Ministry of Agriculture, Lands and Food Production

Vol. III] [Part IV

FLORA

OF

TRINIDAD AND TOBAGO

NUDIFLORAE

CYCLANTHACEAE	(BY D. PHILCOX)
TYPHACEAE	(BY D. PHILCOX)
ARACEAE	(BY S. J. MAYO)
LEMNACEAE	(BY F. N. HEPPER)

APOCARPAE

ALISMATACEAE	(BY D. PHILCOX)
BUTOMACEAE	(BY D. PHILCOX)
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SERIES V—NUDIFLORAE
FAMILY 1—CYCLANTHACEAE

By D. Philcox*

Perennial, rhizomatous, terrestrial herbs or shrubs (rarely epiphytes), acaulescent or with more or less short stems, or root-climbing lianes with long, slender stems; leaves dispersed or distichous, blades generally bifid, more seldom flabelliform-parted or entire, 1–, 2– or 3–costate; petioles sheathing at base; inflorescence an axillary, unbranched spadix, peduncled, subtended and initially enveloped by 2–11 conspicuous foliaceous or petalaceous spathes; flowers always monoecious, densely crowded, staminate and pistillate flowers in spirally arranged groups, each group consisting of one female flower surrounded by four male ones, or in alternate cycles; male flowers rarely lacking perianth, mostly with cupulate, marginally more or less lobate perianth, stamens mostly numerous, anthers originally 4-celled, longitudinally dehiscent, filaments basally connate, usually swollen into so-called basal bulbs; female flowers sometimes entirely coalescent into cycles, individual flowers not being possible to discern (*Cyclanthus*) or, more often, only partly connate with each other or entirely free; tepals in latter group four, free or subconnate, epi– to perigynal, often enlarged and indurate in fruit; staminodes four, flexuously filiform, opposite tepals; ovary 4-carpellate, unilocular, free or, more often, more or less embedded in spadix; styles 0 or 4, free or more or less concrescent to one common style; stigmas 4, alternating with tepals, of very different shape, styles and stigmas usually persisting and accrescent; fruit a fleshy syncarp of united or separate berries, sometimes falling from spadix in concrescent sheets of fleshy pulp; seeds numerous, small to rather large, flat or terete, testa of very different thickness and structure.

Key to the Genera

1 Leaf-blades bifid, flabelliform-parted or entire, costae one or three only running through basal part of blade; fruiting spadix not screw-like 2

*Largely extracted from Monograph of the Cyclanthaceae by Gunnar Harling (Lund, 1958)

Leaf-blades deeply bi-partite, costae forked at base of blade, each branch running to apex of one blade segment; fruiting spadix resembling, in general appearance, a screw ..... 6. **Cyclanthus**

2 Leaf-blades flabelliform-parted, segments 4 (rarely 3 or 5), wedge-shaped, apical parts regularly dentate or lobate; mature petiole 3–5 times length of blade ..... 1. **Carludovica**

2 Leaf-blades bifid or entire, occasionally split when old into few to many irregular lobes; mature petiole up to twice length of blade 3

3 Female flowers connate, at least in their basal parts; seeds flat with thin testa, not or only faintly sculptured 4

3 Female flowers free from each other; seeds terete with thick, characteristically sculptured testa 5

4 Spathes usually 3–5(–6 –8), all spathes of about same length, or lower-placed ones longer than upper; fruit dull, epidermis not hardened and brittle ..... 2. **Asplundia**

4 Spathes 8–11, successively diminishing from upper to lower part of peduncle; fruit very lustrous, epidermis hardened and brittle ..... 3. **Thoracocarpus**

5 Receptacle of male flowers deeply funnel-form, stamens immersed, for long time entirely covered by long perianth-lobes; female flowers free from each other; seeds flat, thin ..... 4. **Evodianthus**

5 Receptacle of male flowers flat or nearly so, stamens always freely exposed; perianth-lobes more or less reduced; female flowers connate; seeds terete ..... 5. **Dicranopygium**

1. CARLUDOVICA *Ruiz & Pavon* emend. *Harling*

Carludovica Ruiz & Pavon *emend.* Harl. in *Acta Hort. Berg.*, Bd. 17, 3:40 (1954)

Terrestrial, erect, acaulescent or very short stemmed, usually densely clumped; leaves dispersed, blades flabelliform-parted, tricostate, as broad as long or broader, segments wedge-shaped, with apical parts regularly lobate or dentate; petiole 3–5 times as long as blade; peduncle about $\frac{1}{3}$ length of petiole, but considerably thicker at least above; spathes 3–4, subdensely crowded below spadix, lanceolate to ovate, cymbiform, lowermost or two lower spathes green, upper creamish- or greenish-white, petalaceous; spadix cylindrical or subellipsoid, more elongate and slender than other genera; male flowers fleshy, massive, lacking distinct pedicel; rounded or somewhat angular; receptacle flat or shallowly concavey perianth lobes 15–20, densely crowded all round receptacle partly covering each other, each lobe rotundate, apiculate, glandularh stamens many, crowded; female flowers partly connate with each other, usually suborbicular or perhaps lengthened, always with well developed tepals; styles single or lacking; stigmas varied; seeds irregular, oblong to suborbicular, rather thick, mostly subangular, never entirely flat, dull yellowish-white.

Carludovica palmata Ruiz & Pavon, *Syst. Veg. Fl. Peru*: 291 (1798); Harling in *Acta Hort. Berg.*, Bd. 18, 1: 128, fig. 35, pls. 1–4 (1958); Adams, *Fl. Pl. Jam.* :72 (1972); Fournet, *Fl. Guadel. & Martin.*: 410 (1978)

C. jamaicensis Lodd. *ex* Fawcett & Harris in *Bull. Bot. Dep., Jam.* 9: 145 (1902)

Plant 1.5–4(–5) m tall; leaf-blades (30–)50–80(–90) cm long; petiole 1–3.5(–4) m long; peduncle (20–)30–50 cm long during anthesis, up to 1 m long or more at fruiting stage; spathes 3–4, lowermost or two lower 15–30(–35) cm long, 3–4(–5) cm wide lanceolate, upper ones 10–20 cm long, 4–5.5 cm wide, broadly lanceolate to ovate, acuminate to subcuspidate; spadix 9–16(–22) cm long, 1–2.5(–4) cm thick during anthesis, narrowly cylindric, up to 30 cm long in fruit, 5.5 cm thick; male flowers 3–5 mm long, stamens (30–)40–55, anthers 1–1.7 mm long; female flowers 3–5mm

broad, in fruit up to 10 mm broad; tepals at anthesis 1.5–3 mm long, 2.5–4.5 mm wide at base, obtusely triangular, subconnate at base; staminodes white to yellowish-white, 3–6 cm long, forming irregular jumble on flowering spadix; seeds (1.5–)2–3 mm long, 1–1.5 mm broad.

Trinidad: cultivated in Botanic Gardens, November 1893, Broadway (TRIN 4393); Long Stretch, near the northern gravel-pit, 27.10.1955, Simmonds (TRIN 15365).

This plant is a native of Andean South America and appears to be wild from Guatemala to central Bolivia. Harling, however, considers it always to be introduced wherever it is recorded from the West Indies.

2. ASPLUNDIA *Harling*

Asplundia Harl. in *Acta Hort. Berg.*, Bd. 17: 41 (1954)

Root-climbing liane with long slender stems, or terrestrial herbs or shrubs, acaulescent or with short to long stems; leaves dispersed, blades always bifid, unicostate to tricostate, plicate; segments mostly oblong, lanceolate to ovate, acute or acuminate; petiole up to twice length of blade, but usually equalling it; peduncle similar to *Carludovica*; spathes usually 3–5(–8), never densely crowded immediately below spadix but irregular in upper half of peduncle, lanceolate to ovate, more or less cymbiform; spadix ellipsoid, ovoid or shortly cylindric, rarely spherical; male flowers symmetrical or asymmetrical, perianth lobes glandular, oblong to obovate, obtuse to truncate, stamens few to many; female flowers partly connate with each other; styles four, entirely or partly free or rarely as one common style; seeds oblate to ovoid, flattened, lustrous, yellowish with thin, unsculptured testa.

Asplundia rigida (Aubl.) Harl. in *Acta Hort. Berg.*, Bd. 17: 43 (1954) & in Bd. 18: 146, fig. 38, pl. 8 (1958); Fournet, *Fl. Guadel. & Martin.*: 411 (1978)

Mammoo

Pothos rigida Aubl., *Pl. Guian.*: 839 (1775)

Root-climbing liane, occasionally terrestrial; stem up to 10 m long, often branched; leaves accumulated at tops of branches, blades 35–65(–80) cm long, bifid to somewhat more than half their length, up to $\frac{3}{4}$, segments (2–) 4–10(–15) cm broad, linear-lanceolate to narrowly lanceolate, more seldom broadly lanceolate, acute to acuminate; petiole 15–35(–55) cm long; peduncle at anthesis (5–)7–10 cm long, at fruiting up to 20 cm long; spathes 5–6, cymbiform, long-acuminate, white to greenish-white, lower 7–12 cm long, 1.5–2 cm wide, upper 5–8 cm long, 2–2.5 cm wide; spadix subcylindric, pendulous, at anthesis (2–)3–4(–5) cm long, 0.8–1.2 cm thick, at fruiting up to 8 cm long, 2 cm thick; male flowers 2.5–3.5 mm long, receptacle 2–2.5 mm diam., deeply concave; perianth-lobes 10–15, smallest often eglandular; stamens (50–)60–90(–100), varying in size; female flowers at anthesis 2.5–5 mm broad, up to 8 mm at fruiting stage; staminodes 3–7 cm long, yellowish-white; seeds 1–1.2 mm long, 0.5–0.6 mm broad.

Trinidad: St Anne's, 20.7.1845, Crueger (TRIN 2233); Mt Tucuche, Crueger 47 (K), col between Piedra Blanca and Naranja, climber, alt. 570 m, 10.8.1947, Simmonds 139 (K, TRIN 13803); Maracas, road to falls, climber, 7.11.1924, Broadway s.n. (K), near the falls, terrestrial, 14.10.1927, Broadway 6881 (BM, K); near milepost 10, Arima-Blanchisseuse road, alt. 600m, 30.7.1976, Barnard, Jones & Crane 430 (RNG); Heights of Aripo, January 1922, Broadway 9923 *pro parte* (NY, TRIN), on slopes S of El Cerro del Aripo, 17.8.1959, Webster & Miller 9743 (TRIN); Matura Forest Reserve, N of Valencia-Toco road, climber, 26.7.1977, Philcox, Andrews & Kelly 8072 (K); Toco road, Valencia, 16.4.1920, Britton, Hazen & Mendelson 1798 (GH, NY); Quarry River forests, near Valencia, 10.10.1924, Broadway 5439 (K); Balandra Bay, 8–9.3.1920, Britton, Britton & Hazen 426 (GH, NY); Mayaro, 15.4.1915, Freeman (TRIN 7901); Mt Tamana, 22.5.1868, Finlay (TRIN 2893); Lagoon Bouffe, mud volcano trail, alt. 40 m, 26.7.1976, Barnard, Jones & Crane 318 (RNG).

Tobago: Lot 42, near a stream, Broadway 4481 *pro parte* (GH); between mile posts 25 and 28, Man of War Bay to Bloody Bay, alt. *ca* 300 m, terrestrial or climber, 23.8.1959, Webster & Walker (TRIN 19691).

Lesser Antilles, Trinidad and Tobago.

Harling (in *Acta Hort. Berg.*, Bd. 18: 226 (1958)) mentions the possibility of a second species, *A. insignis* (Duchass. *ex* Griseb.) Harl. occurring in Tobago. This is on the evidence of some broad tricostate leaves intermixed with Broadway 4066—*Dicranopygium insulare*.

3. THORACOCARPUS *Harling*

Thoracocarpus Harl. in *Acta Hort. Berg.*, Bd. 18: 254 (1958)

Root-climbing liane with long, slender, branched stems; roots of two kinds, short climbing roots in large numbers from stems and branches, and long rope-like reddish-brown aerial roots pendant from branches and upper stem; leaves dispersed, accumulated in tops of branches, of two kinds: relatively large, bifid leaves and smaller entire leaves, the latter usually confined to young sterile branches; blades unicostate, petiole shorter than blade, flattened and more or less channelled above, petiole sheath in young leaves entirely clasping, later less so; peduncle short; spathes 8–11, diminishing in size from upper to lower part of peduncle, lanceolate to ovate, acute, usually broadly clasping; spadix shortly cylindric to ellipsoid or subovoid, very lustrous, olive-green to yellowish-brown, epidermis hard and brittle in ripe fruiting stage; male flowers large, symmetrical, funnel-shaped; pedicel centrally positioned, receptacle deeply hollow; perianth-lobes (8–)10–15, oblong to slightly cuneate, glandular, rather abruptly dilated at tip; stamens varying in size; female flowers connate at base; stigmas sessile; seeds oblong, flat, thin, yellowish, minutely striate.

Thoracocarpus bissectus (Vell.) Harl. in *Acta Hort. Berg.*, Bd. 18: 225, figs. 4e, 8g, 68, pls. 51–53 (1958)

Dracontium bissectum Vell., *Fl. Flumin.* 9: t. 118 (1827) & in *Arch. Mus. Nac.*, Rio de Jan. 5: 388 (1881)

Stems 5–10(–15) m long, up to 5–6 cm diam.; blades of bifid leaves (15–)30–40(–60) cm long, bifid to $\frac{3}{4}$ of their length, segments (1.5–)3–5(–9) cm wide, lanceolate, acute to slightly acuminate, when older sometimes further divided; blades of entire leaves (4–)8–18(–25) cm long, (1–)1.5–3(–5) cm wide, lanceolate, acute to acuminate; petiole of bifid leaves (5–)12–20(–25) cm long, of entire leaves

(2–)3–6(–8) cm long; peduncle 5–10(–15) cm long, spathes along whole peduncle, greenish or yellowish-white to white, 3–5 lower spathes not reaching spadix, diminishing in size towards base of peduncle, *ca* 1.5–4 cm long, 1–2 cm wide, entirely clasping, upper 5–6 spathes wholly or in large part enclosing spadix, 3–9 cm long, 2–3 (–4) cm wide at base, 3–4 cm wide in middle, mostly broadly clasping, usually caducous; spadix 2–5 cm long, 1.5–2.5 cm thick at anthesis, up to 10 cm long, 3.5 cm thick, pendulous at fruiting stage; male flowers 5–7 mm long; receptacle 3.5–5.5 mm diam.; perianth-lobes 3–4 mm long; stamens 40–80; anthers 1–3 mm long, 0.3–0.5 mm broad; female flowers 3–4 mm broad at anthesis, up to 10 mm broad at fruiting stage; staminodes 3–5 cm long, white to yellowish-white; seeds 1.8–2.5 mm long, 0.8–1 mm broad.

Trinidad: without locality, Crueger 231 (*vide* Harl.)(GOET); Caparo, climber, 3.1.1915, Broadway (TRIN 8247); Aripo Road forests, near milepost 4, 15.5.1927, Broadway s.n. (K); Melajo Reserve, *ca* 1.5 km N of Oropuche village, 20.7.1976, Barnard, Jones & Crane 568 (RNG).

Panama, through northern and central South America. Trinidad.

4. EVODIANTHUS *Oersted*

Evodianthus Oerst., *Plantae Novae Centroamericanae* 3: 194 (1857)

Root-climbing liane with long, slender, branched stems, or terrestrial with short to long, erect or creeping, usually unbranched stems; roots in climbing plants of two types: short, greyish climbing roots profusely from stem and branches, and long, rope-like, reddish-brown aerial roots, freely pendant from upper stems and branches; leaves dispersed, subaccumulated at top of branches, often of two kinds: large bifid leaves and smaller entire leaves; blades unicostate; petiole shorter than blade, flattened and more or less channelled above; peduncle relatively long and slender; spathes 3, densely crowded immediately below spadix, lowermost more or less distinctly triangular; spadix subcylindric to ovoid or almost spherical; male flowers symmetrical, obconic, funnel-shaped, perianth-lobes imbricate in two alternating whorls; pedicel rather short, centrally posi-

tioned; receptacle deeply hollow; female flowers free from each other; styles lacking or very short, free; seeds oblate to narrowly ovoid, flattened, orange-red, testa thin and unsculptured.

Evodianthus funifer (Poit.) Lindm. in *K. Svensk. Acad. Handl.*, Bd. 26, Avd. 3, 8: 8 (1900); Harl. in *Acta Hort. Berg.*, Bd. 18: 262 (1958)

Ludovia funifera Poit. in *Mem. Mus. Hist. Nat.* 9: 28 (1822)
Evodianthus funifer subsp. *funifer*. Figs. in Harl. in *Acta Hort. Berg.*, Bd. 18, figs. 4g, 8h, 70, 71; pl. 55 (1958)

Stem in climbing plants up to 15 m long, 6 cm diam., in terrestrial plants rarely exceeding 1–1.5 m; leaf blades 30—70(–80) cm long, bifid to $^1/_2$–$^4/_5$ of their length, rarely only to $\frac{1}{4}$–$\frac{1}{2}$, segments (1.5–)2.5–5(–7) cm wide, linear to linear-lanceolate, rarely narrowly subtrianglar, gradually tapering to more or less long points, or acuminate; petiole (5–)15–35(–45) cm long; peduncle 5–15 cm long at anthesis, up to 25 cm long at fruiting stage; spathes thin, caducous, yellowish-white to pale orange-red, brownish when older, lowermost up to 9 cm long, only basally enclosing spadix, ovate-triangular, two upper spathes 3–5(–6) cm long, 1.5–3(–4) cm wide, lanceolate-ovate to broadly ovate, acuminate to subcuspidate, wholly enclosing spadix; spadix 2–3.5 cm long, 1.5–2 cm thick at anthesis, up to 6 cm long, 3 cm thick, pendulous at fruiting stage, fragrant; male flowers (2–)3–5(–6) mm long; receptacle (2–)3–4 (–4.5) mm diam.; perianth-lobes (8–)10–12(–14) in each whorl; stamens (10–)15–35(–40), irregularly scattered or placed in more or less distinct circles; anthers 0.6—1.5 mm long, 0.3–0.5 mm broad; female flowers 2.5–3.5 mm broad at anthesis, up to 6 mm broad at fruiting stage; staminodes 5–7(–10) cm long, straw-coloured to orange-red; seeds 1–1.2 mm long, 0.4–0.6 mm broad.

Trinidad: without locality, Fendler 749 (BM, E, K, NY); Blue Basin, Diego Martin, December 1893, Broadway (TRIN 5194), 13.5.1915, McLean (TRIN 7743); Maracas, December 1889, Hart (K, TRIN 3711); Maracas Falls, 2.4.1893, Broadway s.n. (K); Heights of Aripo, 11–26.1.1922, Broadway (NY, TRIN 9923 *pro parte*), the caves trail, *ca* 800 m, 24.12.1947, Simmonds 222 (K, TRIN 14026); Mora forest, at end of trace from milepost $5\frac{3}{4}$, Valencia to Matura road, Matura Forest Reserve, *ca* 150 m, 3.5.1975, Philcox & Wood 7757 (K).

Tobago: Easterfield road, between Green Hill and Caledonia, 11.10.1937, Sandwith 1709 (K).

Costa Rica to central Brazil and eastern Peru. Trinidad and Tobago.

5. DICRANOPYGIUM *Harling*

Dicranopygium Harl. in *Acta Hort. Berg.*, Bd. 17: 43 (1954)

Small to medium-sized terrestrial plants, acaulescent or with short fleshy stems; leaves dispersed, blades always bifid, usually unicostate; segments mostly linear, lanceolate or ovate, acute or acuminate; petiole up to twice length of blade, but usually equalling it or shorter; peduncle usually rather long, slender; spathes usually 2–3(3–4 in some species), densely crowded below spadix, at least lowermost narrowly triangular, usually evenly attenuate; spadix small, rather pauciflorous, subcylindric to ellipsoid or oboviod, rarely subspherical; male flowers various, in most species asymmetrical; receptacle flat or nearly so; perianth-lobes short, glandular; stamens very few to many; female flowers connate with each other, rather flat; seeds ovoid to fusiform, terete, mostly dark coloured, with thin characteristically sculptured testa.

Dicranopygium insulare (Gleas.) Harl. in *Acta Hort. Berg.*, Bd. 17: 44 (1954), & in *Acta Hort. Berg.*, Bd. 18: 330, fig. 88a–e, pl. 82 (1958)

Carludovica insularis Gleas. in *Bull. Torr. Bot. Club* 56: 4 (1929)

Acaulescent or very short-stemmed plant; leaf-blades (15–)30–55 cm long, bifid to about $\frac{2}{3}$ their length or more, segments (2–)3–5 cm broad, linear-lanceolate, acute, rarely acuminate; petiole (10–)30–50(–65) cm long; peduncle 12–25(–30) cm long at anthesis; spathes 2, greenish-white to white, lowermost (2.5–)3–5(–8) cm long, 0.8–1.5 cm wide at base, triangular to triangular-ovate, long-attenuate or rather distinctly long-acuminate, uppermost spathe 2–3 cm long, 1.2–2 cm wide, broadly ovate to subrotund, cuspidate, wholly enclosing spadix; spadix obovoid to subspherical, 1–1.5(–2) cm long, 0.5–1 cm thick at anthesis; male flowers 2–3 mm long; receptacle 1.5–2.5 mm diam., lobes 5–9; stamens 6–12; anthers 0.5–0.7 mm long, 0.6 mm broad; female flowers 2.5–3.5 mm wide at anthesis; staminodes 2–4 cm long, white to brown when older; seeds unknown.

Tobago: Lot 42, 21.4.1913, Broadway 4481 *pro parte* (BM, GH, NY, P); slopes of Lambeau Hill, by Frenchman's River, 7.10.1937, Sandwith 1639 (K); Mason Hall, 6.5.1913, Broadway s.n. (K); Castara woods, 30.9.1911, Broadway 4066 *pro parte* (K, holotype; NY, isotype); Menna, 9.11.1932, Broadway 9099 (BM, K); Great Dog River, November 1889, Eggers 5767 (K, P); Trafalgar River, 8.4.1926, Williams & Cheesman (TRIN 11681) Northside Road, Charlotteville to King's Bay, 24.10.1925, Freeman & Williams (K, TRIN 11401).

Known only from Tobago.

6. CYCLANTHUS *Poiteau*

Cyclanthus Poit. in *Mem. Mus. Hist. Nat.* 9:35 (1822)

Plants often densely clumped; leaves dispersed, issuing from short, branched rhizome, blades when young entire, more or less broadly elliptic, later bifid at apex, when mature bifid almost or quite to base; petiole almost equalling blade; peduncle long, slender, shorter than petiole, deeply bent at fruiting stage; spathes 4, rarely 5, occurring near spadix; spadix rather large, cylindric to ellipsoid; flowers arranged in separate cycles around spadix, male and female cycles alternating; male flowers of each cycle forming a unit with individual flowers not discernible; perianth lacking; stamens numerous; female flowers of each cycle entirely coalescent with each other, individual flowers not discernible; seeds subglobose to broadly ellipsoid, long-stalked, testa more or less distinctly sculptured by 10–12 longitudinal ridges connected through numerous, very thin ribs.

Cyclanthus bipartitus Poit. in *Mem. Mus. Hist. Nat.* 9:36 (1822); Harl. in *Acta Hort. Berg.*, Bd. 18: 400, figs. 4p, 8m–n, 110, 111, pls. 107–110 (1958); Fournet, *Fl. Guadel. & Martin.*; 412 (1978)

Leaf-blades 40–100(–120) cm long, segments (5–)8–16(–22) cm wide, oblong-lanceolate, often subfalcate, acute; petiole 40–100(–120) cm long; peduncle (20–)30–60(–70) cm long; spathes at intervals of 0.5–1.5 cm at uppermost parts of peduncle, broadly lanceolate, acute to acuminate, cymbiform, clasping, wholly enclosing spadix, lowermost (15–)20–30(–35) cm long, 3–4 cm wide at base, 5–8 cm

wide somewhat below middle, outside green to greenish-white, inside often yellowish, other spathes (8–)12–18(–25) cm long, 2–3 cm wide at base, 4–8 cm wide below middle, usually pure yellow to yellowish-red, less often red, yellowish-white or yellowish-green; spadix composed of (9–)12–15(–20) cycles of each kind, 4–10 cm long, 1.5–2.5 cm thick, erect at anthesis, up to 20 cm long, 7 cm thick, dirty yellow at fruiting stage, pendant on curved peduncle; seeds 1–1.6(–2) mm long, 0.5–0.8(–1.1) mm thick.

Trinidad: cultivated at St Clair Experimental Station, 2.7.1907, Broadway 2744 (K, P); Diego Martin, McLean (TRIN 7787); beside Madelaine River, east of Arima-Blanchisseuse road, 14.5.1979, Philcox & Cope 8408 (K, P, TRIN); Aripo, by the caves trail, 400 m, 18.6.1947, Simmonds 112 (TRIN 13804); about milepost 7¾, Arima-Blanchisseuse road, 26.8.1977, Philcox & Philcox 8232 (K); Southern Watershed Reserve, 28.3.1920, Britton, Hazen & Mendelson 1103 (NY); Mayaro, Trinity Hills Reserve, Lagoon Bouffe, mud volcano trail, 26.7.1976, Barnard, Jones & Crane 319 (RNG).

From northern Guatemala, through Central America to northern South America; the Lesser Antilles and Trinidad.

FAMILY 2—TYPHACEAE

By D. Philcox

Perennial marsh herbs with creeping rhizomes; stems erect, terete; leaves alternate, linear, sheathing at base, flat, sub-convex on back, entire; flowers unisexual, monoecious, crowded into simple, cylindrical spikes; male inflorescence terminal and above female spike, each spike subtended by foliaceous bract; male flowers mixed with variously shaped scales; stamens usually 2–3, rarely 6–7(–9), filaments free or connate; anthers linear, 2-celled, basifixed, longitudinally dehiscent; female flowers either ebracteolate or with clavate or spathulate bracteoles often mixed with abortive female flowers; ovary superior, stalked, 1-celled with solitary ovule; style slender, elongated, erect; stigma ligulate, spathulate, rhomboid, lanceolate or linear; fruit minute, stalked, fusiform or ellipsoid; seed subcylindric or narrowly ellipsoid.

TYPHA *Linnaeus*

Typha L., *Sp. Pl.*: 971 (1753)

As this is the only genus in the family, the above description is so formed as to act for both.

Typha domingensis Pers., *Synops. Pl.* 2: 532 (1807); Adams, *Fl. Pl. Jam.*: 8: 72 (1972); Fournet, *Fl. Guadel. & Martin.*: 409 (1978); Howard, *Fl. Less. Antill.* 3: 1 (1979)

Plant 1–2.5 m tall; leaves longer or shorter than inflorescence, upper sheaths auriculate, lower continuing into lamina; auricles symmetric or asymmetric; leaves 34–120 cm long, 0.5–1.6 cm wide flat above, smoothly convex beneath; inflorescence with one or more foliaceous, caducous bracts; male spike 20-35 cm long, 0.8–1.5 cm thick, narrowly subconical and usually separated from female by portion of rachis 1–6 cm long; male flowers with 1–5 (–9) stamens, usually 2; filaments 2–4 mm long; anthers 1.8–3 mm long overall including appendix 0.3–0.8 mm long, obtuse to apiculate; bracteoles 3–4 mm long, filiform to spathulate-lanceolate, simple or branched; female spike 9–29 cm long, 1–2.5 cm thick; fertile female flowers 4–9 mm long; ovary 1–1.5 mm long, fusiform on stalk 1–4.5 mm long, covered in long bristles; style 1–3 mm long; stigma 1–2 mm long, filiform, sometimes bent or arched; bracteoles 4–8 mm long, filiform, apex rhombic; sterile female flowers 3–6 mm long, solitary or in groups of up to 4; bracteoles similar to those of fertile flowers; ovary 1–1.5 mm long, obovoid; fruit 1–1.5 mm long, fusiform.

Trinidad: Barataria, 17.4.1935, DV–FG 4204 (TRIN); Cedros, mud volcano, 30.5.1850, Crueger s.n. (K), in pond, 20.9.1915, Caroline King (TRIN 7226), near Beaulieu, May 1915, Broadway (TRIN 9425); milepost 77¼, Icacos road, 27.3.1979, Philcox & Gillies 8299 (K).

Pantropic.

The identity of this plant is constantly a source of confusion among botanists and it is not intended that the matter should be clarified here. However, in spite of many works reducing this species into synonymy under *Typha angustifolia* L., it is considered better to uphold the views of S. Crespo and R. L. Perez-Moreau

(in *Darwiniana* 14:413 (1967) and those of B. G. Biggs and L. A. S. Johnson (in *Contrib. N. S. W. Nat. Herb.* 4:57 (1968)). In doing this I consider that *T. angustifolia* is a plant of the North Temperate regions while our plant, by reason of floral differences as well as size and distribution, represents *T. domingensis* Pers.

FAMILY 3—ARACEAE

by S. J. Mayo

Perennial herbs, often with milky, viscid or acrid sap; scandent (root-climbing) or rosulate epiphytes, or terrestrial with aerial, tuberous or rhizomatous stems, rarely floating aquatics or arborescent; leaves alternate, petiolate, solitary to numerous; petiole typically with well-developed basal sheath, often pulvinate at apex; lamina usually broad, membranous to coriaceous, very variable in size and shape, simple or variously lobed, sometimes perforated, main venation of leaf or leaflet lamina pinnate, palmate, rarely parallel, finer venation reticulate or striate; inflorescence pedunculate, consisting of more-or-less cylindrical spadix of numerous, sessile bractless flowers crowded onto fleshy axis, sometimes with sterile, terminal appendix, subtended by herbaceous, sometimes brightly coloured, spreading or convolute bract-like spathe; flowers without perianth or with perianth of 4–9 free or more-or-less connate tepals, bisexual or unisexual and monoecious with pistillate flowers at base of spadix, staminate flowers at or near apex; sterile flowers or appendages of varying shape often present at base, middle or apex of spadix; stamens opposite perianth segments, free or connate into synandria, anthers sessile or with more-or-less flattened, linear filaments, opening by slits or apical pores, connectives often very thick; ovary superior or immersed, 1-several locular, locules each with 1-numerous ovules, placentation parietal, axile, basal or apical, stigma sessile or borne on short, conical, rarely attenuate style; fruit a 1-several-seeded, fleshy berry, rarely connate to form a syncarp, often brightly coloured; seeds minute to large, variable in shape, with or without endosperm.

A largely tropical family of 110 genera and over 2000 species.

The most recent monograph of the family is by Engler (partly in collaboration with Krause) in *Das Pflanzenreich* IV. 23 A–F

(in 9 volumes) (1905–1920). The tribal and generic classification has been updated more recently by J. Bogner in *Aroideana* 1 : 63–73 (1979).

The Araceae flora of Trinidad and Tobago is more closely related to that of neighbouring northern South America than to the Lesser Antilles. The careful studies of Jonker-Verhoef and Jonker in Suriname are therefore important references (in Pulle, *Fl. Suriname* 1 (2) : 1–80 (1953), *Acta Bot. Neerl.* 2 : 349–362 (1953), *loc. cit.* 8 : 139–155 (1959), *loc. cit.* 15 : 130–146 (1966) and in Pulle & Lanjouw, *Fl. Suriname, Add. & Corr.* 1 (2) : 380–412 (1968).

The present account is based principally on the work of N. W. Simmonds in *Kew Bull.* 1950 (3) : 391–406 (1951) and in *J. Ecol.* 38 : 277–291 (1950). The latter, an account of the ecology of the Araceae of Trinidad, remains almost unmatched as a contribution to the field knowledge of the family.

The Araceae of the Lesser Antilles have been recently revised by R. A. Howard in *Fl. Lesser Antilles* 3 : 372–401 (1979) and in *J. Arn. Arb.* 60 (2) : 272–289 (1979). The latter paper contains much important nomenclatural and historical information. The recent treatment of Venezuelan Araceae by G. S. Bunting (in *Rev. Fac. Agron. (Maracay)* 10 (1–4) : 139–290 (1980), is also an essential reference, though it should be noted that it differs from the present account in certain nomenclatural points.

Key to the Genera

1 Main venation of leaf lamina consisting of 5–7 parallel primary veins, lamina lacking midrib; plant densely pubescent; free-floating aquatic ..... 8. **Pistia**

1 Main venation of leaf or leaflet lamina pinnate, with central midrib and several to many primary lateral veins; plant glabrous; rooted to substratum 2

2 Primary lateral veins of leaf or leaflets running into margin; finer venation usually striate and strongly parallel to primaries, sometimes reticulated 3

2 All or at least apical pairs of primary lateral veins of leaf or leaflets united distally into conspicuous intramarginal collective vein (closely approximate to margin in *Alocasia* and *Colocasia*); finer venation more or less reticulated, never parallel to primaries 9

3 Flowers bisexual; spadix more or less uniform in appearance (sterile or female flowers sometimes present at base); petiole with apical pulvinus (geniculum) 4

3 Flowers unisexual; spadix clearly differentiated into 2 or more zones, each bearing unisexual flowers or sterile organs; petiole lacking apical pulvinus (geniculum) 7

4 Terrestrial herbs; flowers with cup-like perianth formed by connate tepals; spathe spreading, flattened, persistent ...10. **Spathiphyllum**

4 Scandent epiphytes; flowers naked; spathe boat shaped, soon deciduous 5

5 Leaf lamina variegated with irregular green, white or yellow patches; cultivated ornamental; leaves pinnatifid in mature individuals, often with small holes along midrib but never with large perforations; flowering very rare ..... *Epipremnum pinnatum* (L.) Engl., cv. '*Aureum*'

5 Leaf lamina green, not variegated; native wild species or cultivated ornamentals, leaves often perforated; flowering common 6

6 Locules of ovary each with numerous axile ovules; seeds flattened, reniform; leaf lamina entire, never perforated;

finer venation strictly parallel to primary lateral veins; very rare in Trinidad, known only from Northern Range ..... 9. **Rhodospatha**

6 Locules of ovary each with 2 basal ovules; seeds subglobose to oblong; leaf lamina often perforated, pinnatifid or entire; finer venation often reticulated; common throughout Trinidad ..... 5. **Monstera**

7 Plant acaulescent; inflorescence long-pedunculate; spathe entirely white, showy ..... *Zantedeschia aethiopica* (L.) Spreng.

7 Plant with elongated aerial stem; inflorescence shortly pedunculate; spathe often green and inconspicuous, or flushed and tinged with red or white, never completely white 8

8 Plant terrestrial, stems erect or decumbent; leaves sometimes variegated; pistillate portion of spadix adnate to spathe; each pistil with 4 clavate staminodes; stamens connate into synandria ... ... 3. **Dieffenbachia**

8 Plant a scandent epiphyte; leaves very rarely variegated; pistillate portion of spadix not adnate to spathe; pistils lacking staminodes; stamens free ... 7. **Philodendron**

9 Leaves always solitary, trisect at base, each segment then highly divided; lamina with numerous leaflets of somewhat irregular shape 10

9 Leaves solitary to numerous, not trisect and then highly divided; lamina entire, trilobed or pedatisect 11

10 Petioles with transverse, longitudinally striate bands of brown and white; tuber

producing numerous bulbils at apex; primary lateral veins of leaflets 3–5 on each side, rather distant from one another; flowers bisexual; spadix lacking sterile terminal appendix ... ... **6. Dracontium**

10 Petioles green with pale, coalescent, circular to elliptical maculations; tuber not producing numerous bulbils at apex; primary lateral veins of leaflets numerous, more than 5 on each side, strongly parallel and approximate; flowers unisexual; spadix with large, sterile, convoluted terminal appendix ... *Amorphophallus paeoniifolius* (Dennstedt) Nicolson

11 Flowers bisexual; spadix uniform in appearance; petiole with swollen apical pulvinus (geniculum); petiole sheath lacking convolute apical ligule 12

11 Flowers unisexual; spadix clearly differentiated into 2 or more zones; petiole lacking conspicuous swollen apical pulvinus, or if somewhat pulvinate then petiole sheath with convolute apical ligule 13

12 Flowers with perianth of 4 imbricate tepals; spathe spreading, linear to ovate, never cymbiform, usually persistent; petiole sheath short, inconspicuous ... **1. Anthurium**

12 Flowers naked; spathe erect, cymbiform, soon deciduous; petiole sheath long, conspicuous, usually reaching as far as apical pulvinus (geniculum) ..... **5. Monstera**

13 Plant acaulescent, stem an underground tuber 14

13 Plant with distinct or elongated aerial stems 19

14 Leaf peltate 15

14 Leaf not peltate 16

15 Leaf lamina variegated with white and/or red spots; spathe equalling spadix; spadix fertile to apex; not cultivated for edible tuber ..... 2. **Caladium**

15 Leaf lamina not variegated; spathe much longer than spadix; spadix with naked, terminal appendix; cultivated for edible tuber ..... *Colocasia esculenta* (L.) Schott

16 Leaf pedatisect with 5–10 leaflets .....13. **Xanthosoma** (*helleborifolium*)

16 Leaf trilobed or sagittate 17

17 Leaf deeply trilobed with broad, spreading or forward-pointing lateral lobes; upper half of spathe persistent, rich crimson-purple; plant usually small .....12. **Typhonium**

17 Leaf sagittate; upper half of spathe deciduous after flowering, green or white; plant often large 18

18 Posterior lobes of leaf rounded; midrib and primary lateral veins shallowly prominent on upper surface of leaf; secondary lateral veins flowing together between primaries but not forming conspicuous, zig-zag or sinuate inter-primary collective vein; spadix with sterile terminal appendix ..... *Alocasia macrorrhiza* (L.) G. Don

18 Posterior lobes of leaf obtusely pointed, somewhat extrorse; midrib and primary

lateral veins sulcate on upper surface of leaf; secondary lateral veins joining to form conspicuous, zig-zag or sinuate interprimary collective vein; spadix fertile to apex ..... 13. **Xanthosoma**

19 Plant terrestrial; mature leaf sagittate 20

19 Scandent epiphyte; mature leaf deeply trilobed, lateral lobes auriculate (but juvenile plant with slender stems and sagittate leaves); inflorescences up to 7 per leaf axil, pendent in fruit; fruit a fleshy syncarp .....11. **Syngonium**

20 Leaf with 3–5 pairs of primary lateral veins; petiole sheath with free, convolute, apical ligule; stamens free ..... 6. **Montrichardia**

20 Leaf with more than 5 pairs of primary lateral veins; petiole sheath lacking free, convolute, apical ligule; stamens united into synandria 21

21 Posterior lobes of leaf rounded; midrib and primary lateral veins shallowly prominent on upper surface of leaf; secondary lateral veins flowing together between primaries but not forming conspicuous, zig-zag or sinuate interprimary collective vein; spadix with sterile terminal appendix ..... *Alocasia macrorrhiza* (L.) G. Don

21 Posterior lobes of leaf obtusely pointed, somewhat extrorse; midrib and primary lateral veins sulcate on upper surface of leaf; secondary lateral veins joining to form conspicuous, zig-zag or sinuate interprimary collective vein; spadix fertile to apex .....13. **Xanthosoma**

1. ANTHURIUM *Schott*

Anthurium Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1829 (3): 828 (1829)

Epiphytic, climbing or terrestrial, perennial herbs; stems elongate or very abbreviated; leaves petiolate, petiole variable in length with conspicuous pulvinus at apex, sheathed at base; lamina more or less coriaceous when fresh, very variable in shape, linear to ovate or obovate, trifid (not in Trinidad), palmately or pedately lobed, base attenuate to deeply cordate, venation of leaf or leaflet pinnate, usually with intramarginal collective vein on each side of midrib, smaller veins reticulated; inflorescences borne singly at nodes; peduncle of variable length, usually terete, relatively long and slender; spathe usually strap-shaped, sometimes broader, rarely suborbicular, spreading or reflexed, occasionally erect to suberect, usually green, sometimes variously coloured; spadix sessile or stipitate, subcylindric or conical, usually relatively long and slender, entirely covered in flowers of uniform appearance borne in conspicuous, spiral rows; flowers variously coloured, bisexual with perianth of 4 imbricate, cucullate tepals; stamens 4, opposite tepals; pistil 2-locular, each locule with 1–2 axile ovules (rarely more); fruit a fleshy berry, often brightly coloured, when ripe exserted and suspended from tepals by four minute filaments.

Engler (*Pflanzenreich* IV, 23B (Heft 21): 286 (1905)) cited three specimens from Tobago, Seitz 52, 53 and 58, under the name *Anthurium andersonii* Schott. Neither these specimens nor any other material of this species from Trinidad or Tobago has been located. In their treatment of *A. andersonii* from Surinam, Jonker-Verhoef & Jonker (*Acta Bot. Neerl.* 8: 139 (1959)) consider the Tobago record to be doubtful. In the most recent revision of the compound-leaved species of *Anthurium*, Madison (*Selbyana* 2: 264 (1978)) treats the name *A. andersonii* Schott as a synonym of *A. palmatum* (L.) G. Don, a species known from St Lucia, Martinique, Dominica and Guadeloupe, and considers the Surinam material to belong to *A. expansum* Gleason.

Key to the Species

1 Leaf palmately lobed, with (3–)5–9 distinct leaflets; peduncle up to 0.2 times the length of subtending petiole ..... 5. *A. pentaphyllum*

1 Leaf entire, base variously shaped from attenuate to deeply cordate; peduncle 0.7 times or more the length of subtending petiole 2

2 Leaf base deeply cordate with 3–5 distinct, retrorsely-curving basal veins arising on either side of midrib from petiole insertion 3

2 Leaf base attenuate to truncate or emarginate, basal veins inconspicuous, or not retrorsely curving 4

3 Spathe suborbicular to broadly ovate, cordate, bright red, pink or white (cultivated ornamental) ..... *A. andraeanum*

3 Spathe linear-oblong, not cordate, green; endemic to highest peaks of Northern Range ..... 1. *A. aripoense*

4 Intramarginal collective vein of leaf continuous from base to apex, primary lateral veins not excurrent into margin; plants small; lamina up to 40 cm long 5

4 Intramarginal collective vein discontinuous or present only at apex, primary lateral veins excurrent into leaf margin at least in basal pairs; plants large; lamina up to 150 cm long 7

5 Persistent cataphylls net-fibrous; internodes 0.2–0.4 cm thick; tepals pale green at anthesis; leaves conspicuously black- or brown-punctate on both surfaces ..... 6. *A. scandens*

5 Persistent cataphylls membranous; internodes at least 0.8 cm thick; tepals darker green, tinged pink-maroon or purple at anthesis; leaves epunctate or inconspicuously punctate on lower surface only 6

6 Non-fruiting spadix 0.2–0.3 cm thick; leaf lamina epunctate; roots with white or pale green velamen; northern and central Trinidad; common epiphyte in cacao plantations ..... 2. *A. gracile*

6 Non-fruiting spadix 0.4–0.8 cm thick; leaf lamina sparsely and inconspicuously punctate on lower surface; roots wthout velamen; Tobago, rare ..... 7. *A. willdenowii*

7 Lamina minutely black- or brown-punctate on both sides; primary lateral veins interconnected by scalariform (ladder-like) network of more or less horizontal secondary veins; spathe persistent in fruit ..... 3. *A. hookeri*

7 Lamina epunctate; primary lateral veins interconnected by reticulate network of secondary veins; spathe usually deciduous after anthesis ..... 4. *A. jenmanii*

1. **Anthurium aripoense** N. E. Brown in *Bull. Torrey Bot. Club* 51: 4 (1924)

Anthurium guildingii sensu Simmonds in *J. Ecol.* 38: 289 (1950) & in *Kew Bull.* 1950: 396 (1951), *non* Schott (1857)

Terrestrial or (? shortly) climbing herb; stem massive, to *ca* 4 cm thick, with short internodes, densely rooting; petiole 31.5–113 cm long, up to 1 cm thick, shallowly channelled on upper surface and flushed red apically, sheathed for 5–7 cm at base; lamina coriaceous, epunctate, ovate to oblong-ovate in outline, 34.5–70 cm long, 19.5–45 cm broad, 1.3–2.2 times longer than broad, apex acute to rounded, shortly acuminate, base more or less deeply cordate, posterior lobes rounded, sometimes overlapping, 0.1–0.3 times the overall length of lamina, sinus spathulate to obovate (shallower and broader in juvenile plants); primary lateral veins of anterior lobe 8–11 on each side, forming continuous collective vein running at distance of 1–2.5 cm from margin; basal veins 4–6 on each side, innermost free, ascending, continuous with

collective vein, outer 3–5 retrorsely arcuate, distally curving towards apex of leaf and running into margin, outermost 3–4 on each side fused proximally into denuded, 1.5–3.5 cm long basal rib; peduncle 23–56 cm long, 0.7 times as long as petiole; spathe linear-oblong, 7.8–18 cm long, 1–2 cm broad, green, fleshy, acuminate apically into 0.7–2.4 cm long cusp, apparently usually deciduous before fruiting stage of spadix, decurrent for 0.7–1.2 cm on peduncle; spadix subcylindric, slightly tapered apically, 13.7–23 cm long, 0.4–0.6 cm thick at mid-point, sessile or with stipe up to 0.5 cm long, fruiting in lower half only; flowers at anthesis (?) dark purple, 0.2–0.3 cm broad, 0.5–0.7 times as broad as spadix, tepals with apices flattened, smooth; berries purple, apparently subglobose, *ca* 0.6 cm long, *ca* 0.6 cm broad (probably larger when fresh), 2-seeded; seeds 0.5 cm long, 0.5 cm broad, flattened, pale yellow-green, very sticky.

Trinidad: Botanic Gardens, 1906 (TRIN 6848); Piedra Blanca, alt. 640–830 m, 12.1.1947, Simmonds (K); Tucuche, 27.2.1893, Broadway (TRIN 5230); El Tucuche, summit, alt. 920 m, 5.6.1947, Simmonds (TRIN 13888); Blanchisseuse Road, top of Morne Bleu, 16.5.1926, Broadway 6212 (K); Heights of Aripo, 9.3.1929, Broadway 7130 (K, MO), 10–26 Jan. 1922, Broadway 9924 (K, holotype).

Trinidad. Endemic.

Anthurium aripoense is found in the montane forests of the highest peaks of the Northern Range, above 640 m, and normally grows in deep shade, as a terrestrial or (?) shortly climbing herb (Simmonds *loc. cit.* 1951). *A. cordatum* (L.) G. Don (*A. guildingii* Schott), with which Simmonds united *A. aripoense*, differs in having a spathe with a broader, more rounded base, a relatively shorter and thicker spadix, yellowish to light brown (not purple), flowers which are smaller and relatively narrower in comparison with the width of the spadix, and acutely—or acuminately—tipped pistils and berries. *A. cordatum* is not recorded from Trinidad but occurs in the Lesser Antilles, notably St Vincent and St Lucia.

2. **Anthurium gracile** (Rudge) Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater u. Mode* 1829 (3): 828 (1829); Engl. in *Pflanzenreich* IV, 23B (Heft 21): 89 (1905): Simmonds in *J. Ecol.* 38: 288 (1950) & in *Kew Bull.* 1950;

394 (1951): Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 15 (1953) & in Pulle & Lanjouw, *Fl. Suriname Add. & Corr.* 1: 381 (1968); Croat in *Selbyana* 1: 357 (1976)

Pothos gracilis Rudge, *Pl. Guian. rar. ic. & descr.* 1: 23 & t 32 (1805)

Pothos scolopendrinus Ham., *Prodr. Plant. Ind. Occ.*: 16 (1825)

Anthurium scolopendrinum (Ham.) Kunth, *Enum. Pl.* 3: 68 (1841); Engl., *loc. cit.*: 89 (1905); Simmonds, *loc. cit.*: 288 (1950) & in *loc. cit.*: 394 (1951)

Epiphytic, more or less rosulate herb; stems up to 45 cm long, usually shorter, bearing numerous, densely matted, white or pale green velameniferous roots, leaves borne in cluster near apex, old petioles (with abscissed laminae) frequently persisting on lower part of stem; internodes 0.5–1 cm long, 0.8–1 cm thick; cataphylls narrowly triangular, up to at least 10.5 cm long, pale green when young, persisting, becoming brown, membranous; petiole green, shallowly and narrowly sulcate adaxially with distinct margins, abaxially rounded, up to 18 cm long, 0.35 cm thick, shortly sheathed basally, with prominent, often strongly inflexed pulvinus at apex; lamina up to 39 cm long, 9 cm broad, frequently much smaller, linear to narrowly obovate or elliptical, 4–16.5 times as long as broad, upper surface dull dark green, lower surface slightly paler, both surfaces epunctate, apex acuminate, base cuneate or attenuate; midrib on upper surface strongly prominent and narrowly triangular in cross-section, concolorous with lamina, on lower surface less prominent, shallowly rounded, often red-brown tinged; primary lateral veins 16–21 on each side, forming continuous collective vein on each side running at distance of 0.1–0.9 cm from margin; peduncle up to 47 cm long, 0.25 cm thick apically, 1.6–3.6 times as long as petiole, green, tinged brown-red, often more or less horizontally spreading; spathe up to 4.7 cm long, up to 1 cm broad, strongly reflexed, linear to narrowly oblong, apex cuspidate, margins usually revolute, pale green at anthesis, with central brown-red blaze abaxially, becoming red-brown to pinkish-maroon, persisting in fruit; spadix subsessile, slightly tapered apically, often arcuately curved at anthesis, with apex suberect, (1–)2–10 cm long, 0.2–0.3 cm thick, thickening and becoming pendent in fruit; flowers 0.75–1 times

width of spadix, dull maroon-tinged green at anthesis, becoming dull purplish-red in ripe fruit; berries bright crimson to scarlet, subglobose, up to 0.9 cm long, 0.7 cm broad, apex rounded to somewhat flattened, base truncate in lateral view, mesocarp translucent, gelatinous; seeds 2 per fruit, oblong, 0.4 cm long, 0.2 cm broad, white, horizontally disposed in fruit.

Trinidad: without locality, 19.4.1847, Crueger 2243 (TRIN), 1877–80, Fendler 748 (K), 8.5.1925, Hombersley 725–25 (K); St Ann's, 1.2.1934, Broadway 9375 (K); Botanic Garden, 8.5.1889, Broadway 3790 (TRIN); Maraval, 13.2.1911, Broadway 4174 (K); ICTA, St Augustine, alt. low, Simmonds 184 (K, TRIN 13887); St Augustine, University campus, alt. *ca* 15 m, 12.6.1973, Philcox & Kalloo 7114 (K), 5.5.1975, Philcox 7759 (K, TRIN); Quare river forests, 1.2.1934, Broadway 9374 (K); N. Ranges, St. George Co., environs of "Simla" (Asa Wright Foundation), just E of Arima-Blanchisseuse road, milepost 5 from Arima, alt. 270 m, 24.4.1978, Edwards 1036 (K); St Patrick's, Simla, alt. 180 m, 14.9.1962, Purseglove P6531 (TRIN); milepost 9, Arima-Blanchisseuse road, alt. 460 m, 11.6.1975, Philcox & Kalloo 7947B (K); Arima Valley-Lalaja road, alt. 320 m, 12.6.1973, Philcox & Wood 7067 (K); l'Orange Estate, Naranjo Valley, Heights of Aripo, alt. 250 m, 9.2.1947, Simmonds 61 (K, TRIN 13886), Wood 83 (K); Cumuto Main Road, N of Hasnali, 60 m, 30.4.1975, Philcox & Andrews 7720 (K, NY, P, TRIN, US); Toco road, milepost 3, Vega de Oropuche, alt. low, Downs (TRIN 15800); Vega de Oropuche road, 2½ miles alt. low, 20.5.1959, Downs (TRIN 15740); vicinity of Tabaquite, 26–28 Mar. 1921, Britton, Freeman & Nowell 2577 (K).

Trinidad. Widespread in tropical America from Central America to Bolivia and Brazil.

In Trinidad, *Anthurium gracile* is so far known from the northern and central regions at altitudes ranging from about 15 m at St Augustine to at least 460 m along the road from Arima to Blanchisseuse and on El Tucuche (Simmonds *loc. cit.* 1950). Simmonds states that *A. gracile* is a light-demanding epiphyte typically found in the crowns of dominant forest trees and of the shade trees of cocoa plantations. The abundant production of bright crimson

fruits on slender pendent peduncles is characteristic of this widespread and very variable species. The broader-leaved form has for long been known as *A. scolopendrinum* (Ham.) Kunth. *See* Croat (*loc. cit.* 1976) for a recent discussion of the taxonomy.

3. **Anthurium hookeri** Kunth, *Enum. Pl.* 3: 74 (1841); Engl. in *Pflanzenreich* IV, 23B (Heft 21): 71 & fig. 23 (1905;) Hodge in *Lloydia* 17: 33, 156 & fig. 83 (1954); Fournet, *Fl. Ill. Guad. & Mart.*: 420 & fig. 183 (1978); Mayo in *Kew Bull.* 36(4): 698 (1982)

Anthurium hookeri Kunth var. *longecuneatum* Engl. in *Pflanzenreich* IV, 23B (Heft 21): 71 (1905)

Anthurium huegelii Schott in *Oest. Bot. Wochenbl.* 5:82 (1855), *Ic. Aroid.* t. 18–20 (1857) & in *Prodr. Aroid.*: 469 (1860); Brown in *Gard. Chron.* ser. 3, 48: 153 (1910); Simmonds in *J. Ecol.* 38: 288 (1950) *pro parte* & in *Kew Bull.* 1950: 395 (1951) *pro parte*; Jonker-Verhoef & Jonker in Pulle & Lanjouw, *Fl. Suriname, Add. & Corr.* 1: 383 (1968) excl. syn.

Anthurium acaule sensu N.E. Brown in *Gard. Chron.* ser. 3, 48: 153 (1910) *non* Schott (1829)

Epiphytic rosulate herb (also saxicolous in highlands of Surinam); stem abbreviated, covered with dense mass of adventitious roots; cataphylls triangular with acuminate tips, rapidly withering; petiole green, up to 14 cm long, 2 cm thick at mid-point, lower surface rounded, apical pulvinus distinct, with rounded adaxial margins, sheath usually extending as far as pulvinus; lamina coriaceous in life, membranous when dry, up to 140 cm long, 45 cm broad, 2.5–5.5 times longer than broad, obovate, rarely elliptical or ovate, upper surface semi-glossy, mid- to yellowish-green, lower surface slightly paler, both surfaces with numerous minute black or brown punctations, apex acute to obtuse, usually shortly acuminate, base narrowly acute to broadly subcordate; midrib prominent, triangular in section on lower surface, flattened to shallowly rounded on upper surface; primary lateral veins up to 18 per side, long-arcuate-ascending, mostly running into margin, connected by scalariform (ladder-like) network of more or less horizontal secondary veins; peduncle up to 87 cm long, 0.7 cm thick near apex, 4–9.8

times longer than petiole, terete, light green, often flushed purple-red near apex, suberect to spreading at anthesis, procumbent in ripe fruit; spathe up to 22.5 cm long, up to 2.7 cm broad at mid-point, narrowly-oblong, apex cuspidate, pale green on upper surface, lower surface more glossy, green, often flushed purplish-red, persisting unwithered into fruiting stage of spadix; spadix conically tapered, at anthesis up to 29 cm long, 0.9 cm thick at mid-point, erect to suberect, sessile or with stripe up to 1 cm long, procumbent in ripe fruit; flowers intense matt blue-pruple before anthesis, becoming darker with age; anthers bright yellow when newly exserted; berries up to 1 cm long, 0.5 cm broad, obovate to cylindric, rounded at apex, translucent white with reddish or purplish-brown stigma remains, 2-seeded (populations in Grenada and Surinam have obovate fruit, purple at apex, white basally); seeds to 0.3 cm long, 0.15 cm broad, elliptical to hippocrepiform, dark purplish-brown.

Trinidad: without locality, 26.7.1878, Fendler 733 (K); Piedra Blanca, alt. 610–770 m, 12.1.1947, Simmonds (K, TRIN 13882); Northern Range, Arima-Blanchisseuse road, 9¾ miles from Arima, alt. 520 m, 20.4.1978, Edwards 1026 (K); vicinity of Valencia, 4.3.1921, N.L. & E.G. Britton (GH); Matura Forest Reserve, N of Valencia-Toco road, alt. *ca* 370 m, 26.7.1977, Philcox, Andrews & Kelly 8074 (K); Cumaca road, Morne Croix area, Valencia Ward, alt. 300 m, 3.11.1974, Jermy 11069A (K).

Trinidad, Surinam, Lesser Antilles as far north as St Kitts.

Anthurium hookeri is a forest epiphyte and appears to be restricted to the higher altitudes (above 300 m) of the Northern Range, being replaced ecologically in forests at lower elevations by *A. jenmanii* Engl. The critical distinguishing features of *A. hookeri* are to be found in the leaves, which are minutely black- or brown-punctate and have a scalariform pattern of secondary venation. Note that Simmonds (*loc. cit.* 1950, 1951) treated *A. hookeri* and *A. jenmanii* as a single species, to which he applied the name *A. huegelii* Schott. The reference by Simmonds (*loc. cit.* 1951) to *A. acaule* is treated in the present study as pertaining to material of *A. jenmanii*. For a fuller discussion of the name *Anthurium acaule* (Jacq.) Schott, and its application, *see* Mayo in *Kew Bull.* 36 (4): 691 (1982).

A. hookeri has been known to authors under various names and has a complicated nomenclatural history. For a fuller discussion *see* Mayo in *Kew Bull.* 36(4): 691–719 (1982).

4. **Anthurium jenmanii** Engl. in *Pflanzenreich* IV, 23B (Heft 21): 72 (1905); Mayo in *Kew Bull.* 36(4): 712 (1982)

Anthurium trinitatis Engl. in *Pflanzenreich* IV, 23B (Heft 21): 73 (1905)

Anthurium huegelii sensu Simmonds in *Kew Bull.* 1950: 395 (1951) *pro parte*, & in *J. Ecol.* 38: 288 (1950) *pro parte*, *non* Schott (1855)

Anthurium acaule sensu Simmonds in *Kew Bull.* 1950: 395 (1951), *non* Schott (1829)

Anthurium crassinervium sensu Simmonds in *Kew Bull.* 1950: 396 (1951), *non* Schott (1829)

Epiphytic, terrestrial or saxicolous, rosulate herb; stem abbreviated, covered with dense mass of adventitious roots; cataphylls shortly triangular, rapidly decomposing; petiole green, up to 20 cm long but usually shorter, up to 3 cm thick at mid-point, prominently pulvinate at apex, flattened on upper surface with angled margins at least apically, rounded on lower surface, sheath usually shorter than petiole, occasionally extending to pulvinus; lamina coriaceous, up to 150 cm long, 45 cm broad, 2.1–4.9 times as long as broad, obovate, rarely elliptical, upper surface glossy to semi-glossy, dark green, lower surface dull, paler green, both surfaces epunctate, apex obtuse to rounded, occasionally acute, usually shortly acuminate, base very variable, narrowly acute to broadly truncate or rarely subcordate; midrib paler than lamina, prominent on both surfaces, triangular in section with rounded keel on lower surface; primary lateral veins up to 20 on each side, paler than lamina, prominent on both surfaces, connected by reticulate network of secondary veins, mostly running into margin, apical 1–5 pairs usually anastomosing to form short collective vein; peduncle up to 120 cm long, 1.5 cm thick near apex, 4.5–9.2 times longer than petiole, terete to elliptical in section, dark purple-green, green, or purple apically and cream-carmine basally, erect to suberect at anthesis, becoming procumbent in fruit; spathe up to 50.5 cm long, 4.5 cm broad at mid-point, oblong-lanceolate to narrowly oblong, apex cuspidate, pale green with purple flushing

when young, at anthesis completely reflexed, entirely purple-maroon, twisted apically, margins revolute, later withering and usually deciduous; spadix sub-cylindrical to conically-tapered, at anthesis up to 31 cm long, 0.8 cm thick at mid-point, sessile or with stipe up to 0.7 cm long, erect, in ripe fruit procumbent (?); flowers prior to anthesis black-purple, becoming dark maroon-purple at anthesis; anthers pale yellow to orange when newly exserted; berries to 1 cm long, 0.7 cm broad, obovate, rounded at apex and base, translucent and almost white when young, becoming pale mauve-purple, or white basally and rose-purple apically at maturity, 2-seeded; seeds to 0.85 cm long, 0.3 cm broad, oblong to obovate, elliptical in cross-section.

Trinidad: without locality, 1926, Broadway 1406 (BM), 1877–80, Fendler 741 (K, holotype of *A. trinitatis* Engl., NY, isotype), July 1894, Hart (TRIN 5542); Monos Island, Gulf of Paria, 25.3.1945, Ewan 17050 (BM), October 1917, Williams s.n. (TRIN); Gaspar Grande (Gasparee) near Pt Baleine, alt. *ca* 30 m, 7.4.1947, Simmonds (K, TRIN 13883), 2.7.1947, Simmonds (K, TRIN 13884); Gasparee Island, 13.3.1920, Britton & Coker 554 (GH, NY); Tetron (*sphalm.* Teteron) Bay, beach, 15.4.1928, Broadway 6886 (BM, MO); Point Gourde, Telephone Bay, 28.7.1977, Philcox 8084 (K, TRIN); Port-of-Spain, cultivated, June 1911, Broadway 4176 (K); Northern Range, at 18¾ milepost on Arima-Blanchisseuse road, alt. 30–60 m, 1974, Simmonds 126 (K); vicinity of Valencia, 4.3.1921, Britton & Britton 2101 (K, NY); Matura Forest Reserve, N of Valencia-Toco road, 26.7.1977, Philcox, Andrews & Kelly 8075 (K); about ½ mile S of Valencia, Guaico-Manzanilla Reserve, 20.7.1977, Philcox, Kelly & Ramcharan 8034 (K, TRIN); Tabaquite, Montserrat Hills, 24.7.1963, Jermy 2543 (K); Moruga, near the sea, 9.2.1916, Broadway 7621 (TRIN); Hart's Cut to Belle View, 12.3.1921, Britton & Bailey 2236 (K, NY).

Tobago: without locality, Seitz 97 (*ex* Engler, not seen); Great Dog River, Nov. 1889, Eggers 5802 (US); Little Tobago, alt. 30–60 m, 13.8.1958, Purseglove (K, TRIN 17413).

Trinidad, Tobago, Guyana, (?) Surinam.

In his account of Araceae of Trinidad (*Kew Bull.* 1950: 395 (1951)) Simmonds confused this species with *A. hookeri* Kunth. As here understood, *A. jenmanii* Engl. is a species of lowland vegetation

type with a wide ecological tolerance, being found both as an epiphyte in tall, moist forest (*e.g.* Philcox *et al.* 8034) and as a saxicolous herb in the dry open woodlands of the north-western tip of the island (*e.g.* Philcox 8084, Simmonds (TRIN 13883)). The records from Moruga, (Broadway 7621) and Tabaquite (Jermy 2543), indicate that this species is wide-spread throughout Trinidad.

Two records from Tobago were cited by Simmonds (1951) under *Anthurium acaule* (Jacq.) Schott (Eggers s.n.) and *A. crassinervium* (Jacq.) Schott (Seitz 97) based on citations by Engler (*loc. cit.* 1905) under these names. The Eggers collection may well be the same as that found at US (Eggers 5802) and this, together with a more recent collection from that island (Purseglove (TRIN 17413)), falls well within the range of variation exhibited by *A. jenmanii*. The Seitz collection remains untraced though it seems likely that it is of this species.

A. jenmanii Engl. was originally described from specimens collected in lowland Guyana (*see* Engl. in *Pflanzenreich* IV, 23B (Heft 21): 72 (1905)). The type collections are of a large epiphyte characterised by very broad truncate leaf bases. However, a comparison of the syntypes with other Guyanan collections, as well as with the Trinidad and Tobago material, shows that this taxon exhibits a high degree of morphological plasticity in leaf shape. *A. trinitatis* Engl. represents an extreme form with narrowly acute leaf bases and unusually well-developed collective veins in the leaves. For a fuller discussion of *A. jenmanii see* Mayo in *Kew Bull.* 36(4): 712 (1982).

5. **Anthurium pentaphyllum** (Aubl.) G. Don var. **pentaphyllum**

Anthurium pentaphyllum (Aubl.) G. Don in Sweet, *Hort. Brit.* ed. 3: 633 (1839); Engl. in *Pflanzenreich* IV, 23B (Heft 21): 290 (1905); Simmonds in *J. Ecol.* 38: 290 (1950) & *Kew Bull.* 1950: 396 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 25 (1953) & in *Acta Bot. Neerl.* 2: 353 (1953) & in Pulle & Lanjouw, *Fl. Suriname, Add. & Corr.* 1: 383 (1968); Madison in *Selbyana* 2: 276 (1978)

Dracontium pentaphyllum Aubl., *Hist. Pl. Guiane Fr.* 2: 837 & t. 326 (1775)

Scandent epiphyte to 5 m tall (Madison 1978); stem with internodes 1–6 cm long, 0.5–1.5 cm thick, rooting to host at nodes; cataphylls 4–8 cm long, triangular, rapidly withering and deciduous, leaving lower internodes bare; petiole 20–56 cm long, shortly sheathed at base, apical pulvinus digitate, coalescing with pulvinae at base of leaflet petiolules; lamina palmately to slightly pedately lobed, leaflets 5–9 (1–3 in juvenile plants) subequal in size, sessile or up to 3.5 cm petiolulate, outermost leaflets with shortest petiolules, 10–29 cm long, 2.5–10 cm broad, narrowly-obovate to obovate, occasionally elliptical, coriaceous, apex acute to obtuse, ultimately acuminate, base cuneate to acute, outermost leaflets with base usually strongly unequal (often outer side of base rounded to auriculate, inner side attenuate); primary lateral veins of leaflets 5–9 on each side, forming a more or less continuous collective vein running at 0.4–1.3 cm from margin; peduncle 3–12.5 cm long, 0.1–0.2 times length of subtending petiole, stout, erect; spathe 3.2–7 cm long, 1.4–2 cm broad, broadly oblong-ovate, apex acuminate-cuspidate, purplish-green, reflexed, usually persisting to fruiting stages of spadix, decurrent on petiole for 0.2–1.3 cm; spadix short, stout, subcylindric to conic, slightly tapering apically, 3.1–9 cm long, 0.5–1.2 cm thick, subsessile, thickening in fruit, greyish-purple at anthesis, erect.

Trinidad: without locality, 1877–80, Fendler 743 (K, OXF); Maracas Bay, Dannouse (K); Gasparillo-Maracas trail summit, alt. 410 m, 13.4.1947, Simmonds (K); Guaico-Valencia Reserve, 8.6.1949, Simmonds (TRIN 14384); Aripo, by the caves trail, alt. 460 m, 24.12.1947, Simmonds (TRIN 14062); Oropuche cave, alt. 180 m, 2.1.1953, Simmonds (TRIN 14780); Tamana, 18.4.1920, Freeman (TRIN 9066); Mount Tamana, 16.2.1915, Broadway (TRIN 7805), 27.3.1925, Broadway s.n. (K), 18.4.1920, Britton, Britton & Hazen 1941 (K); Cap de Ville (Erin), alt. low, 29.2.1948, Simmonds (TRIN 14197); Irois, 24.4.1868, Finlay (TRIN 2897).

Tobago: Bannock Burn, Delaford Woods, 28.7.1879, Meyer 16 (K); Point opposite Melville Islands, 25.10.1925, Freeman & Williams (TRIN 11411).

Trinidad, Tobago, Caribbean and Atlantic coast of South America, as far as southern Brazil.

Anthurium pentaphyllum is a scandent epiphyte, producing long, high-climbing stems in which the internodes thicken and shorten in the mature flowering phase. However, Freeman & Williams (Herb. Trin. 11411) note that the plant they collected in Tobago was terrestrial. Though widely distributed, this species is not common (Simmonds *loc. cit.* 1951). Madison (*loc. cit.* 1978) states that the berries of *A. pentaphyllum* var. *pentaphyllum* are globose, red to purple.

The specimen cited by Simmonds (*loc. cit.* 1951) from Piedra Blanca (Simmonds, TRIN 14219) is in fact of a juvenile plant of *Syngonium vellozianum* Schott. The juvenile leaves of *A. pentaphyllum* are not sagittate as stated by Simmonds, but as evidenced by material from Tobago (Meyer 16) are similar to the adult leaves but with fewer leaflets, and may be bi- or unifoliolate. The unifoliolate leaf of this latter specimen has an emarginate base and the lamina is cut to form an acutely tipped, forward-pointing lobe on one side of the midrib. (*See* Simmonds (*loc. cit.* 1950) for further ecological details).

6. **Anthurium scandens** (Aubl.) Engl. in Mart., *Fl. Bras.* 3(2): 78 (1878); Engl. in *Pflanzenreich* IV, 23B(Heft 21): 57 & fig. 21 (1905); Simmonds in *J. Ecol.* 38: 288 (1950) & in *Kew Bull.* 1950: 394 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 21 (1953); Adams, *Fl. Pl. Jamaica*: 69 (1972); Fournet, *Fl. Ill. Guad. & Mart.*: 418 & fig. 181 (1978); Howard, *Fl. Lesser Antilles* 3: 380 (1979); Sheffer *et al.* in *Ariodeana* 3(3): 86 (1980)

Dracontium scandens Aubl., *Hist. Pl. Guian. Fr.* 2: 836 (1775)
Pothos violacea Swartz, *Nov. Gen. & Sp. Prodr.*: 32 (1788)

Anthurium leucocarpum Schott in *Oest. Bot. Wochenbl.* 7(7): 53–54 (1857)

Anthurium scandens (Aubl.) Engl. var. *violaceum* (Swartz) Engl. in Mart., *Fl. Bras.* 3(2): 78 & t. 7 (1878)

Anthurium scandens (Aubl.) Engl. var. *leucocarpum* (Schott) Engl. in Mart., *Fl. Bras.* 3(2): 79 (1878)

Creeping epiphyte; stem to at least 55 cm long with internodes 0.6–3.5 cm long, 0.2–0.4 cm thick, 2–12 times as long as thick, rooting at or near nodes; cataphylls pale green when young, rapidly decom-

posing to become conspicuously net-fibrous, pale brown, persisting in leaf-bearing part of stem, becoming worn away in older leafless part of stem; petiole conspicuously pulvinate at base and apex, 0.6–5.5 cm long, 0.05–0.25 cm thick at middle; lamina coriaceous, black to red-brown punctate on both surfaces, more densely so on lower surface, 4.7–14.5 cm long, 1.3–4.7 cm wide, 2–4.5 times as long as wide, narrowly elliptical, narrowly ovate or narrowly obovate, or ovate, elliptical or obovate, apex acute, occasionally acuminate, base cuneate, acute or cuneate-attenuate; midrib prominent on both surfaces; primary lateral veins 8–14 per side, not very strongly differentiated from secondary veins, with conspicuous collective vein running continuously from base to apex on each side of lamina at distance of 0.2–0.6 cm from margin; inflorescences 1–3 per shoot; peduncle 2.6–7.4 cm long, 0.05–0.1 cm thick at middle, 1.7–3.5 times as long as petiole; spathe 0.8–2 cm long, 0.2–0.4 cm wide at middle, narrowly-oblong to narrowly-ovate, apex cuspidate, base rounded, pale yellowish-green, usually sharply reflexed; spadix 1.1–2.8 cm long (2–2.8 cm long in ripe fruit), 0.2–0.5 cm thick (up to 0.9 cm thick in ripe fruit) either sessile or with stipe up to 0.25 cm long; flowers 0.7–0.9 times as wide as spadix, tepals pale green becoming pale violet in fruit; berries white to pale watery violet, depressed-globose, 2–4 seeded; seeds up to 0.3 cm long, 0.15 cm broad, oblong-obovate.

Trinidad: without locality, 1877–80, Fendler 742 (K); Maraval, 12.1.1911, Broadway 3951 (K); El Tucuche trail, alt. 610 m, 2.8.1976, Adams 14078 (TRIN); Centeno, alt. low, 26.3.1957, Hosein (TRIN 15431); Arima-Blanchisseuse road, 1948, Ayliffe (TRIN 14266); St Patrick's, Simla, alt. 180 m, 14.9.1962, Purseglove P6533 (TRIN); Las Lapas road (branch of Blanchisseuse road), 5.2.1926, Broadway 6283 (K); Arima, 2.5.1899, Dannouse s.n. (TRIN); road to Heights of Guanapo, 3.4.1979, Philcox & Phillips 8342 (K, TRIN); Heights of Aripo, 10–26 Jan. 1922, Broadway 9925 (TRIN); end (9th mile) of Cumaca road, Heights of Oropuche, alt. *ca* 150 m, 1.2.1948, Simmonds (K, TRIN 14170); Oropuche local road *via* Valencia near the river, 2½ milepost, 7.5.1926, Broadway 6226 (K); Long Stretch, Oropuche local road, 27.12.1948, Simmonds (K, TRIN 14231); Brazil-Arena road, ICTA Experimental Cacao Plantation, 31.3.1959, Cowan & Simmonds (TRIN 16209); Brazil-Talparo, alte low, 25.1.1948, Simmonds (K, TRIN 14122); St Cecilia Estat., Tamana, *ca* 120 m, Philcox & Andrews 7733 (K, P, TRIN).

Trinidad, tropical South and Central America, West Indies.

Recorded only from the wetter northern and central parts of Trinidad but probably more widespread. Found in association with typical light-demanding epiphytes and characteristic of cultivated trees such as cocoa (Simmonds *loc. cit.* 1950, 1951).

According to Simmonds (*loc. cit.* 1950), *A. scandens* ascends to 240 m in the Heights of Oropuche. In Jamaica it is recorded by Adams (*Fl. Pl. Jamaica*: 69 (1972), as growing at between 230 m and 1850 m and a collection at the Kew Herbarium from Hispaniola (Ekman, Stockholm Herb. no. H1467) gives an altitude of 1000 m. It is thus very likely that this species grows at higher elevations than hitherto recorded in Trinidad.

The varieties recognised by Engler (*loc. cit.* 1878) were based principally on differences in fruit colour. However, these variations do not appear to be correlated with any other significant characters, and there seems little point in recognizing formal taxonomic varieties until more detailed studies have been made.

See Sheffer *et al.*, *loc. cit.* (1980) for a recent treatment of this species.

7. **Anthurium willdenowii** Kunth, *Enum. Pl.* 3: 71 (1841); Schott, *Prodr. Aroid.* 479 (1860); Simmonds, *Kew Bull.* 1950: 395 (1951) ["*willdenovii*"]; Gooding, Loveless & Proctor, *Fl. Barbados*: 89 (1965); Gooding, *The Plant Communities of Barbados*, Govt. Printing Office, Bridgetown, Barbados: 53, 71, 116 (1974); Fournet, *Fl. Ill. Guad. & Mart.* 417 (1978); Howard, *Fl. Lesser Antilles* 3: 381 (1979); Mayo in *Kew Bull.* 36(4): 696 (1982)

Anthurium barbadosense Engl. in *Bot. Jahrb.* 25: 404 (1898)

Epiphyte (growing on vertical gully walls in Barbados); stem shortly creeping, internodes very short, 2 cm thick; cataphylls 7–15 cm long, triangular, membranous, conspicuous, persistent; petiole 7–30 cm long, up to at least 0.7 cm thick, basally shortly sheathed; lamina coriaceous, 27–40 cm long, 5–8.1 cm broad, 4.1–5 times longer than broad, elliptical to narrowly ovate, sparsely and inconspicuously punctate on abaxial surface, apex acute to subacute,

base acute; midrib prominent on both surfaces; primary lateral veins (13–)16–20 on each side, forming continuous collective vein running on each side from base of lamina to apex at 0.5–0.8 cm from margin; peduncle 30.5–42 cm long, up to at least 0.5 cm thick apically, 1.4–4.4 times as long as petiole; spathe 4.5–10.7 cm long, 0.6–1.4 cm broad, narrowly oblong, shortly decurrent on peduncle, apex acuminate, pink (Cowan 1516), persistent at least into young fruiting stage of spadix; spadix 7.5–17 cm long, 0.4–0.8 cm thick at mid-point, subcylindric, somewhat tapered apically, subsessile.

The above description pertains only to the herbarium material cited from Tobago. Examination of living material from Barbados cultivated at Kew (Bannochie s.n., Kew Accession No. 382–68. 38216) has provided the following additional information:—

Petiole yellow-green, deeply channelled (V-shaped in cross-section) adaxially, rounded abaxially; midrib yellow-green, in cross-section rounded and prominent on both sides; lamina dark green adaxially, much paler abaxially, primary venation prominulent, secondary venation largely obscured on both surfaces; peduncle subterete, green, erect, becoming pinkish-red and pendent in fruiting stage; spathe after anthesis green, strongly suffused with pinkish-red, especially abaxially, suberect to spreading, not reflexed; stipe of spadix green, 0.3 cm long; spadix after anthesis with green, flattened apices of pistils exposed, tepals dirty purplish-green; berries lilac-mauve, 0.7 cm long, 0.5–0.6 cm broad, obovate, apices somewhat flattened; seeds similar to fruits in colour, 1–2 per fruit, 0.35 cm long, 0.2–0.25 cm broad, oblong, rounded apically and basally, somewhat flattened.

Tobago: Caledonia Lot 42, 21.4.1913, Broadway 4496 (BM, K); Mount St George-Castara Trace, forest reserve on south summit of Main Ridge, alt. 400 m, 10.4.1959, Cowan 1516 (TRIN 16392).

Tobago, Barbados, (?) St Lucia.

In living material the punctations of the abaxial surface of the leaf can only be distinguished with the aid of a hand lens.

2. CALADIUM *Ventenat*

Caladium Vent., *Descr. Pl. Nouv. Cels.*: t. 30 (1801)

Terrestrial, acaulescent, rosulate herbs with subterranean, subglobose tuber; petiole long, slender, lacking pulvinus at apex, sheathed basally; lamina narrowly ovate or ovate to sagittate, sometimes peltate, membranous; main venation pinnate, anastomosing distally to form conspicuous intramarginal collective vein, finer veins reticulated; peduncle long, slender, solitary; spathe constricted in middle, basal part convolute, tubular, fleshy, somewhat inflated, persistent, apical part expanded in flower, membranous, often white, withering and deciduous after anthesis; spadix subequal to spathe, basal pistillate portion short, subcylindric or tapering apically, intermediate sterile portion inflated basally with large, fleshy synandrodia, constricted apically with elongated synandrodia, apical staminate portion much longer, subcylindrical, tapering at apex and base; flowers unisexual, naked; male flowers each with 3–5 sessile stamens connate into subprismatic, apically truncate synandrium; female flowers each a unilocular pistil, ovules several to many, borne near base of 2–3 intrusive, parietal placentae, stigma sessile; fruit a several-to many-seeded berry. (See M. Madison, *Selbyana* 5(3–4): 342 (1981) for a recent treatment of the genus).

Caladium bicolor (Dryander) Vent., *Descr. Pl. Nouv. Cels.*: t. 30 (1801); Engl. in *Pflanzenreich* IV, 23E (Heft 71): 31 (1920); Simmonds in *J. Ecol.* 38: 287 (1950) & in *Kew Bull.* 1950: 401 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 55 (1953) & in *Act. Bot. Neerl.* 2: 358 (1953) & in *Acta Bot. Neerl.* 8: 145 (1959); Howard, *Fl. Lesser Antilles* 3: 382 & fig. 80 (1979); Madison in *Selbyana* 5(3–4): 342 (1981)

Arum bicolor Dryander in Ait., *Hort. Kew* 3: 316 (1789)

Tuber subglobose; petiole 25–43.5 cm long, variably flecked and flushed red, basal sheath 6–17 cm long, less than half as long as petiole; lamina 14–21 cm long, 10.8–15.5 cm broad, broadest below petiole insertion (*i.e.* across posterior lobes), broadly peltate-sagittate, green or speckled with red and white (variously variegated with white or red in cultivated forms), posterior lobes rounded

or obtuse, separated by parabolic sinus 3–6 cm deep; primary lateral veins 2–3 on each side, anastomosing distally to form more or less looping collective vein running at 0.2–0.6 cm from margin, parallel to inner marginal vein running at *ca* 0.1 cm from margin; basal veins 3–4 on each side, innermost one free, ascending, outermost 2–3 united into well-developed basal rib; finer venation reticulated; peduncle 20–43 cm long; spathe 10–14 cm long, constricted at centre, basal convolute tube 3–3.5 cm long, 2.4–3 cm broad when furled, green on outer surface, variably red-flushed on inner surface, apical expanded lamina 7–9.5 cm long, 3–6 cm broad, white; spadix 8.3–11 cm long, basal pistillate portion *ca* 1.5 cm long, 0.6–0.8 cm thick, intermediate sterile portion 1.8–2.3 cm long, *ca* 0.6 cm thick at inflated base, apical staminate portion 6–6.8 cm long, *ca* 0.8 cm thick; synandria white, pistils yellowish; fruit not seen.

Trinidad: Botanic Gardens, 24.6.1916, Broadway (TRIN 8227); St Augustine, 23.6.1926, Broadway 6315 (K); ICTA, St Augustine, 4.6.1947, Simmonds 105 (TRIN 13865), alt. low, 23.6.1947, Simmonds 115 (K), 5.6.1957, Simmonds (TRIN 15445).

Trinidad, tropical South America and West Indies; also naturalized or cultivated in Old World tropics. (Widely cultivated in temperate countries as a hothouse ornamental plant for its variegated foliage).

Locally very common as a lowland weed of cultivation and probably much more widespread than the above-cited collections would suggest. The leaves die back during the dry season and spring with the first rains, the plant flowering 1–2 months later. Fruit apparently never sets in Trinidad.

The leaves and spadices are used as a vegetable in Surinam and Trinidad (Simmonds *loc. cit.* 1950, 1951; Jonker-Verhoef & Jonker in *Act. Bot. Neerl.* 2: 358 (1953)).

3. DIEFFENBACHIA *Schott*

Dieffenbachia Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1829(3): 803 (1829)

Terrestrial herbs, stem decumbent to erect, naked basally, leaves mostly clustered towards apex, internodes well-developed;

petiole without conspicuous apical pulvinus, basal sheath broad, often ligulate apically; lamina narrowly ovate to ovate, oblong, elliptical or obovate, green or variously variegated, apex acute to obtuse, ultimately acuminate or mucronate, base attenuate, acute, obtuse, truncate, emarginate or subcordate, main venation pinnate, often poorly differentiated from parallel finer venation; inflorescence shorter than, and borne amongst leaves; spathe narrow, oblong, persistent, usually slightly constricted near middle, basal part long, convolute, tubular, apex shorter, expanded, apiculate, often recurved; spadix subequal to spathe, basal pistillate portion adnate to spathe, intermediate sterile portion more or less naked, with scattered staminodes and sometimes pistillodes, apical staminate portion free; flowers unisexual, naked; stamens united into rhombic or polygonal, apically truncate, closely appressed synandria; pistils sparsely to densely scattered on spadix, each surrounded by whorl of 4–5 clavate staminodes, 1–3–locular, each locule with solitary, basal or sub-basal ovule, stigma sessile, subglobose or 2–3–lobed; berries subglobose or 2–3–lobed, each locule with single, large seed.

Dieffenbachia seguine (Jacq.) Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1829(3): 803 (1829); Engl. in *Pflanzenreich* IV, 23DC(Heft 64): 45 (1915); Simmonds in *Kew Bull.* 1950: 400 (1951) ("cf. *seguine* (Jacq.) Schott"); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 43 (1953) & in *Acta Bot. Neerl.* 2: 356 (1953); Adams, *Fl. Pl. Jam.*: 71 (1972); Howard, *Fl. Lesser Antilles* 3: 385 & fig. 82 (1979)

Seguine, Dumb cane.

Arum seguine Jacq., *Enum. Syst. Pl.*: 31 (1760) & *Select. Stirp. Am. Hist.*: 239 & t. 151 (1763)

Dieffenbachia cf. *picta* sensu Simmonds in *J. Ecol.* 38: 287 (1950) & in *Kew Bull.* 1950: 400 (1951)

Terrestrial herb with vesicant, whitish sap; stem erect or decumbent, up to 60 cm high, naked below, internodes *ca* 2 cm long or more, up to 2 cm thick, green; petiole 13–37 cm long, green or white-spotted, basal sheath broad, shortly ligulate at apex, 0.4–0.7 times as long as petiole; lamina 27.5–35.5 cm long, 11.5–14.7 cm broad, 2.1–3.1 times longer than broad, ovate or oblong-ovate, dark green

or white-flecked and spotted, apex acute to obtuse, ultimately shortly acuminate, base subacute, obtuse, rounded, truncate, emarginate or subcordate; primary lateral veins *ca* 12–16 on each side, poorly differentiated, finer venation parallel to primaries; peduncle 10–15 cm long, pendent in fruit; spathe 12–17 cm long, green, narrowly oblong, slightly constricted at middle, convolute except for expanded apex; spadix subequal to spathe; synandria cream at anthesis; berries subglobose, 0.6–0.8 cm in diameter, green, ripening to scarlet, 1-seeded; seeds pale green, fleshy, large, *ca* 0.6 cm long, 0.5 cm broad.

Trinidad: without locality, 1877–80, Fendler 739 (K); Maracas bay, foot-path N side, alt. 150 m, 21.1.1951, Baker (TRIN 14695); Maracas valley, alt. 250 m, 13.3.1957, Simmonds (K, TRIN 15422); near milepost 7¾, Arima-Blanchisseuse road, 26.8.1977, Philcox & Philcox 8231 (K, TRIN); l'Orange Estate, Naranjo valley, Heights of Aripo, alt. 250 m, 9.2.1947, Simmonds 62 (K, TRIN 13869); Guaico-Valencia Reserve, 8.6.1949, Simmonds (TRIN 14386 not seen); Arena Forest Reserve, alt. low, 24.4.1947, Simmonds 91 (TRIN 13870).

Trinidad, northern South America, West Indies.

Common throughout the wetter lowlands, ascending to 460 m on Mt Aripo. The sap is vesicant and induces severe swelling and blistering of the mouth and throat if the stem is eaten.

With the exception of Fendler 739, which was tentatively identified as *D.* cf. *seguine*, Simmonds (*loc. cit.* 1951) treated the Trinidad material as "*Dieffenbachia* cf. *picta* (Lodd.) Schott", distinguishing the two taxa by the presence or absence of leaf variegation and the colour of the lower leaf surface. Engler's treatment (*loc. cit.* 1915) lists numerous infraspecific taxa for both *D. seguine* and *D. picta*, including under the former several varieties with variegated leaves. He notes (p. 49) that *D. picta* is easily distinguished in the living state from *D. seguine* and its varieties by the darker and glossier leaf lamina and the more widely canaliculate leaf.

D. picta appears, from Engler's treatment, to be primarily a plant known in cultivation, and very poorly known, if at all, from field collections. On the basis of material at the Kew Herbarium it

is also very difficult to separate from *D. seguine*. Indeed Jonker-Verhoef & Jonker (*Acta Bot. Neerl.* 2: 356 (1953)) have suggested that *D. picta* may be only a form of *D. seguine*, a view with which I am inclined to agree. Nicolson (in A.C. Smith, *Fl. Vit. Nov.* : 452 (1979)) has united these taxa under the name *D. seguine*, and pending a much-needed revision of the genus this seems the best solution.

4. DRACONTIUM *Linnaeus*

Dracontium L., *Sp. Pl.* 2: 967 (1753)

Medium to large terrestrial herbs, producing a single leaf each year after solitary inflorescence; stem a subglobose, subterranean tuber, sometimes producing numerous, small bulbils around apex; petiole long, erect, smooth, verrucose or asperate, transversely maculate with fine, superimposed, longitudinal striations; lamina essentially trisect, large, umbrella-like, each main lobe multifid and pinnately-lacerated into numerous ovate to elliptical, sessile, broadly decurrent, acuminately-tipped leaflets; peduncle erect, similarly coloured to petiole; spathe enveloping spadix, margins free, convolute basally or not, often fornicate at apex; spadix cylindrical, uniform in appearance, lacking sterile flowers or terminal appendix, much shorter than spathe; flowers bisexual, with perianth of 4–9 imbricate, cucullate tepals; pistil 2–5-locular, each locule with single axile ovule, style long, slender, projecting beyond tepals, stigma terminal, covered with long papillae, 2–5-lobed; fruit a fleshy, one- to several-seeded, obconic berry, apex truncate, stigma persisting as apiculum; seeds large, reniform, verrucose dorsally.

Dracontium foecundum Hook. f. in *Bot. Mag.* t. 6808 (1885); Engl. in *Pflanzenreich* IV, 23C(Heft 48): 42 (1911); Simmonds in *Kew Bull.* 1950: 400 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 8 (1953)

Stem a subglobose, subterranean tuber, *ca* 8 cm in diameter, bearing numerous, small, 1 cm long, dark brown bulbils in concentric rows around apex; petiole up to at least 114 cm long, 1.5 cm thick at base, erect, terete, asperate towards base with occasional verrucae, transversely maculate with longitudinally striate, alternating bands of greenish- to brownish-grey and white; lamina umbrella-like, trisect, each main rachis *ca* 45 cm long or more, further, more-or-less dichotomously branched into rhachillae, both rhachides and rhachillae with irregularly pinnatifid laminar margins; ultimate leaflets

elliptical to ovate, paler green on lower surface, apex acuminate, base broadly decurrent, primary lateral veins 3–6 on each side, impressed on upper surface, prominent on lower surface, united distally on each side into collective vein running at 0.3–0.8 cm from margin; peduncle 19–20 cm long, elliptical in cross-section, much shorter than petiole, coloration similar to petiole, subtended by reddish-brown cataphylls; spathe 18–19 cm long, 3–4 cm broad when furled, cymbiform, somewhat convolute basally, open and fornicate apically with acuminate apex, outer surface dark grey-brown, somewhat paler on main veins, inner surface deep, dark purple, becoming paler at extreme base; spadix 3.5–4 cm long, 0.9–1.4 cm thick, much shorter than spathe, hidden within its convolute basal portion; tepals greyish- to brownish-purple at cucullate apices, styles projecting beyond tepals by 0.1–0.2 cm, similar in colour to tepal apices; fruit not seen.

Trinidad: without locality, 1963, (cult. R.B.G. Kew, Accession No. 568–63, 56802) Jermy s.n. (K); opposite Nestle's Milk Factory, alt. 35 m, 6.8.1963, Barnes (TRIN 18584); Buenos Aires near Erin, 22.2.1933, Broadway 9214 (K).

Trinidad, Surinam, Amazonian Brazil.

Rare (?).

Living material of the Trinidad plant cultivated at Kew (Jermy s.n.) matches the original illustration of *D. foecundum* exactly. Some doubt exists as to whether *D. asperum* C. Koch, another South American species, could be the same taxon, but further field work and observations on the species from the Guianas is needed to resolve this problem.

5. MONSTERA *Adanson* nom. cons.

Monstera Adans., *Fam. des Plantes* 2: 470 (1763)

Scandent epiphytes; juvenile foliage of some species markedly different from that of adult plant, tightly appressed to host trunk in neat, distichous, alternating pattern ('shingle plant'); petiole usually long-vaginate, apically pulvinate; lamina narrowly ovate to ovate, base cuneate or acute to cordate, often unequal-sided, sometimes falcate, margin entire or pinnatifid, often irregularly or regularly perforated between main veins, main venation pinnate, smaller veins

parallel or reticulated, usually reticulated in higher orders; spathe fleshy, at maturity white, cream, yellow or pink, erect, cymbiform, usually widely opening, deciduous after anthesis; spadix cylindrical, sessile, white to yellow in flower, more or less uniform in appearance, basal flowers sterile; fertile flowers bisexual, naked; stamens 4 per flower; pistil prismatic, truncate or conical at apex, 2-locular, each locule with 2 basal ovules, stigma linear to narrowly elliptical; fruiting spadix green, white, yellow or orange, at maturity outer stylar portions of berries splitting off to expose seeds, or rarely berries, indehiscent.

KEY TO THE SPECIES

1 Lamina regularly pinnatifid on both sides 2

1 Lamina with entire margins, or pinnatifid only on one side 3

2 Lamina shorter than petiole, less than 1.3 times longer than broad; pulvinus distinctly winged; cultivated ornamental ... *M. deliciosa* Liebm.

2 Lamina longer than petiole, more than 1.3 times longer than broad; pulvinus not winged; native to Trinidad ..... 2. *M. dubia*

3 Juvenile shoot a shingle plant; leaves cordate, variegated with silvery-grey maculations, appressed to host plant, distichous, forming neat, alternating pattern; epidermis of flowering stem yellow-tan when dry, thick and flaking off; petiole of mature leaves with deciduous sheath; stigma 0.1 cm long or less ..... 2. *M. dubia*

3 Juvenile shoot with leaves erect, not cordate at base, not variegated, not appressed; epidermis of flowering stem green when dry, not flaking off; petiole of mature leaves with persistent sheath; stigma 0.2 cm long or more 4

4 Petiole 0.4–0.7 times as long as lamina; peduncle 0.1–0.2 cm thick, 1.9–2.6 times longer than spadix; primary lateral

veins in apical half of leaf forming intramarginal collective vein 0.3–1 cm from margin ..... 3. *M. obliqua*

4 Petiole 0.8–1 times as long as lamina, peduncle 0.3–0.8 cm thick, 0.9–1.6 times as long as spadix; primary lateral veins not forming intramarginal collective vein or collective vein less than 0.1 cm from margin..... 1. *M. adansonii*

1. **Monstera adansonii** Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1830(4): 1028 (1830); Madison in *Contrib. Gray Herb. Harvard Univ.* 207: 36 (1977); Howard, *Fl. Lesser Antilles* 3: 387 & fig. 83 (1979)

Dracontium pertusum L., *Sp. Pl.* 2: 968 (1753)

Monstera pertusa (L.) de Vriese, *Hort. Spaarn-Bergensis*: 40 (1839), *non* (Roxb.) Schott (1830); Engl. & Krause in *Pflanzenreich* IV, 23B (Heft 37): 103 (1908); Simmonds in *J. Ecol.* 38: 290 (1950) & in *Kew Bull.* 1950: 397 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 39 (1953) & in *Acta Bot. Neerl.* 2: 356 (1953)

Scandent epiphyte; juvenile stems creeping, terrestrial, leaves erect, entire; flowering stems climbing, internodes 1–5 cm long, 0.9–1.5 cm thick, smooth, green, producing hanging stolons with long, slender internodes and reduced leaves; petiole 14–37 cm long, 0.8–1 times as long as lamina, sheathed to apical geniculum; lamina 17–38.5 cm long, 8–23 cm broad, 1.5–2.3 times longer than broad, unequal-sided, ovate, apex acute to obtuse, ultimately shortly-acuminate, base unequal-sided, truncate to obtuse, acute, cuneate or narrowly attenuate, entire or with irregularly distributed elliptical perforations on one or both sides of midrib; primary lateral veins 6–12 on each side, diverging at 35°–65° from midrib; secondary lateral veins parallel to primaries, higher orders of venation reticulated; peduncle 10–13.5 cm long, 0.3–0.8 cm thick, 0.9–1.6 times as long as spadix; spathe longer than spadix, cream to pale yellow, cymbiform, acuminate apically, opening widely at maturity; spadix 6.7–12 cm long, 1.2–2.3 cm thick, cylindrical, white to greenish-white; pistils truncate at apex, stigma linear, 0.2–0.3 cm long; apical stylar portion of fruit splitting off to expose seed.

Trinidad: without locality, 1877–80, Fendler 735 (K); Cumuto Main Road, N of Hasnali, alt.*ca* 60 m, 30.4.1975, Philcox & Andrews 7724 (K); Mt St Benedict, alt. 250 m, 17.12.1946, Simmonds 35 (K); Debe Valley, 26.8.1892, Broadway & Ulrich (TRIN 4771); Tamana road, 300 m, 2.9.1962, Kalloo B513 (TRIN 21826); 1.5 km SE of Brigand Hill, Nariva Swamp, 19.7.1977, Philcox 8024 (K, NY, P, TRIN); Mayaro, March 1922, Bailey 668 (BH *ex* Madison, not seen); Cuche, S of Olivier Trace, 1.8.1977, Philcox & Olivier 8100 (K, NY, P, TRIN); Diego Martin, 10.4.1947, Simmonds (TRIN 13863, not seen).

Tobago: without locality, October 1889, Eggers 5608 (K); Easterfield road between Greenhill and Caledonia, 11.10.1937, Sandwith 1711 (K); Mason Hall Bridge, April 1914, Broadway 4835 (S, US, *ex* Madison, not seen); Castara road, Jan. 1953, Hunnewell 19920 (GH, *ex* Madison, not seen).

Trinidad ,Tobago, tropical South and Central America, Lesser Antilles.

General and common, especially in the wetter parts of the island, ascending to 490 m in the Northern Range. A light-demanding rapidly growing, scandent epiphyte; characteristic of forest margins, disturbed forest areas and cultivated trees. For further ecological details see Simmonds (*loc. cit.* 1950).

Of the three varieties recognised in his recent revision of the genus *Monstera*, Madison (*loc. cit.* 1977) records only *M. adansonii* var. *adansonii* from Trinidad and Tobago, based on three cited specimens (Broadway 4835, Hunnewell 19920 and Bailey 668) which I have not seen. The material studied for the present treatment, however, includes characters of *M. adansonii* var. *laniata* (Schott) Madison in its variation, since some specimens have leaves with the primary lateral veins on at least one side of the lamina diverging at up to 65° from the midrib, and leaf bases truncate on one side and cuneate on the other. Varietal ranks have thus not been recognised here. According to Madison, *M. adansonii* var. *laniata* occurs in Venezuela and the Guianas, and it thus seems possible that these two varieties overlap or intergrade in Trinidad.

2. **Monstera dubia** (HBK.) Engl. & Krause in *Pflanzenreich* IV, 23B(Heft 37): 117 (1908); Madison in *Contrib. Gray Herb. Harvard Univ.* 207: 77 (1977)

Marcgravia dubia HBK., *Nov. Gen. et Spec. Pl.* 7: 217 (1825)

Monstera irritans Simmonds in *Kew Bull.* 1950: 398 (1951) & in *J. Ecol.* 38: 290 (1950) (*sine descr.*)

Large, high-climbing, scandent epiphyte, flowering stems frequently hanging; juvenile shoot a shingle plant, climbing, internodes 2–7 cm long, 0.1–0.4 cm thick, leaves closely appressed to host, increasing in size as plant climbs, distichous, arranged in neat alternating pattern with bases of successive leaves often overlapping, petiole 0.8–3 cm long, 0.2–0.4 times as long as lamina, broadly sheathed to apex, lamina 3.5–10 cm long, 2.5–8.5 cm broad, 1.1–1.4 times longer than broad, sometimes inconspicuously peltate, entire, unequal-sided, often variegated with silvery-grey maculations, apex acute to acuminate, falcate, base cordate, with rounded, approximate to overlapping basal lobes; flowering shoots with internodes 2.5–8.5 cm long, 0.8–1.2 cm thick, epidermis of dried material yellowish-orange and flaking off; petiole 19–34.5 cm long, 0.6–0.8 times as long as lamina, with deciduous sheath reaching to base of apical pulvinus; lamina 26.5–46 cm long, 16.5–27.5 cm broad, 1.4–2.1 times longer than broad, unequal-sided, coriaceous, oblong-ovate to ovate, apex falcate, acute to obtuse, ultimately shortly acuminate, base subcordate to emarginate, with short, rounded, basal lobes separated by broadly parabolic sinus, earliest adult leaves entire, sometimes flowering at this stage, later leaves pinnatifid, often on one side only, pinnae truncate (Madison *loc. sit.* 1977 states that largest leaves are pinnatifid with 1–3 rows of elliptical perforations on each side); primary lateral veins (4–)6–10 on each side; secondary and tertiary lateral veins reticulated especially in lower part of lamina, rather prominent when dry; peduncle 3.5–7.5 cm long, 0.3–0.5 cm thick, 0.8–1.2 times as long as spadix; spathe when furled 5.5–6.5 cm long, *ca* 4 cm broad, buff-brown on outer surface (mature spathe not seen in Trinidad material), rounded apically with short apiculum; spadix 6–9.5 cm long, 1.6–2.2 cm thick, clavate-cylindrical, pistils truncate at apex, stigma linear to elliptical, 0.1 cm long or less; stylar portion of fruit splitting off to expose seeds.

Trinidad: Botanic Gardens, 1.9.1893, Broadway (TRIN 5388) (sterile, juvenile and mature leaves); Maraval, 5.3.1926, Broadway s.n. (K) (juvenile); road to Blue Basin, Diego Martin, 13.5.1915, McLean (TRIN 7724); Brazil-Arena road, ICTA Experimental Cacao Plantation, 31.3.1959, Cowan & Simmonds 1406 (TRIN 16211) (juvenile); near Sans Souci, alt. sea level, 17.9.1947, Simmonds 177 (TRIN 13879) (sterile); Grand Riviere, 1913, Freeman (TRIN 8096) (juvenile); San Juan Estate, Montserrat Hills, alt. *ca* 150m, 1.10.1947, Simmonds 183 (TRIN 13878) (fruit only); Siparia Quarry, 8.4.1921, Britton & Broadway 2813 (K) (juvenile); Marper Estate, S of Sangre Grande, alt. low, 13.6.1947, Simmonds 108 (TRIN 13880) (juvenile); Toco road, 1½ m from Sangre Grande, *ca* 60 m, 7.6.1961, Richardson 924 (TRIN 16172); Tabaquite, 3.12.1955, Simmonds (TRIN 15367), 4.10.1918, Broadway s.n. (K) (juvenile); Fishing Pond, 4.8.1949, Simmonds (K, TRIN 14405); Cap de Ville, Cedros Peninsula, alt. low, 29.2.1948, Simmonds 296 (K, holotype of *M. irritans* N.W. Simmonds).

Trinidad, Costa Rica to Bolivia, Venezuela, northwestern Brazil.

Generally distributed and locally common, ascending to 150 m in Lopinot Valley and Central Range. A light-demanding species frequently flowering on hanging stems with non-perforate leaves.

In their most mature state the vegetative leaves are very large and perforated as well as pinnatifid. The characteristic "shingle" habit of the juvenile plant, often confused with Marcgraviaceae in the past, easily distinguishes this species in Trinidad from *M. adansonii* and *M. obliqua*, in which the juvenile plants do not have this growth form.

Madison (*loc. cit.* 1977) states that the mature spathes of *M. dubia* are coloured pink abaxially and white adaxially.

3. **Monstera obliqua** Miq. in *Linnaea* 18: 79 (1844); Engl. & Krause in *Pflanzenreich* IV, 23B (Heft 37): 103 (1908); Simmonds in *J. Ecol.* 38: 290 (1950) & in *Kew Bull.* 1950: 398 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 36 (1953) & in *Acta Bot. Neerl.* 2: 356 (1953); Madison in *Contrib. Gray Herb. Harvard Univ.* 207: 67 (1977)

Monstera fendleri Engl. in *Bot. Jahrb.* 37: 116 (1905)

Scandent epiphyte; juvenile stems creeping, terrestrial, with erect, entire leaves; flowering stems with internodes 1.5–7.5 cm long, 0.2–0.6 cm thick, sometimes producing hanging stolons with very long, slender internodes and reduced leaves; petiole 6–15.5 cm long, 0.4–0.7 times as long as lamina, sheathed up to apical pulvinus; lamina 11–22.5 cm long, 5–11.5 cm broad, 2.1–3.2 times longer than broad, unequal-sided, ovate to narrowly ovate or oblong, somewhat falcate, usually entire sometimes with 1–3 irregularly distributed perforations, apex acute to obtuse, ultimately acuminate, base unequal-sided, truncate to obtuse, acute or cuneate; primary lateral veins 4–7 on each side, usually forming sinuate intramarginal collective vein at least in upper half of lamina, running at 0.3–1 cm from margin on each side; secondary lateral veins somewhat reticulated, at least distally; peduncle 6.5–10 cm long, 0.1–0.2 cm thick, thickening somewhat in fruit, 1.9–2.6 times longer than spadix in flowering inflorescence; spathe 6–8.5 cm long, 2.4–3.5 cm broad, oblong-elliptical, acuminate apically, yellow at maturity; flowering spadix 2.7–5.3 cm long, 0.6–1 cm thick, cylindrical to narrowly elliptical, yellow, becoming green in young fruit, deep orange in ripe fruit; pistils truncate at apex, stigma linear, 0.2–0.4 cm long; berries indehiscent, globose, free from one another, 1–2-seeded.

Trinidad: without locality, 1877–80, Fendler 736 (K, OXF, isotype of *M. fendleri* Engl.); Caroni Woods, 14.2.1847, (?) Crueger (TRIN); road to Maracas Bay, 10.7.1925, Williams, Freeman & Cheesman (TRIN 11250); St Joseph Stock Farm, alt. 25m, 10.7.1958, Purseglove P6189 (K); milepost 23½, Arima-Blanchisseuse road, 1.4.1979, Philcox & Phillips 8320 (K, TRIN); Piarco Savanna, 3.8.1947, Simmonds 131 (TRIN 13864); l'Orange Estate, Naranjo Valley, Heights of Aripo, alt. *ca* 250 m, 9.2.1947, Simmonds 64 (K, TRIN 13862); Mt Aripo, 24.12.1947, *ca* 630 m, Simmonds 231 (TRIN 14021); Cumuto Main Road, N of Hasnali, alt. *ca* 60 m, 30.4.1975, Philcox & Andrews 7725 (K, NY, P, TRIN, US); vicinity of Tabaquite, March 26, 28, 1921, Britton, Freeman & Nowell 2603 (K); Los Bajos, Erin, 12.11.1915, Broadway (TRIN 7354); Cuche, S of Olivier Trace, 1.8.1977, Philcox & Olivier 8099 (K); Cocorite, 5.10.1846, (?) Crueger (TRIN).

Tobago: Back Hill, above Charlotteville, 16.10.1937, Sandwith 1797 (K).

Trinidad, Tobago. Widespread in northern South America, including Peru and Bolivia.

General, but less common than *M. adansonii*, ascending to 370 m on Mt Aripo. Noted on cocoa, at forest margins, on roadside bush and in the undergrowth of limestone forest on Mt Aripo (Simmonds *loc. cit.* 1950).

6. MONTRICHARDIA *Crueger* nom. cons.

Montrichardia Crueger in *Bot. Zeit.* 12: 25 (1854)

Large, arborescent, rooted, aquatic herbs; stems tall, erect, usually unbranched, smooth or sometimes aculeate, with conspicuous annular nodal scars, naked below; leaves borne in terminal cluster, petiole slightly geniculate at apex with conspicuous sheath produced at apex into free convolute ligule, lamina sagittate to cordate-sagittate, main venation pinnate, forming intramarginal collective vein on each side, finer venation reticulate; inflorescences borne singly in leaf axils; spathe fleshy, convolute at base, expanded above in flower, soon deciduous; spadix subequal to spathe, basal pistillate portion short, cylindrical or tapering slightly at apex, apical staminate portion longer, subcylindrical, tapering slightly at base and apex, contiguous with pistillate portion, lacking staminodes or sterile apical appendix, deciduous after flowering; flowers unisexual, naked; stamens in groups of 4–10, prismatic, with thick, truncate connectives each bearing 2 oblong thecae; pistil unilocular with 1–2 basal ovules; stigma sessile, excavated with minutely rugulose margin; fruit a firm, fleshy, 1-seeded berry, borne in thick, oblong infructescence; seeds large.

Montrichardia arborescens (L.) Schott, *Araceen Betreffendes* 1: 4 (1854); Engl. in *Pflanzenreich* IV, 23C (Heft 48): 124 (1911); Simmonds in *J. Ecol.* 38: 288 (1950) & in *Kew Bull.* 1950: 399 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 76 (1953) & in *Act. Bot. Neerl.* 2: 360 (1953); Howard in *Fl. Lesser Antilles* 3: 389 & fig. 84 (1979)

Arum arborescens L., *Sp. Pl.* 2: 967 (1753)

Stem up to at least 3 m high, erect, usually unbranched, robust, smooth or sometimes aculeate, with milky sap; apical internodes 1–2.5 cm long, 1–2.4 cm thick; petiole 18–36.5 cm long, 0.8–1.1 times as long as overall length of lamina; sheath 0.5–0.8 times as long as petiole, broad, with free, apical, convolute ligule 0.3–3.4 cm long; lamina in overall length (including posterior lobes) 16.5–37.5 cm, 12.5–33 cm broad, broadest at or below petiole insertion, 1–1.5 times longer than broad, dark green on upper surface with paler primary venation, paler on lower surface, apex acute, obtuse or rounded with short apiculum, base sagittate or cordate-sagittate, posterior lobes broad, acuminate at tips, overlapping or separated by oblong to parabolic sinus 0.4–0.6 times as long as lamina; primary lateral veins of anterior lobe 3–5 on each side of midrib, anastomosing distally to form looping collective vein running at 0.2–1 cm from margin, basal ribs of posterior lobes strongly differentiated, each emitting 2–4 well-marked lateral veins on anterior side, 0–2 less distinct lateral veins on posterior side, denuded proximally for 0–2 cm, finer venation reticulated; peduncle 4–9 cm long, stout, 0.4–0.8 times as long as spadix; spathe 10–20 cm long, deciduous after flowering, greenish-yellow to pale yellow on outer surface, basal convolute tube 2.5–5.5 cm long, 1.2–3 cm broad when furled, crimson on inner surface, apical expanded lamina 7.5–14.5 cm long, 3.2–9 cm broad, apex cuspidate; spadix 9.5–13.5 cm long, subequal to or shorter than spathe, cream or fawn-coloured, basal pistillate portion 2–3.5 cm long, 1–1.4 cm thick, apical staminate portion 7.5–10 cm long, 1.2–2 cm thick; infructescence 5–9 cm long, 3–5.5 cm thick, oblong, fruit 1.6–3 cm long, 1–2 cm thick, oblong to obovate, apex excavated with persistent stigma; seed large 1.1–2 cm long, 0.7–2 cm broad, testa brown.

Trinidad: without locality, 1891, Alexander s.n. (TRIN 4564), s.d., ? Crueger s.n. (TRIN); Govt. House Gardens, March 1908, Hart s.n. (TRIN), 22.6.1910, Fielden s.n. (TRIN); Tucker Valley road, 19.8.1976, Adams 14142 (K); Maracas Bay, alt. sea level, 30.3.1947, Simmonds 81 (K); "Toucoutche", 1898, Alexander s.n. (TRIN 6860); Caroni River, 2.1.1893, Broadway s.n. (TRIN 5087); Arima, Nov. 1904, Dannouse s.n. (TRIN); Nariva Swamp, alt. sea level, 20.11.1963, Carrick 1231 (K); Nariva Swamp, W of milepost 38¾, Cocos road, 20.7.1977, Philcox, Kelly & Ramcharan 8042

(K, NY, P, TRIN); Nariva swamp about 1 km E of Brigand Hill, 19.7.1977, Philcox 8032 (K); Sans Souci, NE coast, alt. sea level, 3.1.1947, Simmonds 42 (TRIN 13867); Point Cumana, 20.3.1921, Britton s.n. (TRIN); Cocorite, 12.9.1906, Tredholm s.n. (TRIN), Jan. 1866, Finlay s.n. (TRIN 1991); Austin Road, Cedros, 21.9.1915, King s.n. (TRIN 7130).

Tobago: Lambeau River, Nov. 1889, Eggers 5890 (K); Govt. Stock Farm, Scarborough, alt. 60 m, 14.8.1958, Purseglove P6377 (K, TRIN 17438); Estuary of Hillsborough West River, Mesopotamia, 2.9.1977, Philcox & Philcox 8244 (K).

Trinidad, Tobago. Throughout tropical America forming large stands along river margins and in estuarine and coastal salt-marsh habitats.

A number of species and varieties of *Montrichardia* have been described in the past (see Engl. *loc. cit.* 1911 for details) based on differences in leaf shape and nervation, length and spininess of the stem, texture of the petiole and length of the ligule of the petiole sheath. As Simmonds (*loc. cit.* 1950, 1951) has implied, these taxa may merely reflect the vegetative plasticity of a single widespread species and though apparently correlated with different ecological conditions, are connected by intermediate forms. According to Simmonds, the form with aculeate stems and denuded basal ribs of the leaf posterior lobes appears to have a preference for brackish water conditions. This form has been recognised taxonomically as *M. arborescens* (L.) Schott var. *aculeata* (G. F. Meyer) Engl. (Engl. *loc. cit.* 1911). Jonker-Verhoef & Jonker (1953) recognise *M. linifera* (Arruda) Schott, found along the margins of rivers in the interior of Surinam, and this form also occurs along the east coast of Brazil. However, some material seen in the present study, notably Philcox, Kelly & Ramcharan 8042 from the Nariva Swamp, is intermediate between *M. linifera* and *M. arborescens* as distinguished by Jonker-Verhoef & Jonker (in A. Pulle, *Fl. Suriname* 1: 76 (1953)). A field study of morphological variation in conjunction with ecological studies is required to clarify the status of these various forms.

7. PHILODENDRON *Schott* nom. cons.

Philodendron Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1829(3): 780 (1829), ("*Philodendrum*")

Climbers or rosulate epiphytes, or semi-climbing to terrestrial herbs; stems wiry with slender internodes or massive and fleshy or acaulescent; petiole with long, conspicuous alate sheath or sheath inconspicuous, lacking pulvinus at apex; lamina of very variable shape, usually ovate, elliptical or obovate, sagittate or hastate, sometimes palmately (not in Trinidad) or pinnately lobed, base attenuate to deeply cordate, venetion pinnate, primary lateral veins not forming conspicuous intramarginal collective vein, sometimes not differentiated from finer venation (not in Trinidad), finer veins parallel to primaries; inflorescences one to several per node; peduncle usually relatively short and stout; spathe thick, fleshy, convolute and enclosing spadix, usually somewhat constricted at centre with basal part more or less inflated, apical part spreading at anthesis, later reclosing or remaining more or less expanded, outer surface variously coloured or green, inner surface usually coloured, often red basally, whitish apically; spadix subequal to spathe, basal part bearing pistillate flowers, sterile intermediate part usually somewhat swollen, bearing staminodes, apical part bearing staminate flowers (staminodes occasionally present at extreme apex); flowers unisexual, naked; staminate flowers with 3–4 free stamens, connective very thick, well-developed and tightly appressed apically; pistillate flowers a single ovary with variable number of locules, each locule containing one to numerous ovules on axile, basal or sub-basal placentae, stigma sessile or borne on more or less attenuate style, capitate or discoid and variously lobed; fruit a fleshy berry, usually yellow or reddish-coloured, exposed by splitting of persistent spathe; seeds numerous, small to minute.

As in *Monstera*, the leaves of young shoots, either from seed or as side-shoots from an older stem, are usually rather different in form from the adult leaves. In species with more complex adult leaf shapes the juvenile foliage may differ strikingly in being entire, and cordate or lanceolate. Well-developed petiole sheaths are also characteristic of juvenile leaves.

KEY TO THE SPECIES

1 Leaf lamina pinnately lobed or with markedly sinuate margin 2

1 Leaf lamina not pinnately lobed, margin not markedly sinuate 3

2 Sinus between marginal lobes long, more than $\frac{1}{3}$ of distance from margin to midrib; inner margin of posterior lobes with conspicuous lobes; internodes 5–6 cm thick ..... 2. *P. fendleri*

2 Sinus between marginal lobes $\frac{1}{3}$ or less of distance from margin to midrib; inner margin of posterior lobes lacking conspicuous lobes; internodes 1–2 cm thick ..... 9. *P. simmondsii*

3 Petioles of all leaves with broad, conspicuous sheath 0.9–1 times as long as petiole; leaf lamina ovate, oblong-ovate to elliptical or obovate, rarely emarginate at base 4

3 Petioles of mature leaves with sheath 0.6 or less times as long as petiole, sheath conspicuous only when subtending inflorescence; leaf base cordate, sagittate, hastate or emarginate 5

4 Lamina less than 3 times longer than broad; petiole more than 0.3 times as long as lamina; primary lateral veins of leaf well-differentiated, evanescent only at leaf margin; inflorescences apparently axillary, usually borne on attached climbing shoots ..... 5. *P. lingulatum*

4 Lamina 3 or more times longer than broad; petiole less than 0.3 times as long as lamina; primary lateral veins of leaf poorly differentiated, evanescent well before reaching margin; inflorescences

terminal on unattached, monopodial sideshoots with numerous short internodes ..... 7. *P. rudgeanum*

5 Petiole verruculose apically; primary lateral veins of leaf lamina 7 or more on each side of midrib ..... 6. *P. ornatum*

5 Petiole smooth, not verruculose apically; primary lateral veins of leaf lamina 6 or less on each side of midrib 6

6 Stem of flowering shoot with internodes *ca* 1 cm long, 2 cm or more thick; cataphylls conspicuous, persistent as net-fibrous remains clothed with membranous epidermal remnants; basal portion of spathe conspicuously swollen and red externally 7

6 Stem of flowering shoot with internodes 3 cm long or more, up to 2 cm thick; cataphylls soon caducous; basal portion of spathe green externally, not conspicuously swollen 8

7 Posterior lobes of leaf lamina often overlapping, separated by deep, oblong to spathulate sinus; basal ribs denuded for 2.5 cm or more; petiole subterete, somewhat flattened-convex adaxially ..... 10. *P. simsii*

7 Posterior lobes of leaf lamina never overlapping, separated by shallow, broad, open sinus; basal ribs weakly developed, hardly or not at all denuded; petiole flattened to broadly sulcate adaxially with raised, sometimes alate margins ..... 3. *P. fragrantissimum*

8 Leaf base hastate-cordate or hastate-emarginate; posterior lobes extrorse, rounded, separated by broad, shallow sinus; basal veins not forming basal rib ..... 4. *P. krugii*

8 Leaf base cordate or sagittate, never hastate; posterior lobes separated by deep, narrow or broadly oblong sinus; basal veins coalescing proximally to form distinct basal rib 9

9 Basal ribs of posterior lobes denuded for 1.5 cm or more; petiole 0.9 or more times as long as lamina; peduncle 14 cm long or more; posterior lobes separated by broadly oblong sinus ..... 9. *P. simmondsii*

9 Basal ribs of posterior lobes not or hardly denuded; petiole 0.8 or less times as long as lamina; peduncle up to 15 cm long, usually less; posterior lobes separated by narrowly oblong or parabolic sinus, or overlapping 10

10 Leaf lamina sagittate-cordate with basal veins on each side all coalesced into straight, well-developed basal ribs emitting 2–3 lateral veins on anterior side; peduncle 9 cm long or more; adventitious roots 1–4 at each node, not forming dense patches ..... 1. *P. acutatum*

10 Leaf lamina cordate, basal veins on each side with inner 2 free, more or less spreading-ascending, outermost 2–3 coalesced proximally into short basal rib; peduncle up to 7.5 cm long; adventitious roots forming dense patches on underside of stem ..... 8. *P. scandens*

1. **Philodendron acutatum** Schott, *Syn. Aroid.*: 94 (1856); Krause in *Pflanzenreich* IV, 23DB (Heft 60): 67 (1913); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 67 (1953)

Philodendron wullschlaegelii Schott, *Syn. Aroid.*: 94 (1856)

Philodendron latifolium sensu Simmonds, *J. Ecol.* 38: 291 (1950) & in *Kew* Bull. 1950: 404 (1951)

High climbing, scandent epiphyte, sometimes creeping on ground; stem with internodes 4–17.5 cm long, 0.7–1.5 cm thick, with coriaceous, flaking, yellowish (when dry) epidermis, bearing 1–4 reddish-brown roots at each node; cataphylls *ca* 15 cm long, soon deciduous; petiole 14–23.5 cm long, terete (?), 0.6–0.8 times as long as lamina, when subtending inflorescence basal sheath 2.5–6.5 cm long, 0.2–0.3 times as long as lamina; lamina 18.5–45 cm long, 11–28 cm broad, 1.5–1.9 times longer than broad, normally broadest at or above petiole insertion, ovate in outline, sometimes with slight constriction in anterior lobe, apex shortly acuminate, base deeply cordate-sagittate, posterior lobes obtusely (rarely acutely) pointed or rounded, separated by narrow, oblong to parabolic sinus 0.2–0.3 times as long as lamina; primary lateral veins of anterior lobe 3(–4) on each side, diverging at angle of (55°–)65°–81° from midrib; basal ribs of posterior lobes straight, strongly developed, emitting 2–3 well-differentiated lateral veins on anterior side, 0–1 weakly differentiated veins on posterior side, not at all or very shortly denuded proximally; inflorescence borne singly (? or in pairs) in each leaf axil; peduncle 9–15 cm long, (0.6–)0.9–1 times as long as spathe, up to at least 0.7 cm thick; spathe 12–17 cm long, 1–2.5 cm broad when furled, slightly broader in basal tube, outer surface green, inner surface scarlet-crimson at base, white in apical half; spadix sessile, obliquely inserted on peduncle, 10.5–14 cm long, basal pistillate portion 3.5–5 cm long, 0.9–1 cm thick, lengthening and thickening in fruit, intermediate sterile staminodial portion *ca* 0.5 cm long, 1–1.5 cm thick, thicker in flower than adjacent pistillate portion, apical staminate portion 6.5–8.5 cm long, 0.7–1 cm thick; stamens delicate pink; pistils white, cylindrical, 9-locular, each locule with several axile ovules; stigmas sessile, yellowish to brown, broad, subglobose.

Trinidad: without locality, 1877–80, Fendler 746 (K) (juvenile); Aripo savanna, alt. 30 m, 11.5.1960, Richardson 833 (K); between Arima and San Rafael, alt. low, 7.9.1947, Simmonds (TRIN 13907); Salybia Bay, along N road, 3.6.1933, Swabey (TRIN 12907); Galera Point near Toco, alt. low, 1.1.1947, Simmonds (K, TRIN 13896).

Tobago: Mason Hall, near the river, 6.5.1913, Broadway 4504 (K).

Trinidad, Tobago. Venezuela, Guyana, Surinam.

Throughout Trinidad, ascending to 670 m on El Cerro de Maracas y Las Cuevas, but commonest at low altitudes. Characteristic of forest margins, disturbed and secondary forest, and other higher light intensity sites, *e.g.* cultivated trees, coconuts. Commonly attacked by fungus disease *Mycosphaerella philodendri* (Pat.) Lind., which produces conspicuous orange-yellow spots on the leaves of this but no other Trinidad aroid. (See Simmonds *loc. cit.* (1950) for further ecological details).

Philodendron acutatum Schott as recognised here forms part of a species complex much in need of further study. I have followed Krause (1913) and Jonker-Verhoef & Jonker (1953) in reducing *P. wullschlaegelii* Schott to the synonymy of *P. acutatum* Schott. The Trinidad plant is a good match with the type of *P. wullschlaegelii* Schott (Wullschlaegel 495, from Surinam), as exemplified by the illustration (Schott *Aroideae* 2545) at the Vienna Natural History Museum.

P. latifolium C. Koch is based on the description given by Koch in the Appendix of the *Index Sem. Hort. Bot. Berol.* (1854) p. 8, under the name *P. sellowianum* Kunth, and is said to have petioles canaliculate on the upper surface; no provenance is given for the plant. As Simmonds (*loc. cit.* 1951) pointed out, the tracings at the Kew Herbarium made by N.E. Brown of a leaf specimen from Koch's own herbarium named as *P. latifolium* match the Trinidad species. However, I have preferred to link the Trinidad plant to the populations from northern South America treated by other authors as *P. acutatum* Schott, of which there is ample modern material, and to which the Trinidad plant is very closely related, if not identical. However, it should be noted that Schott's description of *P. acutatum* in *Prodr. Aroid.*: 268 (1860) states that the spathe tube is dirty purplish-coloured on the exterior suface, whereas in the Trinidad species it is apparently always green. *Philodendron grandifolium* (Jacq.) Schott from Venezuela is evidently also part of this complex.

2. Philodendron fendleri Krause in *Pflanzenreich* IV, 23DB (Heft 60): 118 (1913); Simmonds in *J. Ecol.* 38: 289 (1950) & in *Kew Bull.* 1950: 402 (1951)

Scandent epiphyte, often massive, flowering only on attached climbing stems but often low-climbing or lying in loops and coils on ground, with yellowish-brown, gummy aromatic sap; stem climbing to at least 5 m, naked below with leaves crowded into terminal crown, internodes of flowering stems 2–6 cm long, 5–6 cm thick, grey-green, with conspicuous, kidney-shaped petiole scars 3 cm long, 4 cm broad, each node bearing whitish annular scar and several long, pendent, greyish-brown roots up to 0.7 cm thick; cataphylls yellow-green, up to at least 50 cm long, narrowly conical when furled, soon deciduous; petiole 58.5–90 cm long, up to 1.5 cm thick at apex, 2.5 cm thick at base, 1–1.3 times as long as lamina, green with small, purple, glandular maculations, at apex terete or elliptical in section, with short basal sheath 4–7 cm long, lamina 35.5–88 cm long overall, 30–65 cm broad, 1.1–1.4 times longer than broad, broadest at petiole insertion, rather flat in life, more or less horizontal to slightly pendent, in outline ovate to broadly ovate, margin deeply pinnatifid with marginal lobes 6–9 on each side, lobes at centre of lamina 11–23 cm long, 3–8 cm broad, oblong with blunt, unequal-sided tips, apical lobes curving towards leaf apex, central lobes separated by oblong sinuses 1–3 cm broad, extending for 0.5–0.8 of width from lamina margin to midrib, sinuses longest at centre of leaf, apical lobe acuminate, base of leaf lamina sagittate, posterior lobes with inner margins strongly lobed (in adult leaves), separated by oblong to parabolic, sometimes widely spreading sinus 0.2–0.3 times as long as leaf lamina; primary lateral veins of midrib 3–5 on each side, one per marginal lobe, diverging from midrib at angle of 50°–75°; basal veins all coalesced proximally to form basal rib on each side, sometimes with innermost vein free, spreading-ascending; basal ribs of posterior lobes strongly developed, straight, denuded proximally for 1–5 cm, emitting 1–3 well-differentiated lateral veins on anterior side, 1–6 weaker but distinct lateral veins on posterior side, each forming central vein of a marginal lobe; inflorescences up to 4 per leaf axil, all but outermost subtended by white or greenish bicarinate cataphylls; peduncle 11–18 cm long, 1.2–1.4 cm thick, elliptical or subterete in section, green with spares, purplish, glandular maculations at apex; spathe 13–18 cm

long, basal tube somewhat inflated, 6–8 cm long, 2.8–3.7 cm broad when furled, apical lamina 7–9 cm long, 1.8–2.1 cm broad when furled, outer surface green, dull, dirty red-tinged basally, green and reddish-tinged apically, inner surface rich, dark maroon-purple basally, somewhat paler apically; spadix 10–14 cm long, obliquely inserted on peduncle, sessile or subsessile, at flowering stage basal pistillate portion 3–4 cm long, 1.8 cm thick, intermediate sterile staminodial portion 2.5 cm long, swollen and 1.7 cm thick at base, apical staminate portion 7 cm long, 1.3 cm thick, subcylindrical; stamens and staminodes opaque white; pistils 3.5 mm long, 2 mm broad, ovary 8–10-locular, each locule with 3–4 ovules, funicle up to 3 times as long as ovule, placentation basal or sub-basal, ovary shortly narrowed apically, stigma capitate, depressed-globose to thickly discoid, translucent-yellowish.

Trinidad: without locality, Hort. Kew Acc. No. 568-63.56801, 19.5.1977, Jermy s.n. (K), 1877–80, Fendler 745 (K, holotype, OXF, isotype); Government House Grounds, St Ann's, cultivated, 7.11.1907, Broadway 1912 (K), 23.10.1911, Broadway s.n. (K); Hort. I.C.T.A., origin Long Stretch, Simmonds s.n. (K, photo.); Valencia, 4.3.1921, Britton & Britton 2090 (TRIN); Matura Forest Reserve, N of Valencia-Toco road, 26.7.1977, Philcox, Andrews & Kelly 8077 (K); Sans Souci to Grand Riviere, alt. 150 m, 3.1.1947, Simmonds (K).

Trinidad. Endemic.

According to Simmonds (*loc. cit.* 1950), *P. fendleri* is frequent in the wetter forests of Trinidad, ascending to 580 m on Piedra Blanca. *P. fendleri* seems to be most closely related to *P. radiatum* Schott, a Central American species, which has undulate or lobed margins to the main leaf lobes.

In leaf form, with long, oblong marginal lobes, and in the swollen basal spathe tube, richly crimson within, *P. fendleri* also resembles *P. pinnatifidum* (Jacq.) Kunth, a Venezuelan species. However, *P. fendleri* differs in a number of characters including the caducous, non-presistent cataphylls, the longer internodes, producing a climbing, not acaulescent stem, the petioles terete, not broadly channelled adaxially, and the longer peduncle, subequal to the spathe in length. A related species from Cuba and Jamaica

is *P. lacerum* (Jacq.) Schott, which is widely cultivated throughout the world and differs from *P. fendleri* in having longer, more slender internodes, relatively longer peduncles and a less deeply incised lamina with subtriangular marginal lobes.

P. duisbergii Bunting (*Baileya* 14: 68 (1976), described from cultivated material, appears from the description to be very close to *P. fendleri*.

3. **Philodendron fragrantissimum** (Hook.) G. Don in Sweet, *Hort. Brit.* ed. 3:632 (1839); Krause in *Pflanzenreich* IV, 23DB(Heft 60): 122 (1913); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 65 (1953) & in *Acta Bot. Neerl.* 8: 150 (1959)

Caladium fragrantissimum Hook. in *Bot. Mag.* t. 3314 (1834)

Philodendron demerarae Gleason in *Bull. Torr. Bot. Club* 56: 11 (1929)

Philodendron clementis Wright *ex* Griseb., *Cat. Pl. Cub.*: 220 (1886).

Philodendron accrescens N.W. Simmonds in *Kew Bull.* 1950: 402 (1951) & in *J. Ecol.* 38: 289 (1950) *sine descr.*

Scandent epiphyte; stem in juvenile phase vigorously climbing and spreading with internodes slender, *ca* 8 cm long, 0.7 cm thick, and ovate-lanceolate leaves, thickening considerably in flowering phase with internodes up to 1 cm long, 2 cm thick, attached to host plant by dense mass of clasping roots, later producing new climbing shoots of juvenile form; cataphylls 13.5–20 cm long, triangular, marcescent, forming dense mass of net-fibrous remains clothed with membranous epidermal remnants, persisting at petiole bases and around inflorescences; petiole 20–50 cm long, up to 1.5 cm broad, 0.6–1.1 times as long as lamina, upper surface flattened or broadly sulcate with distinct, somewhat raised margins or winged in part along margins, lower surface rounded, smooth, flushed reddish-purple at junction with lamina, shortly sheathed at extreme base; lamina 33.5–53 cm long, 16.8–36 cm broad, 1.3–2.1 times longer than broad, triangular in outline, apex acute-acuminate, base subcordate to cordate, posterior lobes rounded, separated by broad, shallow sinus 2.5–7.5(–8) cm deep, basal margins of lamina decurrent

on upper surface of petiole to form partial or complete transverse ridge across petiole apex; primary lateral veins of anterior lobe (4–)5 on each side, diverging at angle of 45°–65° from midrib, often with intermediate veins weakly differentiated between primaries; basal veins 3–4 on each side, innermost free, ascending or widely-spreading, outermost 2–3 retrorsely arcuate, then ascending distally, more or less united proximally into hardly or not at all denuded basal rib 0.3–2 cm long; inflorescence solitary in leaf axil, amongst cataphyll remains; peduncle 5–6 cm long, thickening apically; spathe 9–11(–12) cm long, basal tube inflated, crimson-carmine externally, *ca* 2.5–3.2 cm broad, apical lamina greenish, flushed with pink dorsally (Simmonds *loc. cit.* 1951), later white; spadix 9 cm long, basal pistillate portion 3 cm long, intermediate sterile, staminodial portion 0.7–1 cm long, apical staminate portion 4–5.3 cm long; pistils 6–7-locular, each locule with numerous ovules on axile placenta, stigma discoid, sessile.

Trinidad: without locality, 1877–80, Fendler 740 (K); Head of Caura Valley, N of Piedra Blanca, 9.3.1947, Simmonds 77 (TRIN 13891); Long Stretch, 15.1.1949, Simmonds 331 (K, holotype of *P. accrescens* N. W. Simmonds), 26.12.1946, Simmonds 36 (TRIN 13890); Matura Forest Reserve, N of Valencia-Toco road, 26.7.1977, Philcox, Andrews & Kelly 8076 (K); about ½ mile S of Valencia, Guaico-Manzanilla Reserve, 20.7.1977, Philcox, Kelly & Ramcharan 8037 (K).

Trinidad. Widespread in the American tropics, including Cuba, Venezuela, Guyana, Surinam, south-western Amazonia and eastern Brazil.

Locally common in shady situations in wet forests of the northern part of Trinidad. (Ref. Simmonds *loc. cit.* (1950) for further ecological details).

In his treatment of Trinidad Araceae, Simmonds (*loc. cit.* 1951) described this species as new under the name *P. accrescens*. However, an examination of the type material shows it to be the same as the Guyanan taxon first described in 1834 by W. J. Hooker as *Caladium fragrantissimum*. This species has also been described under various other names including *P. demerarae* Gleason and *P. clementis* Wright *ex* Griseb., but these are here treated as belonging to a single, widespread taxon.

P. fragrantissimum is well-characterized by its habit, producing rapidly climbing shoots with long, slender internodes which bear leaves of juvenile form. These shorten and thicken considerably at the flowering phase to produce a subrosulate mature plant, from which further climbing shoots are produced later. This habit, the non-denuded basal ribs of the leaf and the petiole cross-sectional shape (flattened-sulcate on the upper surface with distinctive, more or less winged margins) serve to distinguish this species from the larger *P. simsii* (Hook.) G. Don.

4. Philodendron krugii Engl. in *Bot. Jahrb.* 26: 538 (1899); Krause in *Pflanzenreich* IV, 23DB(Heft 60): 85 (1913); Simmonds in *J. Ecol.* 38: 290 (1950) & in *Kew Bull.* 1950: 403 (1951)

Climber, stem up to at least 8 m long with internodes 3–14 cm long, 0.5–1.1 cm thick, with yellowish, aromatic sap, producing several reddish-brown roots at each node; cataphylls *ca* 5 cm long, soon deciduous; petiole (9.5–)16.5–20.5 cm long, *ca* 0.5 cm thick, (0.5–)0.7–0.9 times as long as lamina, terete, when subtending inflorescence bearing basal sheath 3.5–5 cm long; lamina 19–27.5 cm long, 8.5–15 cm broad, 1.6–2.4 times longer than broad, broadest below petiole insertion (*i.e.* across posterior lobes), oblong-ovate in outline, slightly constricted above posterior lobes, apex broadly obtuse, ultimately acuminate, base cordate-hastate, posterior lobes rounded, somewhat extrorse, separated by shallow, widely spreading (occasionally narrower) parabolic sinus 0.1 or less times as long as lamina; primary lateral veins of anterior lobe 3–4 on each side, widely spaced, diverging at angle of 50°–65° from midrib; basal veins 2–3, not coalescing proximally to form basal rib, not denuded; peduncle *ca* 5 cm long, about half as long as spathe; spathe 9.5–11 cm long, *ca* 1.5 cm broad when furled, outer surface green, minutely flecked white, inner surface white, red at base; spadix *ca* 9.5 cm long, basal pistillate portion 3 cm long, 0.7–0.8 cm thick, intermediate sterile staminodial portion *ca* 0.7 cm long, 0.7 cm thick, apical staminate portion *ca* 5 cm long, *ca* 0.7 cm thick; pistils cylindrical with sessile, subglobose stigmas.

Trinidad: Diego Martin, McLean (TRIN 6383); Gasparillo-Maracas trail, the top, alt. 410 m, 13.4.1947, Simmonds (K); Maracas, road to the waterfall, 1.6.1928, Broadway 6964 (K); Oropuche local

road *via* Valencia, 2½ milepost, 7.5.1926, Broadway 6266 (K); Guaico-Valencia Reserve, 8.6.1949, Simmonds (K); Arena Forest Reserve, alt. low, 24.4.1947, Simmonds (K); Siparia Quarry, 8.4.1921, Britton & Broadway 2816 (K); Caratal Forest, alt. sea level, 21.5.1959, Simmonds (TRIN 15741).

Trinidad, Tobago. Endemic.

Generally distributed in forests of wetter areas but not abundant; ascending to 550 m on Piedra Blanca. A forest climber, flowering rarely.

P. krugii Engl. is based on two specimens from Tobago (A. Seitz 85, Eggers 5765) which I have not seen. However, the Trinidad material closely matches the descriptions given by Engler and by Krause (*loc. cit.* 1913). *P. krugii* is evidently very closely related to, if not the same taxon as *P. erubescens* C. Koch & Augustin, a species from Colombia and possibly Venezuela. Material at the Kew Herbarium of this latter species closely resembles the Trinidadian *P. krugii* in leaf shape and venation. *P. erubescens* is described as being red- or brown-tinged in all its vegetative parts, with a red-purple spathe. With further study and more adequate collections from northern South America this may be shown to be a difference not sufficiently important to warrant separation of these taxa at specific rank, in which case the earlier name *P. erubescens* C. Koch & Augustin would be correct.

5. **Philodendron lingulatum** (L.) C. Koch in *Index Sem. Hort. Bot. Berol. Appendix*: 2 (1855), *non* Schott (1856); Krause in *Pflanzenreich IV*, 23DB(Heft 60): 24 (1913); Brown in *Kew Bull.*: 344 (1912); Howard in *Fl. Lesser Antilles* 3: 392 (1979)

Arum lingulatum L., *Sp. Pl.* ed. 2, 2: 1371 (1763)

"*Arum scandens, maximum, flore flavescente*" Plumier *ex* J. Burman, *Plum. Plant. Amer.* fasc. 1–10: 26, t. 37 (1756)

Philodendron dispar Schott, *Syn. Aroid.* : 79 (1856)

Philodendron broadwayi N.E. Brown in *Kew Bull.* : 343 (1912)

Philodendron karstenianum sensu N.W. Simmonds in *J. Ecol.* 38: 290 (1950) & in *Kew Bull.* 1950: 405 (1951)

Scandent herb with resinous smell, climbing vigorously in shade, running on ground and hanging; stem of flowering shoots with internodes 1.5–13.5 cm long, 0.2–2 cm thick, epidermis pale tan-yellow (when dry), bearing several to numerous clasping roots at each node, immature ground-creeping vegetative shoots bearing leaves of reduced dimensions; petiole 4.7–32.5 cm long, (0.3–)0.5–0.8 times as long as lamina, apex 0.1–0.4 cm thick, remainder bearing conspicuous sheath 0.8–1.7 cm broad, 0.9(–1) times as long as petiole; lamina (of flowering shoots) 7.4–41 cm long, 4.6–19.5 cm broad, 1.6–2.9 times longer than broad, ovate, oblong-ovate or oblong-elliptical, slightly unequal-sided, apex acute to obtuse, ultimately shortly but conspicuously acuminate, base sometimes cuneate or acute, usually obtuse to truncate, occasionally emarginate; primary lateral veins (6–)7–9(–10) on each side of midrib, well-differentiated, evanescent only at or near margin, more closely spaced towards base of lamina, discernible on upper surface of lamina (when dry), often with less well-differentiated, parallel, interprimary veins present between them; inflorescences one to several on sympodial flowering stems, borne apparently axillary to leaves, fragrant; peduncle 2.5–7.5 cm long, 0.2–0.5 cm thick, 0.3–0.6 times as long as spathe, sometimes with pinkish streaks; spathe persistent, 5–13 cm long, basal part convolute, somewhat swollen, 1.2–3 cm broad, apical part narrower, in flower and fruit expanded, apex obtuse to rounded, shortly cuspidate, outer surface pale or yellowish-green basally, white to cream-coloured apically, inner surface whitish with brown striae towards base; spadix subsessile (4.3–)8.5–9.5 cm long, basal pistillate portion (1.3–)2.8–3.5 cm long, 0.7–1.3 cm thick, yellowish at flowering stage, greenish later, intermediate sterile staminodial portion 0.3–0.5 cm long, *ca* 0.7–0.8 cm thick, white at flowering stage, apical staminate portion (2.8–)4.5–6 cm long, 0.5–0.9 cm thick, white, and partly exserted from spathe at flowering stage, brown later.

Trinidad: Blue Basin, 13.5.1915, McLean (TRIN 7747) (juvenile); between Naranja and Piedra Blanca, alt. 580 m, 10.8.1947, Simmonds (TRIN 13907), alt. 550 m, 23.2.1947, Simmonds (K, TRIN 13904); El Tucuche trail, alt. *ca* 690 m, 2.8.1976, Adams 14081 (TRIN); Maracas valley, trail to the falls, alt. *ca* 210 m, 16.5.1947, Simmonds (TRIN 13906); shoulder of Morne Bleu, E of 11th mile of Arima-Blanchisseuse road, alt. 610 m, 20.4.1947,

Simmonds (TRIN 13905); 11th mile, Arima-Blanchisseuse road, 25.9.1949, Simmonds (TRIN 14423); Blanchisseuse road, top of Morne Bleu, 16.5.1926, Broadway 6214 (K); Morne l'Enver Reserve, 27.8.1928, Williams (TRIN 12027); Quare ("Quarry") river forests via Valencia, 10.10.1924, Broadway 5442 (K).

Tobago: Lot 42 near Caledonia, 13.6.1913, Broadway s.n. (TRIN); Roxborough-Parlatuvier road, Main Ridge, alt. 450–500 m, 4.4.1959, Cowan 1440 (TRIN 16340); Englishman's Bay, 15.4.1912, Broadway 3880 (K, holotype of *P. broadwayi* N.E. Brown).

Trinidad, Tobago. Lesser Antilles, Puerto Rico, Venezuela, Colombia, Ecuador.

Common in mountain forests in the wet central parts of the Northern Range, ascending to the summit of El Tucuche (920 m); Herb. Trin. 12027, from lowland southern forests at Morne l'Enver, is a rather depauperate form. The populations of the Lesser Antilles appear to have a more emarginate leaf base than in the material seen from Trinidad and Tobago, but the habit of flowering on sympodial rooting shoots is characteristic. (See notes under *P. rudgeanum* Schott).

Further study is needed of this species and its near relatives throughout northern South America and the Caribbean. This may lead to the reduction of various other species to the synonymy of *P. lingulatum* (L.) C. Koch (*e.g. P. karstenianum* Schott, *P. nervosum* Kunth).

6. **Philodendron ornatum** Schott in *Oest. Bot. Wochenbl.* 3: 378 (1853) & in *Prodr. Aroid.*: 247 (1860); Krause in *Pflanzenreich* IV, 23B(Heft 60): 51 (1913); Jonker-Verhoef & Jonker in Pulle & Lanjouw, *Fl. Suriname, Add. & Corr.* 1: 406 (1968)

Zantedeschia asperata C. Koch in *Index Sem. Hort. Bot. Berol. Appendix* 1853: 5 (1854)

Philodendron asperatum (C. Koch) C. Koch in *Index Sem. Hort. Bot. Berol. Appendix* 1855: 4 (1856)

Philodendron rubens Schott, *Syn. Aroid.*: 84 (1856); J.D. Hooker in *Bot. Mag.* t. 6021 (1873); Krause in *Pflanzenreich* IV, 23DB (Heft 60): 61 (1913); Simmonds in *J. Ecol.* 38: 289 (1950) & in *Kew Bull.* 1950: 402 (1951)

Philodendron imperiale Schott in *Oest. Bot. Zeitschr.* 15: 71 (1865)

Philodendron tobagense Engl. in *Bot. Jahrb.* 26: 524 (1899)

Scandent epiphyte; stem in juvenile phase rapidly climbing, with long slender internodes and smaller leaves, in flowering phase thickening considerably with internodes 1–3 cm long, *ca* 3 cm thick, producing horizontal clasping roots around bole of host tree; cataphylls *ca* 22 cm long, 10 cm broad (when expanded), marcescent, forming net-fibrous remains covered with membranous, rusty brown remnants of epidermis; petiole of mature leaves 38.5–75 cm long, *ca* 0.8–1.1 times as long as lamina, at apex verruculose, often red-flushed, adaxially flattened with blunt ridge down median line and bluntly angled margins, abaxially rounded, terete to subterete towards base, with short basal sheath, *ca* 5 cm long; lamina 45–65 cm long, 28–46 cm broad, 1.3–1.9 times longer than broad, flat, glossy, ovate in outline, apex subacute to rounded, ultimately shortly acuminate, base deeply cordate, posterior lobes rounded, separated by open, broadly oblong to parabolic sinus 0.2–0.3 times as long as lamina; primary lateral veins of anterior lobe 7–12, diverging at angle of (45°–)55°–65°(–70°) from midrib, parallel, weaker, interprimary veins often present towards base of anterior lobe; basal veins 7–9, inner 3 free, spreading and ascending, outer 4–6 retrorsely arcuate, ascending distally, united proximally into basal rib 2–4 cm long, denuded for 1–3 cm; inflorescences 1–2 per leaf axil; peduncle 2.5–6 cm long; spathe 11–17 cm long, 1.5–2 cm broad when furled, conspicuously acuminate apically, outer surface white apically, greenish basally, flushed red or pink at basal margin, inner surface richly crimson; spadix subequal to spathe, subsessile, obliquely inserted onto peduncle, basal pistillate portion *ca* 3.5 cm long, 0.8 cm thick, intermediate sterile staminodial portion *ca* 1–1.5 cm long, 1.1 cm thick, swollen basally, apical staminate portion *ca* 7 cm long, 1 cm thick; pistil 5–6-locular, each locule with numerous axile ovules, stigma sessile, broad.

Trinidad: without locality, Fendler 734 (K), Hort. Kew, 6.7.1876, Crueger s.n. (K), 12.6.1878, Crueger s.n. (K); between Piedra Blanca and Naranja, alt. 550 m, 23.2.1947, Simmonds (K); Arima-Blanchisseuse road, 25.9.1949, Simmonds 402 (TRIN 14428); Blanchisseuse road, top of Morne Bleu, 16.5.1926, Broadway 6213 (K) (juvenile); Las Lapas Trace, Blanchisseuse Saddle, alt. 520 m, s.d., Purseglove (K); junction of Blanchisseuse and Las Lapas roads, 26.2.1926, Broadway 5984 (K); Arima, 25.9.1924, Williams & Cheesman (TRIN 10794); Erin road, Siparia, 13.3.1915, Broadway (TRIN 7849); Brazil, 6.3.1921, Britton, Brition & Freeman 2130 (K)

Tobago: Caledonia, Lot 42, 28.4.1913, Broadway 4493 (K).

Trinidad, Tobago. Widespread in tropical South America, including Venezuela, Bolivia, Amazonian and eastern coastal Brazil.

Frequent in the wetter forests of Trinidad, lowland and montane; perhaps commonest at 460 m and reaches 760 m on El Tucuche. *P. ornatum* is a forest plant, flowering in shade, and is characterized by its habit, the apically verruculose petioles, and the large, persistent, net-fibrous to membranous cataphylls of the flowering plant. The juvenile, climbing and running shoots which bear small leaves, thicken considerably (with short internodes) in the flowering stage (*cf. P. fragrantissimum*).

P. tobagense Engl. is based on two specimens (Eggers 5764, 5824) from Tobago which I have not seen. The petioles, however, are described as "superne verrucosus" and the description fits in other respects typical *P. ornatum* Schott. Furthermore, Krause (*loc. cit.* 1913) cites Fendler 734 from Trinidad, and the Kew material of this collection clearly belongs here. Jonker-Verhoef & Jonker (*Acta Bot. Neerl.* 8: 152 (1959)) reduced both this and other species cited above to the synonymy of *P. ornatum*.

The name *P. ornatum* Schott was published on 1 Dec. 1853, and is therefore taken up in preference to Koch's name, *Zantedeschia asperata*. The latter name was published after October 1853, since this is the latest date given in the Index as a flowering time for one of the taxa described therein. However, in other years, flowering times as late as November are given, which implies that this publication, consisting of a seed list with an appendix describing new and little-known plant species grown at the Berlin Botanic Gardens, was

issued in the early part of the year following that printed on the title page. Pending further clarification I have assumed therefore that the name *Zantedeschia asperata* C. Koch was published in 1854.

7. **Philodendron rudgeanum** Schott, *Syn. Aroid.*: 78 (1856) & in *Prodr. Aroid.*: 226 (1860); Simmonds in *Kew Bull.* 1950: 404 (1951); Moore in *Baileya* 19: 122 (1974)

Philodendron cannifolium Engl. in *Bot. Jahrb.* 26: 512 (1899); Krause in *Pflanzenreich* IV, 23DB(Heft 60): 7 (1913), *non* (Dryander) G. Don in Sweet (1839), *nec* Martius *ex* Kunth (1841)

Pothos cannifolius Rudge, *Pl. Guian.*: t. 33 (1805) *nom. illegit. non* Dryander (1802)

Philodendron guttiferum Kunth var. *rudgeanum* (Schott) Jonk. & Jonk. in *Acta Bot. Neerl.* 2: 359 (1953); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 73 (1953) & in *Acta Bot. Neerl.* 8: 150 (1959)

Scandent herb; stem of flowering branches with leaves confined to terminal few cm, naked below, with internodes 0.4–1.7 cm long, 0.3–0.4 cm thick, not producing roots (? unattached and hanging), internodes of non-flowering branches 5–10 cm long, 0.3–0.5 cm thick, often producing clasping roots at nodes, epidermis usually brown (when dry); petiole 2.9–4.9 cm long, 0.2(–0.3) times as long as lamina, with conspicuous sheath 0.4–0.8 cm broad, extending to base of lamina; lamina 13.8–19.8 cm long, 3.6–5.5 cm broad, 3–3.8 times longer than broad, narrowly oblong-elliptical to narrowly obovate, unequal-sided, often slightly falcate, apex acute to subacute, ultimately conspicuously acuminate with 1–1.5 cm long, narrow acumen, base acute; primary lateral veins 7–9 on each side of midrib, poorly differentiated, evanescent well inside margin, discernible only on lower surface of lamina (when dry); inflorescences solitary, borne terminally on monopodial branch stems; peduncle 1.2–2.8 cm long, 0.3–0.5 cm thick; spathe 7.5–8.7 cm long, 1.2–2 cm broad when furled, apex obtuse to rounded, ultimately cuspidate with 0.5–1 cm long cusp, persistent in fruiting stage; spadix *ca* 8.5–9.5 cm long, in young fruit with basal pistillate portion *ca* 5 cm long, 1.7 cm thick, intermediate sterile staminodial portion 0.5 cm long, 0.8 cm thick, apical male portion 3.5 cm long, 0.7 cm thick, persistent, exserted beyond spathe.

Trinidad: without locality, 1977–80, Fendler 744 (K); Laventille, 15.5.1902, Dannouse s.n. (TRIN); Arima, 1.2.1909, Dannouse s.n. (TRIN); Melajo Reserve, alt. low, 12.3.1950, Simmonds (K); Woods of Brazil *via* Guanapo, 4.9.1925, Broadway 5770 (K).

Trinidad. Guyana, Surinam, French Guiana, Brazil (Territorio Amapa).

A forest climber (Simmonds TRIN 14564 was collected in Mora forest). Ecology poorly known, and not discussed in detail by Simmonds (*J. Ecol.* 38: 277 (1950)).

P. rudgeanum is part of a very variable species complex within Sect. *Pteromischum* Schott, which includes *P. lingulatum* (L.) C. Koch and *P. guttiferum* Kunth. Further study is required to establish satisfactory specific limits within this complex. The Trinidad material matches the illustration of Rudge (*loc. cit.* 1805), and Hostmann 136 (K) from Surinam which is cited in Schott's 1860 description. *P. rudgeanum* produces short, non-rooting, monopodial side-shoots with numerous short internodes bearing terminal inflorescences, from larger, attached climbing shoots. In this respect it differs notably from *P. lingulatum* (L.) C. Koch, the flowering shoots of which have a sympodial habit, producing one to several pseudoaxillary inflorescences, and having thicker, longer internodes which are attached to the host plant by clasping roots.

8. **Philodendron scandens** C. Koch & H. Sello, *Index Sem. Hort. Bot. Berol. Appendix* 1853: 14 (1854); Simmonds in *J. Ecol.* 38: 277 (1950) & in *Kew Bull.* 1950: 404 (1951); Bunting in *Gentes Herbarum* 10: 136 (1968); Howard in *Fl. Lesser Antilles* 3: 394 (1979)

Philodendron oxycardium Schott, *Syn. Aroid.* 1: 82 (1856); Simmonds *loc. cit.*: 404 (1951)

Philodendron hederaceum Schott, *Syn. Aroid.*: 90 (1856); Jonker-Verhoef & Jonker in Pulle & Lanjouw, *Fl. Surinam Add. & Corr.* 1: 408 (1968); *non* Schott (1829), *nec* Bunting, *Baileya* 11: 62 (1963)

High climbing scandent epiphyte with leaves of juvenile climbing stems characteristically appressed to host plant in neat, alternating pattern; stem in juvenile phase with internodes 0.2–0.3 cm thick, 4–7 cm long, in adult phase with internodes 0.5–2 cm thick, 6–14 cm long, epidermis coriaceous, yellowish (peeling when dry), bearing dense patches of reddish-tomentose, clasping roots at nodes; cataphylls in juvenile phase marcescent, becoming reddish-brown, 2.5–4.5 cm long, triangular, in adult phase caducous, up to 16 cm long; petiole in juvenile phase 1.5–3 cm long, 0.2–0.25 times as long as lamina, in adult phase 13.5–30 cm long, (0.5–)0.7–0.8 times as long as lamina, when subtending inflorescences basal sheath conspicuous, 0.4–0.6 times as long as petiole; lamina in juvenile phase 9–13 cm long, 7–9 cm broad, 1.3–1.5 times longer than broad, ovate to broadly ovate in outline, apex acuminate, base cordate, posterior lobes overlapping or separated by narrowly oblong sinus, in adult phase 20–37.5 cm long, 15–26.5 cm broad, 1.3–1.5 times longer than broad, ovate to broadly ovate in outline, apex acuminate, base deeply cordate, posterior lobes rounded, sometimes overlapping or with spathulate sinus 0.2–0.3 times as long as lamina; primary lateral veins of anterior lobe 2–3 on each side, apical pair weakly differentiated; basal veins 4–5, outermost 2–3 coalescing proximally to form non-denuded basal rib; inflorescences borne near tips of hanging stems (Simmonds 1950); peduncle 3–7.5 cm long, up to at least 1 cm thick; spathe thick, fleshy, 12 cm long, 3–3.5 cm broad, outer surface green, inner surface crimson basally, shiny-white apically, persistent; spadix 10.8–14 cm long, uniformly 1.6 cm thick near anthesis, basal pistillate portion 3.5–6 cm long, 0.9–1.6 cm thick, thickening considerably in fruit, greenish near anthesis, intermediate sterile staminodial portion 0.5 cm long, apical staminate portion 5.7–8 cm long, 1.1–1.6 cm thick, white near anthesis, later rotting off; pistils 5-locular, each locule with numerous axile ovules; stigma broad, sessile.

Trinidad: Tucuche, 3.2.1857, Crueger (TRIN 5907) (juvenile); between Piedra Blanca and Naranja, alt. 580 m, 23.2.1947, Simmonds (K) (juvenile); 11th mile, Arima-Blanchisseuse road, alt. 580 m, 17.8.1947, Simmonds (K), alt. 580 m, 20.4.1947, Simmonds (K); Tabaquite, 3.12.1955, Simmonds (K); Rio Claro-Mayaro road, 15.4.1949, Simmonds (K); Fifth Company, Moruga Road, 9.7.1919, Broadway s.n. (TRIN) (juvenile).

Trinidad. Widely distributed in tropical America from Mexico to Bolivia including Venezuela, the Guianas, Brazil and West Indies.

According to Simmonds, *P. scandens* is common in the wetter parts of the island and characteristic of well-lit, exposed sites, though tolerant of shade in forest. Flowering is reported to be very rare, and where found always on stems just beginning to descend from the exposed branches of trees on forest margins. (see Simmonds *loc. cit.* 1950 for further ecological details).

Philodendron scandens C. Koch & H. Sello encompasses a widely distributed species-complex, most recently revised taxonomically by G.S. Bunting (*loc. cit.* 1968). The Trinidad population appears to belong to *P. scandens* subsp. *prieurianum* (Schott) Bunting, since examination of juvenile specimens (Crueger TRIN 5907, Simmonds TRIN 13897) revealed the presence of large epidermal cells on the upper surface of the leaf (more or less 0.1 mm in diameter) and leaves with petioles 1/6–1/4 of the lamina length.

P. micans Klotzsch *ex* C. Koch is recorded by Krause (in *Pflanzenreich* IV, 23DB(Heft 60): 59 (1915)) from Tobago, based on a specimen (Eggers 5784) which I have not seen. Bunting (*loc. cit.* 1968) treats this taxon as a *forma* of *P. scandens* subsp. *scandens*, and states that this form is native to Panama. It differs from the typical form in the bronze, metallic sheen of the juvenile leaves.

9. **Philodendron simmondsii** Mayo in *Aroideana* 4 (1): 20–22 (1981)

High climbing, resinous scented, scandent epiphyte; stem with internodes 4–10 cm long, 1–2 cm thick, shortening and thickening in flowering phase, epidermis greyish-green (yellowish when dry), producing several reddish-brown, clasping roots at each node; cataphylls *ca* 14 cm long, soon caducous; petiole 44–87 cm long, 0.9–1.5 times as long as lamina, terete, when subtending inflorescence basal sheath 4–8.5 cm long, 0.1–0.2 times as long as petiole-lamina 30–82 cm long, 21.5–50 cm broad, 1.4–1.7 times longer than broad, normally broadest below petiole insertion (*i.e.* across posterior lobes), triangular in outline, margin strongly sinuate, marginal lobes 5–7 on each side, 1.5–3.5 cm long, most strongly marked at middle of leaf, becoming less distinct towards leaf apex and on inner edge of posterior lobes, apex shortly acuminate, base sagittate, posterior

lobes obtusely pointed, separated by broadly oblong sinus 0.2–0.3 times as long as lamina; primary lateral veins of anterior lobe 4–5(–6) on each side, diverging at angle of 75°–80° from midrib, somewhat prominent and tinged pink on abaxial surface; basal ribs of posterior lobes straight, strongly developed, emitting 2–3 well-differentiated lateral veins on anterior side, 2–3 weaker but distinct veins on posterior side, denuded proximally for 1.5–4 cm; inflorescence 1–2(?) per leaf axil; peduncle 14–17.5(–20) cm long, equal or subequal to spathe, terete; spathe 14.5–16.5 cm long, *ca* 2 cm broad when furled, outer surface green, inner surface crimson basally, paler to white apically; spadix subsessile, obliquely inserted on peduncle, in flower 13.5–14(–15) cm long, basal pistillate portion 3.5–4 cm long, 0.9–1.2 cm thick, lengthening and thickening in fruit, intermediate sterile staminodial portion 1.5–2 cm long, 1.3–1.5 cm thick, apical staminate portion 8 cm long, 1.1–1.2 cm thick; pistils 7–8-locular, with 4–5 axile ovules attached near base of each locule, style conical, stigma capitate, subspherical; fruit oblong, white, few to several seeded; seeds 1–2 per locule, oblong, 3–4 mm long.

Trinidad: Aripo Savanna, alt. low, 7.11.1952, Simmonds (K, TRIN 14782); Long Stretch, near Gravel Pit, alt. low, 11.2.1953, Simmonds (TRIN 14876) (sterile), alt. low, 17.2.1954, Baker & Simmonds (K, holotype, TRIN 15109, isotype); Siparia Reserve, 5.11.1949, Simmonds (TRIN 14492).

Trinidad. Endemic. Typical form so far known only from Long Stretch and nearby Aripo Savanna.

P. simmondsii is evidently related to *P. acutatum*, but is easily distinguished from that species by the sinuate leaf margins, the broadly oblong basal sinus and the distinctly denuded posterior lobes of the leaf. Other distinguishing features of *P. simmondsii* are the conical styles, relatively longer petiole and the usually more numerous primary lateral veins of the anterior lobe of the leaf lamina. According to notes by Simmonds attached to a photograph at the Kew Herbarium, *P. simmondsii* also differs from *P. acutatum* in being non-susceptible to the fungus disease *Mycosphaerella philodendri* (Pat.) Lind. In view of the very local distribution of the typical material it seems a possibility that *P. simmondsii* might be the result of hybridisation between *P. fenderli* and *P. acutatum*,

but further investigations are required which should involve more detailed field observations and collections of all three taxa to establish their true areas of distribution.

Simmonds TRIN 14492 appears to be somewhat atypical in the leaf margin being only slightly sinuous and may be intermediate between this species and *P. acutatum* Schott; the site of collection is also rather isolated from that of the typical material. However, in leaf nervation, style shape and petiole length this specimen appears nearer to *P. simmondsii* than *P. acutatum*.

10. Philodendron simsii (Hook.) G. Don in Sweet, *Hort. Brit.* ed. 3: 632 (1839)

Caladium simsii Hook. in *Bot. Mag.*, t. 3345 (1834) (as to type, not as to illustration)

Caladium grandifolium sensu Sims in *Bot. Mag.*, t. 2643 (1826) *non* Jacq.

Philodendron giganteum Schott, *Syn. Aroid.*: 89 (1856); Krause in *Pflanzenreich* IV, 23DB (Heft 60): 59 & fig. 20 (1913); Simmonds in *J. Ecol.* 38: 289 (1950) & in *Kew Bull.* 1950: 401 (1951); Howard in *Fl. Lesser Antilles* 3: 392 & fig. 85 (1979)

Terrestrial, low-climbing or sometimes epiphytic herb; stem massive, not producing rapidly growing juvenile branches with long slender internodes, internodes short, up to 6 cm long in lower, juvenile portion, *ca* 1 cm long in upper flowering portion, up to 14 cm thick; cataphylls 35–40 cm long, prominently bicarinate, whitish-yellow when young, soon marcescent, rusty-brown, forming persistent, dense mass of soft, net-fibrous remains clothed with brown, membranous epidermal remnants; petiole up to 100 cm long, 3.5 cm thick at base, 1.5 cm thick at apex, 1.3 times as long as lamina, terete or with upper surface apically flattened or convex with angled margins, lower surface rounded, green or sometimes reddish-tinged, sparsely spotted with purple-red glandular punctae; lamina 50–75 cm long, 40–60 cm broad, 1.2–1.3 times longer than broad, broadly ovate in outline, upper surface dark green, lower surface much paler, sparsely spotted with purple-red glandular punctae, apex obtuse, base cordate, posterior lobes well-developed, rounded, sometimes overlapping, separated by oblong to spathulate sinus 11–15 cm deep; midrib flattened on upper surface, strongly prominent on lower

surface; primary lateral veins of anterior lobe 5–6 on each side, diverging at angle of 45°–65° from midrib, impressed on upper surface, prominent and sometimes red-flushed on lower surface; basal veins 7–8 on each side, innermost more or less free, ascending or widely spreading, outermost 6–7 retrorsely arcuate, ascending distally, united proximally into distinct basal rib, denuded for 2.5–8.5 cm; inflorescences up to 7 per leaf axil, spathe tubes hidden amongst cataphyll remains; peduncle 2.5–8 cm long, up to 2 cm thick, thickening towards apex, white; spathe up to 21 cm long, basal convolute tube inflated, up to 7 cm long, 5 cm broad, broadly elliptical, somewhat constricted apically, externally glossy crimson-carmine with white margins, similar internally but duller, apical expanded lamina up to 14 cm long, when expanded 8 cm broad, broadly ovate, apex cuspidate, externally white or more or less green-tinged, sporadically speckled with purple-carmine glandular punctae, internally opaque, dull white; spadix 15–16.5 cm long, pistillate portion sessile, 1.5–4 cm long, up to 2.5 cm thick at mid-point, tapering apically, staminate and staminodial portions together 12–13.5 cm long, opaque, creamy-white, basal staminodial portion somewhat inflated, 2 cm thick, central staminate portion 1.5–1.8 cm thick, tapering towards staminodial apical portion; pistil 6–7-locular, each locule with numerous axile ovules; stigma discoid, on short, thick, conical style. Seeds striate, *ca* 1 mm long, elliptical, numerous.

Trinidad: Between Piedra Blanca and Naranja, 23.2.1947, alt. 550 m, Simmonds (K); El Cerro de Maracas y Las Cuevas, 13.4.1947, *ca* 700 m, Simmonds 83 (TRIN 13894); Maracas, 8.12.1946, Simmonds 34 (TRIN 13892); Arima, s.d., Crueger (TRIN 1800); Blanchisseuse road, near milepost 9, 25.3.1927, Broadway 6596 (K).

Tobago: Mason Hall, 20.5.1913, Broadway 4539 (K).

Trinidad, Tobago. Guyana, Lesser Antilles as far north as Virgin Islands.

Common in the wet northern parts of Trinidad, perhaps more widespread. Lowland and montane, up to 920 m on El Tucuche (see Simmonds *loc. cit.* 1950 for further ecological details).

This species is closely related to *P. fragrantissimum* (Hook.) G. Don. As Simmonds (*loc. cit.* 1951) indicated, *P. giganteum* Schott (originally described from cultivated material of unknown origin), is the same taxon as *P. simsii* (Hook.) G. Don and is consequently here reduced to the synonymy of the latter name.

8. PISTIA *Linnaeus*

Pistia L., *Sp. Pl.* 2: 963 (1753)

Free-floating, acaulescent, aquatic herb with pendent, fibrous roots and densely rosulate, more or less sessile leaves; lamina spathulate, obconic or oblong, tomentose on both surfaces, venation parallel to subparallel; inflorescences small, inconspicuous, hidden amongst leaves; spathe somewhat constricted at middle, basal portion swollen, convolute, apical portion more or less expanded; spadix very reduced, adnate to spathe, bearing single, naked female flower at base, and 2–8 apical connate male flowers in verticel on stalk subtended by shallow cup; each male flower consisting of synandrium of 2 connate stamens; female flower a single unilocular pistil, placentation parietal, ovules several, style narrow, well-developed with small, terminal, subspherical stigma; fruit a thin-walled, several-seeded berry.

Pistia stratiotes L., *Sp. Pl.* 2: 963 (1753); Engl. in *Pflanzenreich* IV, 23F(Heft 73): 259 (1920); Simmonds in *J. Ecol.* 38: 291 (1950) & in *Kew Bull.* 1950: 405 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 5 (1953); C.D.K. Cook *et al.*, *"Water Plants of the World"*: 154 (1974), Junk, The Hague; Howard in *Fl. Lesser Antilles* 3: 395 & fig. 86 (1979)

Water lettuce

Stem vegetatively reproducing by stolons; petiole *ca* 0.3 cm, poorly differentiated from lamina, or lamina sessile; lamina up to at least 8 cm long, 3 cm broad, spathulate, obconic or oblong, green and tomentose on upper surface, paler and more densely tomentose on lower surface, apex rounded to truncate, base cuneate or clawed; primary veins 5–7, parallel or somewhat diverging distally, prominently keeled on lower surface; peduncle *ca* 0.4 cm long; spathe 0.7 cm long, white, persistent, margins and external surface fimbriate-pilose; male inflorescence *ca* 0.1 cm diameter; ovary 0.3 cm long, obvate, obliquely adnate to spadix; style 0.2 cm long; berry *ca* 0.5 cm long, 0.3 cm broad, several-seeded, with thin, membranous pericarp; seeds 0.2 cm long, 0.1 cm broad, subcylindrical, testa brown, rugose to verruculose, base widely perforated and deeply excavated, apex truncate to emarginate, narrowly perforated.

Trinidad: Botanic Gardens, Jan. 1850, Crueger (TRIN 2242): Nariva Swamp, alt. sea level, 25.3.1961, Bennett (TRIN 15978), alt. sea level, 5.1.1959, Aitken (K, TRIN 15705); edge of Nariva Swamp, west of milepost 39½, 5.9.1977, Philcox & Philcox 8250 (K, P, TRIN); Nariva Swamp, milepost 46, alt. sea level, Aitken 45 (TRIN 18605); Irois, 23.11.1916, Broadway (TRIN 8954); milepost 4, San Francique road, 4.5.1979, Philcox, Stoelzel & Kalloo 8383 (K, TRIN, US).

Trinidad. Pantropical.

A floating aquatic that grows in a wide variety of freshwater habitats throughout tropical regions of the world, where it has become a serious weed in many areas.

9. RHODOSPATHA *Poeppig*

Rhodospatha Poepp. in Poepp. & Endl., *Nov. Gen. et Spec.* 3: 91 (1845)

High climbing scandent epiphytes; stems with well-developed internodes; petiole with conspicuous apical pulvinus, sheath well-developed, often reaching to pulvinus; lamina ovate, oblong or elliptical, apex acute to rounded, ultimately acuminate to apiculate, base acute, obtuse, rounded or truncate; venation pinnate, primary lateral veins numerous, not forming intramarginal collective vein, finer venation parallel to primaries; peduncle shorter than petiole; spathe erect, cymbiform, acuminate apically, soon deciduous; spadix subequal or shorter than spathe, usually stipitate, uniform in appearance, lowermost flowers sometimes abnormal, sterile or lacking stamens; flowers naked, hermaphrodite; stamens 4; pistil prismatic, 2(–6?)–locular, each locule with numerous axile ovules, truncate apically, stigma linear to narrowly elliptical; fruit a many-seeded berry; seeds minute, terete to somewhat flattened, reniform to cordiform.

Rhodospatha latifolia Poepp. in Poepp. & Endl., *Nov. Gen. et Spec.* 3: 91 & t. 300 (1945); Engl. & Krause in *Pflanzenreich* IV, 23B(Heft 37): 92 (1908)

Anepsias moritzianus sensu Simmonds in *J. Ecol.* 38: 290 (1950) & in *Kew Bull.* 1950: 397 (1951), *non* Schott (1858)

Scandent epiphyte; stem up to 16 m long, producing tough, hairy, adventitious roots at nodes, internodes 4–15 cm long, 1–2 cm thick, glossy dark green; petiole 42–44.5 cm long with prominent, 4–4.5 cm long, apical pulvinus, sheath 32–34 cm long, at least partly deciduous leaving fibrous remnants; lamina 43–45.5 cm long, 19.5 cm broad, oblong-elliptical, dark glossy green with metallic greyish-green sheen in life (when dry dark olive green on upper surface, brown on lower surface), apex obtuse to rounded, ultimately shortly acuminate, base obtuse, ultimately shortly attenuate; primary lateral veins *ca* 27 on each side, closely parallel; peduncle *ca* 30 cm long; spathe deciduous, unknown (rose-coloured according to original description of species); young fruiting spadix *ca* 17 cm long, 1.4 cm thick with 2 cm long stipe, pistils yellow-pink; young fruits many-seeded, 2-locular, narrowly oblong, 0.15–0.2 cm broad, truncate apically with linear to narrowly elliptical, excavated, persistent stigmas; seeds *ca* 0.7 cm long, *ca* 0.5 mm broad, flattened, reniform, tan-coloured when dry.

Trinidad: Piedra Blanca, 12.5.1949, Simmonds 357 (K. TRIN 14352); between Piedra Blanca and Naranja, alt. *ca* 580 m, 23.2.1947 (inflo. added 13.7.1947), Simmonds 67 (TRIN 13881).

Trinidad. Northern South America, Peru, eastern Brazil.

A very rare species in Trinidad, known only from a single tree in forest on Piedra Blanca in the Northern Range.

Simmonds (*loc. cit.* 1951) identified these collections as *Anepsias moritzianus* Schott, a poorly understood Venezuelan taxon differing from *Rhodospatha* only in having 2–6-locular pistils (2-locular in *Rhodospatha*). Madison in *Contrib. Gray Herb. Harvard Univ.* 207: 32 (1977) has recently united *Anepsias* with *Rhodospatha*, a decision followed by Bogner (*Aroideana* 1: 65 (1979)) in his critical list of the genera of Araceae. Examination of the young fruiting material of Simmonds 67 shows the Trinidadian plant to have 2-locular pistils, and to be a good match with collections from Venezuela (Steyermark & Rabe 96161, Peninsula de Paria) and Colombia (Plowman 3559, Santa Marta region, Depto. Magdalena). Together these collections seem best placed as *R. latifolia* Poepp. pending a much needed revision of the genus. Examination of material at the Kew Herbarium suggests that *R. latifolia* is a widely distributed, somewhat variable taxon.

It seems possible that *R. oblongata* Poepp., recognised by Jonker-Verhoef & Jonker (in Pulle, *Fl. Suriname* 1: 32 (1953)) from Surinam, may be the same taxon as *R. latifolia*, since Poeppig himself distinguished the two only on the shapes of leaf base and apex and stated that *R. oblongata* might be only a variety of *R. latifolia*. Engler & Krause, however, distinguished *R. oblongata* further by the presence of female flowers at the base of the spadix. The Trinidad plant appears to have only hermaphrodite flowers, but this character requires verification in flowering material.

10. SPATHIPHYLLUM *Schott*

Spathiphyllum Schott in Schott & Endl., *Melet. Bot.* 1: 22 (1832)

Terrestrial herbs; stem a subterranean to procumbent rhizome, internodes very short; petiole long and slender, pulvinate at apex, with conspicuous basal sheath; lamina ovate, elliptical or obovate, apex acuminate, base attenuate, acute, obtuse or rounded; main venation pinnate, finer venation parallel to primary lateral veins; peduncle long, slender; spathe narrowly ovate, ovate or elliptical, erect to spreading, not enclosing spadix, white or green, acuminate apically, decurrent to shortly decurrent on peduncle; spadix stipitate or sessile, cylindrical or slightly tapered apically, shorter than spathe, uniform in appearance; flowers hermaphrodite, tightly appressed, with perianth of 4–6 imbricate, free or basally connate tepals, or tepals completely connate into prismatic, apically truncate cup with entire, inflexed margins; stamens opposite and equal in number to tepals, anthers basifixed, filaments broad; pistils 2–4-locular, with 1–8 axile ovules in each locule, apex truncate or with conical style exserted beyond tepals, stigma 2–4-lobed; fruit a 1–to several-seeded berry.

Spathiphyllum cannifolium (Dryander) Schott, *Aroideae* 1: 1 & t. 1 (1853) ("*cannaefolium*"); Engl. & Krause in *Pflanzenreich* IV, 23B(Heft 37): 132 (1908) ; Simmonds in *J. Ecol.* 38: 287 (1950) & in *Kew Bull.* 1950: 393 (1951) ; Bunting in *Mem. New York Bot. Gard.* 10(3): 12 (1960)

Pothos cannifolia Dryander in *Bot. Mag.*: t. 603 (1803) ("*cannaefolia*")

Arum lily, Maraval lily

Terrestrial herb; stem a sympodial, subterranean, procumbent or decumbent rhizome, internodes very short, up to 2 cm thick; petiole up to 74 cm long, 1 cm thick near apex, subequal to lamina, apical pulvinus up to 5.5 cm long, 1.2 cm thick, sheath over half as long as petiole, sometimes reaching as far as pulvinus, margins at least partly deciduous; lamina 20–49 cm long, 8–25 cm broad, ovate, elliptical or obovate, often unequal-sided, dark glossy green on upper surface, paler and dull on lower surface, apex acuminate, base attenuate, cuneate or acute; primary lateral veins 12–22 on each side, strongly parallel, in life impressed on upper surface, prominent on lower surface, finer veins parallel to primaries; peduncle 27-105 cm long, up to 1 cm thick, terete, subequal to slightly shorter than leaf; spathe 8–29 cm long, 2.5–11 cm broad, narrowly ovate to elliptical, white, spreading at anthesis, apex acuminate, base acute to obtuse, ultimately attenuate; spadix 6–17.5 cm long, 0.4–1.8 cm thick, shorter than spathe, subcylindric, tapering somewhat apically, fragrant and white at anthesis becoming green with age, with basal stipe 0.5–4 cm long, 0.15–1 cm thick; perianth a fleshy, prismatic, 4–6–sided, apically truncate cup with entire, inflexed margin, 0.2–0.5 cm broad; stamens 6–8, anthers exserted beyond perianth at anthesis; pistil 3–4–locular with up to 5 axile ovules per locule, apex truncate to shallowly rounded, stigma 3–4–lobed; fruit several-seeded, shortly barrel-shaped, apex more or less truncate, seeds narrowly obovate, angular.

Trinidad: without locality, 1890, Cartwright s.n. (OXF), Crueger s.n. (TRIN 2248), 1877–80, Fendler 747 (K, OXF), Lockhart s.n. (K), de Schack s.n. (K), 14.11.1886, Sherring s.n. (K); Maraval, 4.5.1904, Dannouse s.n. (TRIN); between El Tucuche and Naranja, alt. 700 m, 2.1.1948, Simmonds 233 (TRIN 14063); Tairico Bay, Maracas, alt. sea level, 8.12.1946, Simmonds 33 (K); Maracas Valley, alt. 60 m, 21.5.1962, Richardson 2045 (K); Caura, banks of the river, 11.1.1929, Broadway 7082 (K); River Guanapo, alluvial terrace just off Guanapo Road, Arima Ward, 19.8.1963, Jermy 2872 (cult. K as Accession No. 568–63.56808) (K); Quare River forests, 25.3.1934, Broadway s.n. (K); near Four Roads, alt. 30 m, 30.5.1924, Riley 216 (K); La Brea, woods, 25.2.1866, Finlay s.n. (TRIN 1996); milepost 57½, Cedros Road, 2.4.1979, Philcox & Phillips 8338 (K, TRIN).

General, common in lowlands and valleys, inhabiting damp places and the margins of lowland streams; rarely ascends above 240 m in Northern Range (note Simmonds 233, however, from El Tucuche at 700 m). (see Simmonds (*loc. cit.* 1950) for further ecological notes).

Bunting (*loc. cit.* 1960) noted that *S. cannifolium* attains its maximum stature in Trinidad.

11. SYNGONIUM *Schott*

Syngonium Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1829(3): 780 (1829)

Scandent epiphytes; stem with well-developed internodes, rooting at nodes; petiole long, slender, lacking apical pulvinus, with long basal sheath; lamina sagittate to hastate in juvenile growth phase, in adult phase sagittate, tri- or pedatifid, trisect or pedately 5–9-sect, outer lobes usually auriculate basally, main venation of lobes pinnate, anastomosing distally to form intramarginal collective vein on each side, 1–2 parallel marginal veins also usually present, finer venation reticulate; inflorescences usually several per leaf axil, pendent in fruit; peduncle short, lengthening in fruit; spathe constricted at middle, basal, convolute tube fleshy and persistent, apical expanded lamina thinner, after flowering abscissing at base and deciduous; spadix with basal conical pistillate portion, intermediate constricted, sterile portion, apical clavate or subcylindric staminate portion abscissing with apical portion of spathe; flowers unisexual, naked; male flower a lobed synandrium of 3–4 connate stamens, apex truncate; female flowers connate, ovary 1–2-locular, each locule with single ovule, placentation axile to basal, stigma sessile, subglobose; fruit a fleshy, elliptical to ovoid syncarp; seeds large.

Key to the Species

1. Mature leaves with never more than 3 main lobes, the lateral 2 auriculate at the base on the exterior side ..... *S. vellozianum*
2. Mature leaves usually with at least 7 main lobes ..... *S. podophyllum*

(*See* Appendix)

Syngonium vellozianum Schott in *Oest. Bot. Wochenbl.* 4: 418; (1854); Engl. in *Pflanzenreich* IV, 23E(Heft 71): 125 (1920); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 48 (1953) & in *Acta Bot. Neerl.* 2: 357 (1953)

Arum auritum sensu Vellozo, *Fl. Flumin.* 9: t. 113 (1835) *non* L.

Syngonium vellozianum Schott var. *oblongisectum* Engl. in *Pflanzenreich* IV, 23E(Heft 71): 127 (1920); Simmonds in *Kew Bull.* 1950: 405 (1951)

Syngonium vellozianum Schott var. *poeppigii* (Schott) Engl. in Martius, *Fl. Brasil.* 3(2): 130 (1878)

Syngonium poeppigii Schott, *Syn. Aroid.*: 68 (1856)

Scandent epiphyte up to at least 6 m; flowering stem with internodes *ca* 4–7 cm long, 1 cm thick, juvenile stems *ca* 0.3 cm thick, epidermis coriaceous, tan-coloured (when dry); petiole 31–34 cm long, basal sheath 0.4–0.6 times as long as petiole; lamina in juvenile phase *ca* 17 cm long, 9 cm broad, sagittate, in adult phase overall length 22–24.5 cm, overall width 25–34.5 cm, deeply trifid, central lobe 20–21.5 cm long, 10–11.5 cm broad, ovate to elliptical, apex obtuse, ultimately short-acuminate, lateral lobes 16–20 cm long, 6.5–7.5 cm broad, unequal-sided, apex acuminate, base auriculate with rounded to oblong lobe on exterior side only; primary lateral veins of central lobe 3–5, diverging from midrib at 35°–50°, anastomosing distally to form collective vein running at 0.3–1.4 cm from margin on each side, 1–2 parallel, outer marginal veins also present; inflorescences *ca* 6 per leaf axil; peduncle *ca* 5 cm long, up to 7 cm and pendent in young fruit; spathe *ca* 4.5–5 cm, basal convolute tube *ca* 2–2.5 cm long, green, apical expanded lamina *ca* 2–2.2 cm long, yellow; spadix subequal or slightly shorter than spathe; young fruit *ca* 2.5 cm long, *ca* 2 cm broad, broadly elliptical, enclosed by persistent spathe tube.

Trinidad: without locality, 1877–80, Fendler 738 (K); Carenage, April 1893, Alexander (TRIN 5597); between Naranja and Piedra Blanca, alt. 550 m, 18.4.1948, Simmonds 302 (TRIN 14219) (juvenile); Siparia Quarry, 8.4.1921, Britton & Broadway 2795 (K); Moruga, La Fortune trace, 14.2.1916, Broadway (TRIN 7620).

Trinidad. Widespread in South America including Peru, Venezuela, the Guianas, Amazonia and the rain-forests of the eastern coast of Brazil.

A high climbing forest epiphyte. Generally distributed in Trinidad, but from the number of collections, apparently not common. Simmonds 302 (TRIN 14219) was identified (Simmonds *loc. cit.* 1951) as *Anthurium pentaphyllum* (Aubl.) G. Don, but represents the juvenile growth phase of *S. vellozianum*, with entire, sagittate leaves and slender stems. In his recent revision of the genus, Croat (in *Ann. Missouri Bot. Gard.* 68(4): 565–651 (1982) treats *S. vellozianum* as a synonym of *S. podophyllum* Schott.

12. TYPHONIUM *Schott*

Typhonium Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1829 (3): 752 (1829)

Terrestrial, acaulescent herbs with subglobose tubers; leaves rosulate, radical; petiole long, subequal or longer than lamina, slender; lamina sagittate, hastate, trilobed (in Trinidad) or pedatisect, rarely cordate; main venation of lamina lobes pinnate, usually forming distinct intramarginal collective vein on each side; finer venation reticulate; peduncle usually shorter than petiole; spathe sharply differentiated into shorter, basal, persistent, apically constricted, convolute tube, and longer, apical, marcescent, long-acuminate, expanded lamina; spadix differentiated into 4 distinct parts, short basal pistillate portion bearing female flowers, intermediate sterile portion bearing filamentous or clavate sterile appendages often at base only, cylindrical staminate portion bearing densely appressed male flowers and terminal, conical to flagelliform, stipitate, sterile appendix; flowers unisexual, naked; stamens free; pistils unilocular with 1–2 basal ovules.

Typhonium trilobatum (L.) Schott in *Wiener Zeitschr. fur Kunst, Literatur, Theater & Mode* 1829(3): 752 (1829) & in *Prodr. Aroid.*: 108 (1860); Engl. in *Pflanzenreich* IV, 23F (Heft 73): 117 (1920); Simmonds in *J. Ecol.* 38: 287 (1950) & in *Kew Bull.* 1950: 405 (1951); *non* Jonker-Verhoef & Jonker in *Acta Bot. Neerl.* 8: 149 (1959); Nicolson & Sivadasan in *Blumea* 27(2): 488 (1981)

Arum trilobatum L., *Sp. Pl.* 2: 965 (1753)

Tuber subglobose, 2.5–3.5 cm diameter; petiole 18–32.5 cm long, 1.5–2 times longer than lamina, sheathed basally; lamina in overall engtth 11–21 cm, overall width 14–19.5 cm, as broad or broader lthan long, deeply hastate-trilobed, base cordate with oblong to spathulate sinus broader than long; central lobe 7.5–18 cm long, 3–6.5 cm broad, narrowly ovate to ovate, acuminate apically, cuneate basally; lateral lobes 8–15.5 cm long, 2.5–7.5 cm broad, typically forward pointing, unequal-sided, apex acuminate, base truncate with outer edge acutely or obtusely angled or rounded; primary lateral veins of leaf lobes anastomosing distally to form more or less looping collective vein running at 0.1–1.1 cm from margin; midribs of lateral lobes denuded proximally for 1.4–4 cm; inflorescence giving off foetid smell; peduncle 2–3.5 cm long; spathe 12–21.5 cm long, greenish on outer surface, basal, convolute tube 2.5–4.5 cm long, 1.4–2 cm broad, more or less inflated, constricted apically, expanded lamina 9–17 cm long, 5–9 cm broad, apex long-acuminate, inner surface crimson-purple; spadix 7.5–11.5 cm long, 0.5–0.6 times as long as spathe, pistillate portion pink, conical, up to 1.2 cm long, 0.7 cm broad, sterile intermediate portion up to 3 cm long, 0.1 cm thick in apical, naked part, basal 0.8 cm densely covered with long, filiform, tortuose, yellow, sterile organs, male portion cylindrical, 1.3–1.7 cm long, 0.25–0.5 cm thick, terminal sterile appendix 4.7–5.7 cm long, 0.2–0.5 cm thick, purple, base truncate, supported on 0.2 cm long stripe.

Trinidad: Hort. Trin., 1906 (TRIN); Botanic Gardens, 9.7.1928, Broadway 6992 (K); St Anns, 23.5.1933, Broadway 9244 (K); St Clair Experiment Station, 25.7.1919, Broadway s.n. (TRIN); St Augustine, 16.7.1947, Simmonds 123 (TRIN 13877); Warner Street, St Augustine, 8.7.1977, Philcox 8021 (K, M, NY, P, TRIN, US).

Trinidad.

Naturalized alien, native to Tropical Asia. According to Simmonds (*loc. cit.* 1950), an escape from cultivation and found principally along roadsides and in cacao plantations (*e.g.* Diego Martin).

The Trinidad plant is characterised by the long, tortuose, sterile filaments, the relatively short, basally truncate terminal appendix of the spadix, and the deeply trilobed leaf lamina with the

lateral lobes angular at the base and typically forward pointing. In these characters it differs from the plant described under the name *T. trilobatum* (L.) Schott by Jonker-Verhoef & Jonker (*loc. cit.* 1959), in which the sterile filaments are 0.4 cm long and erect, the terminal appendix of the spadix much longer and obliquely truncate at the base and the leaf lamina hastate with obtuse, shorter basal lobes.

The concept of *T. trilobatum* (L.) Schott as treated by Jonker-Verhoef & Jonker seems to be mixed since of the references which they cite under this name, some clearly describe the same taxon as the Trinidad plant (*e.g.* Engler (*loc. cit.* 1920), Schott (*loc. cit.* 1860)) while others pertain to the plant they have described from Surinam (*e.g.* Sims in *Bot. Mag.* t. 2324 (1822). Their description, however, matches the weedy species *T. blumei* Nicolson & Sivadasan, naturalized or perhaps cultivated in many parts of the tropics (see Nicolson & Sivadasan, *loc. cit.* 1981).

13. XANTHOSOMA *Schott*

Xanthosoma Schott in Schott & Endl., *Melet. Bot.*: 19 (1832)

Small to large terrestrial, arborescent or acaulous herbs with underground rhizome or tuber, vegetative parts with milky latex; stem massive, erect, fleshy or acaulescent; leaves all radical or borne in terminal rosette on stem; petiole long, lacking apical pulvinus, sheathed basally; lamina sagittate, hastate, trisect or pedatisect; main venation pinnate, forming intramarginal collective vein on each side, finer venation reticulate; inflorescences one to many in each leaf axil, borne on peduncles of varying length; spathe strongly constricted at middle, basal portion fleshy, somewhat inflated, convolute, persistent, apical portion membranous, expanded (in flower), eventually deciduous; spadix lacking sterile terminal appendix, clearly differentiated into basal conical to subcylindrical pistillate portion, intermediate basally inflated, sterile portion, and apical subcylindrical, staminate portions flowers unisexual, naked; male flower consisting of 4–6 stamen; united into prismatic, apically truncate synandrium; pistils 3–4–locular with axile placentation, ovules several to numerous in each locule, style broad, fleshy, discoid, connate with adjacent styles:

sterile portion with basal synandrodia often enlarged; fruit a fleshy orange berry with several to numerous small seeds. (see Madison in *Phytologia* 35: 103 (1976) for a recent discussion of the taxonomic distinctions between *Xanthosoma* and *Caladium*).

KEY TO THE SPECIES

1 Leaf lamina sagittate to hastate; plant with thick, more or less elongated stem, leaves in terminal rosette 2

1 Leaf lamina pedatisect with 5–10 leaflets; plant acaulescent with rosette of radical leaves borne on subglobose, underground tuber ..... 1. *X. helleborifolium*

2 Aerial stem elongated, up to 3 m long; basal ribs of posterior lobes of leaf denuded proximally for at least 1.5 cm; latex greyish, evil-smelling; margins of petiole sheath undulate basally; rhizome cylindrical; synandrodia truncate apically, basal ones not greatly enlarged or elongated; native species, not cultivated 2. *X. undipes*

2 Aerial stem short (in immature or smaller specimens often very short or undeveloped); basal ribs of posterior lobes of leaf not denuded proximally; latex milky, not evil-smelling; margins of petiole sheath not undulate basally; rhizome angular; basal whorl of synandrodia elongated, clavate; cultivated widely for edible rhizomes and leaves ..... *X. sagittifolium* (L.) Schott

1. **Xanthosoma helleborifolium** (Jacq.) Schott in *Oest. Bot Zeitschr.* 15: 33 (1865); Engl. in *Pflanzenreich* IV, 23E (Heft 71): 61 (1920); Simmonds in *J. Ecol.* 38: 287 (1950) & in *Kew Bull.* 1950: 401 (1951); Jonker-Verhoef & Jonker in Pulle, *Fl. Suriname* 1: 50 (1953) & in Pulle & Lanjouw, *Fl. Suriname, Add. & Corr.* 1: 391 (1968); Howard, *Fl. Lesser Antilles* 3: 397 (1979)

Arum helleborifolium Jacq., *Collect. Bot.* 3: 217 (1791) & *Ic. Pl. Rar.* 3: 18 & t. 613 (1792)

Acontias helleborifolius (Jacq.) Schott in Schott & Endl., *Melet. Bot.* 1: 19 (1832)

Fowl-foot bhaj

Terrestrial, acaulous herb with subterranean tuber bearing fleshy, white, adventitious roots; leaves radical, dying back in dry season; petiole 21–36 cm long, 2–3 times longer than lamina, sheathed at base; lamina pedatifid, reniform in outline, with 5–9 elliptic to obovate, remote, sessile leaflets; central leaflet 9.5–17.5 cm long, 2.7–6.6 cm broad, apex acuminate, base cuneate to attenuate, primary lateral veins 3–6, more or less united to form looping sometimes discontinuous collective vein running at 0.3–0.8 cm from margin; other leaflets decreasing in outward succession; peduncle 10–13 cm long; spathe 9–13 cm long, constricted at middle, basal portion convolute, tubular, inflated, 2.3–3 cm broad when furled, green, apical portion expanded, white at anthesis, withering later; spadix subequal to spathe, 8.5–12.8 cm long, obliquely inserted on 0.3–0.4 cm long stipe, basal pistillate portion cylindrical, 1.8–2 cm long, 0.5–0.6 cm thick, intermediate sterile portion 2.5–3.5 cm long with basal synandrodia much inflated, apical ones narrow, elongated, apical staminate portion 5.5–7 cm long, 0.5–0.6 cm thick, subcylindrical, tapered apically; synandria 0.15–0.2 cm in diameter, apically truncate with invaginated margins; styles fleshy, discoid, connate; stigmas hemispherical.

Trinidad: without locality, 1877–80, Fendler 737 (K), 4.6.1865, Finlay (TRIN 1994); Botanic Gardens, 26.7.1922, Broadway (TRIN 10166); St Joseph Stock Farm, alt. 25 m, 10.7.1958, Purseglove P6190 (K); ICTA, St Augustine, alt. low, 5.7.1947, Simmonds 117 (K); Caurita Valley, 13.7.1947, Simmonds 122 (TRIN 13875); Tabaquite, Rio Claro road near 4½ milepost, 19.7.1926, Broadway 6340 (K).

Trinidad. Central and northern South America, West Indies.

General in distribution, though not common.

X. helleborifolium is a native lowland weed of cultivation; the leaves are used for food by local inhabitants, who eat them as a spinach or callaloo.

2. **Xanthosoma undipes** (C. Koch) C. Koch in *Bonplandia* 4: 4 (1856); Engl. in *Pflanzenreich* IV, 23E(Heft 71): 49 (1920); Nicolson in *Taxon* 24: 345 (1975); Howard in *Fl. Lesser Antilles* 3: 398 (1979)

Xanthosoma jacquinii Schott in Schott & Endl., *Melet. Bot.* 1: 19 (1832), *nom. nud.*, & in *Syn. Aroid.*: 57 (1856); Engl. in *Pflanzenreich* IV, 23E (Heft 71): 47 (1920); Simmonds in *J. Ecol.* 38: 287 (1950) & in *Kew Bull.* 1950: 400 (1951); Jonker-Verhoef & Jonker in Pulle & Lanjouw, *Fl. Suriname*, *Add.* & *Corr.* 1: 395 (1968), *non* Schott *ex* Kunth (1841)

Wild tannia

Large terrestrial herb with greyish, evil-smelling latex; stem massive, decumbent, erect or ascending, up to 3 m long, 20 cm thick, with cylindrical thick rhizome; petiole up to 1.5 m long, terete apically, sheathed basally, margins of sheath undulate (Koch, *loc. cit.* (1856), Engl., *loc. cit.* (1920)); lamina ovate-triangular in outline, up to at least 80 cm long, 60 cm broad, broadest across posterior lobes below petiole insertion, apex obtuse, ultimately shortly acuminate, base sagittate to somewhat hastate, posterior lobes broad, obtusely tipped, often overlapping; primary lateral veins 7–9 on each side of midrib, anastomosing to form continuous collective vein running at 0.2–0.7 cm from margin; basal rib of each posterior lobe strongly differentiated, straight, emitting 3–8 lateral veins on each side, denuded proximally for 2.5–4 cm; peduncle 10–40 cm long, erect at anthesis, pendent in fruit; spathe 18–20 cm long, basal, convolute tube green or purplish-green on outer surface, crimson-purple within, apical expanded lamina white; spadix subequal to spathe, cream-coloured, apical staminate portion rotting off in fruit; berries with numerous, longitudinally-ridged, broadly-elliptical, 0.1 cm long seeds.

Trinidad: without locality, 13.1.1915, Broadway (TRIN); Maracas Valley near the falls, alt. *ca* 210 m, 27.12.1946, Simmonds 39 (K, TRIN 13873); Maracas, near the falls, 27.2.1925, Broadway 5562 (K); Matchepoorie, 11.3.1921, Britton & Britton 2208 (K); Botanic Gardens, 15.2.1915, Broadway (TRIN 7841); Heights of Aripo, *ca* 260 m, 9.2.1947, Simmonds 63 (TRIN 13874).

Tobago: Parlatuvier, 24.10.1937, Sandwith 1901 (K); Englishman's Bay, 15.11.1912, Broadway 4433 (K).

Trinidad, Tobago. Central America, tropical South America, West Indies.

Found throughout the wetter, northern parts of Trinidad, locally abundant in the Northern Range, and ascending to 760 m on El Tucuche. Characteristic of wet, rocky streamsides and ravines in forest and cacao plantations (Simmonds *loc. cit.* 1950).

Xanthosoma undipes is very similar in general appearance to *Xanthosoma sagittifolium* (L.) Schott and its cultivars, but according to Simmonds (*loc. cit.* 1951) is never cultivated and is reputed to be poisonous. Clear distinctions between the widely cultivated *X. sagittifolium* and its most closely related congeners seem difficult to define in the light of present knowledge of this group. Those distinctions between *X. sagittifolium* and *X. undipes* given in the literature are listed in the above key, but due to a lack of available material they have not all been satisfactorily verified in the present study, and would be well worth further scrutiny.

A specimen (Hart 7004) strongly resembling *X. undipes* exists at the Kew Herbarium under the name *X. belophyllum* (Willd.) Kunth. This plant was cultivated at the Botanic Gardens in Trinidad, but was originally brought there from Jamaica. According to Jonker-Verhoef & Jonker (*loc. cit.* 1968) *X. belophyllum* differs from the other two species discussed above in lacking an aerial stem, the underground parts being small, rounded tubers.

Appendix

Cultivated Species

Alocasia macrorrhiza (L.) G. Don

Native of tropical Asia, but cultivated in many parts of the tropics. Stems are edible after thorough cooking. Represented by single sterile collection (Laventille, alt. low, 22.2.1956, Simmonds (TRIN 15376)).

Amorphophallus paeoniifolius (Dennstedt) Nicolson

(*A. campanulatus* Blume *ex* Decne.)

Native of tropical Asia, where the tuber is eaten after thorough cooking. Not yet recorded from Trinidad, but a photograph exists at the Kew Herbarium of a specimen cultivated at Santiago, Santo Domingo (Ekman, 9.10.1931) under the name *Dracontium polyphyllum* L.

Anthurium andraeanum Linden *Anthurium*

Native of the Pacific slopes of the Andes from Ecuador to Colombia. Cultivated as an ornamental for the white, pink or red spathes.

Colocasia esculenta (L.) Schott *Dasheen, Eddo*

Native of tropical Asia but cultivated throughout tropics for starchy tubers which can be eaten after cooking. A staple food in the islands of Polynesia, where it is known as "taro". Represented by one sterile collection (Aripo savanna, alt. 30 m, 2.10.1959, Richardson 757 (K)). Probably naturalized in Trinidad as in many other parts of the tropics. *See* Howard, *Fl. Lesser Antilles* 3: 382 & fig. 81 (1979).

A naturalized variety of this species occurs in damp soils in Trinidad, and is abundant in the Sangre Grande area. It is known locally as "Wild Dasheen", and is not used for food. This variety is characterised by purple petioles and long, vigorously growing rhizomes that form extensive underground networks. The tuber is small and often hardly developed; handling the plant is known to cause considerable skin irritation. The classification, uses and distinguishing features of the many forms of *Colocasia esculenta* are topics about which very little useful published literature exists. Field studies of these problems are urgently needed.

Epipremnum pinnatum (L.) Engl. cv. **"Aureum"**

A cultivated, ornamental climber with variegated foliage, and sometimes naturalized in parts of Asia. Widely known under the name *Scindapsus aureus*.

Monstera deliciosa Liebm.

One of the world's most widely cultivated ornamental plants, due to the beautiful, fenestrate and pinnatifid leaves. Native to Mexico and Central America. The fruit are delicious when ripe, but care should be taken to avoid the outer "rind" of thickened stylar parts which are full of needle-sharp trichosclereids.

Syngonium podophyllum Schott

A Central American species cultivated in many parts of the world as an ornamental. One specimen seen from Trinidad (Henry Pierre Terrace, 9.4.1980, Admas s.n. (K)).

Xanthosoma sagittifolium (L.) Schott *Tannia, Yautia*

Cultivated throughout tropics for the edible leaves and tubers, which must be cooked before eating. Native to tropical South America and the West Indies. Ref. Howard, *Fl. Lesser Antilles* 3: 398 & fig. 87 (1979).

Zantedeschia aethiopica (L.) Spreng.

A widely cultivated ornamental, valued especially for the pure, white spathes. Native to Southern Africa but naturalized in many other areas of the tropics at higher altitudes.

Variegated cultivars of *Dieffenbachia* and *Caladium bicolor* are also to be seen in gardens as ornamental foliage plants.

FAMILY 4-LEMNACEAE

By F. N. Hepper

Aquatic herbs, floating or submerged and freely drifting, very reduced in structure to a flat or curved thallus or suborbicular, often minute, stems and leaves undifferentiated; vascular tissue minimal; roots present or absent, often solitary, suspended in the water, devoid of root hairs, occasionally sheathed at point of insertion, tip covered by a cap; vegetative reproduction usual with daughter thallus budding from a lateral pocket, often remaining attached to parent; resting buds (turions) sometimes produced in adverse conditions; flowering erratic, flowers monoecious, developing in a pouch or pit, enclosed by a spathe or spathe absent; staminate flowers 1–2, anthers 2-thecous; pistillate flower solitary, style short, stigma concave; ovules 1–6; seeds ellipsoid, usually ribbed; endosperm scanty or none.

Cosmopolitan in still fresh-water, with most species in the warmer countries.

Key to the Genera

1 Roots present 2

1 Roots absent..... 3. **Wolffiella**

2 Root solitary on each thallus..... 1. **Lemna**

2 Roots numerous arising from a swelling ... 2. **Spirodela**

1. LEMNA *Linnaeus*

Lemma L., *Sp. Pl.*: 970 (1753)

Aquatics, submerged or more usually floating in great numbers, individual thalli more-or-less cohering; thalli oblong or ovate, more-or-less asymmetrical, thin or spongy; daughter thallus budding from lateral pocket; root solitary; flowering erratic-floral pocket lateral with spathe enclosing 2 staminate and 1 pistil, late flowers; fruit 1(–6)-seeded; seeds usually longitudinally ribbed.

KEY TO THE SPECIES

Thalli rather thick, obscurely 3-nerved, obovate or suborbicular; root sheath at base winged, cap tip acute..... 1. *L. aequinoctialis*

Thalli very thin, obscurely 1-nerved, oblong to elliptic; root hardly sheathed, cap more or less rounded at tip..... 2. *L. valdiviana*

1. Lemna aequinoctialis Welw., *Apont. Phytogeo.*: 578 (1859)

L. minor sensu Griseb., *Fl. Brit. W. Ind.*: 512 (1864)

L. perpusilla sensu Britton & Wilson, *Bot. Porto Rico & Virgin Isl.* 5: 131 (1923); Moscoso, *Cat. Fl. Doming.* 1: 68 (1943); Leon, *Fl. Cuba* 1: 274 (1946); Lemee, *Fl. Guyana franc.* 1: 267 (1955); Daubs, *Monogr. Lemnac.*: 25 (1965); Den Hartog & Van der Plas in *Blumea* 28: 363 (1970); Adams, *Fl. Pl. Jam.*: 71 (1972); Fournet, *Fl. Guadel. & Martin.*: 413 (1978); Howard, *Fl. Lesser Antilles* 3: 402 (1979)

L. paucicostata sensu Pulle, *Enum. Vasc. Pl. Surinam* 82 (1906)

Duckweed, Lentille d'eau

Thallus free floating, pale green, obovate, variable in size, 1.5–4 mm long, 0.7–2.5 mm wide, asymmetrical, upper surface with or without an apical papilla and 1 or more along the midline, obscurely 3-nerved; daughter thallus very shortly stipitate, several individuals adhering closely; root solitary; sheath winged below the thallus; root cap straight, very acute; flowering cavity lateral; spathe open; fruit obliquely ovoid, little exserted beyond margin of thallus.

Trinidad: Off Churchill-Roosevelt Highway, 30.8.1961, Bennett (K, TRIN 16433); Debe, 20.5.1970, Rankin 292 (TRIN); E of Avocat towards St John's Canal, 4.5.1979, Philcox & Stoelzel 8391 (K, TRIN, Z); Mohess Trace, Debe to Penal road, 16.10.1978, Bennett & Baranowski s.n. (TRIN); milepost 77¼, Icacos road, 27.3.1979, Philcox 8293 (K, TRIN, Z); Kelly Village, 2.9.1970, Rankin 320 (K, TRIN); Nariva Swamp, 23.3.1961, Bennett (TRN 15979 in part); Ferry Road, Carapo, 20.2.1977, Adams 14220 (K).

Throughout much of the tropics and subtropics.

The forthcoming revision of Lemnaceae by E. Landolt restricts *L. perpusilla* to eastern U.S.A. and uses the name *L. aequinoctialis* for the species elsewhere in the world hitherto known as *L. perpusilla* or *L. paucicostata*.

2. **Lemna valdiviana** Philippi in *Linnaea* 33: 239 (1864); Daubs, *Monogr. Lemnac.*: 28, pl. 10 (1965); Howard, *Fl. Lesser Antilles* 3: 403 (1979)

L. cyclostasa Ell. *ex* Schleid. in *Linnaea* 13: 390 (1839), in syn.; Fournet, *Fl. Guadel. & Martin.*: 413 (1978)

Duckweed, lentille d'eau

Thalli thin, free floating, usually several attached together, oblong or elliptic in fruit, 2.5–5 mm long, 0.5–1.5 mm wide, asymmetrical at base, surface usually smooth, median nerve inconspicuous; root cap curved, more-or-less rounded; flowers occasional in lateral cavity, spathe open; fruit well exserted beyond margin of thallus, lying straight; seed oblong-ovoid.

Trinidad: Piarco Savanna, near Centeno, 7.5.1979, Philcox & Stoelzel 8407 (K, TRIN, Z); Nariva Swamp, 33.3.1961, Bennett s.n. (TRIN 15979, in part).

In much of South America and extending to parts of the West Indies.

2. SPIRODELA *Schleiden*

Spirodela Schleid. in *Linnaea* 13: 391 (1839)

Floating aquatics; thallus discoid to oblong, 3–10 mm long, 1.2–8 mm wide; daughter thallus budding from lateral slit, remaining attached to parent by slender stipe, several individuals often connected; roots 2–numerous, usually from swollen portion beneath thallus, root-cap acute; turions (resting buds) produced in adverse conditions; flowers rarely produced, unisexual, spathe enclosing 2–3 male and female flowers in lateral slit pouch, male flowers each with 1 stamen; pistillate flower bearing 1–4 ovules.

Cosmopolitan genus with 5 species, easily recognised by the presence of several to numerous roots.

Spirodela polyrhiza (L.) Schleid. in *Linnaea* 13: 392 (1839); Hegelm., *Lemnac. Monogr.*: 73, 151, t. 13/10–16, t. 14, 15 (1868); Britton & Wilson, *Bot. Porto Rico & Virg. Isl.* 5: 131 (1923); Moscoso, *Cat. Fl. Doming.* 1: 68 (1943); Leon, *Fl. Cuba* 1: 274 (1946); Lemée, *Fl. Guyana franc.* 1: 266 (1955); Daubs, *Monogr. Lemnac.*: 8 (1965); Den Hartog & Van der Plas in *Blumea* 28: 360 (1970); Fournet, *Fl. Guadel. & Martin.*: 413 (1978)

Lemna polyrhiza L., *Sp. Pl.*: 970 (1753); Adams, *Fl. Pl. Jam.*: 71 (1972); Howard, *Fl. Less. Antill.* 3: 402 (1979)

Greater duckweed

Free-floating aquatic; thallus orbicular-ovate, 3–8 mm long, almost as broad, with 5–11 conspicuous nerves, sometimes tinged pink above, usually purplish beneath; daughter thallus budding from near point of root-insertion in a slit in the mother thallus; roots 5–15, arising from greatly thickened basal part of thallus; root-cap acute; rootless resting bud (turion) produced in adverse conditions, 2 mm in diameter; flowers seldom produced, surrounded by a small open spathe in a lateral slit-pouch, with 1 pistillate flower, and 2–3 staminate flowers each consisting of a single stamen; fruit slightly wing-margined; seeds 1–2.

Trinidad: Nariva Swamp, off Manzanilla to Mayaro road, 11.4.1977, Tej Singh s.n. (TRIN 21277), 16.2.1978, Ramcharan 431 (TRIN 22110).

Cosmopolitan.

3. WOLFFIELLA *Hegelmaier*

Wolffiella Hegelm. in *Engl. Bot. Jahrb.* 21: 303 (1895)

Aquatic, submerged just beneath water surface, basal part at surface at flowering; thalli asymmetric, very thin, strap-like; daughter thalius budding from triangular pouch at one end; flowers in a pit off-set from median line on upper surface, without spathes, unisexual side-by-side, single stamen, single pistil.

5 species mainly in the tropics.

Wolffiella lingulata (Hegelm.) Hegelm. in *Engl. Bot. Jahrb.* 21: 303 (1895); Daubs, *Monogr. Lemnac.* 36, pl. 15 (1965); Den Hartog & Van der Plas in *Blumea* 28: 365 (1970); Howard, *Fl. Less. Antill.* 3: 403 (1979)

Wolffia lingulata Hegelm., *Lemnac. Monogr.*: 132 (1968); Fournet, *Fl. Guadel. & Martin.*: 413 (1978)

Thallus thin, curved, without nerves, 3.5–9 mm long, 1.5–4 mm wide, usually only two thalli together, often brown-punctate with pigmented cells; fruit oblique, slightly compressed.

Trinidad: Débé, 20.5.1970, Rankin 292a (K); Mohess Trace, Débé to Penal road (cult. St Augustine), 16.10.1978, Bennett & Baranowski (TRIN 22286); Nariva Swamp, 3.5.1979, Philcox & Stoelzel 8377 (K, TRIN), 15.5.1979, Philcox, Stoelzel & Kalloo 8411 (K, TRIN, Z); Charuma River area, 15.5.1979, Philcox, Stoelzel & Kalloo 8409 (K, TRIN).

In Central and South America and the West Indies.

SERIES VI. APOCARPAE

FAMILY 1—ALISMATACEAE

By D. Philcox

Annual or perennial, aquatic or marsh plants, usually acaulescent; leaves alternate or basal, petiolate; petioles elongate, sheathing at base; lamina linear-lanceolate to ovate or sagittate, sometimes floating; flowers whorled at nodes of racemes, on whorled branches of panicles or less frequently umbellate, actinomorphic, hermaphrodite or unisexual; perianth bi-seriate; sepals free or connate at base, persistent; petals free; stamens 3–6 or more, free, hypogynous; carpels free, 6 or more, superior, whorled or in globular head, achenes arranged similarly.

1. SAGITTARIA *Linnaeus*

Sagittaria L., *Sp. Pl.*: 993 (1753)

Mostly perennial aquatic or marsh plants, either emersed or submersed with floating leaves; emergent leaves where present often with sagittate blades, floating leaves frequently cordate; plants mostly monoecious, rarely dioecious; scape erect; flowers in usually 3-flowered whorls with up to 10 whorls in each inflorescence, lower whorls usually female with male above; sepals 3, herbaceous, reflexed in male flowers, spreading, reflexed or appressed in female flowers; petals white, deciduous; stamens usually numerous; carpels numerous, 1-celled, 1-ovuled, in crowded, spherical head; achenes flattened, winged, beaked.

Sagittaria guyanensis Kunth, *Nov. Gen. & Sp.* 1: 250 (1815); Bogin in *Mem. New York Bot. Gard.* 9, 2: 192 (1955); Adams, *Fl. Pl. Jam.*: 33 (1972)

S. echinocarpa Mart., *Amoen. Bot. Monac.*: 6, tab. 3 (1829)

Echinodorus guianensis (Kunth) Griseb., *Fl. Brit. W. Ind.*: 505 (1861)

Lophotocarpus guyanensis (Kunth) Durand & Schinz, *Conspect. Fl. Afr.* 5: 487 (1894); J. G. Smith in *Ann. Rep. Mo. Bot. Gard.* 6: 61 (1895); Woodson & Schery, *Fl. Panama* 2, 1: 6 (1943); Jonker in Pulle, *Fl. Surin.* 1, 1: 478 (1948)

Lophotocarpus guyanensis var. *echinocarpa* (Mart.) Buch. in Engl., *Pflanzenr.* 4, 15: 36 (1903)

Perennial; leaves (in Trinidad material) floating, blades (1.5–) 2.5–4 cm long, 1–2.8 cm wide, broadly ovate, obtuse, deeply cordate, glabrous; petiole 3.5–12 cm or more long; submersed leaves not seen; scape 3.5–10 cm long with 8–10(–12) flowers in inflorescence.

Trinidad: Icacos Savanna, 1.2.1852, Crueger (TRIN 1814), 2.2.1853, Crueger s.n. (K), April 1861, Crueger s.n. (K), 28.2.1866, Finlay (TRIN 1994).

Throughout tropical America.

In the National Herbarium is a specimen of a further species *Sagittaria subulata* (L.) Buch. var. *gracillima* (S. Wats.) J. G. Sm. This cultivated plant was collected by C. D. Adams (14281) from Chai's fish farm and is a very good example of this North American taxon.

FAMILY 2—BUTOMACEAE

By D. Philcox

Perennial rhizomatous aquatic or marsh herbs, usually laticiferous; leaves either basal or partly cauline; flowers solitary or umbellate, actinomorphic, hermaphrodite; perianth bi-seriate; sepals 3, imbricate; petals 3, imbricate, fragile; stamens hypogynous, free, either 9, in two series or numerous with external sterile; ovaries 5 to several, often attached at base; capsule folliculate; seeds numerous.

In addition to our one native species, *Hydrocleys nymphoides*, one other member of the family, *Limnocharis flava* (L.) Buchenau, has been recorded from cultivation in the Botanic Gardens, Tobago.

HYDROCLEYS *L. C. Richard*

Hydrocleys L. C. Rich. in *Mem. Mus. Hist. Nat.* 1: 368, t.18 (1815)

Aquatic herbs with floating leaves; flowers solitary or in small groups; stamens numerous, external sterile ones of filaments only; ovaries about 6, lightly attached at base, apical part sterile; follicles free.

Hydrocleys nymphoides (Willd.) Buch. in *Abh. Nat. Ver. Bremen* 2: 2, 6 (1869); Jonker in Pulle, *Fl. Surin.* 1, 1: 484 (1948)

Stratiotes nymphoides Willd., *Spec. Pl.* 4: 821 (1805)

Limnocharis humboldti L. C. Rich. in *Mem. Mus. Hist. Nat.* 1: 369, tab. 19, fig. 1 (1815); Williams & Williams, *Useful & Ornament. Fl. Trin. & Tobago*, ed. 4: 207 (1969)

Water poppy

Plant rooting in mud; stem elongate, procumbent, rooting at nodes; leaves clustered, long petiolate; lamina 3.5–8 (–10) cm long, 3.5–8 cm wide, suborbicular, apex obtuse, subcordate at base, entire, subcoriaceous 7(–9)-veined, midrib thickened beneath; petiole 10–20 cm or more long; flowers solitary or several clustered together, subtended by 3 cm long, 0.5 cm wide bracts, on long peduncles, pedicellate; peduncles 7–12 cm long, terete; pedicels 4–14 cm long; sepals 2 cm long, 0.5 cm wide, ovate-oblong, marginally membranous, free; petals up to 3 cm long, 4 cm wide, broadly obovate to orbicular-cuneate, yellow, darker at base; stamens 1 cm long; anthers purplish *ca* 0.5 cm long; filaments purple, narrowed at apex; staminodes several *ca* 6.5 mm long, 1 mm wide; ovary *ca* 1 cm long, apically sterile; stigma 2-lobed; follicles *ca* 1.8 cm long, up to 0.4 cm wide; seeds areolate, *ca* 1 mm long, 0.5 mm wide.

Trinidad: La Fantasie Pasture, 1892, Hart s.n. (TRIN 5061); Palmyra pond, Broadway s.n. (NY); Cedar Hill pond, April 1890, Hart (TRIN 4068); Oropouche Lagoon, 5.4.1865, Finlay (TRIN 1992); Penal, 20.5.1970, Rankin EJR 304 (TRIN).

Tropical South America.

FAMILY 3—NAJADACEAE

By D. Philcox

Submerged aquatic plants of fresh or brackish water; stems slender, much branched; leaves opposite or whorled, linear, entire or variously toothed, sheathed at base; flowers usually monoecious, unisexual, solitary, axillary; male flowers with 2-lipped perianth; stamens 1, sessile, in each flower; female flowers lacking perianth or with membraneous perianth; ovary 1-carpellate, 1-locular; style short or lacking; stigmas 2–4; fruit usually enclosed in leaf sheath.

NAJAS *Linnaeus*

Najas L., *Sp. Pl.*: 1015 (1753)

As this is the only genus in the family, the above description is so formed as to act for both.

Najas guadalupensis (Spreng.) Magnus in Engl. & Prantl, *Nat. Pflanzenfam.* 2, 1: 217 (1889); Britton & Wilson, *Bot. Porto Rico & Virg. Isl.* 1: 13 (1923); Adams, *Fl. Pl. Jam.*: 35 (1972); Howard, *Fl. Less. Antill.* 3: 14, fig. 4 (1979)

Caulinia guadalupensis Spreng., *Syst.* 1: 20 (1825)

Submerged plant of fresh or brackish water, trailing or forming dense tangled masses; leaves 1–2.5 cm long, 0.5–1.5 mm wide, opposite, numerous, linear, apex obtuse or acute, margin very minutely toothed, sheaths rounded, toothed; stamens 2–3 mm long; fruit 2 mm long; seeds narrowly ellipsoid, clearly reticulate.

Tobago: in tanks of ornamental *Nymphaea* species, on hillside, Botanic Garden, Scarborough, 4.4.1979, Philcox & Phillips 8346 (K).

United States, Central and tropical South America, West Indies.

This plant has not yet been recorded from a truly wild source in our islands. It is felt that the above collection was of material either introduced when planting out cultivated specimens, or had been introduced by wading birds.

FAMILY 4—RUPPIACEAE

By D. Philcox

Submerged aquatic herbs of brackish or salt water; stems long, filiform, almost thread-like, forking; leaves alternate or opposite, slender, linear, 1-nerved, sheathing at base; flowers bisexual, in short terminal spikes initially enclosed in sheathing leaf bases, becoming exserted on elongated peduncles, ebracteate, perianth lacking; stamens 2; anthers 2-celled; filaments short; carpels 4, each 1-ovuled; style wanting, stigma peltate; fruit drupaceous, becoming long-stipitate, indehiscent.

RUPPIA *Linnaeus*

Ruppia L., *Sp. Pl.*: 127 (1753)

As this is the only genus in the family, the above description is so formed as to act for both.

Ruppia maritima L., *Sp. Pl.*: 127 (1753); Griseb., *Fl. Brit. W. Ind.*: 506 (1861); Britton & Wilson, *Bot. Porto Rico & Virg. Isl.*, Pl. 1:10 (1923); Proctor in Gooding *et al.*, *Fl. Barbad.*: 29 (1965); Adams, *Fl. Pl. Jam.* : 34 (1972); Fournet, *Fl. Guadel. & Martin.*: 58 (1978); Howard, *Fl. Less. Antill.* 3: 9, fig. 2 (1979)

Stems up to 1 m long, pale brown to olive green, slender; leaves 3–10 cm long, *ca* 0.5–1 mm wide, linear to filiform; pedicels usually 4 or more, 0.6–3 cm long, clustered in pseudo-umbel; fruiting peduncles up to 30 cm long, capillary; drupes 2–3 mm long, ovoid, oblique or gibbous at base, apex short-pointed.

Trinidad: Chacachacare, south side, embedded in sand at low-tide, 12.4.1961, Richardson 1042 (TRIN 16163); Carenage, milepost $6\frac{3}{4}$, marine, in muddy sand just above *Thalassia* zone, 3.4.1958, Richardson 322 (TRIN 15481); Laventille swamp, aquatic in cleared mangrove swamp, 18.7.1950, White s.n. (BM), 20.11.1950, White s.n. (BM); Caroni Swamp, 7.7.1950, White s.n. (TRIN 14617), 12.1.1958, Richardson 247 (K, TRIN 15466), 23.8.1973, Adams 13663 (TRIN 20879), 29.7.1976, Barnard, Jones & Crane 409 (RNG), 6.9.1977, Philcox & Philcox 8254 (K); mouth of Salybia River, 23.10.1932, Broadway 9038 (BM, K), 21.3.1979, Philcox & Gillies 8274 (K).

Tobago: by bridge over Thompson River at Lowlands Roads, 2.9.1977, Philcox & Philcox 8247 (K, TRIN).

Cosmopolitan in distribution.

FAMILY 5—ZANNICHELLIACEAE

By D. Philcox

Perennial, submerged, aquatic herbs; rhizome slender, elongate, creeping; leaves opposite, alternate or crowded, linear, sheathing at base; monoecious or dioecious; flowers axillary, solitary or cymose; perianth absent or reduced to 3 small scales; stamens 1(–3); anthers 1–2-locular, longitudinally dehiscent; carpels 1(–9), free; style simple or 2–4-lobed; ovules solitary; fruiting carpels sessile or stipitate, indehiscent.

HALODULE *Endlicher*

Halodule Endl., *Gen. Pl. Suppl.* 1: 1368 (1841)

Creeping, marine herbs, rooted, rhizomes jointed; stems with 1–4 leaves at each node; leaf sheaths 1–6 cm long, enclosing solitary flowers; male flowers comprising 2 unequally attached anthers at end of long pedicel; female flowers subsessile, of single carpel; fruit small, subglobose, somewhat compressed.

Key to the Species

Leaf-tip biscuspidate, appearing emarginate...1. *H. wrightii*
Leaf-tip tricuspidate, with distinct median tooth, equalling or much exceeding length of lateral teeth ..... 2. *H. beaudettei*

1. **Halodule wrightii** Aschers. in *Sitz.-Ber. Ges. Naturf. Freunde Berlin* 1868: 19, 24 (1868); Britton & Wilson, *Bot.Porto Rico & Virg. Isl.*, Pt. 1: 12 (1923); Howard, *Fl. Less. Antill.* 3: 11, fig. 3b–c (1979)

Diplanthera wrightii (Aschers.) Aschers. in Engl. & Prantl, *Nat. Pflanzenfam., Nachtr.*, 37 (1897); Hodge in *Lloydia* 17: 111 (1954)

Rhizome with short stem at each node; leaves 5–20 cm long, 0.3–1 mm wide, linear to linear-filiform, apex appearing emarginate with 2 lateral teeth protruding; male flowers: pedicel 10–24 mm long, anthers 3.5–5 mm long; female flowers: ovary 1.5–2 mm long, ovoid, ellipsoid or globose; style 11–12 mm long, subterminal; fruit 1.5–2 mm long, ovoid, somewhat compressed.

Trinidad: Williams Bay, in 0.25–0.5 m deep water, with *Thalassia*, 8.11.1976, Ramcharan s.n. (TRIN), 15.11.1976, Ramcharan s.n. (TRIN).

West Indies. Persian Gulf and the coast of tropical West and East Africa.

2. **Halodule beaudettei** (den Hartog) den Hartog in *Blumea* 12: 303, fig. 5 (1964); Adams, *Fl. Pl. Jam.*: 35 (1972); Howard, *Fl. Less. Antill.* 3: 11, fig. 3d (1979)

Diplanthera beaudettei den Hartog in *Pacif. Natur.* 1, 15: 4, fig. 2a–c (1960)

Leaves 5–20 cm long, 0.6–1.25 mm wide, linear, apex tricuspidate with median tooth up to 10 times length of lateral teeth; flowers and fruit unknown.

Trinidad: Chacachacare, shallow, sheltered, sandy bay in about 60 cm deep water, 2.1.1954, Simmonds (K, TRIN 15033); Scotland Bay, in about 2 m deep water, 4.8.1976, Alkins in Adams 14112 (TRIN).

West Indies. Along the Atlantic coast of North America to North Carolina and the Pacific coast of Panama and Nicaragua.

Both species need seriously searching for around our islands as there is no reason to believe that they are really as rare as the few records tend to indicate.

FAMILY 6—POTAMOGETONACEAE

By D. Philcox

Perennial, rooted, freshwater, aquatic herbs with elongate, submerged and floating stems; leaves alternate or opposite, 2-ranked, frequently polymorphic with thin submerged leaves and broad-bladed, petiolate, floating leaves, sheathing at base; inflorescence axillary, spicate, erect and usually above water; peduncle sheathing at base; flowers regular; tepals 4, shortly clawed; stamens 4, inserted on claws of tepals; anthers sessile, bilocular; carpels 4, each 1-ovulate; stigma usually sessile; fruit drupaceous, indehiscent.

POTAMOGETON *Linnaeus*

Potamogeton L., *Sp. Pl.*: 126 (1753)

As there are only two genera in this family (the other being the monotypic *Groenlandia* J. Gay), the above description is so formed as to act here for both the family and the genus *Potamogeton*.

Potamogeton nodosus Poir. in Lam., *Encycl. Meth. Bot. Suppl.* 4: 535 (1816); Hodge in *Lloydia* 17: 110 (1954); Adams, *Fl. Pl. Jam.*: 34 (1972); Howard, *Fl. Less. Antill.* 3: 5, fig. 1 (1979)

P. fluitans auct. *non* Roth.; Griseb., *Fl. Brit. W. Ind.*: 506 (1861)

Stems ascending, terete, branched; submerged leaves 10–25 cm long, 7–25 mm wide, linear to elliptic-lanceolate; floating leaves: blades 7–15 cm long, 1–2 cm wide, elliptic to lanceolate, apex obtuse to subacute, base acute, entire, glabrous, petioles 4.5–14 cm long, spikes 1-2(–5) cm long, borne on floating branches; fruit 3.0–4.5 mm long, obovoid.

Trinidad: Quare River, 10.10.1924, Broadway 5432 (BM, K), above dam, 3.2.1929, Freeman (TRIN 12112); Oropuche River, July 1860, Crueger 62 (TRIN 1610), April 1896, Alexander (TRIN 6071), near cave, 1.2.1948, Simmonds 270 (TRIN 14135), 8.4.1950, Simmonds 452 (K, TRIN 14579); junction of Oropuche and Platanal Rivers, 18.2.1973, Wood 1706 (TRIN).

West Indies; United States, Central and South America, Europe and Asia.