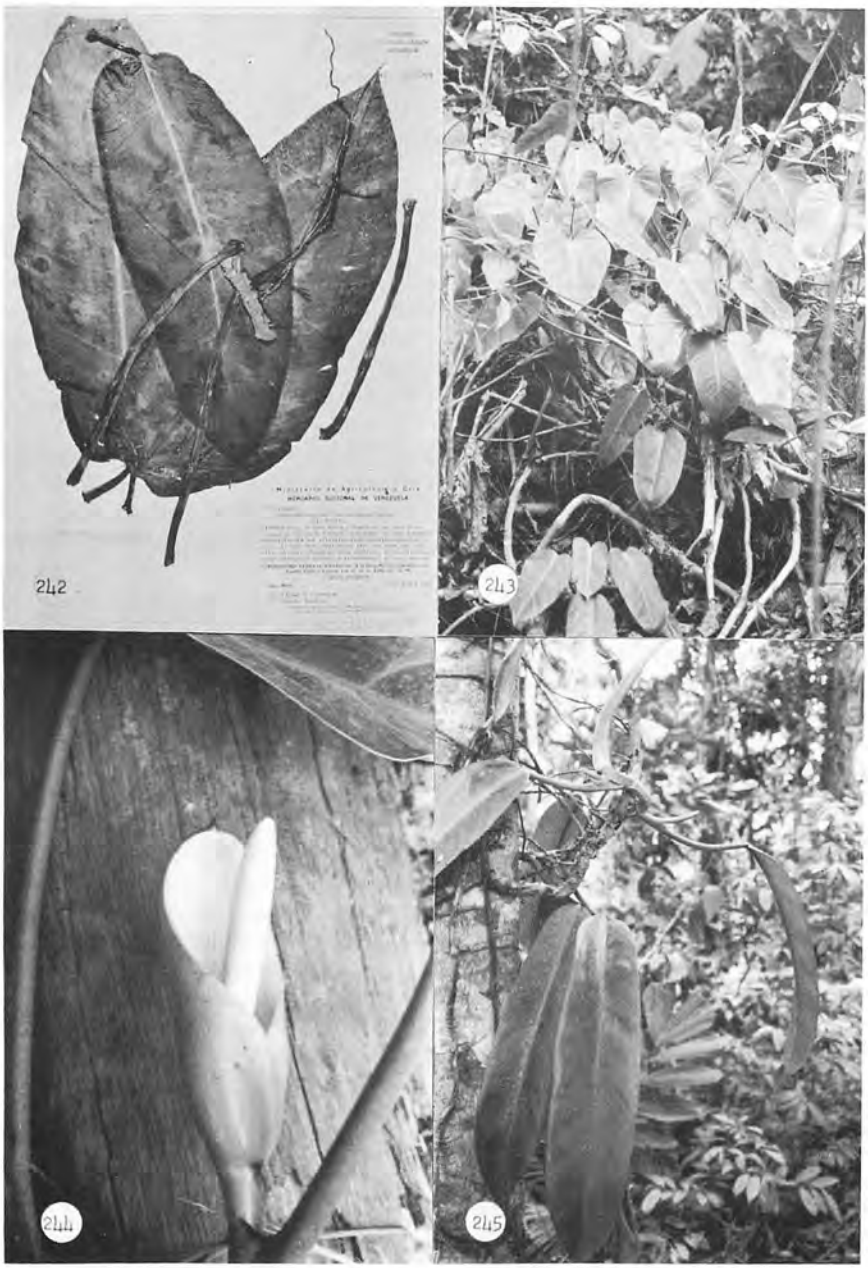
The species is a scandent, epiphytic or epipetric vine with elongated flowering internodes. It is characterized by its long internodes (8-20 cm long), generally sharply 2-ribbed deciduous cataphylls, its petioles, terete to slightly flattened near the apex, by its ovate to narrowly ovate, subcoriaceous, semiglossy blades about as long as the petioles and by its solitary green inflorescences. The peduncle is green, sometimes with purple spots. The spathe is green with the tube tinged reddish violet outside and dark red-violet within. The pistillate portion of the spadix is creamy white and about as long as the staminate portion. In this latter characteristic the species corresponds well to Schott's drawing (#2705). (As was mentioned earlier, this plant could well have been collected in Venezuela as this country was a part of the country of "Gran Colombia". Herbarium specimens of cultivated plants in European botanical gardens closely match Venezuelan material considered *P. lindenii).*

One collection made out of the known range may also belong in *P. lindenii.* A collection from Carabobo *(Croat 54546)* differs from other collections in having oblong-ovate blades drying blackened and have one or both lateral margins concave. In this respect, they correspond to *P. krugii* but the leaves of the other collections of that species dried brown.

Philodendron lindenii is remarkably similar to *P. erubescens* C. Koch & Augustin, which was attributed to Novo Granada by Koch and the two may prove to be conspecific. (In this case, *P. lindenii* would be synonymized under *P. erubescens,* the earlier name by 2 years). The two species are so similar in habit, leaf and inflorescence shape that I would assume they were synonymous, except for the fact Schott (1860) reported *P. erubescens* to have a reddish purple spathe whereas he reported *P. lindenii* to have a spathe with a greenish yellow tube outside with the inside reddish purple. The latter best fits Venezuelan material.

Philodendron lindenii has leaf blades and stems similar to *P. fraternum.* In fertile condition, the former can be distinguished by having solitary inflorescences (vs. 2-3 per axil in *P. fraternum)* which have the spathe tube green on the outside.

Philodendron modestum, attributed to Venezuela by Schott (1860) has leaves remarkedly similar to those of *P. lindenii* (especially Schott drawing #2578), but that species differs in having the pistillate portion of the spadix scarcely more than one-third the length of the staminate spadix. In addition, it has a spathe tube which is green outside and greenish white within (versus wine-red within for *P. lindenii).* The species is



Figs. 242-245. 242. *Philodendron liesneri* Bunting. Venezuela. Amazonas: Río Casiquiari, 100 m, *Steyermark & Bunting 102673*. ----243. *P. lindenii* Schott. Venezuela. Mérida: Mesa Bolívar - Tovar, 450 m, *Croat 54879*. Habit, x1/31. ----244. *P. lindenii*. Venezuela. Barinas: Mérida - Barinas, 1000 m, *Croat 60747*. Inflorescence, x9/20. ----245. *P. macroglossum* Schott. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60794*. Habit, x1/15.

poorly known and was excluded by Bunting (1979).

Philodendron linnaei Kunth, Enum. Pl. 3: 47. 1841.

Philodendron linnaei is widespread in the northern Amazon Basin (albeit poorly collected), ranging from Venezuela to the Guianas (at least Surinam & French Guiana), Brazil (Pará, Bahia, Amazonas) and Peru (vicinity of Iquitos) usually occurring at less than 200 m, but ranging up to 800 m in the Guiana Highlands (found at 800 m near Sta. Elena de Uairén near the Brazilian border in southern Bolívar State). In Venezuela, the species ranges from Monagas and Delta Amacuro to Bolívar and Amazonas (Cerro Yapacana, San Carlos de Río Negro, Cerro Arauicaua and near Cerro Neblina). In the areas around San Carlos de Río Negro and around Cerro Neblina, the species is everywhere abundant as an epiphyte in the forest understory. Fig. 249

The species is characterized by its rosulate leaves, very short, obtusely flattened to obtusely sulcate petioles (a small fraction of the blade length), its thick, narrowly oblanceolate leaf blades with a broadly convex, raised midrib and no apparent primary lateral veins on either surface, and by its frequently long-pedunculate inflorescences (peduncle often longer than the spathe), which are red-maroon to purple on the tube outside (red within) and white on the blade.

It is most easily confused with *P. insigne*, which has a similar habit, short petioles and similar long-pedunculate inflorescences with reddish spathe tubes. See that species for separation.

Philodendron linnaei has a curious growth habit in that the stem intermittently produces a series of short, thick internodes and a rosulate series of leaves, then reverts again to slender, long internodes until it reaches a point higher up on the tree, where it once more produces a rosette of leaves. I have seen as many as five such rosettes on a single tree trunk, all less than 1 m apart and all connected.

The Peruvian material may prove to be at least subspecifically distinct in having a generally more massive inflorescence with a broader peduncle and spathe (together 25-36 cm long) and with an infructescence up to 6 cm diam. In addition, at least one collection *(Davidson & Jones 9628)* is reported to have the petiole broadly concave adaxially with weakly spreading, thick marginal ribs.

Philodendron macroglossum Schott, Oesterr. Bot Wochenbl. 7:197. 1857.
TYPE: Venezuela. Caracas: Reichenbach (destroyed); photo of Schott specimen prepared in Vienna (Field Museum Neg. #29853) serves as the type.
= *P. adhatodaefolium* Schott, Synop. Aroid. 81. 1856.
TYPE: Venezuela; photo of Reichenbach specimen prepared in Vienna (Field Museum Neg. #29841) serves as the type.

Philodendron macroglossum Schott is endemic to evergreen forests at 1,000-1,360 m in the Cordillera de la Costa of northern Venezuela, ranging from Aragua (Altos de Choroní & Pittier National Park) to Carabobo and Yaracuy (Cerro la Chapa). Figs. 245, 250-251

It is characterized by its scandent stems with elongate internodes, (somewhat flattened on one side), the moderately elongate leaf blades, which are usually rounded to subcordate at the base, the moderately long, subterete petioles, which are weakly flattened adaxially, and especially by the cluster of up to 4 inflorescences per leaf axil.

The species is either a highly variable one or must be further divided. A collection from Carabobo *(Steyermark 952130)* best corresponds to a Reichenbach collection seen by Schott (Field Museum Neg. #29853), but has

Figs. 246-249. 246. *Philodendron insigne* Schott. Venezuela. Bolívar: Gran Sabana, Santa Elena - El Dorado, 1040 m, *Croat 54318*. Habit, x1/23. ----247. *P. insigne*. Venezuela. Amazonas: vic. Cerro Neblina, Río Mawarinuma, 140 m, *Croat 59332*. Preadult plant, x1/9. ----248. *P. lindenii* Schott. Venezuela. Barinas: Mérida - Barinas, 1000 m, *Croat 60747*. Flowering shoot, x1/11. ----249. *P. linnaei* Kunth. Venezuela. Amazonas: Cerro Neblina, *Croat 59372*. Habit, x1/15.

leaves only 2.8 times longer than broad. The Reichenbach collection, which lacks a petiole, is 4.7 times longer than broad. Another close match is *Croat 21421* from Aragua, but that collection has blades more subcordate and ranging from 1.5-2.2 times longer than broad. The Croat collection also has juvenile leaves that are almost rounded at the base, with petioles about three-fourths as long as the blades. Other collections of *P. macroglossum* (both in Aragua and in Yaracuy) have juvenile blades more narrowly oblong-linear or narrowly oblong-oblanceolate and have petioles about one-fourth to one-third as long as the blades. The significance of these differences is not yet apparent, but it suggests that more than one species may be involved. All the material has 5-6 pairs of primary lateral veins departing the midrib at 65-75° angle.

Philodendron macroglossum is closely related to *P. buntingianum* from the Cordillera de Mérida in Mérida and Táchira. That species also has stems with elongate internodes (somewhat flattened on one side), elongate petioles and elongate blades narrowed toward the base and briefly connate. *Philodendron buntingianum* differs, however, in having thinner blades more frequently drying blackened and have generally 8-10 pairs of primary lateral veins arising at a higher angle (55-65°). In addition, it has only 1 or 2 inflorescences per axil and has a lower range (from 450-1,000 m.)

Bunting (1979), following Engler, states that the type of *P. macroglossum* is an Appun collection. Schott (1855) did not cite a specimen with his description and the only existing specimen that I know of is one by Reichenbach (represented by a photograph taken by Macbride in the Schott Herbarium prior to its destruction). Thus, the photograph of this collection (Field Museum Photo #29853) serves as the type.

Bunting (loc. cit.) also placed *P. adhatodaefolium* Schott in synonymy with *P. macroglossum*. I believe this judgment is correct but the leaves appear to be juvenile ones (matching perfectly, for example, the juvenile leaves of *Croat 54497*), despite the fact that inflorescences are also affixed to the sheet.

At the same time Bunting synonymized *P. inconcinnum* Schott. Despite the fact that Schott (1855) attributes *P. inconcinnum* to Venezuela, it does not closely match any Venezuelan species and is, in fact, a species from Central America, ranging from Nicaragua to Panama.

Philodendron maguirei Bunting, Acta Bot. Venez. 10: 302. 1975.

Philodendron maguirei is currently known only from Venezuela at 125-200(1,400) m in southwestern Amazonas, but surely occurs in adjacent Brazil (Amazonas). It has been collected only along the Río Yatua at the foot of Cerro Arauicaua and around the Cerro Neblina base camp. Figs. 252, 254-255

It is characterized by its terrestrial habit (or in soil deposits on rocks), its repent stem with short internodes (1-2 cm and ca. 1 cm diam.), sharply 2-ribbed cataphylls persisting semi-intact at apex and weathered to fibers at base, by its long, obtusely to prominently D-shaped petioles (terete and reddish at base) sometimes with an obtuse medial rib, and by the oblong-triangular, deeply cordate-sagittate blades, with a deep sinus usually much longer than broad. The blades dry somewhat reddish brown on the lower surface, while the petioles dry straw-colored. The posterior rib extends along the upper edge of the sinus of the blade for some distance, but is never really naked. The long-pedunculate inflorescences are much shorter than the petioles, which in turn are much longer than the blades. The peduncles may be considerably longer than the spathe and are tinged purplish violet. The spathe is light green on the

Figs. 250-253. 250. *Philodendron macroglossum* Schott. Aragua: Henri Pittier National Park, 1450 m, *Croat 60545.* Habit, x1/18. ----251. *P. macroglossum* Schott. Same locality as *Croat 60545;* 1030-1060 m, *Croat 60568.* Leaves, x1/8. ----252. *P. maguirei* Bunting. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59624.* Inflorescence, x1/5. ----253. *P. maroae* Bunting. Venezuela. Amazonas: Río Casiquiare, 125-140 m, *Bunting et al. 3980.*

tube, and creamy white on both sides of the blade.

The species appears to be related to *P. tenue* and greatly resembles it, especially owing to the narrow sinus, the somewhat flaring posterior lobes and having a sinus which is not naked. The two species do not overlap, with the latter occurring only in the eastern and northern part of the country at 120-1,200 m. *Philodendron tenue* also differs in having typically a more closed sinus and more numerous, closely spaced, primary lateral veins in the anterior lobe.

Philodendron maroae Bunting, Acta Bot. Venez. 10: 303. 1975.

Philodendron maroae is endemic to Venezuela, known only from the sandy savannas between Maroa and Pimichín in Amazonas, at 100-140 m.

The species is recognized by its epiphytic habit, its persistent weathered cataphylls, its sharply D-shaped petiole (slightly convex medially with sharp, erect-spreading margins) and its large sagittate blades with sunken veins.

The species is very similar to *P. chimantae* Bunting, which differs in having a winged-angled petiole (with wings to 3 mm wide) which is undulate in the distal 3-4 cm. Figs. 253, 262

Philodendron megalophyllum Schott Prodr. Aroid. 279. 1860.
TYPE: Peru. San Gavón, *Lechler 2493* (K, lectotype).
= *P. deflexum* auctt. non Poeppig ex Schott
= *P. myrmecophyllum* Engl., Bot. Jahrb. 37:127. 1905.
TYPE: Brazil. Amazonas: Río Negro, Manaus, *Ule 6003* (B, hololectotype; G, isolectotype).
Figs. 256-260

Philodendron megalophyllum ranges from southern Venezuela to Guyana, Surinam, French Guiana and the Amazon Basin in Brazil, Colombia (Putumayo and Vaupés), Ecuador (Napo), Peru (Amazonas, Loreto, Ucayali, San Martín and Cuzco) and Bolivia. In Venezuela, the species occurs in Amazonas, Bolívar, Barinas and Apure. One specimen from Sucre *(Benitez de Rojas 2933)* may also be this species but it is somewhat out of range, though the species is generally common at low elevations below 200 m, but ranges up to 600-1,100 m in the foothills of the Andes in Peru and Bolivia. I have collected it at 600 m near Icabarú in southern Bolívar State of Venezuela.

It is a thick-stemmed epiphytic vine or, less frequently, it is found on steep rocky banks or terrestrially, as in the white sand areas around Iquitos, Peru. I have also seen the species growing terrestrially along road banks around San Carlos de Río Negro in Amazonas State.

The young plants are frequently associated with ant nests and have unusually soft swollen petiole bases. Even the adult plants characteristically have relatively spongy petioles. Otherwise, the species is characterized by its large, thin blades with conspicuous posterior lobes, its long, almost terete petioles, sharply 2-ribbed, deciduous cataphylls and especially by its 5-6 long-pedunculate, slender green inflorescences in each axil (the spathe tube is violet-purple inside and sometimes tinged similarly on the outside).

The species has long been confused with *P. deflexum* Poeppig, a species with a much narrower, more elongate, oblong-triangular anterior lobe, narrower, more spreading posterior lobes, a broadly open sinus and short peduncles. The two taxa are separated here, but because of the inexactitude in typification some discussion is warranted. Schott's original description of *P. deflexum*, wherein he attributes the species to Poeppig (based on an undesignated herbarium specimen), describes a plant with an oblong blade, a broad sinus and sagittate-hastate, triangular-oblong lobes. This description matches well the Berlin herbarium

Figs. 254-257. 254-255. *Philodendron maguirei* Bunting. Venezuela. Amazonas: Cerro Neblina, *Croat 59386.* 254. Leaves, x1/8. 255. Leaves, x1/8. ----256. *P. megalophyllum* Schott. Cultivated at Munich; originally collected in Peru. San Martín: Moyobamba. Habit, x1/15. ----257. *P. megalophyllum.* Venezuela. Amazonas: San Carlos de Río Negro - Solano, *Croat 59630.* Habit, showing inflorescences, x1/6.

Figs. 258-261. 258-259. *Philodendron megalophyllum* Schott. (Brazil: Mato Grosso: Correga do Gata.) Harley et al. Venezuela. Amazonas: San Carlos de Río Negro - Solano, *Croat 59630*. 258. Leaves, x1/8. ----259. Inflorescence, x1/2. ----260. *P. megalophyllum*. Venezuela. Amazonas: Cerro Neblina, *Croat 59371*. Leaf, x1/8. ----261. *P. melinonii* Brongn. ex Regel. *Plowman 1263*. Photo: Plowman. Inflorescences, x1/5.

specimen of *Poeppig 1281* from Pompayaco, Peru (not located on map). An illustration of both the Poeppig collection and typical *P. megalophyllum* from Peru are included here for comparison (See figs. 193 & 264-268). Curiously, Schott later produced a drawing (#2571) which differs from the Poeppig collection cited above, but even this illustration could still fit his original written description. That drawing is presumably based on the same plant, but shows the anterior lobe to be more triangular and the posterior lobes to be broader and less prominently spreading. It has not been determined if this represents stages of development or if real differences exist and the Schott drawing #2571 (I.D.C. Fiche 55) represents a different species. Certainly I have not seen adult foliage of the common, widespread species previously identified as *P. deflexum* with leaves having such a narrow and elongate anterior lobe as is found on *Poeppig 1281*. The most critical feature, for separation of *P. deflexum* and *P. megalophyllum*, however, is the inflorescence, which on *P. deflexum* has a peduncle which is shorter than the spathe, whereas on *P. megalophyllum* the peduncle is generally much longer than the spathe. While the type description of *P. megalophyllum* does not mention an inflorescence, the type of the species, a Lechler collection from Peru, perfectly matches this widespread species.

Philodendron melanochlorum Bunting, Acta Bot. Venez. 10: 304. 1975.

Philodendron melanochlorum is endemic to the Gran Sabana in Bolívar State along the northern escarpment between km 114 and 134, growing at about 1,000 m elevation in a very humid, low forest life zone. The plant may occur epiphytically or terrestrially.

According to Bunting (1979) the species is closely related to *P. tatei* Krause, which is known only from Cerro Duida in Central Amazonas. It differs from *P. tatei* (Bunting, loc. cit.) in the size of its spathe, but also in having its ovules restricted to the lower one-third of the locule (versus throughout the locule for *P. tatei).* Fig. 263

The species is characterized by short internodes (to ca. 3 cm diam.) with thick, reddish cataphylls which later persist in a rotting mass, by its stiff, obtusely V-sulcate petioles longer than the blades, by its coriaceous, oblong-elliptic blades, with 7-10 pairs of sunken primary lateral veins only slightly apparent below on drying and by its inflorescence, with a spathe only about 9 cm long (versus to 15 for *P. tatei).*

Philodendron melinonii Brongn. ex Regel, Gartenflora 23:67. t.789. 1874.

Philodendron melinonii is known from Venezuela, Guyana, French Guiana and Brazil, but the nature of the distribution is poorly known. In Venezuela, it is apparently common in the lowland forests of Delta Amacuro in the northeast and it occurs also in the lowland forests of southern Venezuela in Amazonas at San Carlos de Río Negro; it is also reported from the Gran Sabana at perhaps 1,000 m or more. In French Guiana, it occurs in lowland forest at about 250 m, where it is common. Around Manaus in Brazil, I found the species may be one of the dominant epiphytes (though not previously reported from there). I suspect that the species ranges much more broadly, no doubt extending along the entire Guiana coast from the mouth of the Orinoco to Amapá in Brazil, then across the northern Amazon and into southern Venezuela and southern Colombia. The collection from the Gran Sabana suggests it may be even more widespread in the Guiana Highlands.

Because of its persistent cataphyll fibers, its broad basal sinus, its sharply D-shaped, broadly sulcate petioles, the red spathe tube and white blade, the species has been confused with *P.*

Figs. 262-265. 262. *Philodendron maroae* Bunting. Venezuela. Amazonas: Río Casiquiare, 125-140 m, *Bunting et al. 3980*. ----263. *P. melanochlorum* Bunting. Venezuela. Bolívar: Sta. Elena - El Corado on the Gran Sabana, 1040 m, *Croat 54320*. Habit, x1/11. ----264. *P. melinonii* Brongn. ex Regel. Cultivated at Maracay Bot. Gard. Leaves, x1/15. ----265. *P. melinonii*. Venezuela. Amazonas: San Carlos de Río Negro, no voucher. Infructescence, x3/10.

fragrantissimum. That species is distinguished by its broadly ovate blades and in having reddish brown, persistent cataphyll fibers. It also has a much more slender petiole. Figs. 261, 264-265

The species is characterized by its persistent cataphylls (the fibers of which are pale, not reddish), its usually elongate, thick, somewhat spongy D-shaped petioles (1.5-3 cm diam.), which are broadly sulcate adaxially with erect margins, by the usually narrowly ovate-oblong or sometimes oblong-elliptic blades, which are subcordate basally and by the inflorescences having a bright red tube and a white to reddish blade (white within). The plant may reach immense size and the leaves may form a rosette more than a meter across.

Blades may be equally as long as the petioles to almost 5 times longer than the petioles but average about 2 times longer than the petioles. They range from 31-68 cm long and 12-50 cm wide, averaging 49 cm long and 27 cm wide.

Philodendron milleri Croat, sp. nov.
TYPE: Venezuela. Amazonas: Depto. Río Negro, Neblina Massif, Cañon Grande, along Río Mawarinuma between the mouth of the canyon and the first major fork of the river, ca. 7 airline km ENE of Puerto Chimo, 0°50-51'N, 66°2-6'W, *Davidse & Miller 27278* (MO, holotype; VEN, isotype).

Planta epipetrica; caulis ca. 2 cm diam.; petiolus 56 cm longus, 7-12 cm latus, subteres; lamina subcoriacea, 3-lobata; lobus medius oblonga-ellipticus, 35 cm longus, 13.5 cm latus; lobus lateralis inequilaterus-oblongus, 23-25 cm longus, ca. 7.5 cm latus; inflorescentia 4; pedunculus 7-8.5 cm longus, 5-10 mm diam.; spatha coriacea, purpurea, 12-14 cm longa, tubus ellipticus, 4-8 cm longus; spadix 9-12 cm longus.

Epipetric; internodes ca. 2 cm diam., brownish when dried; cataphylls probably deciduous. LEAVES with petioles 56 cm long, 7-12 mm diam. when dried, probably terete or subterete, surface spongy when fresh, drying brown, minutely striate, sheathing in the lower one-seventh of the blade, the sheath 7 cm long; blades subcoriaceous, prominently 3-lobed, the median lobe more or less oblong-ellitpic, with the margins appearing concave in the lower one-third, 35 cm long, 13.5 cm wide, shortly acuminate at apex (the acumen somewhat apiculate), broadly confluent with the lateral lobes, the lateral lobes inequilateral-oblong, 23-25 cm long, ca. 7.5 cm wide; sinus broadly parabolic, 4.5 cm deep; upper surface semiglossy when dried, lower surface drying matte, greenish brown above, paler below, midrib flat to weakly raised above, slightly darker than surface when dried, prominently raised below, paler than surface on drying; basal veins in the lateral lobes 6-7 per lobe, mostly in the lower portion of the lobe, flat above, raised below; posterior rib not naked or naked to 1.5 cm, turned up on outer margin; primary lateral veins 5-6 per side, departing midrib at an acute angle, spreading at 55-65° angle, straight in the lower one-half, ascending toward the apex, drying flat above, raised, paler than surface below; interprimary veins lacking, minor veins drying prominulous below, moderately obscure above, interspaced with long to sometimes short latex canals which dry darker than surface. INFLORESCENCES (dried) at least 4 per axil; peduncle 7-8.5 cm long, ca. 5-10 mm diam.; spathe coriaceous, wine-purple, 12-14 cm long, constricted just above the middle, spathe tube ellipsoid to ovoid, 4-8 cm long, 20-30 mm diam.; spathe blade elliptic to lanceolate; spadix ca. 9-12 cm long, the pistillate portion ellipsoid to subclavate, broader than base of staminate portion, 3.5-5(7) cm long, 7-15(23) mm diam., staminate portion oblong, tapering toward the apex, 4.5-5.5 cm long, 6-8 mm diam.,

drying slightly broader than the sterile portion, the latter 0.6-0.8 cm long, 4-8 mm diam.; female flowers more or less ovoid, ca. 1.3-2.2 mm in both directions, more or less arranged in spirals, ca. 14-16 per spiral; pistils with thickish, unevenly drying apron subtending stigma, pistil walls with pale glanular raphides embedded in them; stigma circular, raised, 0.5-0.8 mm long, shallowly depressed medially, occasionally with 6 small pits visible (arranged in a circle), pistil probably 5-locular; fertile staminate flowers with the margins somewhat angled, 8-11 per spiral, drying 0.6-1.5 mm long; sterile staminate flowers irregularly shaped, drying black. INFRUCTESCENCE with berries (immature) pale green.

Philodendron milleri is endemic to Venezuela, known only from the type collection on Cerro Neblina in Amazonas of Venezuela. It was found growing at 350-400 m in a canyon on boulders along the forest edge, probably in tropical wet forest life zone.

The species is recognized by its long-petiolate leaves with deeply 3-lobed blades, its subterete petioles, and clusters of at least four inflorescences per axil with wine-purple spathes, and peduncles shorter than the spathe. Especially characteristic are the dried yellowish brown leaves, which have conspicuous dark intermittent latex vessels visible between the minor veins.

It is named in honor of Dr. James Miller of the Missouri Botanical Garden who, along with Gerrit Davidse, collected the type and also played the major role in the Garden's expeditionary efforts to Cerro Neblina during 1985 and 1986.

Philodendron milleri might be confused with two other species in Territorio Amazonas having deeply 3-lobed leaf blades, e.g., *P. cataniapoense* and *P. barrosoanum*. *Phildendron cataniapoense* differs in having blades which dry blackened with more broadly spreading posterior lobes, a more elliptic medial lobe and smaller, more slender inflorescences with green spathes.

Both of the above species also differ in lacking the dark-drying laticiferous vessels that are visible on the lower surface of *P. milleri*.

Philodendron muricatum Willd. ex Schott, Oestr. Bot. Wochenbl. 4: 418. 1854. Figs. 266-267

Philodendron muricatum is widespread throughout much of the Amazon Basin, ranging from Venezuela to the Guianas and western Brazil (Rio Branco, Rio Madeira) from 50-415 m. It is to be expected in the Loreto Department of Peru. Bunting (1979) states that the species often forms large stands over vegetation along streams or in wet savannas. In Venezuela, it is restricted to Amazonas (drainage of the Guainía, Casiquiare, Pacimoni, Yatua and Temi) and Bolívar State (Chimantá).

The species is characterized by its scandent habit, stems which are generally verrucose (or otherwise covered with hair-like or spine-like projections) and drying conspicuously yellowish brown (B & K yellow 6 or 7/2.5), by its moderately small leaves with verrucose petioles, which are obtusely flattened or sulcate adaxially and shorter than the blades. The blades are narrowly ovate to ovate-triangular; they are variable, with the sinus very narrow, much longer than broad, or moderately open. The basal veins are commonly free, or nearly so, from one another or if they are ever united, the posterior rib formed by their junction is rarely ever naked. The species is closely related to *P. brevispathum* (see that species for further comparison).

Some Venezuelan collections in Amazonas are unusual in being only sparsely warty (*Liesner 17193* - Mamurividi) or completely smooth (*Davidse 27615* - Río Baria).

Figs. 266-269. 266. *Philodendron muricatum* Willd. ex Schott. Venezuela. Amazonas: vic. San Carlos de Río Negro, 120 m, *Liesner 8727*. ----267. *P. muricatum*. Venezuela. Amazonas: Río Yatua, Cerro Araui - Piedra Catipan, 100 m, *Steyermark & Bunting 102057*. ----268-269. *P. ornatum* Schott. Venezuela. Aragua: Henri Pittier National Park, *Croat 60595*. 268. Habit, x1/11. 269. Leaf, x1/8.

Philodendron ornatum Schott, Oestr. Bot. Wochenbl. 3: 51. 1841.

Philodendron ornatum ranges from Venezuela to the Guianas, Brazil, Ecuador (Napo), Peru (San Martín) and Bolivia at 120-1,600 m, mostly above 1,000 m. In Venezuela, it occurs throughout the Cordillera de la Costa from Zulia to Miranda in the western part of the Cordillera de la Costa then south from Yaracuy to Táchira in the Cordillera de Mérida and also south from Sucre to Delta Amacuro, Bolívar and Amazonas.

The species is characterized by its moderately large, relatively thin, bicolorous, heavily-veined, broadly ovate, deeply-cordate leaf blades which dry black or brown, by the petiole, which is longer than the blade, sharply D-shaped (sometimes sulcate) and warty-verrucose, at least near the apex (sometimes also with a medial rib) and by its unribbed to bluntly 1-ribbed cataphylls, whose fibers persist in a disorganized mass. The inflorescences are borne usually two or more at each node, with the spathe greenish on the outside and purplish to maroon within, and is especially dark in the tube.

Philodendron ornatum was treated by Bunting (1979) as *P. rubens*, but that species is synonymized by Mayo in the Flora of Trinidad and Tobago (in press). It is noteworthy that Schott's illustrations show *P. rubens* to be a species with no sign of persistent cataphylls (which in addition to the verrucose petioles, is the most characteristic feature of *P. ornatum*), so there is still doubt in my mind that *P. rubens* is synonymous. It is also interesting to note that though Schott's illustrations of *P. rubens* show no persistent cataphylls, a plant illustrated and distributed by Engler (Drawing #122) clearly shows persistent (but not weathered) cataphylls. It also differs from Schott's illustrations in having a spadix with the pistillate portion appreciably narrower than the staminate, whereas Schott's illustration (#2458 - Fiche 53c) shows a spadix with the pistillate portion equally as broad as the staminate. Perhaps *P. rubens* represents a distinct, but as yet unknown, species. On the other hand, there can be no doubt that the common Venezuelan species which has gone by the name *P. rubens* best fits *P. ornatum*.

In Venezuela, *P. ornatum* is most easily confused with *P. trujilloi*, which also has persistent cataphyll fibers and dries black (like many collections of *P. ornatum*); but that species has an oblong-ovate blade with 9-10 primary lateral veins, a longer peduncle (usually exceeding the length of the spathe) and a petiole that is smooth at the apex.

The single Ecuadorian collection, though out of the known range of the species, seems clearly to belong in *P. ornatum*. The collection *(Holm-Nielsen et al. 20148)* was made on the Rio Aguarico at Tangoy, 75°27'W, 0°34'S. In addition, *Plowman 11640E* from Peru (San Martín: Mariscal Cacéres: Dtto. Campanilla, 7.4 km N of Pulcache, 900-950 m.), though sterile, is almost certainly this species. A Bolivian collection *(Krukoff 11367)* from the Department of La Paz, Province of Larecaja at Copacabana, 850-950 m, was annotated as *P. muschlerianum* by Bunting. The collection agrees well with *P. ornatum* but has no stem so the persistent cataphylls could not be seen.

The type *P. muschlerianum* has not been studied, so it is not certain whether it is synonymous with *P. ornatum*. Figs. 268-269, 274-275

Philodendron panduriforme (H.B.K.) Kunth, Enum. Pl. 3:51. 1844.

1. *P. panduriforme* var. *panduriforme* = *Pothos panduraeforme* H.B.K., Nov. Gen 1: 78. 1815.
   TYPE: Venezuela. Amazonas: along Río Orinoco between Río Guapo and Tamatama, *Humboldt & Bonpland 1189* (Herb. Willd. 3103).
   = *P. latilobum* Schott, Synop. Aroid. 104-105. 1856.
   TYPE: Peru. Loreto: Maynas,

Figs. 270-273. 270-272. *Philodendron panduriforme* (H.B.K.) Kunth var. *panduriforme*. Venezuela. Amazonas: vic. San Carlos de Río Negro, 100 m, *Croat 59645*. 270. Habit, x1/8. 271. Leaf, x1/5. 272. Stem x6/25. ----273. *P. panduriforme* var. *reichenbachianum* (Schott) Croat. Venezuela. Amazonas: vic. San Carlos de Río Negro, 100 m, *Croat 59647*. Leaf, x6/25.

Figs. 274-277. 274. *Philodendron ornatum* Schott. Venezuela. Pregonero - La Fundación, *Croat 54958*. Petiole x6/25. ----275. *P. ornatum*. Colombia. Meta: vic. San Luis de Cubarral, *Croat 55537*, Stem x6/25. ----276-277. *P. panduriforme* var. *reichenbachianum* (Schott) Croat. Venezuela. Amazonas: vic. San Carlos de Río Negro, 100 m, *Croat 59647*. 276. Leaf, x1/8. 277. Stem, x1/5.

Poeppig s.n. (destroyed); Schott Drawing 2582, NYBG Neg. #4167 serves as the type. See also *Ule 6933* (HBG).

Philodendron panduriforme ranges throughout the northern and western perimeters of the Amazon basin from southern Venezuela (Amazonas) to Colombia (Meta & Putumayo), Ecuador (Napo) and western Brazil (Rio Juruá in Amazonas). *Croat 51209,* with juvenile leaves collected near Iquitos, Peru, also appears to be this species. Most collections were made between 120 and 150 m except at Macoa in Putumayo, which is at 500 m. The species consists of two varieties, the typical variety whose range was given above and the variety *reichenbachianum,* newly combined with *P. panduriforme* in this paper. See that variety for a key to separation of the two varieties. In Venezuela, var. *panduriforme* was first collected at Cerro Yapacana on the Río Orinoco drainage in west central Amazonas, but was later collected around San Carlos de Río Negro and around the Cerro Neblina base camp on Río Mawarinuma. It is abundant around San Carlos de Río Negro, growing as a low hemiepiphytic vine (always reported with this habit). Figs. 270-272

The species is characterized by its scandent habit, moderately light brown stems with long internodes 1.5-3 cm diam., which usually dry deeply sulcate, often with peeling epidermis, by its subterete petioles (obtusely flattened on younger plants) which are about 2/3 as long as the blades and especially by its deeply 3-lobed, generally coriaceous blades. The paired inflorescences have a peduncle almost as long as the spathe, with the spathe variously described as green or white or with an almost white tube. *Steyermark & Bunting 103066* describes the spathe tube as creamy within, while *Steyermark et al. 122407* describes the spathe as pale green tinged with madder (a form of red) on the tube outside, dark madder within on the tube and pale green on the blade within. The peduncle may be 5.5-10.5 cm long and ca. 1 cm diam.; the spathe 8-11.5 cm long, 2.4-3 cm diam. on the tube with the spadix exserted 8-10 mm above the spathe.

Philodendron panduriforme is readily distinguishable from the two other deeply 3-lobed species with which it may occur. Both *P. hylaeae* and *P. cataniapoense* also occur in Amazonas, although as yet the three taxa have not been collected in the same areas. Both *P. hylaeae* and *P. cataniapoense* differ from *P. panduriforme* in being more deeply lobed, with the sinus between the lobes being only 1-4.5 cm from the apex of the petiole (versus 7.5-19 cm in *P. panduriforme).* Both also have relatively thinner blades and proportionately longer, narrower lateral lobes.

The typical variety of *panduriforme* is distinguished from the var. *reichenbachianum* by being proportionately much broader (ranging 1.1-1.9 times longer than broad), averaging 1.3 times longer than broad, versus being 2.3-3.2 times longer than broad in var. *reichenbachianum* (averaging 2.6 times longer than broad). In addition, the lateral lobes are proportionately much shorter in variety *reichenbachianum,* with the medial lobe being about 4 times longer than the lateral lobes (versus 1.4-2.8 times longer than the lateral lobes for var. *panduriforme* and averaging only 2 times longer). Figs. 273, 276-278

It is interesting to note that the Humboldt and Bonpland type collection represents a rarely represented preadult leaf form. In this collection, the lateral lobes together are not as wide as the medial and thus are much shorter than the medial lobe, a feature more commonly associated with var. *reichenbachianum.* Nevertheless, the specimen also exhibits the elliptic medial lobe associated with the typical variety (see the var. *reichenbachianum*

Figs. 278-281. 278. *Philodendron panduriforme* var. *reichenbachianum* Schott. Venezuela. Amazonas: vic. San Carlos de Río Negro, 100 m, *Croat 59647*. Leaf, x1/5. ----279. *P. pedatum* (Hook.) Kunth. French Guiana. vic. St. Elie, W of O.R.S.T.O.M. Project, 250 m, *Croat 53829*. Habit, x1/15. ----280. *P. pedatum* (Hook.) Kunth. Cultivated, Caracas. Leaf, x1/8. 281. *P. pinnatifidum* (Jacq.) Schott. cultivated, Andromeda Gardens. Leaf, x6/25.

for additional details).

It is noteworthy that both Engler and Krause misinterpreted *P. panduriforme* and confused it with specimens of *P. bipennifolium*, a species which ranges from southern Venezuela to southern Brazil in the vicinity of Rio de Janeiro. Engler, in his 1878 treatment of the Araceae for Martius' *Flora Brasiliensis*, confused *P. bipennifolium* Schott with *P. panduriforme* (illustrating and synonymizing the former with the latter). In his 1913 revision of *Philodendron* in *Das Pflanzenreich*, he cites only the type specimen of *P. panduriforme* from Venezuela, but it is apparent from the widely distributed specimens (see, for example, *Engler Arac. 238)* that he was considering misidentified plants of *P. bipennifolium*. The latter, which is in section *Schizophyllum* Schott, is not closely related to *P. panduriforme*, a member of section *Baursia* Reichb.

Philodendron bipennifolium differs from *P. panduriforme* in having a distinct, usually hippocrepiform sinus and lateral lobes which are roughly square in outline (commonly almost truncate on the upper edge and cordate at the base.)

It should be noted, in conclusion, that the original spelling of the species, i.e., *P. panduraeforme*, has been changed in accordance with Article 73.8 of the International Code of Botanical Nomenclature (1983).

2. ***P. panduriforme*** var. ***reichenbachianum*** (Schott) Croat, comb. nov.
= *Philodendron reichenbachianum* Schott, Oesterr. Bot. Wochenbl. 7:197. 1857.
TYPE: Venezuela. Caracas: Reichenbach (Destroyed; Field Museum Neg. #29861 serves as the type).

Bunting (1979) excluded *P. reichenbachianum* from consideration for the Venezuelan flora, but recent collections have confirmed its presence there. However, the type collection could not have been made at or near Caracas (possibly the specimens were shipped from Caracas) but rather, from Amazonas. Plants agreeing perfectly with the type photo (Field Museum Photo 29861) have been collected near San Carlos de Río Negro. Field work at San Carlos de Río Negro has proved that *P. reichenbachianum* is only subspecifically distinct from *P. panduriforme*. Consequently, it will be treated as a variety here and will be redescribed in detail, for as up to now it has been very poorly known. A key for the separation of the two varieties is provided. Figs. 273, 276-278.

Key to varieties of *Philodendron panduriforme* (H.B.K.) Kunth

A. Blades 1.1-1.9 times longer than broad (averaging 1.3 times longer than broad); medial lobes 1.4-2.8 times longer than lateral lobes. .. .. var. *panduriforme*

B. Blades 2.3-3.2 times longer than broad (averaging 2.6 times longer than broad); medial lobe about 4 times longer than the lateral lobes; known only from vicinity of San Carlos de Río Negro. ..... var. *reichenbachianum* (Schott) Croat

Hemiepiphyte, loosely climbing to 1.5-3 m on trees.

Juvenile plants with internodes 3-9 cm long, to 1 cm diam., the dried epidermis light brown, ridged longitudinally and cracked perpendicular to axis. LEAVES with petioles 8-12 cm long, ca. 5 mm diam.; blades oblong-oblanceolate, 22-27.5 cm long, 7-7.7 cm wide, broadest well above the middle, narrowest about 5 cm above the base (3.9-5.1 cm wide) just above the slightly flaring "lateral lobes" (these together 4.9-6.1 cm wide), narrowly long-acuminate at apex, broadly acute to weakly attentuate at base.

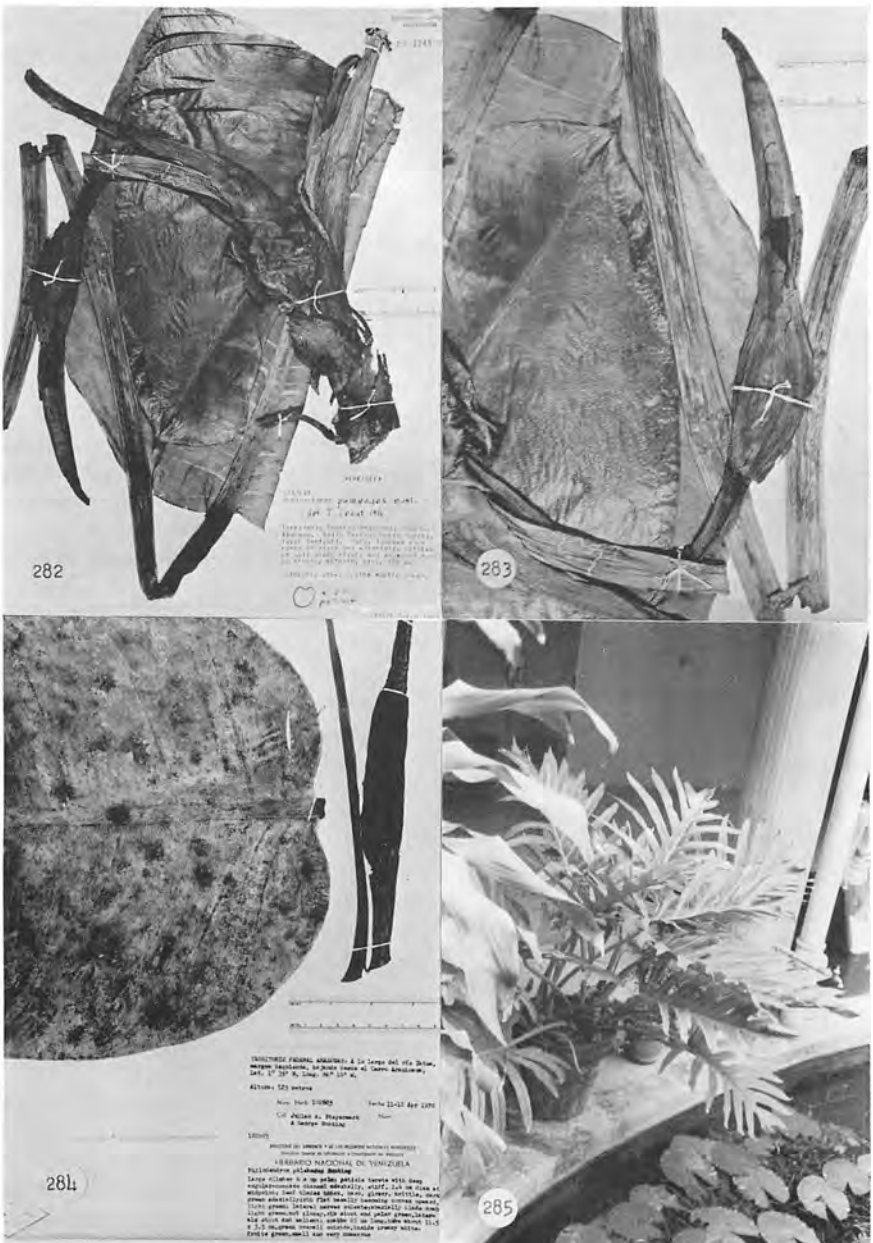
Adult plant with stems elongate to 3 m or more long, sometimes branching; roots 1- several at each node, mostly less than 15 cm long, 3-4 mm diam.; internodes 3-10 cm long, 1-2.5 cm diam, dark green, turning light brown, semiglossy, somewhat flattened on one side, drying tan and deeply fissured longitudinally with large segements loosening on drying; cataphylls green, thin, sharply 2-ribbed, the ribs not prominently raised, promptly deciduous. LEAVES with petioles slightly spongy, obtusely D-shaped in cross-section, with an obtuse medial rib adaxially near the base, broadly convex abaxially near the apex, to 28.5 cm long, ca. 6 mm diam.; blades moderately coriaceous, to 47 cm long, ca. 20 cm wide, broadest across the lateral lobes, more or less panduriform, the medial lobe ca. 38 cm long, ca 14.3 cm wide, broadest well above the middle, briefly acuminate at apex, gradually tapered toward the base and ca. 6 cm wide at its narrowest point (ca. 10.5 cm above the base); lateral lobes bluntly hastate to almost rounded, slightly directed toward the base or spreading outward at a 90° angle to the midrib, ca. 13 cm long; blade surface dark green and semi-glossy above, much paler and matte on lower surface; midrib broadly convex above, prominent, scarcely paler than the surface, more or less concolorous and convex below; primary lateral veins arising at a 50-60° angle from the midrib, slightly and obtusely sunken above, raised and convex below (only slightly more prominent than laterals on drying); minor veins obscurely visible below. INFLORESCENCE solitary, much shorter than the petioles; peduncles slender, to 10.5 cm long, terete, ca. 5 mm diam.; spathe green (post anthesis) drying reddish brown, 9.7 cm long, weakly constricted ca. 4.5 cm above the base, weakly coriaceous; spadix 9.5 cm long, the pistillate portion ca. 4.5 cm long, the upper 5 spirals of flowers not pollinated, pistils ca. 5 mm long; stigma with a thick button-like center, depressed medially and with a broad, irregularly rounded skirt around it to 8-9 mm diam., its margin erose; spadix with staminate portion 5 cm long; sterile staminate portion with flowers in 2 spirals, slightly thicker than the fertile staminate portion, the flowers irregular, ca. 2 mm long and 1.6 mm wide at apex, weakly sulcate medially; fertile staminate portion cylindroid, tapered to a blunt tip, the flowers flattened at apex, very irregularly 4-5 sided, 0.3-1 mm diam. INFRUCTESCENCE with immature fruits white, 3.5-4.0 mm long (dried); mature fruits not known.

Variety *reichenbachianum* is known only from mature virgin lowland forests near San Carlos de Río Negro in southern Amazonas of Venezuela at about 120 m. It occurs with the variety *panduriforme*, but is much rarer. After considerable search, only a single large individual was located. The thought has occurred to me that, being so rare, it could be a hybrid, probably between the typical variety of *P. panduriforme* and another species with an elongate leaf blade, perhaps *Croat 59629*.

Variety *panduriforme* is distinguished by its proportionally longer medial lobe and proportionally shorter lateral lobes. See the discussion following the typical variety. Aside from leaf shape, the two varieties agree in most characteristics.

Philodendron pedatum (Hook.) Kunth, Enum. Pl. 3: 49. 1841.

Philodendron pedatum is a highly variable species ranging throughout northeastern South America, from Venezuela to the Guianas and Brazil (Amapá and Pará to Ceará). In Venezuela, it occurs in Delta Amacuro, Bolívar and Amazonas in the east and Apure in the west. It should be expected all across the northern Amazon region since it is common along the Río Orinoco and Río Negro drainage, as well as in the forests around



Figs. 282-285. 282-283. *Philodendron phlebodes* Bunting. Venezuela. Amazonas: Cerro Yureba, 350 m, *Liesner 18690*. ----284. *P. phlebodes*. Venezuela. Amazonas: Río Yatua, 125 m. *Steyermark & Bunting 102605*. ----285. *P. pinnatifidum* (Jacq.) Schott. Cultivated, Caracas. Habit, x1/23.

Cerro Neblina near the Brazilian border in southern Amazonas. Figs. 279-280

It is characterized by its deeply 3-lobed leaves, which are irregularly and narrowly or broadly lobed, often almost to the base. It is a member of section *Schizophyllum* and its confused with no other species in Venezuela. Its closest relatives, *P. bipennifolium* Schott and *P. quinquelobum* Krause, are species from southern Brazil or the western Amazon basin in Peru, respectively.

Philodendron phlebodes Bunting, Acta Bot. Venez. 10: 306. 1975.

Philodendron phlebodes is apparently endemic to southern Venezuela and adjacent Colombia from 125 to 900 m. Figs. 282-284

The species is characterized by its epiphytic habit, thick stems with long, persistent cataphylls, sulcate petioles and ovate, more or less coriaceous blades with primary lateral veins conspicuous.

The species is poorly understood. Bunting (1979) describes the petiole as narrowly and deeply sulcate adaxially, but *Liesner 18690,* otherwise matching the species, reports shallowly and obtusely sulcate petioles. In addition, while some collections have spathes which are pale green or whitish within, others have the interior of the spathe tube scarlet red. While there is considerable variation in the dried condition of specimens from various parts of Bolivar and Amazonas, it would appear to be no more variable than *P. pulchrum;* perhaps *P. phlebodes* will prove inseparable from that species. The two species would appear to differ in no major character and *P. phlebodes* in Venezuela is distinguished only by growing on rocks or epiphytically.

Philodendron pinnatifidum (Jacq.) Schott, Wiener Z. Kunst 3: 780. 1829.

Philodendron pinnatifidum is currently believed to be endemic to Venezuela in the Cordillera de la Costa, known only from the Henri Pittier National Park in Aragua east to Cerro Naiguatá in the Distrito Federal and to Guatopo Park and Cerros del Bachiller in Miranda State. Figs 281, 285

The species, a member of sect. *Macrolonchium,* is distinguished by its epiphytic habit, its short, thick stems with short internodes hidden by dense, persistent, cataphyll fibers, its sharply sulcate petioles, its more or less rosulate leaves with blades deeply and pinnately lobed, with some of the lower lobes sinuate or lobed.

The species is most easily confused with *P. fendleri* in Venezuela, but that species is a vine with long internodes, deciduous cataphylls, subcylindric petioles and less deeply lobed blades.

Philodendron pinnatifidum could also be confused with *P. houletianum* from Guyana which Engler placed in section *Polytomium* along with *P. fendleri.* Engler states that *P. houletianum* has leaves sub-bipinnately parted with up to 12 lobes, a terete petiole, a "short" peduncle, and the female portion of the spadix is only slightly shorter than the male portion. In all these aspects it differs from *P. pinnatifidum.*

Philodendron ptarianum Steyermark, Fieldiana, Bot. 28(1): 99. 1951.

Philodendron ptarianum is known from Guyana and Venezuela at 460-1,690 m. In Venezuela, it is known only from Bolívar and Amazonas. Sites not reported by Bunting (1979) include Bolívar — Cerro Guaiquinima as well as Icabarú — Santa Elena and Río Chicanán on the Gran Sabana and Amazonas — Cerro Marahuaca and Río Casiquiare.

The species is recognized by its coriaceous, waxy, oblong, long-petiolate blades with usually rounded or obtuse bases and a smooth upper surface with all of the veins more or less equal. It also has persistent, intact cataphyll fibers.

The species is most easily confused with *P. callosum,* which has a similar

habit and similar leaves, but that species differs in having veins which are closely and deeply sunken on the upper surface. Figs. 286-288

Philodendron pulchrum G. M. Barroso, Arch. Jard. Bot. Rio de Janeiro 15: 92. 1957.

= *Philodendron remifolium* Schultes, *Rhodora 66: 124. 1964.*

TYPE: Colombia: Vaupés, Río Paca, *Schultes & Cabrera* 19553 (ECON, holotype).

Figs. 289-290, 294-295

Philodendron pulchrum ranges from southern Venezuela to Brazil (Roraima and Amazonas), Colombia (Vaupés and Putumayo) and Peru (Amazonas, Loreto and San Martín), at 115-1,250 m.

The species is recognized by its coriaceous, ovate-elliptic to oblong-elliptic blades which are obtuse to rounded or weakly subcordate at base, its sharply to obtusely sulcate petioles and its long pedunculate inflorescence (1 per axil) with the spathe usually green on the outer surface and described variously as white, green or pinkish within. Sometimes the outer surface is spotted reddish, especially toward the base. The plant's habit is variable. In Venezuela, where it is common in Amazonas in the Department of Río Negro, the species is usually terrestrial. Elsewhere, it is usually a hemiepiphyte, clambering to considerable heights in trees. (See photos of population at San Carlos de Río Negro, Amazonas, Venezuela and at Macoa in Putumayo, Colombia).

The species is closely related to a group of Venezuelan species, especially *P. dunstervilleorum, P. phlebodes* and *P. pimichinense* and is perhaps not separable from the latter. *Philodendron pimichinense*, known only from the area north of the Río Guainía between Maroa and Yavita, differs in having more slender, typically almost oblong, blades. Like *P. pulchrum* in Venezuela, it is a terrestrial, erect herb; aside from blade shape and less conspicuous primary lateral veins, it differs little from *P. pulchrum*.

Philodendron phlebodes is also similar to and perhaps inseparable from *P. pulchrum*. See that species for differences.

Another closely related species from Bolívar is *P. dunstervilleorum*. Bunting (1979) indicates that this species differs by having moderately smooth blades with interprimary veins lying between each pair of primary lateral veins (also true of *P. phlebodes*). Though Bunting (1979) did not mention the inner spathe surface, one collection, believed to be *P. dunstervilleorum (Croat 54250)*, has the inner surface of the spathe maroon (see that species for additional comments).

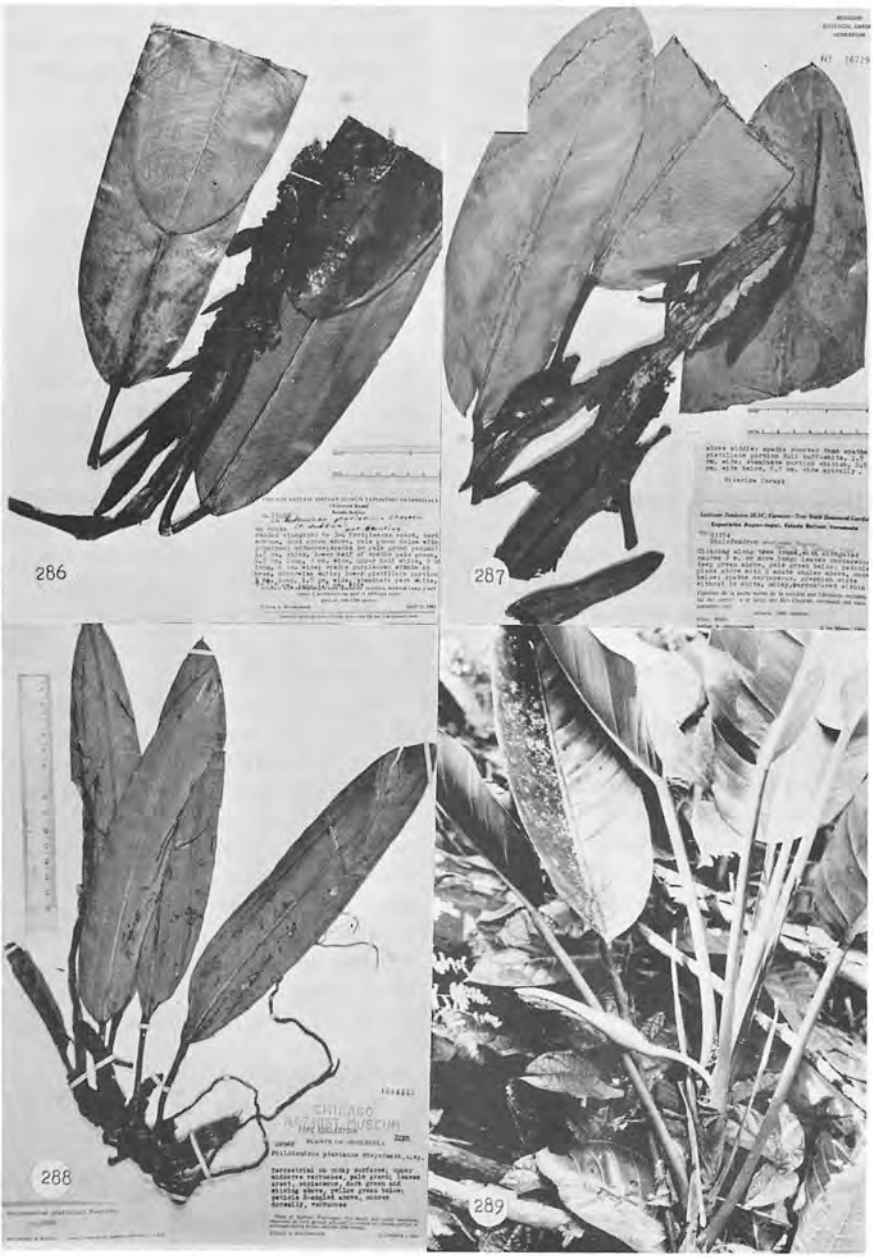
Less closely related, though perhaps confused with *P. pulchrum*, is *P. dyscarpium* Schultes. It differs in having much smaller leaves and a spathe tube that is maroon within. (See photo under that species).

Philodendron rhodoaxis Bunting, Acta. Bot. Venez. 10: 308. 1975.

Philodendron rhodoaxis is endemic to the Cordillera de la Costa in cloud forests at 1,150-1,500 m. It is currently known from only Aragua, Yaracuy and Trujillo.

It is a typical member of section *Pteromischum* and is abundant in the forests at the summit in Pittier National Park along the road between Maracay and Ocumare. Figs. 291-293

The species is characterized by having the petiole sheath end well below the leaf base, by its oblong-elliptic to ovate blades with 10-14 prominently arcuate primary lateral veins and by having the axis of the spadix pinkish when fresh. (Bunting, 1979).



Figs. 286-289. 286-288. *Philodendron ptarianum* Steyermark. 286. Venezuela. Bolívar: Chimantá Massif, 850-1100 m, *Steyermark 75099*. 287. Venezuela. Bolívar: Auyan-Tepuí, *Steyermark 93254*. 288. Venezuela. Bolívar: Ptari-Tepuí, *Steyermark 59682*. ----289. *P. pulchrum* G. M. Barroso. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59257*. Habit, x1/9.

Philodendron roraimae Krause, Pflanzenreich, IV 23Db (Heft 60): 123. 1913. Figs. 296-298, 302.

Philodendron roraimae is endemic to the Guiana Highlands from Venezuela, Brazil and, without doubt, Guyana, ranging from the northern escarpment forest south of El Dorado to Cerro Roraima in the south, at 700 to 1,660 m.

The species is a large, rosulate epiphyte characterized by the thick, persistent, sharply 2-ribbed cataphylls (remaining more or less intact apically, coarsely fibrous at base), the subterete petioles (somewhat flattened adaxially with an obtuse medial rib), which are somewhat asperous near the apex, the coriaceous, broadly ovate, deeply cordate, semiglossy blades (with midrib and posterior rib paler green) and by the paired inflorescences, which are bright red on the tube outside and greenish white within, while the blade is greenish white on both surfaces.

The species is not easily confused with any other, though it has leaf blades and cataphylls somewhat like larger plants of *P. chimantae*. However, that species differs in having a petiole which is usually conspicuously winged-angled, at least on the adaxial surface.

Philodendron rudgeanum Schott, Synop. Aroid. 78. 1856.

Philodendron rudgeanum ranges from Trinidad and the Guianas to Brazil (Amapá) and Venezuela. In Venezuela, it ranges from Bolívar and Delta Amacuro in the east to Yaracuy, Portuguesa, Mérida and Trujillo. Most specimens were collected at 1,200-2,000 m. Although the material from the three more western states mentioned above matches the type reasonably well, *Steyermark & Dunsterville 112358*, from Bolívar State, differs in having the primary lateral veins obscure above and only faintly visible below. *Davidse & Gonzalez 16269*, from Delta Amacuro, also differs in having larger leaves (to 22 cm long) and occurs at only 0-200 m.

The species is a typical member of section *Pteromischum*, and is characterized by the petiole being winged-vaginate all the way to the base of the blade and often with the apex of the sheath overlapping the base of the blade. The blades are small (less than 22 cm long and 7.5 cm wide) drying somewhat brownish below and somewhat ashen gray on the upper surface. Blade shape is relatively variable, from ovate-elliptic to oblong-elliptic or somewhat oblanceolate. Figs. 299-300

In most respects it is similar to *P. krauseanum*, but that species has thicker, less narrowly acuminate leaves drying more brown or blackened above and petioles which are not sheathed all the way to the apex. In addition, the stems of *P. krauseanum* are more conspicuously ribbed on drying.

Philodendron cf. ***sagittifolium*** Liebm., Vidensk. Meddel. Dansk Naturhist. Foren Kjøbenhavn 17. 1849.

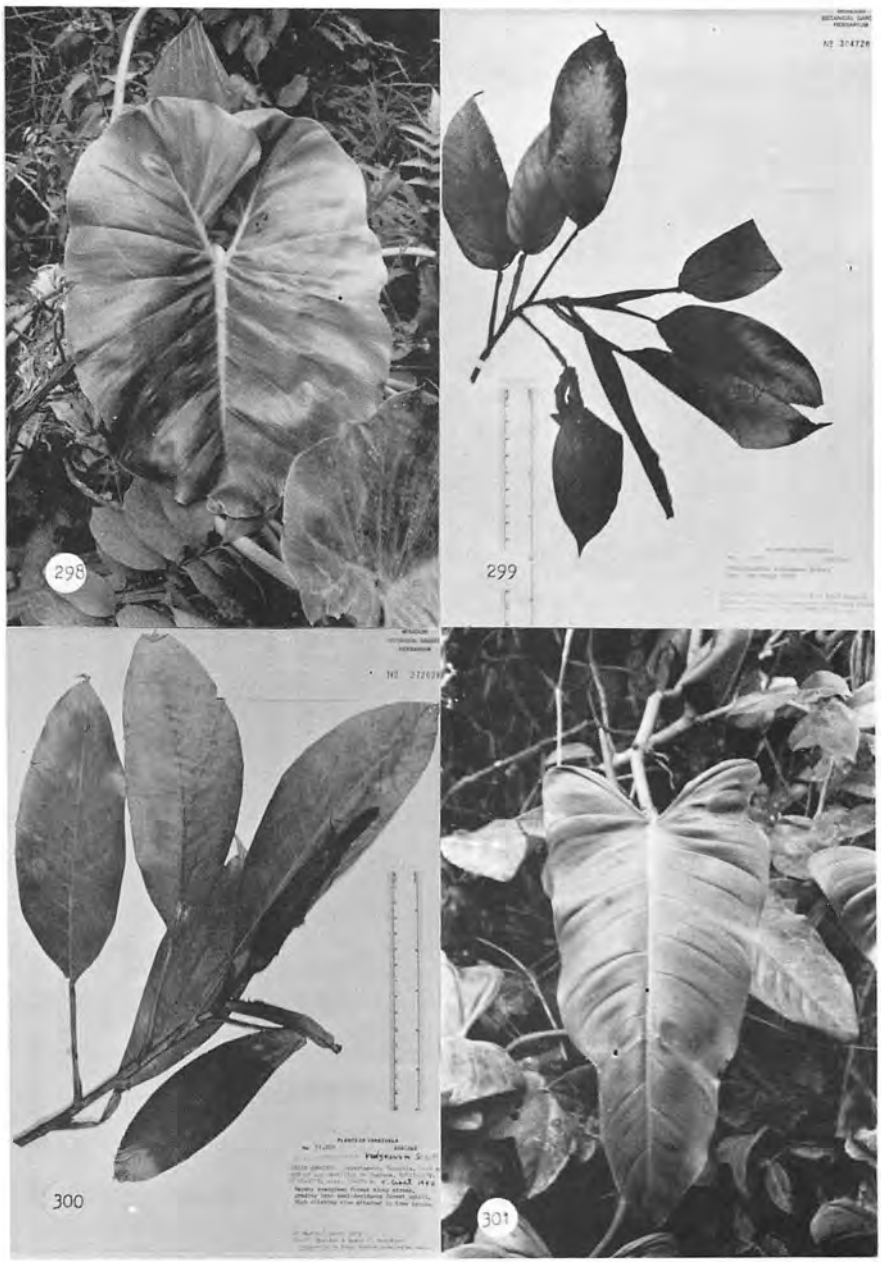
A collection from the Cordillera de la Costa in Yaracuy in the cloud forest above Salom *(Croat 60804)* does not key out well in Bunting's 1979 treatment for *Philodendron* of Venezuela. It is, perhaps, *P. sagittifolium* Liebm. from Central America, differing only slightly from typical material of that highly variable, widespread species. More studies are needed to determine if *Philodendron sagittifolium* does occur in Venezuela. Figs. 301, 303-304, 306

Philodendron scandens C. Koch & Sello, Ind. Sem. Hort. Berol. App. 14. 1853.

Philodendron scandens ranges from Mexico to Panama (on both slopes of the Continental Divide), Colombia and Ecuador (at least as far south as Los Ríos Province) on the Pacific slope and from Venezuela to the Guianas, Brazil, Peru and Bolivia in the Amazon basin. In Venezuela, it is widespread though seldom collected, known at sea level to 900(1,200) m, from the Cordillera de la Costa in Aragua, and in Yaracuy, along

Figs. 290-293. 290. *Philodendron pulchrum* G. M. Barroso. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59257*. Inflorescence, x6/25. ----291-293. *P. rhodoaxis* Bunting. Venezuela. Aragua: Henri Pittier National Park, 1150-1200 m, *Croat 60597*. 291. Stem and leaves, x1/8. 292. Leaves, x1/5. 293. Leaves, x1/5.

Figs. 294-297. 294-295. *Philodendron pulchrum* G. M. Barroso. 294. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59257*. 294. Leaf, x1/8. 295. Colombia. Putumayo: Macoa, *Croat 51761*. Flowering shoot, x1/9. ----296-297. *P. roraimae* Krause. Venezuela. Bolívar: Gran Sabana, Sta. Elena - El Dorado, 1070 m, *Croat 54300*. 296. Stem with weathered cataphyll fibers x1/4. 297. Stem with inflorescence, x1/6.



Figs. 298-301. 298. *Philodendron roraimae* Krause. Venezuela. Bolivar: Sta. Elena - El Corado on the Gran Sabana, 1070 m, *Croat 53400.* Leaf, x1/6. ----299-300. *P. rudgeanum* Schott. 299. Venezuela. Trujillo: ESE of Boconó, 1600 m, *Liesner et al. 12849.* ----300. Venezuela. Delta Amacuro: Tucupita, 50-200 m, *Davidse & Gonzalez 16269.* ----301. *P. cf. sagittifolium* Liebm. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60804.* Leaf, x1/6.

Figs. 302-305. 302. *Philodendron roraimae* Krause. Venezuela. Bolívar: Gran Sabana, Sta. Elena - El Dorado, 1070 m, *Croat 54300.* Habit, x1/31. ----303-304. *P. cf. sagittifolium* Liebm. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60804.* 303. Habit, x1/15. 304. Stem with inflorescences, x1/5. ----305. *P. smaragdinum* Bunting. Venezuela. Amazonas: Puerto Ayacucho - Sanariapo, 100 m, *Croat 55063.* Habit x1/6.

the base of the Cordillera de Mérida in Táchira and Apure as well as in eastern Venezuela in Delta Amacuro and Bolívar (Río Paragua; Icabarú, near the Brazilian border). Fig. 307

The species is one of the commonest, most widespread species in the genus. It is distinguished by its scandent habit, long internodes somewhat flattened on one side, the terete petiole, the moderately coriaceous, broadly ovate blades with an obovate sinus and a posterior rib that is not at all naked. It is similar to both *P. acutatum* and *P. smaragdinum*. Both differ in having terete stems; both *P. acutatum* and *P. smaragdinum* also differ in having fewer numbers of ovules per locule (Bunting, 1979). In addition, *P. acutatum* differs in having a more triangular blade, which is considerably longer than broad (more broadly ovate in *P. scandens*).

Philodendron smaragdinum Bunting, Acta Bot. Venez. 10: 311. 1975.

Philodendron smaragdinum is endemic to Venezuela, known only from Amazonas at less than 200 m, from the type locality at the base of Cerro Duida (central part of the state) and near Puerto Ayacucho. At Puerto Ayacucho, the plant was found growing atop huge granite boulders in partial shade.

The species is characterized by its scandent habit, elongate, smooth internodes, deciduous, unribbed cataphylls, its long, obtusely flattened petioles and by its broadly ovate, moderately thin, semiglossy, moderately small blades. Fig. 305

It is at least superficially similar to *P. scandens*, which differs in having the internodes flattened on one side and in having many more ovules per locule. In Bunting's key (1979) the species keys out with *P. acutatum*, since both species have 1-4 ovules per locule. *Philodendron acutatum* differs from *P. smaragdinum* in having blades usually much larger than 20 cm long (versus usually smaller than 20 cm long for *P. smaragdinum*), in having prominent primary lateral veins (versus moderately obscure on the lower surface, at least on drying, for *P. smaragdinum*) and 6-11 locules per pistil (versus usually 3, rarely 4, in *P. smaragdinum*).

Philodendron solimoesense A. C. Smith, J. Arnold Arbor. 20: 289. 1939.

Philodendron solimoesense ranges from northern Venezuela to the Guianas, Brazil (Amapá, Amazonas), Colombia (Vaupés) and Peru (Loreto) at elevations of less than 250 m. In Venezuela, the species occurs in Miranda near the Caribbean coast, in seasonally dry forests between Carnearo and Chirimena as well as in the Cerros del Bachiller. It is also known from north of the Guiana Highlands in Bolívar (Tumeremo-Bochinche road) with extensions along the Guiana coast to Amapa in Brazil, as well as in southern Venezuela in Amazonas (Río Yatua at base of Cerro Arauicaua) and Apure (widespread). Figs. 308-309

This species, one of the few truly high-growing canopy epiphytes in the Amazon basin, often occurs high on the tree branches well above the crown. The species seems to manage this difficult feat by obtaining nutrients from its huge roots that extend all the way to the ground. The roots are heavily armed with spine-like protuberances.

It is similar to *P. venezuelense*, which also may be a crown epiphyte, but the latter species seems to thrive better as a terrestrial plant in sandy areas such as around San Carlos de Río Negro (where individuals may attain immense size). See the discussion following that species for separation of these two taxa.

Philodendron sphalerum Schott, Prodr. Syst. Aroid. 235. 1860.

= *P. longepetiolatum* Engl., Bot. Jahrb. 1:483. 1881. French Guyana, *Melinon* (P).

Figs. 306-309. 306. *Philodendron* cf. *sagittifolium* Liebm. Venezuela. Yaracuy: Salom - Candelaria, 1260-1290 m, *Croat 60804.* Inflorescences, x1/6. ---- 307. *P. scandens* C. Koch & Sello. Venezuela. Yaracuy: Salom - Candelaria, *Croat 60808.* Habit, x1/15. ----308-309. *P. solimoesense* A. C. Smith. Brazil. *Harley et al. 10705. 308. Leaf. 309. Inflorescences.*

Philodendron sphalerum ranges from Venezuela to Guyana, Surinam and French Guiana from 100-500 m. In Venezuela, the species is known only from Amazonas along the Río Casiquiare *(Steyermark 102673).* It is the first report for Venezuela.

The species is recognized by its appressed-climbing habit, moderately long internodes, its long-petiolate, elliptic to elliptic-lanceolate blades which dry green, are acuminate at the apex and truncate to obtuse at the base, somewhat decurrent on the petiole. Also characteristic are the paired, slender, long-pedunculate inflorescences with a green spathe, which is not constricted above the base.

Philodendron longepetiolatum, synonymized here for the first time, has been reported from Guyana and French Guiana. It had been separated by having longer petioles and blades and by having terete petioles. However, these characters have broken down on closer inspection and the two taxa are therefore united.

Philodendron steyermarkii Bunting, Acta Bot. Venez. 10: 312. 1975.

Philodendron steyermarkii, known until recently only from Venezuela, is known from Brazil (Roraima), Colombia (Vaupés) and Peru (Loreto) at 125-800 m. In Venezuela, it is known from southern Bolívar (vicinity of Santa Elena and Icabarú as well as Caño Pablo, a tributary of Río Caura) and in Amazonas (Cerro Arauicaua, vicinity of Pimichín and along the Río Cataniapo).

The species is distinguished by its high climbing habit, long, slender internodes, terete petioles, the ovate-oblong blades with scarcely any development of primary lateral veins and with a subcordate base. The inflorescence is creamy, suffused with lilac outside on the tube and purple-magenta inside on the tube. Fig. 310

Herbarium material is perhaps most easily confused with *P. ptarianum,* but the latter differs in having short internodes, a creeping habit, sulcate petioles and waxy blades.

Philodendron strictum Bunting, Phytologia 60 (5):328. 1986.

Philodendron strictum is endemic to Venezuela, known only from the vicinity of the Tamá massif on Cerro Las Minas SSW of San Cristóbal near Santa Ana at 110-1330 m.

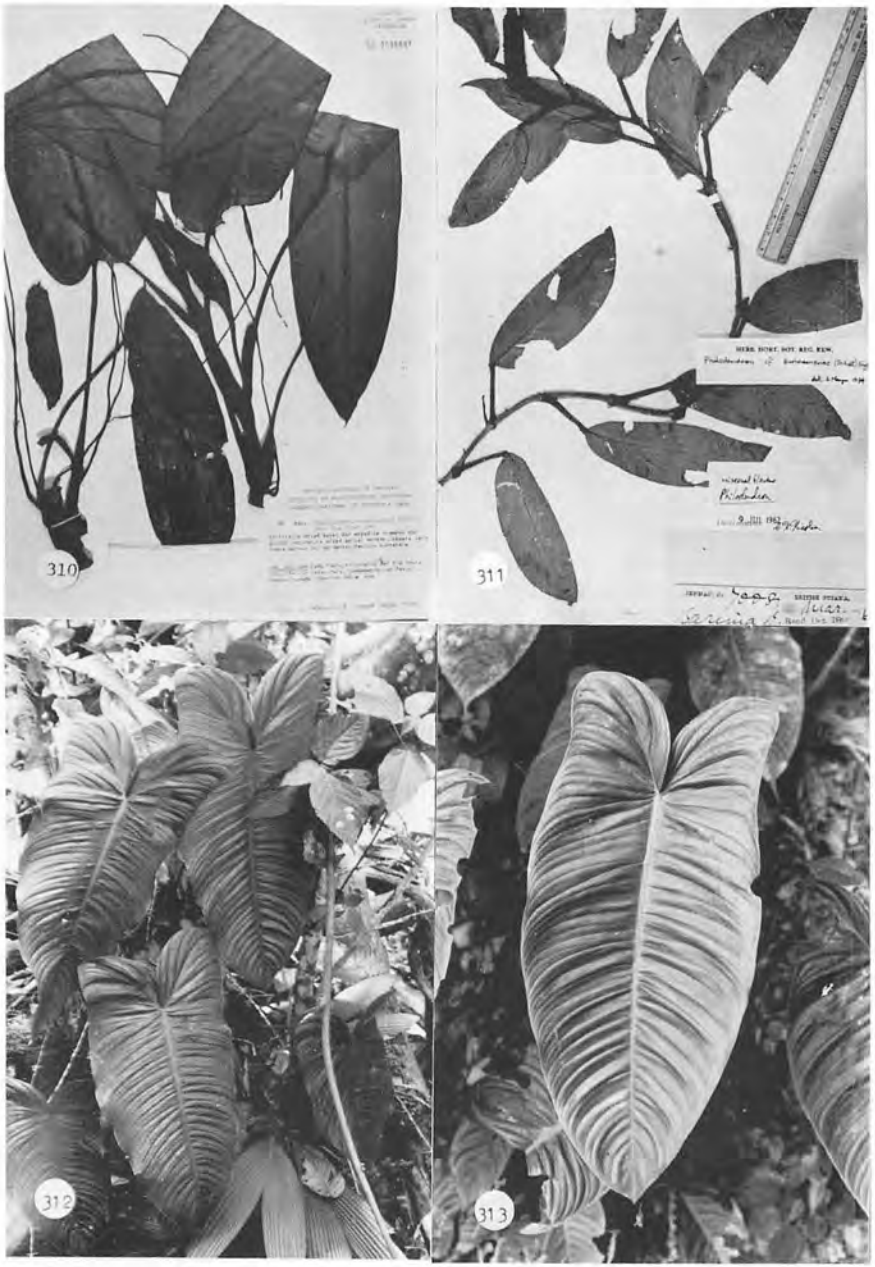
The species is characterized by its thick stems, short internodes, thick, sharply 2-ribbed cataphyll which persists semi-intact at upper nodes (eventually deciduous), by its subterete petiole (weakly flattened at apex and obtusely sulcate at base) and by its broadly ovate blades with a hippocrepiform sinus and 3-5 broadly spreading primary lateral veins. Especially characteristic is the dried petiole which has a conspicuous yellow epidermis.

The species is a member of Sect. *Polyspermium* (Bunting, 1986) and is similar to *P. cundinamarcense* Croat, sp. nov. ined. from Colombia, which differs in having a matte blade with closer primary lateral veins and a narrower sinus. Also an apparent relative is *P. hebetatum* Croat & Grayum sp. nov. ined. from Costa Rica, Panama and Colombia. That species differs in having triangular-ovate blades and a spathe tube which is purple on the outside.

Philodendron surinamense (Miq. ex Schott) Engler, DC. Monogr. Phan. 2: 361. 1879. Fig. 311

Philodendron surinamense ranges from Venezuela (Amazonas and Bolívar) through the Guianas to Brazil and Peru (vicinity of Iquitos) from near sea level to 1,300 m.

It is a member of section *Pteromischum* and is characterized by petioles sheathed to or nearly to the base of the blade and by its rather small, oblong-elliptic (sometimes somewhat oblanceolate or lanceolate) blades lacking



Figs. 310-313. 310. *Philodendron steyermarkii* Bunting. Venezuela. Bolívar: vic. Río Cuara. *Morillo & Liesner 8924.* ----311. *P. surinamense* (Miq. ex Schott) Engler. Guyana. *Jenman 7008.* ----312-313. *P. tenue* C. Koch. Venezuela. Mérida: La Azulita - El Vigia, 760 m, *Croat 54875.* Habit, x1/8. 313. Venezuela. Táchira: San Cristóbal - La Fundación, 810 m, *Croat 60693.* Leaf blade, x1/5.

primary lateral veins. It appears to be closely related to *P. rudgeanum*, which differs in having blades with distinct primary lateral veins and which usually dry brown (versus greenish in *P. surinamense*).

Philodendron tachirense Bunting, Phytologia 60 (5):330. 1986.

Philodendron tachirense is endemic to Venezuela, known at present only from Táchira (but to be expected in adjacent Mérida), occurring at 1100-1200 m in premontane wet forest life zones. All known collections were made east of San Cristóbal, between San Cristóbal and La Florida as well as in the area between La Fundación and Pregonero. Figs. 314, 318-319

The species is recognized by its scandent habit, caducous, unribbed cataphyll, moderately spongy, more or less terete petioles, its ovate, inequilaterally ovate, subcordate to cordate blades with a triangular sinus which is broader than deep and with the posterior rib not naked. Also characteristic are the inflorescences which occur in clusters of 4-5 per axil, have unconstricted spathes with the tubes green outside, maroon within and with the blades white on both surfaces.

The species is placed in Section *Oligospermium* (Bunting, 1986) and somewhat resembles *P. azulitense*, but the latter differs in having no more than 2 inflorescences per axil, and in having a more triangular leaf blade with the posterior rib naked for up to 2 cm.

Philodendron tenue C. Koch & Augustin, Ind. Sem. Hort. Berol. App. 7. 1854. Figs. 312-313

Philodendron tenue ranges from Nicaragua to southern Ecuador (El Oro) on the Pacific slope. In Venezuela, it ranges along the foothills of the Serranía de Perijá (Zulia), through the Cordillera de la Costa (Yaracuy to the Distrito Federal at Cerro Naiguatá) and in foothills of the Cordillera de la Costa from Mérida to Apure. It is strange that the species is found on both sides of the Andes (an unusual pattern except for the most weedy of species) but still does not extend to the western Amazon basin. It should certainly be expected there.

The species is characterized by its epiphytic habit, short internodes, persistent cataphyll fibers, its more or less terete petioles (equal to or longer than the blades) and especially by the ovate to ovate-triangular blades with prominent posterior lobes, which are often directed outward. Also characteristic is the narrow to almost closed, V-shaped sinus, with the posterior ribs not at all naked. The anterior lobe has numerous, close primary lateral veins.

The species is similar to, and perhaps related to *P. maguirei*, but that species is terrestrial, has fewer, typically 3-6, primary lateral veins (versus 8 to 20 for *P. tenue*) and has petioles drying straw yellow (versus green to brown for *P. tenue*).

Philodendron trujilloi Bunting, Acta Bot. Venez. 10: 313. 1975.

Philodendron trujilloi is known only from Venezuela, occurring at 100-1,350 m in the foothills of the Serranía de Perijá in Zulia (and also E of Lago Maracaibo in the foothills of the Cordillera de Mérida) an in the Cordillera de Mérida from Yaracuy south to Táchira and Apure. Though not yet known from Barinas or Mérida, it is to be expected there. Figs. 315-317

The species is characterized by its short internodes, persistent cataphyll fibers, more or less D-shaped petioles about equalling the blades, obtuse medial ribs, large oblong-ovate blades (which dry blackened) with 8-10 sunken veins and by its long-pedunculate inflorescences.

It is confused with *P. ornatum*, which has similarly black-drying blades, a D-shaped petiole and persistent, pale cataphyll fibers. That species differs in

Figs. 314-317. 314. *Philodendron tachirense* Bunt. Venezuela. Táchira: Fundación - Pregonero, 1200 m, *Croat 60700.* Inflorescences x 3/10. ----315-317. *P. trujilloi* Bunting. 315. Venezuela. Bolívar: Gran Sabana, El Dorado - Sta. Elena, 990 m, *Croat 53995.* Habit x 1/31. 316. Venezuela. Táchira: San Cristóbal - La Fundación, 810 m, *Croat 60692.* Leaf, x1/8. 317. Leaf, x1/5.

having a more broadly ovate blade, petioles which are verrucose (at least near the apex) and proportionately shorter peduncles. The spathe of *P. ornatum* also differs in having the spathe tube purplish to maroon within, versus creamy-white within for *P. trujilloi*.

Philodendron venezuelense Bunting, Acta Bot. Venez. 10: 315. 1975.

Philodendron venezuelense is currently known only from Colombia and Venezuela (where it occurs in the drainage system of the Río Guainía and Río Negro, as well as the Casiquiare, Pacimoni and Yatua rivers). In Venezuela, it is common in the forest around the Cerro Neblina base camp and near San Carlos de Río Negro. In Colombia, it has been collected as far west as the plains along the Cordillera Oriental southwest of Florencia (presumably it ranges throughout southern Colombia to Venezuela). Figs. 320-322, 342

The species is a member of subgenus *Meconostigma,* and is characterized by having stamens about 10 times longer than broad (Bunting 1979), as well as huge stems with conspicuous leaf scars and stout roots. It is also characterized by its generally huge size, its coriaceous, deeply cordate-sagittate blades, which are borne pendent on the semi-erect to spreading, obtusely D-shaped petioles having an obtuse medial rib. The large posterior lobes may be overlapping on larger blades, with an obovate to rhombic or mitered sinus and with the posterior rib naked for 5 to 7 cm or more. Its very long, coriaceous, brown cataphylls are characteristically persistent.

The species is similar to *P. solimoesense* (also a member of subgenus *Meconostigma),* but that species differs in having deciduous cataphylls, more narrowly triangular blades, and leaf axils bearing numerous, small, stiff brownish scales. In addition, that species has less conspicuous "cross-veins" (minute veins extending between the minor veins) than does *P. venezuelense*. Specimens of *P. solimoesense* also show the frequent presence of thick, spiny roots which appear to be characteristic of this species. I do not know how consistently spiny they are, but plants I saw of *P. venezuelense* were thick but not spiny.

Philodendron venosum (Willd.) Croat, comb. nov. Figs. 323-324

= *Pothos venosa* Willd. in Roemer & Schultes, Syst. Veg 3. (Mant.): 300. 1827.
TYPE: Venezuela. Sucre: Cumaná, *Humboldt & Bonpland 3097* (B).

= *Philodendron nervosum* Kunth, Enum. Pl. 3: 51. 1841, nom. illegit.
TYPE: Same as *Pothos venosa* (see above).

= *P. broadwayi* N. E. Brown, Kew Bull. 1912: 343.
TYPE: Trinidad. Near Caledonia. *Broadway 3880* (K, holotype; G, GH, isotypes).

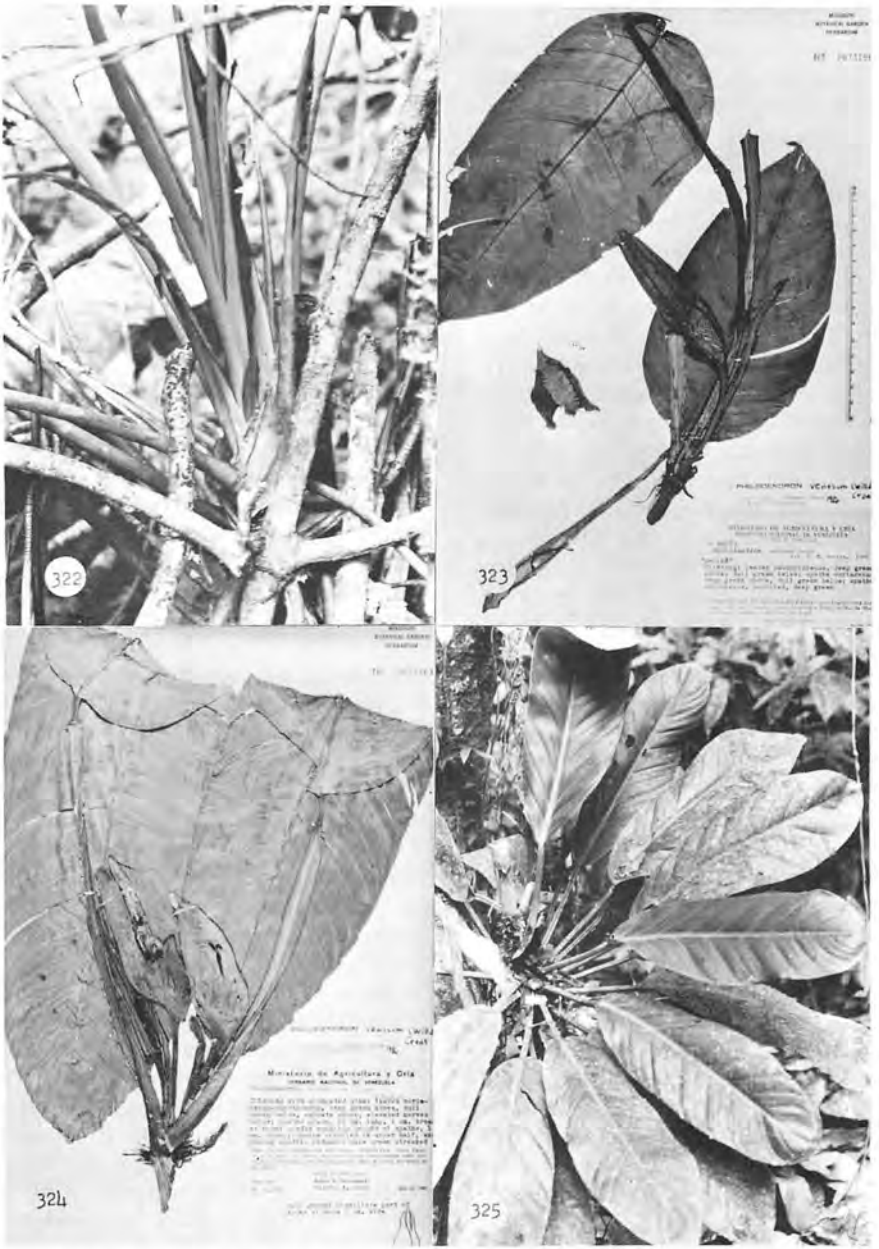
= *P. karstenianum* auctt. non Schott (1856): N. W. Simmonds, J. Ecol. 38:290. 1950; N. W. Simmonds, Kew Bull. 1950:405. 1951; Bunting, Rev. Fac. Agron. (Maracay) 10:233. 1979.

Philodendron venosum ranges from northeastern Venezuela to Trinidad. Specimens collected in Sucre (e.g., *Steyermark & Agostini 91159* and *Steyermark & Liesner 120637)* are virtually identical to material from Trinidad (e.g., *Broadway 3889, 6913).*

Mayo (Flora of Trinidad and Tobago, in press) reported it also as *P. lingulatum* (L.) C. Koch, for Colombia and Ecuador, but it probably ranges no farther west than Sucre and Monagas in the eastern end of the Cordillera de la Costa of Venezuela.

The species is characterized by its ovate to oblong-ovate or oblong-elliptic, slightly inequilateral blades with obtuse to truncate or sometimes weakly subcordate bases which dry green, and by its petioles, broadly winged usually

Figs. 318-321. 318. *Philodendron tachirense* Bunt. Venezuela. Fundación - Pregonero, 1200 m, *Croat 54951*. Habit, x1/6. 319. *P. tachirense*. Venezuela. Táchira: Fundación - Pregonero, 1200 m, *Croat 60700*. Leaf, x1/5. ----320-321. *P. venezuelense* Bunting. 320. Venezuela. San Carlos de Río Negro, 100 m, *Croat 59259*. Habit, x1/15. 321. Venezuela. Amazonas: vic. Cerro Neblina, 140 m, *Croat 59324*. Habit, x1/9.



Figs. 322-325. 322. *Philodendron venezuelense* Bunt. Venezuela. Amazonas: vic. Cerro Neblina, 140 m, *Croat 59324*. Stem x1/9. ----323-324. *P. venosum* (Willd.) Croat. 323. Venezuela. Sucre: Peninsula of Paria, Manacal - Pauje, 750-830 m, *Steyermark & Rabe 96073*. ----324. Venezuela. Sucre: Peninsula of Paria, 850-860 m, *Steyermark & Agostini 91159*. ----325. *P. venustum* Bunting. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59346*. Habit, x1/11.

to within 1-2 cm of the base of the blade (Mayo, (loc. cit.) reports them to be sometimes fully winged in Trinidad) and by having 2-3 inflorescences per axil. The peduncles are nearly as long as the relatively short, broad spathes.

The species has been confused with *P. inaequilaterum,* which has more narrowly winged petioles, blades with more numerous, broadly spreading lateral veins and a longer, more slender inflorescence. It is also similar to *P. lingulatum,* which occurs farther north in the Lesser Antilles and on Puerto Rico and Hispañola. That species differs in having a much longer, more gradually tapered spadix, and more typically ovate to narrowly ovate blades.

The current, easy access to the entire set of Schott drawings made possible with the publication of the IDC microfiche edition of Schott's "Icones Aroideae et reliquiae" (1984) makes a reinterpretation of this species possible. The species was originally published as *Pothos venosa* Willd. by J. A. & J. H. Schultes in Roemer & Schultes, Syst. Veg. 3 (Mant.) in 1827, based on a Humboldt and Bonpland collection reportedly from Novo Andulasia (Venezuela). One drawing of a specimen in the Willdenow Herbarium #3097 (collection #295) is labeled "Cumaná". Schott apparently attributed this collection to having been made at Cumaná in Sucre State of Venezuela. Modern collections from this part of Venezuela and from Trinidad have short inflorescences which are scarcely or not at all constricted above the tube.

Kunth (1841) apparently misinterpreted the spelling of the name of this species and validly but illegitimately renamed it as *Philodendron nervosum.* Schott (1856, 1860) and Engler and Krause (1913) followed this error, as did others, e.g., Simmonds (1950, 1951) and Bunting (1979). Moreover, Engler and Krause further confused things by synonymizing *P. venosum* (as *P. nervosum)* with *P. karstenianum* Schott (a species based on a Karsten collection from Colombia). That species, though having similar leaves, has a decidedly different inflorescence, with the tube and blade portions clearly demarcated by a noticeable constriction above the spathe tube (see Schott drawing 2701, 2393). With Engler and Krause's circumscription, the species included clearly unrelated material from western South America and Panama.

It is also interesting to note that although the only collections I have seen of *P. venosum* were made in northeastern Venezuela or in Trinidad, one Schott drawing (2392) was purportedly made from a Fendler collection from Colonia Tovar in Aragua. That drawing shows an inflorescence very similar to material from eastern Venezuela, but a photo of the actual specimen at Kew shows the spathe to be somewhat more constricted above the tube. Perhaps it is not *P. venosum.*

Philodendron venustum Bunting, Acta Bot. Venez. 10: 316. 1975.

Philodendron venustum is known only from Venezuela in Territorio Amazonas (Cerro Neblina, Cerro Arauicaua, Cerro Yapacana, Río Guainía, Río Orinoco and Río Negro), but it is undoubtedly in adjacent Colombia, at least in Guainía and Vichada. It occurs in evergreen forests at low elevations, mostly less than 250 m. The range of *P. venustum* will probably be found to be much wider than currently known. A collection from Colombia (Meta) (*Croat 55539),* and several from Loreto, Peru, *(Gentry et al. 29156, 29913; Vasquez 495)* are remarkably similar to *P. venustum.*

The species is an appressed-epipyte characterized by its relatively long stem with moderately short internodes and persistent cataphyll fibers. Its petioles are less than one-half to two-thirds as long as the blades, thicker than broad and obtusely sulcate, and the more or less oblong blades (3.2-4.2 times longer than wide) have an obtuse, rounded or

subcordate base. The midrib beneath is thicker than broad. The inflorescence is solitary, with a pale green spathe which is white-lineate at the base.

The species could be confused with *P. lemae*, but that species has blades only about twice as long as broad and is apparently not related to *P. venustum*, but rather to a series of other seemingly closely related species, including *P. dyscarpium* Schultes, *P. dunstervilleorum* Bunting, *P. remifolium* Schultes, *P. phlebodes* Bunting and others.

Philodendron venustum seems to be a member of section *Polyspermium* Engler, series *Caniphyllum* Schott, along with *P. cuneatum* Engler and *P. fibrillosum* Poeppig (being closer to the former). *Philodendron cuneatum* differs in having several inflorescences per node. Fig. 325

Philodendron vinaceum Bunting, Acta Bot. Venez. 10: 317. 1975.

Philodendron vinaceum is endemic to Venezuela, occurring at 700-1,300 m in the Gran Sabana of Bolívar State.

The species is a rosulate epiphytic herb characterized by its short internodes, a rotten mass of cataphylls (unribbed when fresh with the outer epidermis persisting for a time), its broadly ovate, usually moderately thick blades, which are rounded to subcordate at the base and brownish maroon when young on the lower surface. The petioles are generally somewhat shorter than the blades and are obtusely D-shaped to broadly sulcate adaxially, with usually prominent margins. The inflorescences are solitary, with the peduncle somewhat shorter than the spathe. Another unusual feature of this species is the presence of well developed "cross-veins" extending between adjacent minor veins on the lower surface (see *Croat 54316*). Fig. 326

Noteworthy is *Steyermark & Dunsterville 92760* from 1,220 m on Cerro Venamo. This sheet has a blade which dries very thin and lacks the cross-veins mentioned above. In terms of blade shape, it matches *P. melinonii* well, and it may prove to be that species. Also noteworthy is *Bunting 2857*, identified as *P. vinaceum* and marked "paratype" and which is possibly *A. fragrantissimum*.

Philodendron wurdackii Bunting, Phytologia 60 (5): 333. 1986.

Hemiepiphytic vine, the stems sometimes loosely attached to host on flowering plants, flowering at 1.5-4 m high on trunk; internodes 2-10 cm long, 1-1.5 cm diam., at least sometimes somewhat flattened on one side with distinct marginal ribs on the flattened portion, green turning brown in age, drying irregularly sulcate and fissured, the epidermis light yellowish or reddish brown, often cracking free in large pieces, sometimes with scurfy cracks perpendicular to the axis; cataphylls sharply two-ribbed, deciduous. LEAVES scattered along stem, spreading in the same direction as the petioles; petiole firm to spongy; 8-24 cm long, 1-1.5 cm diam., cross-sectional shape variable, obtusely D-shaped to somewhat triangular or obtusely flattened laterally, mostly broadly convex adaxially, the margins obtuse to acute, sheathed 2-5 cm at base, the apex at least sometimes with a dark green construction or a raised ring around the petiole; blades oblanceolate to oblong-oblanceolate, subcoriaceous, semiglossy, (35)30-40(48) cm long, 4.3-12.2 cm wide, broadest well above the middle, acuminate to abruptly acuminate, narrowed to base and rounded to weakly subcordate at base, weakly arched along the midrib, medium to dark green above, slightly paler and yellow-green beneath; midrib convex to flattened and concolorous above, raised beneath; primary lateral veins at most weakly sunken above, slightly raised beneath, drying obscure (usually scarcely or not at all distinguishable on either surface), minor veins moderately obscure both before and after drying,

Figs. 326-329. 326. *Philodendron vinaceum* Bunting. Venezuela. Bolívar: Sta. Elena - El Dorado, 1040 m, *Croat 54316*. Habit x1/6. ----327. *P. wurdackii* Bunt. Venezuela. Amazonas: vic. Cerro Neblina, 140 m, *Croat 59385*. Leaves, x1/8. ----328-329. *P. wurdackii* Bunt. Colombia. Meta: Villa Vincencio - Granada, *Croat 55538*. Inflorescences, x1/2.

arising at 45-60° angle, extending straight to the midrib. INFLORESCENCES erect, usually paired, less frequently 3 per axil; peduncle terete, darker green than the spathe, 4-10(14) cm long, 5-7 mm diam. (about one-third as long as, to somewhat longer than the spathe); spathe 7-13 cm long, subcoriaceous, outside glossy, tube ca. 4-5 cm long, 2 cm diam., light green on tube, cream on blade, inside creamy white, weakly constricted about midway; spadix almost sessile or with stipe to 1.3 cm long, white at anthesis (or shortly after anthesis), straight and extending 1-3 cm beyond the end of the spathe (persisting protruding through the end of the reclosed spathe), the pistillate portion 2.3-5.7 cm long, up to one-third or to almost one-half as long as the staminate portion of the spadix, 6-11 mm diam.; the pistils (dried) 1-1.2 mm long, 0.5-0.6 mm wide; stigma brown, button-shaped, 4-5 mm diam., depressed medially, the center often raised (the stigma thus looking like a small wheel with a central hub, often also with a series of small cavities around the hub), with a thin, whitish, more or less translucent, broad skirt around the base of the stigma (these overlapping with one another in juvenile stage, making the sides of the pistil not visible and disappearing altogether after enthesis), ovary 6-locular, locules uniovulate; staminate portion 5-8.2 cm long, 6-11 mm diam., bluntly tapered to apex, broadest at upper one-third, narrowest 2-2.5 cm from base, the staminate flowers irregularly 4-5 sided, truncate and smooth at apex, 1-1.5 mm wide in one direction, frequently flattened and much narrower in the other dimension. INFRUCTESCENCE not seen.

Philodendron wurdackii ranges throughout the northern Amazon region, extending from southern Venezuela, northern Brazil (Amazonas, Rio Japura, Rio Demeny) to southern Colombia (Vaupés, Meta), Ecuador (Napo and Pastaza) to Peru (Loreto) and occurs at 120-1,130 m. In Venezuela, it is known only from Amazonas (Río Yatua, San Carlos de Río Negro and base of Cerro Neblina). Figs. 327-329

It is probably a member of section *Oligospermium* series *Belocardium* and is apparently related to a series of scandent, hemiepiphytic species with more or less elongate leaves with frequently soft petioles and rounded to subcordate leaf bases. It is perhaps closest to *P. heterophyllum* Poeppig, *P. uleanum* Engler and *P. wittianum* Engler, but differs from all of these in having only inconspicuous primary lateral veins which are not at all apparent on drying, whereas the above species have comparatively prominent primary lateral veins even on drying.

Bunting (1979) treated this species as *P. paxianum* Krause (although he reported that the inflorescences extended up to the middle of the subtending blade, whereas they are more frequently shorter, sometimes scarcely as long as the petiole or even shorter than the petiole), but that species, like the others mentioned above, has prominent primary lateral veins. In my opinion, *P. paxianum* is probably closely related to the others mentioned in section *Oligospermium*, series *Belocardium* and I believe Engler erred in placing it in section *Baursia* with *P. linnaei*, *P. insigne* and others.

BRAZIL. AMAZONAS: basin of Rio Demeni, vic Tototobi, *Prance et al. 10234, 10312* (NY); Mpio. Maraã, Rio Japurá, environs of town of Maraã, Lago Maraã, 1°51'S, 65°36' W, *Plowman et al. 12204* (NY).

COLOMBIA. AMAZONAS-VAUPES: Río Apaporis, Soratama (above mouth of Río Kananarí), 0°5'N, 70°40'W, 300 m, *Schultes & Cabrera 15106* (US). META: along road to San Luis de Cubarral, 0.5 km W of North-South hwy. between Villavicencio and Granada, 3°45'N, 73°45'W, 550 m, *Croat 55538* (JAUM, MO).

ECUADOR. NAPO: 3 km N of Lago Agrio, between Lago Agrio and Río San Miguel, 0°5'N, 76°50'W, 450 m, *Croat 50305* (MO); 17 km W of Lumbaque (70 km W of Lago Agrio), 1,130 m, *Gentry 12575* (MO); Canyon Putumayo, Río Aguarico, Dureño, 500 m, *Plowman et al. 4045* (GH); Río

Wai si ayá, tributary of Río Aguarico, 1.5 km upriver, 0°15'S, 76°21'W, 300 m, *Brandbyge et al. 32676* (AAU); Parque Nacional Yasuní, Añangu, 0°31'S, 76°23'W, 270 m, *Luteyn et al. 9023* (MO); Río Cuyabeno, near Puerto Montufar, 0°6'S, 76°1'W, 230 m, *Holm-Nielsen et al. 21311* (AAU); Nuevo Rocafuerte, *Harling et al. 7273* (MO). PASTAZA: Río Bobonaza, oil exploration camp Chichirota, 2°22'S, 76°40'W, 300 m, *Ollgaard et al. 35293* (MO); road from Puyo to Baños, 5.7 km W of Shell, 1°26'S, 78°9'W, 1,070 m, *Croat 59079 (MO)*.

PERU. LORETO: Prov. Loreto, between Bartra and San Jacinto, Río Tigre, 2°30'S, 75°45'W, 200 m, *Diaz & Jaramillo 1386* (AMAZ, MO); Prov. Requena, Dtto. Jenaro Herrera, Río Yavarí, 7 km, *Juan Revilla 1239* (MO).

VENEZUELA. TERR. FEDERAL AMAZONAS: Río Yatua, toward Cerro Arauicaua, 1°35'N, 66°10'W, 125 m, *Steyermark & Bunting 102595* (MO, MY, NY, US, VEN); Ríos Pacimoni-Yatua, Casiquiare, 100-140 m, *Maguire et al. 37446*, holotype (NY); Río Casiquiare, between Pueblo Viejo and Yacami, 1°50'N, 66°30'W, 100 m, *Steyermark & Bunting 102673* (MY); Casiquiare, Yavita region, Río Temi, 5 km from Pimichín, 125-140 m, *Bunting et al. 3869* (MY); 20 km S of Ríos Negro-Casiquiare confluence, 2 km E of San Carlos de Río Negro, 1°56'N, 67°3'W, 120 m, *Liesner 6311* (MO); 3 km NE of San Carlos de Río Negro, *Liesner 6774* (MO); 4 km NE of San Carlos de Río Negro, 1°52'N, 67°2'W, *Liesner 8656* (MO); Dpto. Río Negro, lower part of Caño Baria above Río Baria, 1°N, 66°20'W, 130 m, *Liesner 17075* (MO).

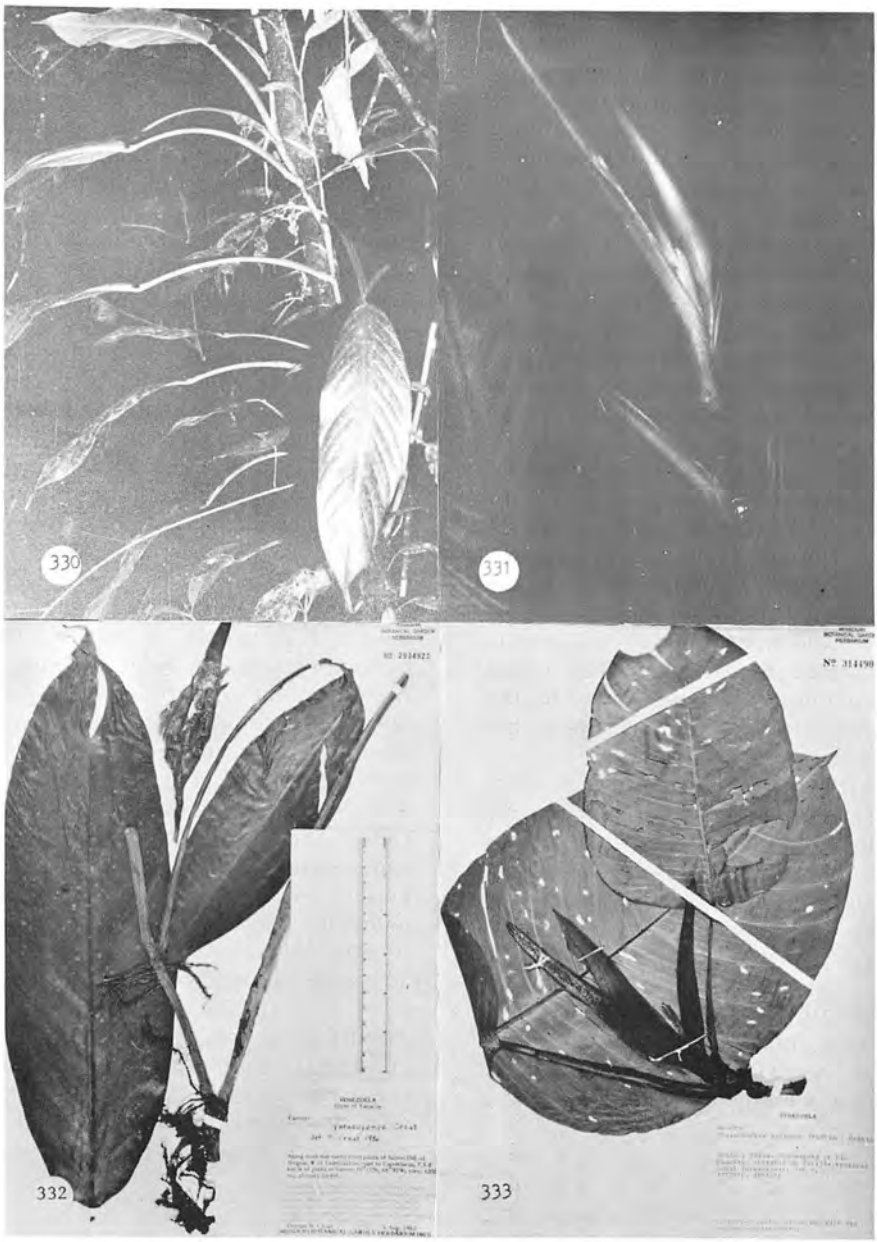
Philodendron yaracuyense Croat, sp. nov. Figs. 330-332

TYPE: Venezuela. Yaracuy: along road due N from Central plaza in Salom (NE of Nirgua, W of Valencia) on road to Candelaria, 7.5-8 km N of plaza in Salom, 10°11'N, 68°30'W, 1,200 m, primary forest, *Croat 54652A* (MO 2934923, holotype).

Planta hemiepiphytica; internodia 6-10 cm longa, 1-1.5 cm lata; petiolus 27-32 cm longus, alatus; lamina oblonga-elliptica ad lanceolata-elliptica, 25-39 cm longa, 7.5-10.4 cm lata, anguste acuminata, basi obtusa ad oblonga-lanceolata; nervis lateralibus 5-7; inflorescentia 2; pedunculus 4 cm longus; spatha viridis, 13 cm longa; baccae ignotae.

Hemiepiphyte; stems creeping up tree trunks to 2 m or more, densely rooted at the nodes, sometimes branching; internodes 6-10 cm long, 1-1.5 cm diam., green drying yellowish brown (B & K yellow ca. 7/7.5) with longitudinal sulcae and narrow, sharp ridges. LEAVES with petioles 27-32 cm long, broadly spreading, broadly sheathed to within 1-1.5 cm of the apex, broadly sulcate above the sheath, drying yellowish brown like the stems, the sheath drying green, erect to spreading, to 10 mm or more broad when flattened midway on petiole, both sides rounded at apex, both the petiole and sheath drying with conspicuous, short, pale raphides visible; blades thin, oblong-elliptic to lanceolate-elliptic 25-39 cm long, 7.5-10.4 cm wide, held at ca. 180° angle from petiole and weakly arched along the midrib, narrowly long-acuminate at apex, acute to obtuse at base, the surface glossy when fresh, dark green above, only slightly paler beneath (drying semiglossy, dark greenish brown above, olive green beneath); primary lateral veins 5-7, obtusely and weakly sunken above (scarcely or not at all visible on drying), weakly raised beneath (drying slightly paler than the surface), arising at ca. 50° angle from the midrib, moderately arcuate to the margins; minor veins obscure above when fresh (drying weakly raised), obscurely visible beneath (drying weakly raised and about as prominent as the primary lateral veins, but not pale).

INFLORESCENCES 2 (possibly 3) per axil; peduncles terete, 4 cm long, ca. 5 mm diam.; spathe semiglossy, green both inside and outside, to 13 cm long; tube narrowly oblong-ovoid, ca. 1.7 cm diam., not constricted at the apex; blade narrowly pointed at the apex; female spadix drying 3 cm long, 1.3 cm diam., tapering slightly to both apex and base, ca. 9 mm diam. at base, ca 8.5 mm diam. at apex; flowers in ca. 25 spirals, pistils 2-2.3 mm long, the stigma capitate, ca. 1 mm diam., somewhat resinous and covered with short, stigmatic bristles; staminate spadix white, 6-5 cm long, the sterile staminate sec-



Figs. 330-333. 330-332. *Philodendron yaracuyense* Croat. Venezuela. Yaracuy: N of Salom, 1200 m, *Croat 54652A*. 330. Habit, x1/6. 331. Inflorescence, x1/12. 332. Leaves. ----333. *P. zulianum* (Bunting) Bunting. Venezuela. Zulia: Río Guasare, 280 m, *Gentry 41155*.

tion ca. 5 mm long, the fertile spadix ca. 1.5 cm diam., tapered toward the apex, abruptly narrowed in the lower 1 cm portion of spadix and ca. 9 mm diam.

INFRUCTESCENCE not seen.

Philodendron yaracuyense is known only from the type locality growing in the understory of primary forest at 1,200 m. It is a member of section *Pteromischum*, recognized by its yellowish brown, sharply ridged dried stem, the broadly winged petiole with the sheath extending almost to the apex and the long, thin, more or less oblong-elliptic, long-acuminate blades drying with the primary lateral veins only visible on the lower surface.

Because of its broadly sheathed petiole and elongate blades, it is most similar to *P. lingulatum* and *P. rhodoaxis*. With the former, it also shares a yellow-brown, coarsely ribbed dried stem, but *P. lingulatum* differs in having proportionately much broader blades (usually less than 2.5 times longer than broad and rounded at the base) and in having the primary lateral veins clearly visible on the dried upper surface.

Pilodendron rhodoaxis differs from *P. yaracuyense* in having a relatively smooth, green dried stem, and blades which generally dry gray to gray-green, with up to 14 moderately prominent primary lateral veins (versus 5-7 and moderately obscure in *P. yaracuyense*).

Philodendron zulianum (Bunting) Bunting, ined.

(= *P. inequilaterum* Lieb. ssp. *zulianum* Bunting Acta Bot. Ven. **10**: 299. 1975)

TYPE: Venezuela. Zulia, SW of Mision de Los Angelos de Tokuku (Tocucu) SW of Machiques, along Quebrada Perayra, tributary of Rio Tokuku (Tocucu), 450-475 m, *Steyermark 99865* (VEN, holotype; US, isotype). Fig. 333

This species is apparently restricted to northwestern Venezuela in the State of Zulia, along the slopes of the Serrania de Perija at 250-475 m.

Although Bunting (1979) reported the species (as *P. inequilaterum* ssp. *zulianum)* for Tachira as well, that material *(Bunting 2501)* is probably *P. calatheifolium* Bunting, sp. nov. ined. A recent collection of *P. calatheifolium* was found in Tachira (Croat 60705), made in the vicinity of Repressa Dorada between Pregonero and La Fundacion. It is superficially very similar to *P. zulianum*, having stems which dry similarly (though more yellow than brown) with deep furrows and acute ridges and it has blades of similar shape and size (less than 1.5 times longer than broad). It also occurs at a much higher elevation (1,350 m) and has a blade that is velvety above with the minor veins on the lower surface distinct and darker than surface when fresh, but drying scarcely raised and lacking any cross-veins between the minors. *P. zulianum*, on the other hand, is not described as velvety above and has the minor veins below very prominent with a conspicuous, mostly anastomosing network of cross-veins. It is in this latter regard, also, that *P. zulianum* is distinguished from *P. inequilaterum* Liebm. The latter species, which is more widespread in Venezuela, is distinguished by having more elongate blades (generally more than twice as long as broad) which have distinct cross-veins arranged perpendicular to the minor veins in a regular, scalariform fashion (not irregular and anastomosing as in *P. zulianum)*. Another feature separating these two species is spathe tube color (outside), being green in *P. inequilaterum* and tinged red-purple for *P. zulianum*.

RHODOSPATHA

Rhodospatha badilloi Bunting, Acta Bot. Venez. 10: 318. 1975.

Rhodospatha badilloi is endemic to Venezuela, occurring at about 1,600 m

in cloud forests of the Cordillera de la Costa and perhaps also in Lara (Parque Nacional Yacambú) according to Bunting (1979). Fig. 334

It is characterized by its high-climbing epiphytic habit, generally elongate internodes, winged petioles which extend to the base of the geniculum and coriaceous, somewhat brittle elliptic blades (Bunting, 1979).

The species is similar to *R. moritziana* (Schott) Croat, but the latter differs in having shorter internodes, in being terrestrial and generally occurring in dense colonies along the steep banks of streams below 1,400 m.

Rhodospatha bolivarana Bunting, Acta. Bot. Venez. 10: 319. 1975.

Rhodospatha bolivarana is endemic to Venezuela, known for certain at an elevation of more than 500 m in Bolivar (Río Canaracuni) but is surely also in Amazonas at Cerro de la Neblina at 140 m *(Liesner 15978).* Fig. 335

The species is distinguished by its scandent habit, its oblong-elliptic, somewhat inequilateral blades and especially by the margins of the sheath, which extend along the full length of the geniculum (at which point the margins are crisped) and are continuous with the margins of the blade.

Rhodospatha moritziana Schott, Oester. Bot. Wochenbl. 7(14): 109. 1857.

Anepsias moritzianus (Schott) Schott, Gen. Aroid. pl. 73. 1858.

Monstera moritziana (Schott) Steyerm., Fieldiana Bot. 28: 819. 1957.

Rhodospatha moritziana (Schott) Croat, Flora of Barro Colorado Island, Stanford Univ. Press. 1978, p. 219.

Rhodospatha moritziana (Schott) Bunting, Rev. Fac. Agron. (Maracay) 10(1-4): 256. 1979.

Rhodospatha moritziana ranges from Costa Rica south to Peru and east to Venezuela at elevations from sea level to 1,300 m. In Venezuela, it is found in the Cordillera de la Costa (Yaracuy, Aragua, Miranda) and in the Cordillera de Mérida (Táchira). Fig. 336

It reaches 3 meters in height, and is characterized by its short internodes, its sheathed, sharply sulcate petioles, which are longer than the blades, and its papyraceous, elliptic-ovate blades. Its inflorescence has a coral, yellowish or creamy, slightly tapered spadix, and a boat-shaped, white spathe. *Rhodospatha moritziana* is especially distinguished by its terrestrial habit. It can only be confused by *R. cf. picta* Nichols, which has a petiole shorter than its blade.

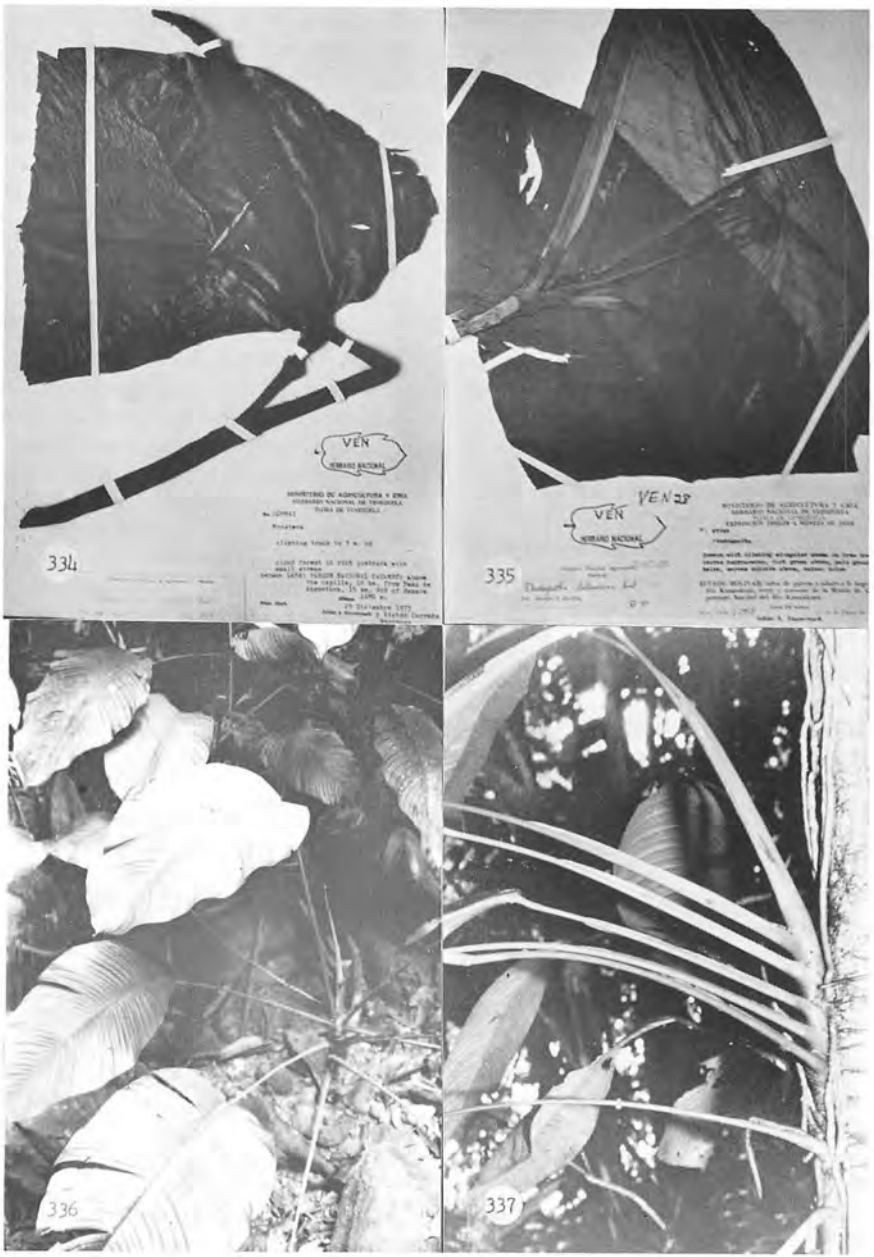
Until only a few years ago, the Oesterreichisches Botanisches Wochenblatt was unavailable in the U.S., which accounts for the above combinations made in *Rhodospatha*. The publication is apparently very rare even in Europe, and the copy at the Vienna Natural History Museum may be the only existing copy.

Rhodospatha oblongata Poeppig in Poepp. & Endl, Nov. Gen. Sp. 3: 91. 1845.

Rhodospatha oblongata ranges from Venezuela to Surinam, Brazil and Peru. In Venezuela, it is known from Bolívar and Amazonas at 125-1,200 m.

The species is recognized by its appressed, epiphytic habit, distichous leaves with long-petiolate, moderately small, acuminate, narrowly oblong-elliptic blades (generally less than 11 cm wide). The species is not confused with any other species in the part of Venezuela where it occurs. Figs. 337, 343

Two other species occur in the region, and both differ by having longer internodes (being scandent rather than appressed epiphytic creepers). *Rhodospatha bolivarana* has much larger leaves (to 19 cm wide), which have sheath margins continuous with the base of the blade (ending well below the base of the blade in *R. oblongata*). *Rhodospatha venosa* differs in having a propor-



Figs. 334-337. 334. *Rhodospatha badillo* Bunting. Venezuela. Lara: Yacambú Park, *Steyermark & Espinoza 108841*. ----335. *R. bolivarana* Bunting. Venezuela. Bolívar: Rio Kanarakuni, 400 m, *Steyermark 97798*. ----336. *R. moritziana* (Schott) Croat. Venezuela. Aragua: Henri Pittier Park, 970 m, *Croat 60579*. Habit, x1/6. ----337. *R. oblongata* Poepp. Venezuela. Amazonas: vic. Cerro Neblina, 140 m, *Croat 59387*. Habit, x1/8.

tionately much broader blade, which is rounded rather than attenuate at the base.

Rhodospatha venosa Gleason, Bull. Tor. Bot. Club 56: 12. 1929.

Rhodospatha venosa ranges from Guyana to northeastern Brazil (Amapá) from 120-400 m. In Venezuela, it occurs only in Amazonas at Cerro Yapacana, Río Cataniapo, south of Pto. Ayacucho, Río Yatua below Cerro Arauicaua, San Carlos de Río Negro, Río Temi near Yavita and in the vicinity of Maroa along the Río Guainía. Figs. 376-379.

It is distinguished by its climbing habit, its long, smooth, brown-drying internodes and its inequilateral, ovate-elliptic to oblong-elliptic blades, which dry brown with the primary lateral veins moderately conspicuous and somewhat paler than the surface when dried.

The species is very similar to *Heteropsis steyermarkii* Bunting, but that species has somewhat smaller leaves which dry blackened and have the primary lateral veins less conspicuous. In addition, the latter species lacks trichosclereids in the leaf blades (present but sparse in *Rhodospatha venosa*).

SCHISMATOGLOTTIS

Schismatoglottis bolivarana Bunting & Steyermark, Brittonia 21: 187, fig. 1,2. 1969.

Schismatoglottis bolivarana is endemic to Venezuela, where it is known from Bolívar (Gran Sabana — Meseta de Jaua on Río Kanarakuni and Cerro Piton on Río Chicanan) and from Amazonas on the Caño Caname at 95-400 m. The species may grow on steep muddy banks or in white sand savannas, often in wet areas. It is distinguished from *S. spruceana* by its ovate blades. Figs. 338-339

Schismatoglottis spruceana (Schott) Bunting var. ***spruceana,*** Ann. Missouri Bot. Gard. 47: 70-71. 1960.

Schismatoglottis spruceana var. *spruceana* ranges throughout the lowlands of the northern Amazon basin from Vaupés in Colombia to Territorio Amazonas in Venezuela, south to Amazonas in Brazil, occurring at less than 150 m, usually in sandy soil, in full sun or partial shade.

It is distinguished by its clumping, terrestrial habit, small size (less than 40 cm), lanceolate, acuminate leaf blades, and more or less *Philodendron*-like inflorescence. The only other taxa of *Schismatoglottis* in Venezuela are *S. bolivarana,* from Bolívar, which has leaf blades cordate and more than 8 cm wide (versus 2.5-6 cm wide), and *S. spruceana* var. *williamsii,* with blades no more than 1.8 cm wide. Figs. 340-341

SPATHIPHYLLUM

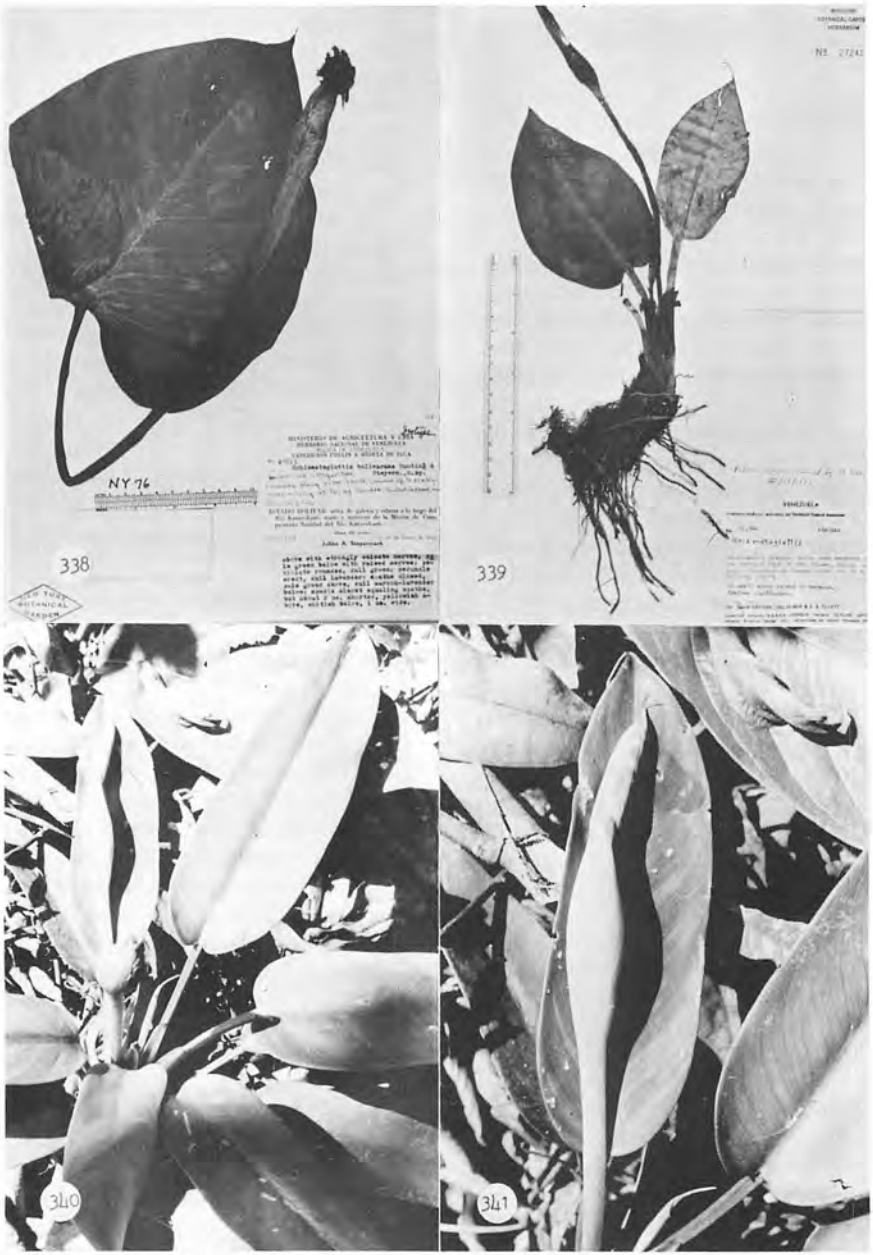
Spathiphyllum cannaefolium (Dryand.) Schott, Gen. Aroid. 1: 1, t. 1. 1853.

Spathiphyllum cannaefolium ranges throughout the moist forest life zones of northern South America. It is found from the Amazon basin of Peru, Ecuador, SE Colombia and Venezuela to the Guianas, Trinidad, and northern Venezuela at elevations ranging from sea level to 1,200 m. Figs. 344, 346-347

In Venezuela, it ranges from Zulia (W of Lake Maracaibo) on both sides of the Cordillera de Mérida (Táchira, Mérida, Barinas, Trujillo), southeast through Apure, Amazonas and Bolívar and north to Monagas and Sucre, and the Delta Amacuro.

It is characterized by its white (maturing green), scarcely tapered, stipitate spadix and ovate to lanceolate, white (sometimes with a green exterior) spathe, and especially by its tepals, which are completely fused.

Spathiphyllum humboldtii Schott, Gen. Aroid. 1 c. t. 2. 1853.



Figs. 338-341. 338-339. *Schismatoglottis bolivarana* Bunting & Steyermark. 338. Venezuela. Bolívar: Río Kanarakuni, 400 m, *Steyermark 97811.* Isotype. 339. Venezuela. Atabapo, 95 m, *Davidse et al. 17044.* ---- 340-341. *S. spruceana* (Schott) Bunting. Venezuela. Amazonas: San Carlos de Río Negro, 100 m, *Croat 59255.* 340. Flowering and early fruiting plant, x3/10. 341. Inflorescence, x13/20.

Spathiphyllum humboldtii ranges from southern Venezuela to Guyana, Surinam, French Guiana, Brazil (Pará and Roraima) and Peru (Loreto) at less than 1,000 m, occurring in sandy soil along water courses. Figs. 345, 362

The species is recognized by its moderately small stature (less than 1 m tall), petioles longer than the blades, more or less oblong-lanceolate blades with veins arising at 45-60° angle, its lanceolate, non-decurrent, green, reflexed spathe and especially by its stipitate, more or less oblong, green spadix with bluntly exserted styles (drying acutely pointed and black and contrasting sharply against the much paler ovary).

The species is most easily confused with *S. liesneri* Croat, known from the general area of southern Venezuela. The latter species, known only from the vicinity of San Carlos de Río Negro. occurs in similar habitats in white sand soils along the edge of streams. It differs from *S. humboldtii* in having a white spathe and spadix, (both drying brown), styles barely acute on drying (merely mammiliform) and by leaves equally as long as the petioles, drying dark brown above and yellow-brown below.

In contrast, *S. humboldtii* has blades drying gray-green above, yellow-green below and has petioles 1.3-1.6 times longer than the blades.

Spathiphyllum liesneri Croat, sp. nov. TYPE: Venezuela. Amazonas: Caño de Tremblador, 10 km NE of San Carlos de Río Negro, 1°57'N, 67°3' W, 120 m, *Liesner 3607* (MO 2639296, holotype; VEN, isotype).

Planta rupicola; internodia minus quam 1 cm longa, ca. 1.3 cm diam.; petioli 71 cm longi, vagina usque ad dimidium longitudinis petioli; laminae subcoriaceae, oblongae-lanceolatae, acutae inaequilaterliter ad basim, 49 cm longae, 12.5 cm latae; pedunculi 70 cm longi; spatha alba, oblonga-elliptica, 19.5 cm longa, 6 cm lata; spadix albus, 8 cm longus, 8 mm diam.

Terrestrial; stem probably erect, at least 6 cm long; internodes shorter than broad, less than 1 cm long, ca. 1.3 cm diam., brown when dried; roots grayish brown when dried, velutinous, slender and elongate, somewhat tapered at apex, at least 7 cm long, 0.5-3 mm diam. LEAVES more or less erect; petioles 71 cm long, on drying 4-5 mm diam.; geniculum drying darker than petiole, 3.5 cm long, sheathing up to one-half of petiole, the sheath inequilaterally ending with one side rounded and the other narrowly rounded; blades subcoriaceous, oblong-lanceolate, gradually acuminate (the acumen probably inrolled) inequilaterally acute at base, 49 cm long, 12.5 cm wide, broadest in the lower one-third of the blade; both surfaces matte when dried, dark brown above, paler, yellowish brown below; midrib flat above when dried, raised, probably higher than broad below, slightly darker than surface; primary lateral veins ca. 15 per side, departing midrib at 35-50° angle, straight or arcuate ascending to the margin, weakly raised above, more prominently raised below; interprimary veins raised on both sides, almost as conspicuous as primary lateral veins above, slightly less conspicuous than primary lateral veins below; lesser veins weakly visible when dried. INFLORESCENCES with peduncle 70 cm long, 5-7 mm diam., more or less equalling petioles, brownish when dried; spathe subcoriaceous, white,; oblong-elliptic, 19.5 cm long, 6 cm wide, broadest at or near middle, the apex long acuminate, the acumen 25 mm long, the base somewhat decurrent; stipe 2.7 cm long in front; spadix white when fresh, brown on drying, more or less cylindroid, slightly curved, held at 170° angle from peduncle, 8 cm long, 8 mm diam.; pistils poorly preserved, mammilate at apex, with numerous trichosclereids in their walls, dark brown

when dried, the ovary 3(?) locular, the ovules ca. 12(?), 4(?) per locule; anthers drying yellowish brown, 0.6-0.8 mm long, 0.7-0.9 mm wide, seemingly sessile, withdrawn beneath staminodia; thecae oblong, 0.3-0.4 mm wide, not divcaricate or very slightly divaricate, the staminodia shorter than pistils, somewhat clavate, 1-1.2 mm long.

Spathiphyllum liesneri is known only from the type locality in Territorio Amazonas of Venezuela near San Carlos de Río Negro at 120 m. Fig. 348

The species is characterized by occurring along stream banks in white sand soils, by having petioles about as long as blades, oblong-lanceolate blades which dry dark brown above and yellow-brown below and especially by its large, oblong-elliptic, white spathe, which is somewhat decurrent at the base, long acuminate at the apex and dries brown and by the somewhat knobby, white, more or less oblong spadix, which dries brown with mammilate pistils.

The species is named in honor of Mr. Ronald Liesner of the Missouri Botanical Garden. It is most easily confused with *S. humboldtii*. See that species for differences.

Spathiphyllum monachinoi Bunting, Mem. N.Y. Bot. Gard. 10(3): 19, fig. 5. 1960.

Spathiphyllum monachinoi ranges from southern Venezuela to northern Brazil (Pará) at 100-200 m. In Venezuela, it is known from Bolívar (Río Parguaza) and Amazonas (Department of Atabapo, near Cerro Cururito). Fig. 349

Plants grow to 50-70 cm tall. The species is distinguished from other, similar species in Venezuela (e.g., *S. jejunum* Bunting, *S. schomburgkii* Schott and *S. neblinae* Bunting, by its much longer blades.

Spathiphyllum neblinae Bunting, Mem. N.Y. Bot. Gard. 10(3): 25, fig. 5. 1960.

Spathiphyllum neblinae is endemic to Venezuela, known from Amazonas at Cerro Neblina and Cerro Yureba on the lower Río Ventuari and from Bolívar at Cerro Marutani on the Paramichi River and on the Pano River at 140-400 m, occurring on rocks or mossy banks of streams. Fig. 350

Two collections from Bolívar are probably also this species: *Liesner & Brewer 12498*, collected at 400 m along the Río Paramichi east of Cerro Marutani (3°N, 62°W) and *Cardona 2965*, collected along the Río Pano, a tributary of the Río Caura at 390 m.

The species is closest to *S. schomburgkii*, but is distinguished by having a thinner blade 4.5-5.5 times longer than broad, which dries with the primary lateral veins more prominent (Bunting, 1979).

Spathiphyllum perezii Bunting, Acta Bot. Venez. 10: 321. 1975.

Spathiphyllum perezii is endemic to Venezuela, known from both slopes of the Cordillera de Mérida at 125-1,000 m (localities include El Vigia and El Quince in Mérida and the vicinity of Represa Dorada in Táchira). Figs. 351-352

It is distinguished by its long petiolate, more or less elliptic, somewhat inequilateral, caudate-acuminate blades which dry brownish with many close primary lateral veins (1.3-2.4 cm apart) and drying scarcely more prominent than the interprimary veins. It has a white, ovate-lanceolate, caudate-acuminate spathe and a white spadix.

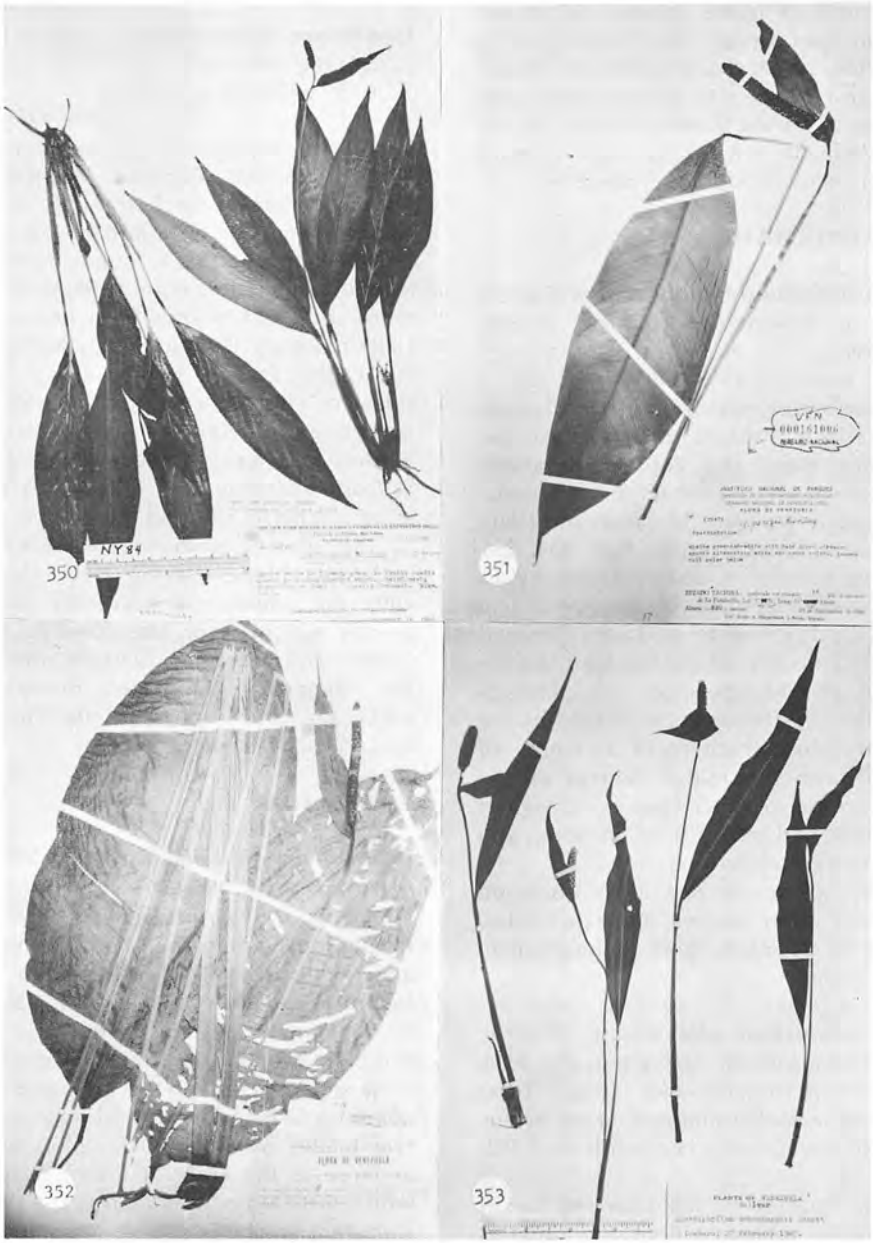
The species is perhaps related to *S. fulvovirens* according to Bunting (1979), but it differs from that species in having a longer, more slender petiole, a thinner blade and by its caudate-acuminate spathe.

Spathiphyllum schomburgkii Schott, Oestr. Bot. Wochenbl. 7: 158. 1857.

Spathiphyllum schomburgkii ranges from Venezuela to Guyana at 150-900 m.

Figs. 342-345. 342. *Philodendron venezuelense* Bunt. Venezuela. San Carlos de Río Negro, 100 m, *Croat 59259*. Habit, x1/108. ----343. *Rhodospatha oblongata* Poepp. Venezuela. Amazonas: vic. Cerro Neblina, 140 m, *Croat 59387*. Leaves, x1/8. ----344. *Spathiphyllum cannaeifolium* (Dryand.) Schott. Cultivated, Lyon Arboretum. Flowering plant, x1/6. ----345. *S. humboldtii* Schott. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59568*. Habit, x1/18.

Figs. 346-349. 346-347. *Spathiphyllum cannaeifolium* (Dryand.) Schott. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59302*. 345. Habit, x1/5. 347. Inflorescence, x6/25. ----348. *S. liesneri* Croat. Venezuela. Amazonas: vic. San Carlos de Río Negro, 120 m, *Liesner 3607*. Type. ---- 349. *S. monachinoi* Bunting. Venezuela. Bolívar: Río Parguaza, 115 m, *Wurdack & Monachino 41056*. Holotype.



Figs. 350-353. 350. *Spathiphyllum neblinae* Bunting. Venezuela. Amazonas: *Maguire et al. 36797*. Holotype. ----351-352. *S. perezii* Bunting. 351. Venezuela. Táchira: SW of La Fundación, 920 m, *Steyermark & Manara . 125471*. 352. Venezuela. Mérida: El Vigia - La Fria, *Bunting 3136*. ---- 353. *S. schomburgkii* Schott. Venezuela. Bolivar: Icabarú. Collector unknown.

It is generally less than 50 cm tall with long-petiolate blades 5-7 times longer than broad. It is closest to *S. neblinae*, which shares a blade of similar size and shape. It differs from that species in having blades that dry usually yellowish brown, with the primary lateral veins moderately obscure. Fig. 353

STENOSPERMATION

Stenospermation multiovulatum (Engler) N. E. Brown, Gard. Chron. 1: 684. 1894.

=*S. steyermarkii* Bunting

Stenospermation multiovulatum ranges from Panama to Venezuela, the Guianas, Brazil and Peru at elevations from sea level to 2,100 m. In Venezuela, it occurs in Bolívar (Chimantá) and Delta Amacuro (Río Cuyubini). Figs. 354, 364

The species is distinguished by its oblong-oblanceolate blades (24-56 cm long, 7.5-10 cm wide) and fully sheathed petioles, usually much shorter than the blades (8.5-30 cm long). Also characteristic is the acute angle formed by the lateral veins which form an angle of 15-20° with the midrib (versus usually much more in other species) as well as the long peduncle (33-52 cm long) and the hexagonal flowers.

The species is not easily confused with any other species. It is expected to prove to be much more widespread in Venezuela.

Stenospermation ulei Krause, Notizbl. Bot. Gart. Berlin-Dahlem 6: 113. 1914.

Stenospermation ulei ranges from Venezuela to Guyana and Brazil occurring in the Guiana Highlands at 1,100-2,300 m.

The species is characterized by its elliptic to oblong-elliptic, moderately thick blades, more or less equalling the petioles; especially characteristic is its cernuous spathe and spadix, and the fact that the spathe generally is long persistent, even into fruiting the stage (rather than caducous as is the general case in this genus). Fig. 356

SYNGONIUM

Syngonium podophyllum Schott, Bot. Zeitung (Berlin) 9: 85. 1851.

= *S. vellozianum* Schott

Figs. 357-358

Syngonium podophyllum ranges from Mexico to the Guianas, Brazil and Bolivia, occurring on both sides of the Andes at least as far south as Los Ríos Province in Ecuador. It ranges from sea level to usually less than 1,000 m, being more abundant below 750 m, and especially between 100 and 500 m. In Venezuela, the species ranges along both sides of the Cordillera de Mérida, occurring in Apure, Zulia, Táchira, Barinas and also in the Cordillera de la Costa (Yaracuy and Aragua), as well as in northern lowland Bolívar.

The species is distinguished by its pedatisect blades having 3-5 divisions, with the outermost segments prominently auriculate on the outer margin. Other distinguishing features include the somewhat elongate internodes, milky sap and especially the clusters of 4-11 inflorescences per axil.

UROSPATHA

Urospatha sagittifolia (Rodsch.) Schott, Aroid. 1: 4. 1853.

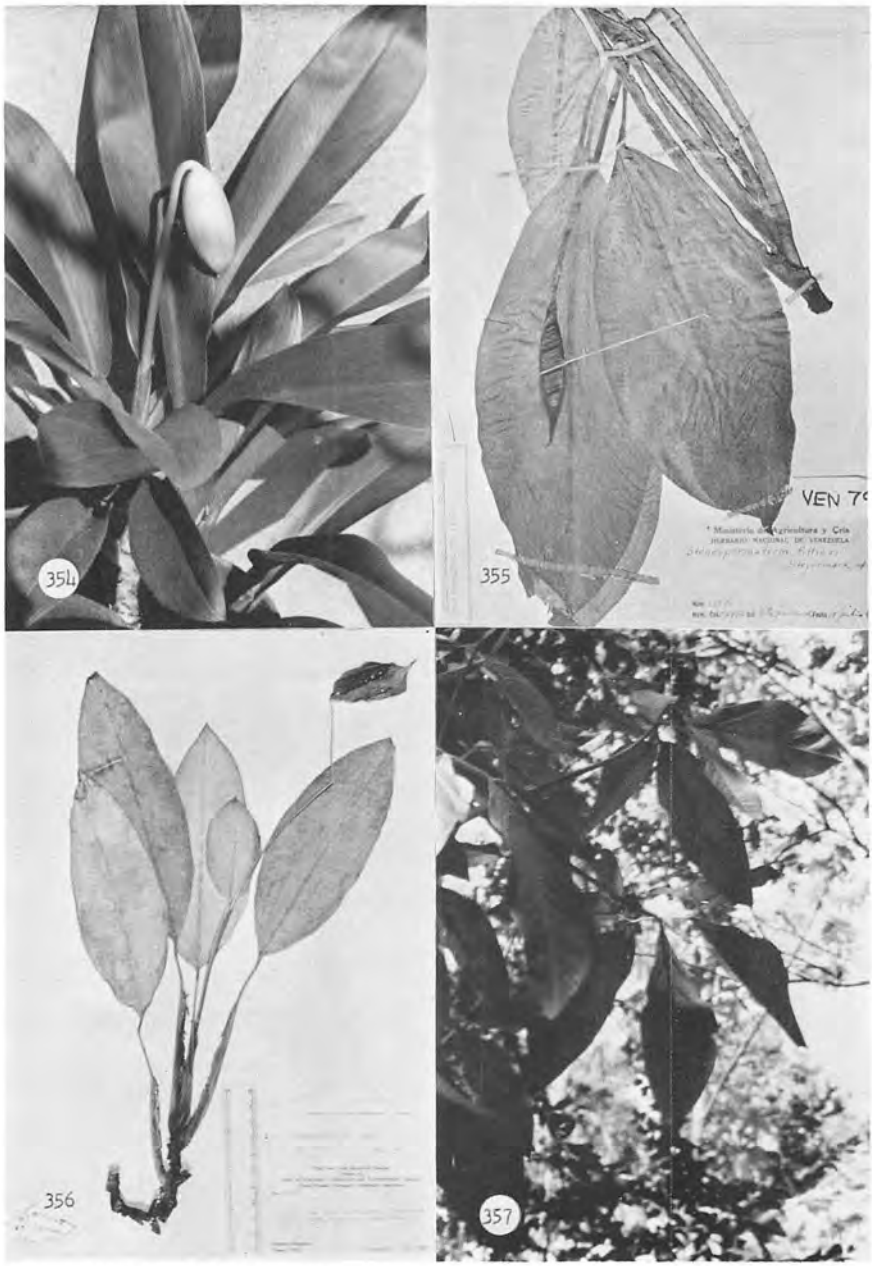
Urospatha sagittifolia is widespread throughout northern South America, and ranges from Peru and Ecuador east to Brazil and the Guianas at 50-750 m. In Venezuela, it ranges from Amazonas north to Monagas and Delta Amacuro.

It is characterized by having a rhizome up to 6 cm diam., and by its sagittate blades, with posterior lobes often as large as the anterior lobes (both of which are always acuminate). The thick, succulent spathe is slightly convolute at the base, and the petioles and peduncles have a mottled appearance.

Figs. 359-360

XANTHOSOMA

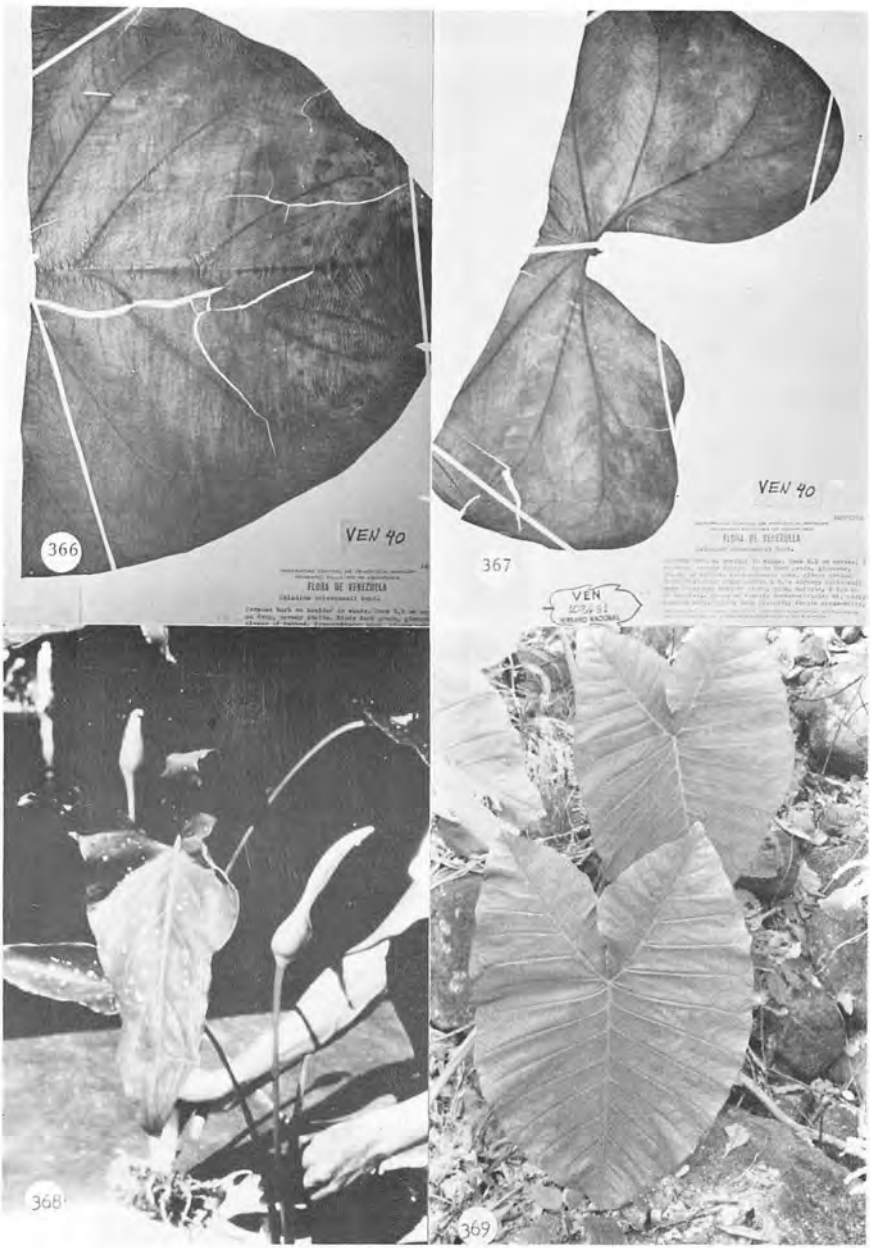
Xanthosoma akkermansii (Bunting) Croat, comb. nov. Figs. 361, 366-367



Figs. 354-357. 354. *Stenospermation multiovulatum* (Engler) N. E. Brown. Panama. Panamá: El Llano - Cartí Road, *Croat 33686B.* Flowering plant, x1/5. ----355. *Stenospermation pittieri* Steyerm. Venezuela. Táchira: Bramón – La Delicias, 1800-2245 m, *Steyermark 57455.* ----356. *Stenospermation ulei* Krause. Venezuela. Amazonas: Cerro Sipapo, 1500 m, *Maguire et al. 28692.* ----357. *Syngonium podophyllum* Schott. Venezuela. Yaracuy: Marín - Aroa, 180-270 m, *Croat 60603.* Adult leaves, x1/9.

Figs. 358-361. 358. *Syngonium podophyllum* Schott. Venezuela. Yaracuy: Marín - Aroa, 180-270 m, *Croat 60603*. Preadult leaves, x1/8. ----359-360. *Urospatha sagittifolia* (Rudge) Schott. Colombia. Vaupés: vic. Mitú, 200 m, *Croat 56828*. 359. Habit, x1/8. 360. Inflorescence, x3/10. ----361. *Xanthosoma akkermansii* (Bunting) Madison. Venezuela. Amazonas: Pto. Ayacucho - Sanariapo, *Bunting et al. 3539*. Type.

Figs. 362-365. 362. *Spathiphyllum humboldtii* Schott. Venezuela. Amazonas: Cerro Neblina, 140 m, *Croat 59568*. Inflorescence, x9/20. ----363. *Stenospermation ammiticum* Bunting. Venezuela. Amazonas: Cerro Neblina, *Croat 59325*. Habit, x1/6. ----364. *Stenospermation multiovulatum* (Engl.) N.E. Br. Panama. Panamá: El Llano-Cartí Road, 300-350 m, *Croat 33686B*. Inflorescence, x3/10. ----365. *Xanthosoma bayo* Bunting. Venezuela. Barinas: Altamira - Calderas, 975 m, *Croat 60757A*. Habit, x1/15.



Figs. 366-369. 366-367. *Xanthosoma akkermansii* (Bunting) Croat. Venezuela. Amazonas: Pto. Ayacucho - Sanariapo, *Bunting & Van Rooden 3539.* Leaf, x1/6. ----368. *X. aristeguietae* (Bunting) Madison. Venezuela. Guárico: 2 km N of Ortiz, *Bunting 4495.* Type, flowering plant, x1/12. Photo: Steyermark. ----369. *X. bayo* Bunting. Venezuela. Barinas: Altamira - Calderas, 975 m, *Croat 60757A.* Habit, x1/18.

= *Caladium akkermansii* Bunting, Acta bot. Venez. 10: 281. 1975. TYPE: Venezuela. Amazonas: Dept. Atures: Puerto Ayacucho-Sanariapo km 35, 100 m, *Bunting, Akkermans & van Rooden 3539* (MY, holotype).

Madison (1981), in his paper on the Caladieae, did not treat *Caladium akkermansii.* Since the taxon has pollen in tetrads and clearly belongs in the genus *Xanthosoma* along with others transferred there by Madison, the transfer is made here.

Xanthosoma aristeguietae (Bunting) Madison, Selbyana 5(3-4): 364. 1981. (= *Caladium aristeguietae* (Bunting).)

Xanthosoma aristeguietae is known from Venezuela and northern Brazil. In Venezuela, the species is known from Portuguesa, Carabobo, Guárico and Cojedes at elevations of less than 250 m.

The species is recognized by its large, hastate, spotted leaves with the posterior lobes held more or less erect and also by its elongate inflorescences. The species is closely related to *X. striatipes,* differing from it by being larger, having broadly hastate rather than lanceolate to somewhat sagittate blades and by having a longer inflorescence (Madison, 1981). Fig. 368

Xanthosoma bayo Bunting, Acta Bot. Venez. 10: 325. 1975.

Xanthosoma bayo is endemic to Venezuela, known only from the western Andes on slopes of the Cordillera de Mérida (Portuguesa, Trujillo, Mérida and Táchira) at moderately low elevations. Bunting (1979) reports it to be especially common along roads and in open areas, where it may form extensive colonies. The accompanying photographs were taken of a plant in a dense colony along a small stream in moderate shade in secondary forest. Figs. 365, 369

Xanthosoma nitidum Bunting, Acta Bot. Venez. 10: 329. 1975.

Xanthosoma nitidum is endemic to Venezuela on the south side of the Cordillera de la Costa in Miranda and Aragua, at 500-1,500 m.

It is characterized by its simple, moderately thick blade, with an ovate-elliptic medial lobe and prominently hastate posterior lobes. The plants are less than a meter tall and have a corm colored brilliant orange within (Bunting, 1979). Fig. 370

Xanthosoma pariense Bunting, Acta Bot. Venez. 10: 330. 1975.

Xanthosoma pariense is endemic to Venezuela, and is known only from the states of Sucre and Monagas at ca. 540 m. It is characterized by its blade, which has a hastate base and obtuse posterior lobes that are directed outward, and by its green spathe tube. Figs. 371-372

Xanthosoma peltatum Bunting, Acta Bot. Venez. 10: 332. 1975.

Xanthosoma peltatum Bunting is endemic to Venezuela, and is known from southwestern Táchira between San Cristóbal and Delicias at 1,230-2,000 m. A similar collection has been found southeast of La Azulita in Mérida *(Croat 54861).*

Xanthosoma peltatum is characterized by its thick (12 cm diam.), erect stem (up to 2 m long) and by its peltate blade, with posterior lobes fused (up to 12 cm). Its inflorescence has a creamy white spadix, and a green spathe tube tinged purplish on the interior. Figs. 373, 374

Xanthosoma trilobum Bunting, Acta Bot. Venez. 10: 334. 1975.

Xanthosoma trilobum is endemic to Venezuela, where it is known from Territorio Amazonas near the mouth of the Caño Yapacana, the Río Pacimoni (Llancami), Yutaje and the Río Ventuari, at 100-250 m in tropical moist forest life zones. Fig. 375

Figs. 370-373. 370. *Xanthosoma nitidum* Bunting. Cultivated, Steyermark. Leaves, x1/4. ----371-372. *X. pariense* Bunting. Venezuela. Monagas: Maturín - Cumuná, 520 m, *Croat 54354.* 371. Leaf, x1/5. 372. Plant in early fruit, x1/5. ----373. *X. peltatum* Bunting. Venezuela. Táchira: Sta. Ana - Río Negros, 1230-1330 m, *Croat 60660.* Flowering plant, x1/12.

Fig. 374. *Xanthosoma peltatum* Bunt. Venezuela. Táchira: San Cristóbal - Delicias, 1850 m, *Croat 54971*. Leaves, x1/9.

Fig. 375. *X. trilobum* Bunting. Venezuela. Amazonas: Yacami, Río Casiquiare, 100 m, *Steyermark & Bunting 102670*. Type specimen.

The species is characterized by its small size (30-60 cm tall) and by its membranaceous blade, often being completely divided into 3 distinct segments (sometimes the blades are merely deeply three-lobed when young). Also characteristic is the long-pedunculate inflorescence, with the peduncle longer than the petioles and the spathe merely weakly constricted and cucullate at the apex.

LITERATURE CITED

Bunting, G. S., 1975. Nuevas especies para la revision de las Araceas Venezolanas. Acta Bot. Ven. 10: 263-335.

_____, 1979. Sinopsis de las Araceae de Venezuela. Rev. Fac. Agron. (Maracay) 10: 139-290.

_____, 1986. New taxa of Venezuela Araceae, Phytologia 60 (5): 293-290.

Croat, T. B., 1978. Flora of Barro Colorado Island (Panama Canal Zone). Stanford Univ. Press, Stanford, Calif. 943 pp.

Engler, A., 1878. Araceae. In Martius, Flora Brasiliensis, Vol. III. pt. 2.

_____, (partly with K. Krause), 1905-1920. Araceae. Das Pflanzenreich. IV. 23A-F, Heft 21, 37, 48, 55, 60, 64, 71, 73, 74.

Jonker - Verhoef, A. M. E. and F. P. Jonker, 1953. Araceae, in A. Pulle (ed.), Flora of Suriname I: 1-80.

Kunth, C., 1841. Enum. Pl. 3: 51. 1841.

Madison, M. T., 1977. A revision of *Monstera* (Araceae). Contr. Gray Herb. Harvard Univ. 207: 3-100.

_____, 1978. The species of *Anthurium* with palmately divided leaves. Selbyana 2: 239-282.

_____, 1981. Notes on *Caladium* (Araceae) and its allies. Selbyana 5(3-4): 342-377.

Mayo, S. J., (in press). Araceae, in Flora of Trinidad and Tobago.

Schott, H. W., 1984. Icones Aroideae et Reliquiae. Inter Documentation Company. A G Poststrasse 14, 6300, Zug, Switzerland.

_____, 1856. Synopsis aroidearum complectens. Vindobonae, 140 pp.

_____, 1860. Prodromus Systematis Aroidearum. Vindobonae, 602 pp.

Schultes, R. E., 1964. Plantae Colombianae. XVII. Rhodora 66: 118-120.

Simmonds, N. W., 1950. Notes on the biology of Araceae in Trinidad. J. Ecol. 38: 290. 1950.

_____, 1951. The Araceae of Trinidad and Tobago. B. W. I. Kew Bull. 1950: 405.

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Appendix 1. The Araceae of Venezuela. All names preceded by asterisks represent names which did not appear in Bunting's 1979 synopsis. They may represent synonyms or new taxa.

Figs. 376-379. *Rhodospatha venosa* Gleason. Venezuela. Amazonas: vic. Cerro Neblina, Rio Mawarinuma, 140 m, *Croat 59390*. 376. Habit, x1/15. 377. Flowering plant, x1/8. 378. Leaves, x1/5. 379. Inflorescence, x3/10.

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
Alocasia macrorrhiza (L.) G. Don	2,3	Me,Mi		Introduced from old world tropics and naturalized in places
**Anthurium acrobates* Sodiro	5	Am	below 200 m	S. Colombia (Meta) to Ecuador and Peru. First report for Venezuela (or anywhere west of the Andes). Sect. *Belolonchium?*
A. amoenum Kunth & Bouché	2,3	Ar,Ba,DF,Fa, La,Me	1,420-2,140 m	Endemic; Sect. *Xialophyllium;* moderately rare in undisturbed wet sites
A. angelorum Bunting	3	Me,Zu	250-460 m	Endemic; Sect. *Porphyrochitonium* (not related to *A. gracile*)
A. apaporanum R. E. Schultes	5	Am	200-1,000 m	Also in S. Colombia, Amazonian Ecuador and Peru; Sect. *Porphyrochitonium*
**A. aroense* Bunting	2	Ya	1,200-1,800 m	Endemic; perhaps Sect. *Porphyrochitonium* but there is no mention of glandular punctations (Bunting, 1986)
**A. bakeri* Hook. f.	5	Am	below 200 m	Also ranges from Guatemala to Colombia; also in Guyana. New to Venezuela (*Croat 59591,* Cerro Neblina base camp). The earliest collection for eastern South America is *A. C. Smith 3014,* collected in 1938, in British Guiana (it remained unidentified until recently); Sect. *Porphyrochitonium*
**A. bernardii* Croat	3	Ba,Tr	850-1,900 m	Endemic; Sect. *Porphyrochitonium*
**A. berryi* Bunting	3	Zu	2,700-3,300 m	Endemic (Bunting, 1986); similar to *A. ginesii* Croat; Sect. *Belolonchium*
**A. betanianum* Croat	4	Ta	2,150-2,600 m	Endemic; Sect. *Belolonchium*

A. bonplandii Bunting ssp. *bonplandii*	5	Am,Bo	100-700 m	Also in Colombia and Brazil; Sect. *Pachyneurium*
* ssp. *cuatrecasii* Croat	5	Am	75-380 m	Also in Colombia; Sect. *Pachyneurium*
A. bredemeyeri Schott	2,3	Ar,DF	920-2,300 m	Endemic; Sect. *Xialophyllium*
**A. caraboboense* Croat	2	Ca	10-100 m	Endemic; Sect. *Oxycarpium*
A. caripense Bunting	1	Mo,Su	800-1,273 m	Endemic; known for certain only around Caripe; Sect. *Belolonchium*
A. cartilagineum (Desf.) Kunth	2,1	Ar,DF,Su	1,273-2,240 m	Endemic; Sect. *Belolonchium*
**A. cataniapoense* Croat	5	Am,Bo	below 150 m	Endemic; Sect. *Pachyneurium*
A. clavigerum P.&E.	3,5,6	Am,Ap,Ba,Bo, Ta,Zu	0-1,250 m mostly below 500 m	Widespread in Central & South America; Sect. *Dactylophyllium*
A. costatum C. Koch & Bouché	2	Ar,DF	1,000 m	Endemic; Sect. *Cardiolonchium*
A. crassinervium (Jacq.) Schott	2,3	Ar,Ca,DF,Fa, La,Me,Mi,Ta, Tr,Ya,Zu	to 1,600 m	Also in the western cordillera of Colombia; Sect. *Pachyneurium*
A. crassivenium Engler				Known only from Colombia; material placed here by Bunting (1979) is treated under *A. puberulinervium* Croat

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
*A. *cubense* Engler	3	Zu	50-530 m	Also in Colombia, West Indies & Central America; Sect. *Pachyneurium*
*A. *davidsei* Croat	4	Ta	2,200-2,600 m	Endemic; Sect. *Belolonchium*
A. digitatum (Jacq.) Schott	1,2	Am,An,Bo,Ca, DA,DF,Fa,La, Mi,Su,Ya	up to 1,800 m	Endemic; Sect. *Dactylophyllium*
*A. *eminens* Schott	5	Am,La,Mi,Po	(200)1,000-1,650 m	Widespread in South America; Sect. *Dactylophyllium, treated as A. wittianum* by Bunting
A. englerianum Bunting				=*A. jenmanii* Engler
A. expansum Gleason	6	Am,Bo	150-1,350 m	Also in the Guianas; Sect. *Dactylophyllium*
A. fendleri Schott	2,3	Ap,Ar,Ba,Co, Fa,La,Me,Po. Ta,Tr,Ya,Zu	60-1,000(1,450) m	Also in Colombia and Panama; Sect. *Pachyneurium*
*A. *fernandezii* Croat	2,3	Ar,DF,Me,Tr	1,200-2,380 m	Endemic; Sect. *Porphyrochitonium*
*A. *formosum* Schott	3	Me,Ta,Zu	up to 1,300 m	Also Colombia to Costa Rica and Peru (*Ambrose et al. 2,401*): Huanuco: valley of Río Chinchao, below Chinchao; Sect. *Calomystrium*
*A. *gehrigeri* Croat	3	Me,Ta,Zu	500-2,800 m	Endemic; Sect. *Porphyrochitonium*
*A. *ginesii* Croat	3	Me,Zu	1,800-3,800 m	Endemic; Sect. *Belolonchium*

**A. gonzalezii* Croat	3	Ca,Ta	750-1,800 m	Endemic; Sect. *Porphyrochitonium*
A. gracile (Rudge) Lindl.	1,2,3 5,6	Am,Ap,Ba,Bo, DA,Me,Mi,Mo, Su,Ta,Ya,Zu	200-250 m	Widespread in the neotropics; Sect. *Leptanthurium*
**A. guanchezii* Bunting	5	Am	110-120 m	Endemic; Known only from vicinity of Río Autana SE of Pto. Ayacucho; 4°52'N, 67°27'W (Bunting, 1986); Section unknown
A. guayanum Bunting	6	Bo	usually above 500 m	Also known from other countries of the Guianas; Sect. *Pachyneurium*
A. hookeri Kunth	1,6	An,Bo,Mo,Su	450-1,450 m	Also from the Lesser Antilles; Section unknown, related to Sect. *Pachyneurium* only in habit
A. huegelii Schott				=*A. hookeri* Kunth
**A. huequeense* Bunting	2	Fa	below 300 m	Endemic; Sect. *Pachyneurium;* compares with *A. crassinervium* (Bunting, 1986)
A. humboldtianum Kunth ssp. *humboldtianum*	2	Ar,Ca,DF,Ya	700-2,380 m	Endemic; Sect. *Belolonchium*
* ssp. *viridispadix* Croat	3	La,Me	1,300-2,300 m	Endemic
**A. humoense* Croat	2	Su	1,273 m	Endemic; Sectional placement uncertain
A. igarapeum Bunting	5	Am	130-160 m	Endemic to Cerro Neblina; Sect. *Calomystrium;* related to *A. roraimense*
A. jenmanii Engler	1,5	Bo,Mo,Su	100-250 m	Also in Trinidad & Tobago, the Guianas and Brazil (Amapá); Sect. *Pachyneurium*
A. julianii Bunting	3	Ar,La,Me,Ta, Tr	2,000-3,290 m	Endemic; Sect. *Belolonchium*

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
A. kunthii Poeppig	3	Am	below 300 m	Also known from Costa Rica to Peru; Sect. *Dactylophyllium*
**A. liesneri* Croat	6	Am	ca. 1,250 m	Endemic; tentatively placed in Sect. *Belolonchium*
A. lilacinum Bunting	2	Ca,DF,Fa,Mi	20-1,400 m	Endemic; Sect. *Pachyneurium*
A. longissiumum Pittier ssp. *longissimum*	2,3	An?,Ar,Ca, DF,Fa,Me,Mi, Ta,Ya	1,150-1,590 m	Also apparently in Peru; Sect. *Schizoplacium*
*ssp. *nirguense* Bunting	2	Ya	1,200-1,360 m	Endemic to the Cerro La Chapa, N of Nirgua
**A. marinoanum* Croat	2	Su	not available	Endemic; section uncertain
A. neblinae Bunting				=A. triphyllum Brongn.
A. nubicola Bunting	3	Me	2,400-3,000 m	Endemic; Sect. *Belolonchium;* probably not related to *A. signatum*
A. nymphaeifolium C. Koch & Bouché	2,3	An,Ar,DF,Fa, La, Me, Mi, Po, Ta,Tr,Ya,Zu	600-2,650 m	Probably also in the western Cordillera of Colombia; Sect. *Calomystrium*
A. paradisicum Bunting	2	Ar	1,200-1,300 m	Endemic; Sect. *Belolonchium*
A. pariense Bunting	1,2	Su,Ya	700-1,800 m	Endemic; Section unknown, probably *Belolonchium*

A. pentaphyllum (Aubl.) G. Don var. *pentaphyllum*	1	Su	low	Widespread in South America; Sect. *Dactylophyllium*
**A. perijanum* Bunting	3	Zu	1,440-1,460 m	Endemic, Sierra de Perijá; Sect. unknown; compares with *A. subsagittatum* (Bunting, 1986)
A. praemontanum Bunting				=A. formosum Schott
A. ptarianum Steyermark	6	Am,Bo	500-2,200 m	Endemic; to be expected in the Guianas; Sect. *Digitinervium*
**A. puberulinervium* Croat	3	Ta	1,300-2,000 m	Endemic; to be expected in Colombia; Sect. *Polyneurium*
A. roraimense N. E. Br.	6	Am,Bo	300-1,500 m	Endemic; to be expected in the Guianas; Sect. *Calomystrium*
**A. scandens* (Aubl.) Engl. ssp. *pusillum* Sheffer	6	Am,Ya	800-1,800 m	Also from Colombia to Honduras ranging from 600-2,500 m; Sect. *Tetraspermium*
ssp. *scandens*		all except: Co,Gu	up to 2,450 m	Widespread throughout the neotropics; Sect. *Tetraspermium*
A. signatum C. Koch & Mathieu	3	Ta	(900)1,300-2,800 m	Endemic; Sect. *Belolonchium*, but somewhat more 3-lobed than most; possibly Sect. *Semaeophyllium*
A. smaragdinum Bunting	3	Me,Po,Ta,Tr	above 1,300 m	Endemic; Sect. *Belolonchium?*
**A. smithii* Croat	3	Me,Ta,Tr,Zu	(900)1,300-3,200 m	Also in Colombia in Norte de Santander and Santander; Sect. *Porphyrochitonium*

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
A. subsagittatum (HBK) Kunth	2,3	Ar,DF,Fa,La Me,Mo?,Ta,Ya	650-2,000 (2,400) m	Endemic; Sect. *Xialophyllium?*
**A. subscriptum* Bunting	5	Am	110-120 m	Endemic, known only from vic. of Río Autana, 4°51'N, 67°27'W; Sect. *Porphyrochitonium;* compared with *A. friedrichsthalii* Schott (Bunting, 1986)
A. subtrilobum Schott	2	Ar,Ya	1,200-1,360 m	Endemic; Sect. unknown: possibly a natural hybrid with *A. longissimum* Pittier and a cordate species
**A. tachiranum* Croat	3	Ta	ca. 1,850 m	Endemic; Sect. *Belolonchium*
A. tamaense Bunting	3	Ta	2,400-3,200 m	Endemic; Sect. *Belolonchium*
A. tatei Bunting	6	Am	1,340 m	Endemic; Sect. Calomystrium, related to *A. nymphaeifolium*
**A. trinerve* Miq.	3,5,6	Am,Ap,Ar,Bo, Ya,Zu	up to 1,250 m	Ranges from Guatemala to Brazil; Sect. *Tetraspermium;* apparently considered a part of *A. scandens* by Bunting (1979)
**A. triphyllum* Brongn.	5,6	Am,Bo	600-2,980 m	Widespread in South America; Sect. *Semaeophyllium*
A. wagenerianum C. Koch & Bouché	2	Ar,Ca,DF,Fa, Mi,Ta	0-600 m	Narrow endemic; Sect. *Pachyneurium;* closely related to *A. crassinervium*
A. wittianum (Engl. ex Macbride				=*A. eminens* Schott
A. wurdackii Bunting	6	Am	780-900 m	Endemic (Cerro Yapacana; Cerro Neblina); Sect. *Pachyneurium*
**A. xanthoneurum* Bunting	6	Am	990-1,670 m	Endemic; known only from Cerro Aratitiyope, 2°10'N,65°34'W; Sect. *Pachyneurium* (Bunting, 1986)

A. yutajense Bunting	6	Am	1300-1500 m	Endemic; Sect. Urospadix?
Caladium akkermansii Bunting				=*Xanthosoma akkermansii* (Bunting) Croat
C. *aristequietae* Bunting				=*Xanthosoma aristequietae* (Bunting) Madison
*C. *aturense* Bunting	5	Am	100-140 m	Endemic; vicinity of Pto. Ayacucho (Bunting, 1986)
C. *bicolor* (Ait.) Vent.	2,3,5	Am,Ap?,Ar,Ba, Bo,Ca,Gu,Mi, Ta,Ya,Zu	to 830 m	Widespread in South America along roads, edge of deciduous forests
C. *coerulescens* Bunting	2,3	Ba,Po,Ta,Tr	200-1,300 m	Endemic; southwest slopes of the Cordillera de Mérida; open, more or less weedy areas
C. *humboldtii* Schott	5	Am	low	Also in Brazil; in shady areas in sandy soil in Amazonas near Yavita
C. *macrotites* Schott	5	Am,Ap	75-150 m	Also in Colombia and Brazil; frequent in Amazonas: Dept. Atabapo: open, sandy areas
C. *picturatum* C. Koch & Bouche	5	Am,Bo	100-600 m	Also in Brazil and Peru; Madison (1981) included this species with C. *bicolor*
C. *smaragdinum* C. Koch & Bouché	2	Ca,DF,Mi	below 500 m	Endemic; Madison (1981) included this species with C. *bicolor*
*C. *steyermarkii* Bunting	5	Ap,Ta	175-280 m	Endemic; vic. of San Camilo (Apure); San Cristóbal-Barinas (Táchira) (Bunting, 1986)
C. *striatipes* C. Koch & Bouché				=*Xanthosoma striatipes* (Kunth) Madison

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
Colocasia esculenta (L.) Schott		Da,Ta	50-1,380 m	Introduced from Asia and widely cultivated
Cyrtosperma wurdackii Bunting				=*Urospatha wurdackii* (Bunting) A. Hay, comb. nov. ined.
Dieffenbachia bolivarana Bunting	6	Am,Bo	650-1,700 m	Was endemic to Guiana highlands, Venezuela (slopes of Chimantá-tepuí) and in Guyana; now known also from Amazonas: Dept. Río Negro, Cerro Neblina, camp 5, 1,250 m, *(Liesner & Stannard 16857; Gentry & Stein 46551)*
**D. liesneri* Croat	5	Am	150 m	Endemic; vicinity of Cerro Neblina, Caño Baria
**D. longipistila* Croat	5	Am	150 m	Endemic; vicinity of Cerro Neblina
D. paludicola N. E. Br. ex Gleason	5	Am	ca. 120-175 m	Also in Guyana and Surinam; in Venezuela known only between Yavita (Río Temi) and Maroa (Rio Guainía)
D. parlatorei Lind. & André	2,3	Ap,Ba,Me,Ta, Tr,Zu	30-620 m	Also in Colombia
D. parvifolia Engler	5	Am	ca. 100-140 m	Also in Amazonian Brazil; in Venezuela, known only from Río Pacimoni and base of Cerro Neblina
D. sequine (Jacq.) Schott	1,2,3, 5	Am,Ap,Ar,Ba, Bo, Ca,DA,DF, Fa,La,Me,Mi, Mo,Po,Ta,Tr, Ya	50-1,200 m	Widespread in Central & South America as well as the West Indies

**Dracontium aricuaisanum* Bunting	3	Zu	100-250 m	Endemic; Distrito Perija, 9°35'N, 72°53'W (Bunting, 1986)
D. asperum C. Koch	6	Bo	ca. 98 m	In Venezuela collected only near Santa Elena; reportedly also from Surinam, Brazil (Para) and Puerto Rico! Venezuelan material reported as this species by Bunting (1979) may not differ from *D. changuango;* the species may not occur in Venezuela
**D. changuango* Bunting	2,3,6	Bo,Ca,Gu,Po	100-500 m	Endemic
D. polyphyllum L.	2,5	Am,Ca,Gu,Po, Zu	150-600 m	Also reported for Guyana, Surinam & French Guiana as well as Puerto Rico and Haiti
Heteropsis flexuosa (HBK) Bunting	6	Am,Bo	up to 1,000 m	Also known from Brazil and the Guianas
H. melinonii (Engl.) Jonk. & Jonk.	5,6	Am,Bo	up to 1,330 m	Also in Surinam & French Guiana
H. spruceana Schott var. spruceana	5,6	Am,Bo	up to 300 (1,095) m	Also in Guyana, Brazil (Pará) & Colombia (Vaupés)
* *var. robusta* Bunting	5	Am	90-110 m	Endemic, vic. of Pto. Ayacucho (Bunting, 1986)
**H. steyermarkii* Bunting	5	Am	125-400 m	Endemic, Cerro Yapacana, 3°45'N, 66°45'W (Bunting, 1986)
**H. tenuispadix* Bunting	5,6	Am, Bo	125-800 m	Southern Venezuela to N Brazil, mostly known from Orinoco drainage and N. Río Negro; possibly also in Peru; previously confused with *H. flexuosa*

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
**Jasarum steyermarkii* Bunting	5,6	Bo	500-1,400 m	Also in Guyana, upper Mazaruni River; in Veneuela restricted to the Gran Sabana; wholly submerged aquatic in streams
Monstera adansonii Schott				
* var. *laniata* (Schott) Madison	1,2,3 5,6	Am,An,Ap,Ar, Ba,Bo,Ca,DA, DF,Fa,La,Me, Mi,Mo,Po,Su, Ya,Zu	0-600(1,170) m	Ranges from Nicaragua to Curaçao, Tobago; also Trinidad, the Guianas, Brazil (Amapá and Pará), Peru and Bolivia
* var. *klotzschiana* (Schott) Madison	5,6	Am,Bo	100-1,000 m	Ranges from S Venezuela to the Guianas to Amazonian Peru and Bolivia and Brazil south to Paraná; reported by Madison (1977)
M. dilacerata (C. Koch & Sello) C. Koch	3	Am,Mi,Zu	below 1,180 m	Ranges from Guatemala & Belize to Peru and southern Brazil
M. dubia (HBK) Engler & Krause	1,2,3	Am?,An,Ap,Ar, Ba,Bo,DF,Fa, Me,Mi,Mo,Su, Ta,Ya,Zu	0-1,500 m	Ranges from Costa Rica to Bolivia, western Brazil, Venezuela and Trinidad
M. henripittieri Bunting				=*M. lechleriana* Schott (not reported from Venezuela in Madison's 1977 revision
M. lechleriana Schott	2,3,5, 6	An,Ap,Ar,Ba, Bo,DF,Mi,Su, Ta,Ya	(250)800-1,200 (1,800) m	Ranges from Costa Rica to Panama, Venezuela, the Guianas, Brazil (Pará and Amapá), Peru and Bolivia
M. obliqua Miq.	1,2,3, 5	Am,An,Ap,Bo, DA,Mo,Su,Ta, Ya	up to 1,000 m	Ranges from Panama to Bolivia, Amazonian Brazil, Venezuela and Trinidad

**M. spruceana* (Schott) Engler	2,3,5, 6	Am,Ar,Bo,Ta, Ya,Zu	20-600(1,400)m	Ranges from Honduras to Colombia, Venezuela, Guyana, Brazil and Peru
M. steyermarkii Bunting				=*M. spruceana* (Schott) Engler
Montrichardia arborescens (L.) Schott	1,2,5	AmAp,Bo,DA, Gu,Mo,Su	up to 210 m	Ranges from Guatemala to northern Brazil and the Guianas; also in the Lesser Antilles
**M. linifera* (Arr.) Schott	5	Ap,Bo,Gu,Mo, Su	0-350 m	Also in Brazil and Colombia
Philodendron acutatum Schott	1,2,3 5	Am,Ap,Ba,Bo, DA,DF,Gu,Mi, Mo,Su,Tr,Zu	up to 1,000 m	Also in the Guianas and northern Brazil; Sect. *Polyspermium*
**P. amplisinum* Bunting	3	Zu	400-500 m	Endemic; Dtto. Mara: Río Guasare; Sect. *Polyspermium* (Bunting, 1986)
P. ampullaceum Bunting	3	Me,Ta	above 1,800 m	Endemic; known only from between Bramón & Las Delicias; Sect. *Oligospermium*
**P. anaadu* Bunting	5	Am	120-220 m	Endemic; known only from Depto. Atabapo (Bunting, 1986)
**P. appunii* Bunting	3	Ar?,DF	ca. 1,000 m	Endemic; vic. Colonia Tovar; Sect. *Oligospermium* (Bunting, 1986)

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
P. aristeguietae Bunting	2	Ar,DF	1,000-1,200 m	Endemic to the Cordillera de la Costa Sect. *Pteromischum*
P. atabapoense Bunting	5	Am	ca. 100-140	Endemic; Sect. *Oligospermium*
P. auyantepuiense Bunting	6	Am, Bo	1,100-1,850 m	Endemic
**P. azulitense* Croat	3	Me	ca. 900 m	Endemic
P. barrosoanum Bunting	3,5	Am,Ap,Ba,Me, Ta,Tr,Zu	up to 1,000 m	Also in Colombia, Peru, Brazil and Ecuador; Sect. *Oligospermium?*
**P. benitezii* Croat	3	Ta	800m	Endemic; Sect. *Pteromischum*
**P. bipennifolium* Schott	5	Am	below 100 m	Ranging to S. Brazil; Sect. *Schizophyllium*
**P. borgesii* Bunting	3	Ta	ca. 1,100 m	Endemic; Sect. *Oligospermium;* similar to *P. grandifolium* (Bunting, 1986)
**P. brevispathum* Schott var. *brevispathum*	1,2,5	Am,An,Ap,Bo, Gu	60-230 m	Also Nicaragua to Panama; Sect. *Polyspermium*
* var. *wurdackii* Croat	5	Am	160 m	Endemic
**P. buntingianum* Croat	3	Me,Ta	600-1,000 m	Endemic; Sect. *Oligospermium,* series *Belocardium*

**P. calatheifolium* Bunting	3	Ta	1,100-1,350 m	Endemic; east of San Cristóbal; vic. Represa Dorado; Sect. *Pteromischum* (Bunting, 1986)
P. callosum Krause	6	Bo	250-1,300 m lower elev. in French Guiana	Also in Guyana and French Guiana, no doubt Surinam as well as Brazil; Sect. *Philopsammos* (Bunting, 1986)
**P. canaimae* Bunting	6	Bo	450 m	Endemic; vic. Canaima, 6°14'N, 62°45'W; Sect. *Philopsammos* (Bunting 1986)
**P. cataniapoense* Bunting	5	Am	100-300 m	Endemic; Sect. *Oligospermium,* series *Doratophyllum*
P. chimantae Bunting	6	Bo	400-1,130 m	Endemic; Sect. *Oligospermium*
**P. consobrinum* Bunting	3	Ta	2,050-2,350	Endemic; Distrito Junín, between Villa Páez and Betania; Sect. *Oligospermium* (Bunting, 1986)
**P. craspedodromum* Schultes	5,6	Am	100-800 m	Also in Colombia; Sect. *Philopsammos*
P. danteanum Bunting	2	DF	2,000 m or above	Endemic; Sect. *Oligospermium?*
**P. davidsei* Bunting	3	Zu	100-250 m	Endemic to the Río de Oro, 9°8'N, 72°52'W; probably Sect. *Baursia* (Bunting, 1986)
P. deflexum Poepp. ex Schott				Material included here is treated under *P. megalophyllum*
**P. delascioi* Bunting	1	DA	below 300 m	Endemic; Dpto. Pedernales, 9°45'N, 61°53'W (Bunting, 1986)
P. dunstervilleorum Bunting	6	Am,Bo	ca. 1,000 m	Endemic; Sect. *Philopsammos* (Bunting, 1986)

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
P. dyscarpium R. E. Schultes var. *dyscarpium*	5	Am	95-700 m	Also in Colombia; Sect. *Philopsammos* (Bunting, 1986)
* var. *ventuarianum* Bunting	5	Am	100 m	Endemic; Río Ventuari, 3 hrs. below Las Carmelitas (Bunting, 1986)
**P. effusilobum* Croat	2	Ar,Fa,La,Ya	800-1,200 m	Endemic
P. englerianum Steyerm.	6	Am,Bo	600-1,200 m	Endemic; Sect. *Philopsammos*
**P. exile* Bunting	6	Am	795-830 m	Endemic; Río Matacuni, vic. Simarawochi, 3°49'N, 64°39'W; Sect. *Pteromischum* (Bunting, 1986)
P. fendleri Krause	1,2	DF,Mi,Su,Zu	50-750 m	Also in Trinidad; Sect. *Polytomium*
P. fragrantissimum (Hook.) Kunth	1,2,5	Am,Ap,Bo,Me, Ta, Zu	up to 1,000 m	Ranges from Guatemala and Belize to Amazonian Peru, Brazil and to the Guianas, Trinidad and Cuba; Sect. *Macrolonchium*
P. fraternum Schott	2,3	Ar,DF,Fa,La, Me,Mi,Po,Ta, Tr,Ya,Zu	920-2,300 m	Probably also in the western Cordillera of Colombia; Sect. *Polyspermium*
P. giganteum Schott	1	Mo,Su	700-800 m	Also in the West Indies from Puerto Rico to Trinidad; Sect. *Polyspermium*
**P. glanduliferum* Matuda *ssp. *camiloanum* Croat	5	Ap,Ta	250-1,200 m	Endemic
**P. goeldii* G. M. Barroso	5	Am	below 200 m	Also in Amazonian Colombia, Brazil and Peru; subgenus *Meconostigma*

P. grandifolium (Jacq.) Schott	1,2	Ar,Bo,Ca,DA, DF,Fa,Me,Ta, Ya,Zu	up to 1,260 m	Also French Guiana, Guyana; Sect. *Polyspermium*
**P. guaiquinimae* Bunting	6	Bo	750-840 m	Endemic; Cerro Guaiquinima, 5°44'N, 63°41'W (Bunting, 1986)
P. hederaceum (Jacq.) Schott	1,2,3	An,Ap,Ar,Bo, Ca,Fa,Gu,Mo, Po,Ta,Tr,Zu	0-1,500 m	Mexico to northern South America in deciduous forests in the northern half of Venezuela and south along the Cordillera de los Andes to Apure; Sect. *Macrogynium*
P. henripittieri Bunting	2,3	Ar,Me	750-1,500 m	Endemic; probably the largest *Philodendron* in Venezuela; Sect. *Polyspermium*
P. holmquistii Bunting				=*P. brevispathum* Schott
P. holtonianum Schott				Venezuelan material called this is included in *P. effusilobum* Croat
P. hylaeae Bunting	5,6	Am,Bo	115-920 m	Also in Colombia, Peru, Brazil, Ecuador and Guyana; Sect. *Oligospermium*
P. inaequilaterum Liebm.				
ssp. *inaequilaterum*	2,3	Am,Ap,Ba,Ca, DF,Ta,Ya	100-1,270 m	Ranges from Mexico to Venezuela, Colombia and Ecuador; Sect. *Pteromischum*
* ssp. *anthoblastum* Bunting	5	Am	90 m	Endemic; Depto. Atures, Río Orinoco, Siquita, 4°13'N, 67°47'W (Bunting, 1986)
ssp. *zulianum* Bunting				=*P. zulianum* Bunting

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
P. insigne Schott	5,6	Am,Bo	100-1,040 m	Northern Amazon basin; in the Guianas, Brazil, Colombia and Peru; Sect. *Baursia*
P. karstenianum Schott				Not in Venezuela; Colombia only! Material treated here by Bunting (1979) is *P. venosum*
P. krauseanum Steyerm.	6	Bo	700-1,230 (1,660) m	In Venezuela known only from the Gran Sabana and Chimantá; also from Guyana, Peru (San Martín), Ecuador (Napo) and Brazil (Amazonas and Rio Japurá); Sect. *Pteromischum*
P. krugii Engler	1,2	Northern coastal ranges Su to Fa	750-900 m	Also known from Trinidad and Tobago; close to *P lindenii* Schott and *P. erubescens* C. Koch & Augustin; Sect. *Oligospermium*
P. lemae Bunting	6	Bo	300-910 m	Endemic; known only from Sierra de Lema; Sect. *Polyspermium?*
P. levelii Bunting	5,6	Am	10-140 m	Endemic; similar to *P. barrosoanum;* Sect. *Oligospermium?*
**P. liesneri* Bunting	5	Am	125 m	Endemic to the Río Casiquiare, 1°57'N, 66°50'W; (Bunting, 186); Sect. *Oligospermium* series *Belocardium*
P. lindenii Schott	3	Ap,Ba,La,Me, Po,Ta,Ya,Zu	up to 1,600 m	Also no doubt in Colombia; Sect. *Oligospermium*
P. linnaei Kunth	1,5	Am,Bo,DA,Mo	50-800 m	Also in the Guianas, Amazonian Brazil and Peru; Sect. *Baursia*
P. macroglossum Schott	2,3,5	Am,Ap,Ar,Ca?, DF,Me,Ta,Ya	125-1,360 m	Endemic; Sect. *Baursia*
P. maguirei Bunting	5,6	Am	125-200(1,140) m	Endemic; known only from southern Amazonas (C. Neblina and C. Arauicaua); Sect. *Polyspermium*

**P. marahuacae* Bunting	6	Am	1,560 m	Endemic; Macizo de Marahuaca, headwaters of Río Iguapo, 3°36'N, 65°23'W (Bunting, 1986)
P. maroae Bunting	5	Am	100-140 m	Endemic; similar to *P. chimantae;* Sect. *Oligospermium*
P. megalophyllum Schott	1,5,6	Am,Ap,Ba,Bo, DA,Su	up to 1,100 m	Also in Colombia, Peru and Brazil; no doubt in Amaznian Ecuador as well as French Guiana and Bolivia; Sect. *Oligospermium*
P. melanochlorum Bunting				=*P. tatei* ssp. *melanochlorum* (Bunting) Bunting
P. melinonii Brongn. ex Regel	1,6	Am,Bo,DA	up to 1,200 m	Also known from French Guiana, Guyana and Amazonian Brazil; Sect. *Macrolonchium*
P. meridense Bunting	3	Me,Ta	600-1,460 m	Endemic; known only from the La Azulita-Mérida Road and Zea-Laguna Blanca Road; Sect. *Oligospermium*
P. mesae Bunting	3	Me	ca. 760 m	Endemic; known only from around Mesa Bolívar; Sect. *Oligospermium*
**P. milleri* Croat	5	Am	350-400 m	Endemic
**P. multinervium* Bunting	6	Am	795-830 m	Endemic; Río Matacuni, vic. Simarawochi; 3°49'N, 64°36'W; Sect. *Oligospermium* (Bunting, 1986)
P. muricatum Willd. ex Schott	1,5,6	Am,Bo,DA	50-415 m	Also known from Guyana and Brazil; Sect. *Oligospermium*
P. nervosum (Schult. & Schult.) Kunth				=*P. venosum* (Willd.) Croat
**P. orionis* Bunting	3	La,Zu	120-1,600 m	Endemic to Venezuela; Lara: Dtto. Torres: Páramo Agua Linda, N of Palmarito (on Lara-Zulia road, 35 km E of El Venado) *Bunting and Fucci 13470;* Sect. *Polyspermium* (Bunting, 1986)

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
P. ornatum Schott	1,2,5, 6	Ap,Ar,Bo,DA, DF,Fa,La,Me, Mi,Mo,Su,Ya	250-2,000 m	Also known in Colombia, Ecuador, French Guiana and Bolivia; Sect. *Polyspermium*
P. panduriforme (HBK) Kunth var. *panduriforme*	5	Am	100-700 m	In Venezuela, known only from near Cerro Yapacana and along the Yavita-Pimichín road; also from Brazil, Colombia, Ecuador and Peru; Sect. *Baursia*
* var. *reichenbachianum* (Schott) Croat	5	Am	119-270 m	Endemic to Venezuela, vicinity of type locality
P. cf. *paxianum* Krause				Not in Venezuela! Was confused with *P. wurdackii*
P. pedatum (Hook.) Kunth	1,5,6	Am,Bo,DA	50-950 m	Also known from Guyana, Surinam, French Guiana and Brazil. Doubtfully in Colombia; Sect. *Schizophyllium*
**P. peraiense* Bunting	6	Bo	900m	Endemic; Perai-tepuí, ca. 4°30'N, 61°30'W; Sect. *Philopsammos* (Bunting, 1986)
**P. perplexum* Bunting	3	Ta	125-200 m	Endemic; La Grita-La Fria (N of San Cristobal); Sect. *Oligospermium* (Bunting, 1986)
P. phlebodes Bunting	5	Am	125-900 m	Endemic; known only from near Cerro Arauicaua and at the base of Cerro Neblina; Sect. *Philopsammos* (Bunting, 1986)
P. pimichinense Bunting	5	Am	ca. 140 m	Endemic; known only from the area between Yavita (Río Temi) and Maroa (Río Guianía) in humid savannas in sandy soil; Sect. *Philopsammos* (Bunting, 1986)

P. pinnatifidum (Jacq.) Schott	2	Ar,DF,Mi	up to 1,300 m	Endemic to Cordillera de la Costa; Sect. *Macrolonchium*
P. ptarianum Steyermark	5,6	Am,Bo	460-1,690 m	Also known from Guyana; Sect. *Philopsammos*
P. pulchrum G. M. Barroso	5	Am	115-1,250 m	Also known from Brazil, Colombia and Peru; Sect. *Philopsammos*
P. reichenbachianum Schott				=*P. panduriforme* var. *reichenbachianum* (Schott) Croat (placed in "species excluded" by Bunting, 1979)
P. remifolium Schultes				=*P. pulchrum* G. M. Barroso
P. rhodoaxis Bunting var. *rhodoaxis*	2	Ar,Ya	1,150-1,500 m	Endemic to the Cordillera de la Costa; Sect. *Pteromischum*
* var. *angustifolium* Bunting	2	Ya	1,200-1,400 m	Endemic; N of Salom; Cerro de la Chapa (Bunting, 1986)
P. roraimae Krause	6	Bo	700-1,660 m	Endemic; should be expected in adjacent Guyana
P. rubens Schott				=*P. ornatum* Schott
P. rudgeanum Schott	1	Bo,DA,La,Mo, Po,Ta,Ya	(200)520-1,600 m	Known also from Trinidad, the Guianas and Brazil; Sect. *Pteromischum*
**P. sabulosum* Bunting	5	Am	125-140 m	Endemic; vic. Yavita; vic. Pimichín; Sect. *Philopsammos* (Bunting, 1986)
P. cf. *sagittifolium* Liebm.	2	Ya	1,260-1,290 m	If really this species, also in Colombia and Panama to Mexico
P. santodominguense Bunting	3	Ba,Me	1,000 m	Endemic; known only from La Soledad in Barinas and Mitisus in Mérida; Sect. *Oligospermium*

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
P. scandens C. Koch & H. Sello	2,3	Ap,Ar,Bo,Ta, Ya,Zu	0-1,360 m	Ranges from Mexico to the West Indies, Trinidad, Venezuela, the Guianas, Brazil, Peru and Bolivia; Sect. *Polyspermium*
P. smaragdinum Bunting	5	Am	below 200 m	Endemic; Sect. *Polyspermium*
P. solimoesense A. C. Smith	5	Am,Ap,Bo	250 m	Also known from Guyana, Brazil and Peru; subgen. *Meconostigma*
P. sphalerum Schott	5	Am	below 500 m	Also in Surinam; Sect. *Oligospermium*
P. spruceanum Bunting	5	Am	100 m	Endemic; known only from Río Yatua; close to *P. roraimae;* subgen. *Meconostigma*
P. steyermarkii Bunting	5,6	Am,Bo	125-800 m	Also in Brazil, Colombia and Peru; Sect. *Philopsammos* (Bunting, 1986)
**P. strictum* Bunting	4	Ta	1,100-1,330 m	Endemic; Cerro las Minas, 7°36'N, 72°13'W; Sect. *Polyspermium* (Bunting, 1986)
**P. sucrense* Bunting	2	Su	225 m	Endemic; Caripito-Carúpano, 10°30'N, 63°35'W (Bunting, 1986)
P. surinamense (Miq. ex Schott) Engler	5,6	Am,Bo	up to 1,300 m	Also known from Guyana, Surinam, Brazil (Amapá) and Peru
**P. tachirense* Bunting	3	Ta	1,100-1,150 m	Endemic; 19-25 km E of San Cristóbal; Sect. *Oligospermium* (Bunting, 1986)
P. tatei Krause ssp. *tatei*	5	Am	1,000-1,500 m	Endemic; known only from the slopes of Cerro Duida; Sect. *Philopsammos* (Bunting, 1986)

* ssp. *melanochlorum* (Bunting) Bunting	6	Am,Bo	700-1,350 m	Endemic
P. tenue C. Koch & Augustin	2,3	Ap,DF,La,Me, Ta,Ya,Zu	810-1,600 m	Ranging from Nicaragua to Ecuador and Venezuela
**P. tessmanii* Krause	3,5	Ap,Ta	100-1,000 m	Also in Surinam, French Guiana and Peru; Sect. *Pteromischum*
**P. triangulare* Bunting	3	Tr	1,300-1,650 m	Endemic; vic. Escuque, ca. 9°25'N, 70°45'W; Sect. *Oligospermium* (Bunting, 1986)
P. trujilloi Bunting	2,3	Ap,Ar,Me,Ta, Ya,Zu	100-1,350 m	Endemic; Sect. *Polyspermium*
P. venezuelense Bunting	5	Am	125-140 m	Known only from Venezuela but to be expected in eastern Colombia and perhaps also in northern Brazil; subgen. *Meconostigma*
**P. venosum* (Willd.) Croat	1,2	Ar,DF,Fa,Mo, Su	below 1,000 m	Also in Trinidad & possibly Lesser Antilles; treated as *P. karstenianum* by Bunting (1979); Sect. *Pteromischum*
P. venustum Bunting	5	Am	120-400 m	No doubt in adjacent Colombia as well; Sect. *Polyspermium*
**P. victoriae* Bunting	3	Ta	ca. 800 m	Endemic; vic. of El Corozo, S of San Cristóbal, related to P. barrosoanum; Sect. *Oligospermium* (Bunting, 1986)
P. vinaceum Bunting	6	Bo	700-1,300 m	Endemic; Sect. *Polyspermium*
**P. wurdackii* Bunting	5,6	Am	120-1,130 m	Also in Brazil, Colombia; Ecuador and Peru; Sect. *Oligospermium* (Bunting, 1986)
**P. yaracuyense* Croat	2	Ya	1,200 m	Endemic

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
**P. yavitense* Bunting	5	Am	125-140 m	Endemic; Depto. Casiquiare, vic. Pimichín; section unknown (Bunting, 1986)
P. zulianum (Bunting) Bunting ined.	3	Zu	250-475 m	Endemic; known only from the plains of Lake Maracaibo and foothills of the Serranía de Perijá; Sect. *Pteromischum*
Pistia stratiotes L.	1,2,3	Ap,Ar,DA,Fa, Po,Su,Zu	low elev.	Widespread in tropics
Rhodospatha badilloi Bunting	2,3	Ar,La	above 1,660 m	Endemic
R. bolivarana Bunting	6	Bo	below 600 m	Endemic; known only from along Río Canaracuni, S of Cerro Jaua in SE Bolívar
**R. falconensis* Bunting	2	Fa	1,360 m	Endemic; Sierra de San Luis, above Uria (Bunting, 1986)
**R. guasareensis* Bunting	3	Zu	1,450-1,600 m	Endemic; Dtto. Mara, vic. Puerto "El Bosque" de la Guardia Nacional, 10°47'N; 72°40'W (Bunting, 1986)
R. cf. *heliconifolia* Schott	3	Me,Ta	200-2,300 m	To be expected in adjacent Colombia
R. moritziana Schott	2,3	Ap,Ar,Mi,Ta, Ya	0-1,300 m	Also known from Colombia, Ecuador and Peru
**R. steyermarkii* Bunting	2	Su	700-750 m	Endemic; Peninsula de Paria, E of Cerro de Humo; aff. *R. moritziana* (Bunting, 1986)
R. oblongata Poeppig	5,6	Am,Bo	125-1,200 m	Also occurs in Guyana, Surinam and Brazil
R. perezii Bunting	3	Me,Ta	250 m	Endemic

R. cf. *picta* Nichols.	3	Ap,Me,Po, Ta?,Tr	200-1,500 m	Endemic
R. venosa Gleason	5,6	Am	120-400 (1,000) m	Also occurs in Guyana
Schismatoglottis bolivarana Bunting & Steyerm.	5,6	Am,Bo	95-400 m	Endemic; differs from *S. spruceana* by its ovate-cordate leaf base
S. spruceana (Schott) Bunting var. *spruceana*	5	Am,Bo	to 150 m	Also known from Brazil
var. *williamsi* (Steyerm.) Bunting	5	Am	to 150 m	Endemic
Spathiphyllum cannaefolium (Dryand.) Schott	1,2,3 5,6	Am,Ap,Bo,DA, Me,Mo,Su,Ta, Zu	below 1,200 m	Ranges from Amazon basin in Colombia, Ecuador, Peru, Brazil and Venezuela to Trinidad and the Guianas
S. humboldtii Schott	5	Am,Ta	below 1,000 m	Also in Guyana, Brazil, Colombia, Ecuador and Peru
S. jejunum Bunting	5	Am	ca. 250 m	Possibly same as *S. schomburgkii* Schott; in Venezuela known only from Jacaré, Río Cunucunuma
S. lanceaefolium (Jacq.) Schott	2,3	Ar,Ca,Fa,Me, Mi,Po,Zu	up to 1,300 m	Endemic; along streams and in cloud forests
**S. liesneri* Croat	5	Am	below 120 m	Endemic
S. monachinoi Bunting	5	Am,Bo	100-200 m	Endemic; known only from along Río Parguaza; probably also from Brazil *(Cid & Ramos 1070)*

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
S. neblinae Bunting	5	Am,Bo	140-400 m	Endemic
S. perezii Bunting	3	Me,Ta	ca. 125-1,000 m	Endemic; known only from El Vigia-El Quince Road and Represa Dorado; apparently related to *S. fulvovirens*
S. schomburgkii Schott	5,6	Am,Bo	150-900 m	Endemic?; growing near the base of the tepuís; possibly also in Colombia: Bolívar: 150 km N of Barrancabermeja, 900 m *(Bruijn 1110*, VEN) matches the species well
Stenospermation ammiticum Bunting ssp. *ammiticum*	5,6	Am,Bo	140-1,575 m	Also known from adjacent Guyana; in Venezuela usually growing along the base of the tepuís; possibly also from Peru *(Schunke 5867)*
* ssp. *neblinae* Bunting	6	Am	1,700-2,000 m	Endemic; Cerro de la Neblina (Bunting, 1986)
S. multiovulatum (Engl.) N. E. Br.	1,6	Bo,DA	0-2,100 m	Ranges from Panama to Venezuela, the Guianas, Brazil and Peru
S. pittieri Steyermark	3	Ta	above 1,800 m	Endemic; known only from between Bramón and Las Delicias
S. spruceanum Schott	5	Am,Bo	up to 1,800 m	Also ranges from Guyana to Brazil, Peru, Colombia and Ecuador
S. steyermarkii Bunting				=*S. multiovulatum* (Engl.) N. E. Brown
S. ulei Krause	5,6	Am,Bo,DA	mostly above 1,000-2,300 m	Also known from Brazil
Syngonium apurense Bunting				=*S. atrovirens* Bunting

S. atrovirens Bunting	3	Ap,Me,Ta,Zu	below 500 m	Known also from Colombia *(André 419 bis)* in Magdalena Prov. (Naranjo-Carare); most closely related to *S. yurimaguense* from Brazil, Ecuador, Peru and Bolivia
S. crassifolium (Engl.) Croat	3	Me	125 m	Also in Colombia and Ecuador; in Venezuela known only from El Vigia-El Quince *(Bunting 2403,* MY)
S. aff. *hastifolium* Engler				Material treated by Bunting (1979) is here included in *S. crassifolium* (Engler) Croat
S. meridense Bunting	3	Me	ca. 125 m	Endemic; known only along the Caño Zancudo-La Azulita road and between El Vigia and El Quince
**S. podophyllum* Schott	1,2,3 5,6	Am,Ap,Ar?,Ba, Bo,DA,Me,Ta, Tr,Ya,Zu	below 1,000(1,510) m	Ranges from Mexico to Guianas, Brazil and Bolivia
S. vellozianum Schott				=*S. podophyllum* Schott
Thaumatophyllum spruceanum Schott				=*P. goeldii* G. M. Barroso
Typhonium divaricatum (L.) Decne.		DF		Introduced and escaped around Caracas
Urospatha sagittifolia (Rodsch.) Schott	1,5	Am,An,Bo,DA, Mo	50-750 m	Also known from the Guianas, Peru, Colombia, Ecuador and Brazil
**U. wurdackii* (Bunting) A. Hay comb. nov., ined.	5	Am	100 m	Endemic; known only from Cerro Yapacana near Río Orinoco

SPECIES	FLORISTIC ZONES	STATES	ELEVATION	COMMENTS
Xanthosoma akkermansii (Bunting) Croat	5	Am	100-125 m	Endemic; known only from granitic outcrops between Puerto Ayacucho and Sanariapo
X. aristequietae (Bunting) Madison	2,7	Am,Ca,Co,Gu, Po	below 250 m	Endemic
X. bayo Bunting	3	Me,Po,Ta,Tr	200-500 m	Endemic; in open areas, especially along roads
**X. bolivaranum* Bunting	6	Bo	200-400 m	Endemic; Gran Sabana, km 87 from El Dorado (Bunting, 1986)
X. caulotuberculatum Bunting	6	Bo	50-500 m	Endemic; known only from El Dorado-Santa Elena de Uairén Road; *Steyermark et al.* at 50 m from Delta Amacuro may be this species
X. conspurcatum Schott	5	Am	below 250 m	Also from Surinam, in Venezuela known only from Yavita
X. helleborifolium (Jacq.) Schott	2,6	Ar,Bo,Ca,DF, Fa,Gu,La,Po	up to 900 m	Ranges from El Salvador to the Guianas and Amazonian Peru, Brazil, Colombia and Ecuador
X. jacquinii Schott	1,2	Am,Ar,Mi,Mo, Su,Ya	750-2,000 m	Widespread in neotropics
X. longilobum Bunting	3	Ba,Me,Tr	below 1,000 m	Endemic to Cordillera de Mérida
**X. maroae* Bunting	5	Am	120-400 m	Endemic; Maroa (Río Guainía); Gran Sabana, km 87 from El Dorado (Bunting, 1986)
X. mexicanum Liebm.	3,5	Am,Ba,Me,Po, Tr,Zu	400-500 m	Ranges from Mexico to Venezuela; in Venezuela, from the western slopes of the Cordillera de Mérida and SE Zulia

X. orinocense Bunting	5	Am	125 m	Endemic; along Río Orinoco near the mouth of the Caño Yapacana
X. pariense Bunting	1	Mo,Su	to 540 m	Endemic; similar to *X. pentaphyllum* (Vell.) Engler (see photo)
X. peltatum Bunting	3	Ap,Me,Ta	1,230-2,000 m	Endemic
X. pentaphyllum (Vell.) Engler	2	Ar,Ca,Mi	0-1,000 m	Ranging from Mexico to Venezuela
X. pilosum C. Koch & Augustin				=*X. mexicanum* Liebm.
X. sagittifolium (L.) Schott	3,5	Am,Ba,Mi,Ta, Ya	up to 1,900 m	Known also in Colombia, Ecuador, Peru and perhaps elsewhere; in Venezuela known only from Barinas-Santo Domingo Road
X. saguasense Bunting	3	Po, Tr	ca. 1,400 m	Endemic; in Venezuela known only from near the Río Saguas
X. striatipes (Kunth) Madison	5	Am,Bo,Gu	75-450 m	Also in Colombia, the Guianas, Brazil and Paraguay
X. trilobum Bunting	5	Am	100-250 m	Endemic; known from along the Río Orinoco near the mouth of the Río Pacimoni (Llacami), in the vic. of Canariapo and in the vic. of Yutaje

All names preceded by asterisks represent names which did not appear in Bunting's 1979 synopsis. They may represent synonyms or new taxa.

Death Notice of Ganopathy Thanikaimoni, an important researcher on Araceae pollen: The community of aroid researchers mourn the loss of Dr. G. Thanikaimoni, formerly head of the Department of Palynology at the French Institute, Pondicherry, India, who met his untimely death at the hands of terrorists during a hijacking attempt at Karachi, Pakistan, on 6 September 1986. Thani, as he was known to his friends, completed a major work on the pollen of the Araceae, comprising the most complete light microscope survey of pollen ever done (Thanikaimoni, 1969). He spent considerable time at the Missouri Botanical Garden and was a kind and likable individual. Thanikaimoni's monumental *Bibliographic Index on the Morphology of the Pollen Grains of Angiosperms,* begun in 1972 and appearing in five volumes, is a testimony to his prolific activity. The Aroid Society, which has benefited at least indirectly from his extensive work with pollen of the Araceae, extends its sympathy to Thani's wife, his son and his daughter.

Thanikaimoni, G. 1969. Esquisse palynologique des Aracées. Inst. Franc. Pondicherry, Trav. Sect. Sci. Tech. 5(5): 1-31.

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FRONT COVER:
Anthurium julianii Bunting
Venezuela: Lara: between Humocaro Alto and La Palma, 2050 m, Croat 60640.

BACK COVER:
Philodendron megalophyllum Schott
French Guiana: Cayenne City, near Ostrom Research Station, at sea level, Croat 53809.

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