

THE VASCULAR FLORA OF LA SELVA BIOLOGICAL STATION,
COSTA RICA*
ORCHIDACEAE

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Epiphytic, terrestrial, sometimes saprophytic or rarely semiaquatic, perennial (rarely annual) herbs, vines or subshrubs, the growth habit monopodial or more commonly sympodial. Roots fibrous, often thickened and provided with a velamen. Shoots either sympodial or monopodial; in terrestrial genera sometimes with corms (underground swollen stems), or in epiphytic genera with pseudobulbs (swollen aerial stems) or secondary stems (nonswollen aerial stems), these sometimes superposed and referred to as stem segments. *Leaves* alternate, simple or rarely lobed, thin and plicate or variously thickened and conduplicate, or rarely terete or triquetrous, usually parallel veined but occasionally net veined. *Inflorescence* 1-flowered, a spike, raceme or panicle, either erect or pendulous, borne ter-

minally at the sympodial apex or laterally on the stem, opening sequentially (over a period of time) or simultaneously. *Flowers* usually bisexual but occasionally unisexual, zygomorphic, sessile or pedicellate. Perianth of 2 alternating tripartite whorls, the parts often variously adnate or connate; sepals 3, all similar or the dorsal dissimilar, free or variously connate; petals 3, the 2 similar lateral ones termed lateral petals or simply petals, the other one usually substantially modified and called the lip or labellum. Androecium and gynoecium variously united into a unique structure, the column, which may be extended at the base into a column foot; stamens 1, rarely 2 or very rarely 3; pollen usually variously consolidated into massulae or pollinia, but sometimes viscid or powdery; stigmas 3, often with one of them modified into a pollen transfer apparatus called the rostellum; ovary inferior, usually resupinate, 1- or rarely 3-celled, appearing nearly indistinguishable from the pedicel. *Fruit* a capsule, very rarely a berry (e.g., *Vanilla*), bearing numerous minute seeds lacking endosperm.

This treatment includes 114 species distributed among 43 genera. Dimensions given should be taken as guidelines only as they are usually based on small sample sizes. Similarly, flowering times may be much less restricted than those indicated on herbarium sheets. Statistics on the orchids of La Selva are presented in *Proceedings of the Twelfth World Orchid Conference* (Atwood, 1987: 46-50).

KEY TO THE GENERA

1. Plant body consisting of a cluster of roots and 1-several inflorescences arising from a much reduced inconspicuous stem. 4. *CAMPYLOCENTRUM*.
1. Plant body otherwise.
 2. Plant a large vine several meters long. 42. *VANILLA*.
 2. Plant caespitose, rhizomatous or repent, but never a vine several meters long.
 3. Plants terrestrial and veneration convolute, never conduplicate.
 4. Leaves plicate.

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5. Pseudobulbs present although sometimes hidden; inflorescences always lateral from the base of the plant. 43. *WARREA*.
5. Pseudobulbs absent; inflorescences terminal or borne in the axils of the upper leaves. 27. *PALMORCHIS*.
4. Leaves not plicate, never appearing corrugated.
 6. Plants creeping; leaves separated at anthesis by conspicuous internodes. 12. *ERYTHRODES*.
 6. Plants never creeping; leaves remaining in basal rosettes at anthesis. 1. *BELOGLOTTIS*.
3. Plants epiphytic, or if terrestrial, then leaves conduplicate.
 7. Plants lacking pseudobulbs; leaves plicate, or if conduplicate, then flowers borne in dense, distichous inflorescences (see *Elleanthus graminifolius*).
 8. Flowers numerous, in heads or spikes; sepals never more than 1.5 cm long. 9. *ELLEANTHUS*.
 8. Flowers up to 3 at a time; sepals more than 2 cm long. 37. *SOBRALIA*.
 7. Plants with pseudobulbs or if lacking then leaves conduplicate and inflorescences otherwise.
 9. Ovary articulated to the persistent pedicel (easily seen in aged inflorescences). Key 1.
 9. Ovary never so articulated.
 10. Inflorescences terminal at the stem apex. Key 2.
 10. Inflorescences lateral on the stem. Key 3.

KEY 1 (PLEUROTHALLIDINAE)

1. Sheaths of the secondary stems flared and ciliate-hispidulous at the apex.
 2. Blade of the petal 2-lobed, much broader than long. 19. *LEPANTHES*.
 2. Blade of the petal not 2-lobed, longer than broad. 40. *TRICHOSALPINX*.
1. Sheaths, if flared, not ciliate-hispidulous at the apex.
 3. Pollinia 8. 25. *OCTOMERIA*.
 3. Pollinia 2 or 4.
 4. Leaf sheaths hispidulous-scurfy. 23. *MYOXANTHUS*.
 4. Leaf sheaths glabrous.
 5. Column lacking a distinct foot.
 6. Petals conspicuous, extending beyond the sinus between the sepals. 28. *PLATYSTELE*.
 6. Petals inconspicuous, not extending beyond the sinus between the sepals. 39. *STELIS*.
 5. Column with a distinct foot.
 7. Lateral sepals with a distinct platelike callus. 35. *SCAPHOSEPALUM*.
 7. If callus on sepals present (*Dryadella*), then not platelike.
 8. Lip with a claw about half the length of the blade; lateral sepals with transverse calli at the base. 8. *DRYADELLA*.
 8. Claw of lip if present much less than a third the length of the blade.
 9. Fused base of the sepals as long as or longer than the free portion of the dorsal sepal. 20. *MASDEVALLIA*.
 9. Dorsal sepal free from the lateral sepals, or if connate, the fused portion much shorter than the free portion of the dorsal sepal. 29. *PLEUROTHALLIS*.

KEY 2

1. Column extended at the base into a foot, or (in *Jacquiella*) stems not swelled and provided with 4–10 distichous, semiterete leaves.
 2. Leaves terete or semiterete.
 3. Stems superposed; leaves at least 10 cm long. 33. *REICHENBACHANTHUS*.
 3. Stems not superposed; leaves much less than 5 cm long. 16. *JACQUINIELLA*.
 2. Leaves neither terete nor semiterete.
 4. Vegetative shoots never superposed; inflorescence supported on a distinct peduncle. 30. *POLYSTACHYA*.
 4. Vegetative shoots superposed; inflorescence sessile or apparently so. 36. *SCAPHYGLOTTIS*.
1. Column without a distinct foot; stems and leaves otherwise.
 5. Lip adnate to at least half the length of the column. 11. *EPIDENDRUM*.
 5. Lip free from the column or adnate only at the base.
 6. Stems superposed; flowers red. 14. *HEXISEA*.
 6. Stems not superposed; flowers not red.
 7. Peduncle covered by linear-lanceolate, imbricating floral bracts more than 10 mm long. 24. *NIDEMA*.
 7. Peduncle bracts much shorter and nonimbricating. 10. *ENCYCLIA*.

KEY 3

1. Vernation convolute, never conduplicate; leaves lacking an obvious midrib or keel.
 2. Pseudobulbs cylindric to ellipsoidal, at least 12 cm high, provided with at least 5, thin, plicate leaves lasting less than one year and deciduous in the dry season.
 3. Tips of persistent leaf sheaths of old pseudobulbs provided with spines; lip of either male or female flowers saccate. 5. *CATASETUM*.
 3. Leaf sheaths not provided with spines; neither male nor female flowers saccate. 6. *CYNOCHES*.
 2. Pseudobulbs much less than 12 cm long, with at most 3 leaves lasting more than one year and becoming deciduous with age, not with the dry season.
 4. Inflorescence erect or arching, never pendent; leaves not plicate. 22. *MENDONCELLA*.
 4. Inflorescence pendent; leaves plicate.
 5. Pseudobulbs 1-foliolate. 38. *STANHOPEA*.
 5. Pseudobulbs 2-foliolate.
 6. Inflorescence pilose. 17. *KEGELIELLA*.
 6. Inflorescence never pilose. 13. *GONGORA*.
1. Vernation conduplicate; leaves with an obvious midrib or keel.
 7. Plants monopodial.
 8. Leaves fleshy; inflorescence many-flowered. 4. *CAMPYLOCENTRUM*.
 8. Leaves thin; inflorescence 1-flowered. 7. *DICHAEA*.
 7. Plants sympodial.
 9. Inflorescence 1-flowered, never with 2 or more flowers borne sequentially.
 10. Sepals closely appressed into an apically flared funnelform tube; and petals tipped with a metallic blue spot. 41. *TRIGONIDIUM*.
 10. Sepals not appressed into an apically flared funnelform tube; petals lacking a metallic blue spot. 21. *MAXILLARIA*.
 9. Inflorescence at least 2-flowered, the flowers often borne sequentially.
 11. Plants psygmoid (the shoots fanlike). 32. *PSYGMORCHIS*.
 11. Plants not psygmoid.
 12. Inflorescence a thickened clavate spike; pseudobulbs conspicuously 4-angled in cross section. 3. *BULBOPHYLLUM*.
 12. Inflorescence never a thickened clavate spike; pseudobulbs not 4-angled.
 13. Lip less than 1.1 cm long.
 14. Lip white to lavender, with a very short spur. 15. *IONOPSIS*.
 14. Lip yellow, lacking a spur. 18. *LEOCHILUS*.
 13. Lip at least 1.2 cm long.
 15. Lateral sepals at least 1.5 times longer than the lip.
 16. Flowering sequential; sepals and petals dissimilar, neither lanceolate nor attenuate. 31. *PSYCHOPSIS*.
 16. Flowering simultaneous; sepals and petals similar, lanceolate-attenuate. 2. *BRASSIA*.
 15. Lateral sepals much less than 1.5 times the lip length.
 17. Lip basally spurred, the lateral lobes folded around the column. 34. *RODRIGUEZIA*.
 17. Lip not spurred, the lateral lobes not folded around the column. 26. *ONCIDIUM*.

1. *BELOGLOTTIS* Schltr.

GARAY, L. A. 1980. A generic revision of the Spiranthininae. Bot. Mus. Leaflet 28: 277-425.

Terrestrial or rarely hemiepiphytic herbs with fasciculate roots. *Leaves* basal, petiolate. *Inflorescence* a many-flowered spike supported on an erect bracteate scape. Sepals variously connate at the base and spreading at the apex, the laterals with an oblique, subdecurrent base; lateral petals agglutinate with dorsal sepal, short-decurrent at base, the lip unguiculate, sagittate at the base of the lamina, the lateral margins agglutinate with the sides of the column; column ballooned out in front; rostellum 2-lobed; stigmata approxi-

mate but not confluent. A neotropical genus of about seven species.

1. *Beloglottis subpandurata* (Ames & Schweinf.) Garay FIGURE 1.

Rosulate hemiepiphytes, often growing on rotten logs; roots fleshy, to about 8 mm in diameter. *Leaves* elliptic to somewhat oblanceolate and petiolate, to about 20 cm long and 2.5 cm broad. *Inflorescence* to 14 cm long, many-flowered, supported by a scape up to 15 cm long, provided with 1 to several upward pointing acuminate sheaths; with pedicellate ovaries about 1.4 cm long subtended by lanceolate floral bracts to about

2 cm long. *Flowers* essentially glabrous, white or whitish; dorsal sepal oblong-lanceolate, tapering from about the middle, 7–8 mm long and 1.7 mm wide, the lateral sepals oblique, somewhat triangular and tapering from the base, 8–9 mm long and 2 mm wide; lateral petals closely appressed to the dorsal sepal, linear-oblongate, 5–6 mm long and 1 mm wide, the lip sagittate, slightly constricted below the thickened acute to obtuse apex and provided with a pair of fleshy, incurved calli at the base; column 4 mm long, with a bifid rostellum. Flowering in February. Throughout Central America but rare at La Selva.

This is one of a few hemiepiphytic members of an otherwise terrestrial group of plants.

2. BRASSIA R. Br.

Cespitose or repent epiphytic herbs, usually with well developed pseudobulbs with 1–3 *leaves* at the apex. *Inflorescence* an arching several- to many-flowered raceme borne laterally at the base of the pseudobulb. *Flowers* large and conspicuous, subtended by small elongate spathaceous bracts; sepals free, narrowly attenuate to caudate, sometimes of equal length but usually the dorsal much shorter; lateral petals similar to the dorsal sepal but usually shorter, the lip simple or obscurely lobed, forming more than a right angle with the column; column short, stout and erect, lacking wings; anther terminal, pollinia 2, waxy.

A neotropical genus of about 38 species differing from *Oncidium* mainly by its attenuate floral segments.

1. *Brassia caudata* (L.) Lindl. FIGURE 2.

Cespitose or creeping epiphytes, to about 35 cm high with conspicuous rhizomes separating the pseudobulbs; roots coarsely fibrous, velamentous, 2 mm in diameter; pseudobulbs 2-foliate, to 10 cm long and 2.5 cm broad, subtended by several bracts with the 1 or 2 uppermost occasionally bearing articulated blades. *Leaves* elliptic, acute, chartaceous, to about 25 cm long and 5 cm broad. *Inflorescence* lateral, few- to 12-flowered, to 20 cm long, supported by a peduncle of about the same length with pedicellate ovaries 1.5–2 cm long. *Flowers* light green with brown bands, turning yellowish with age; sepals very variable in degree of attenuation, the dorsal sepal to about 5 cm long and 5 mm wide, the lateral sepals much longer, to 12 cm long and 5 mm wide; lateral petals lanceolate, to about 2.5 cm long and 5 mm wide, the lip acuminate, somewhat cuneate at the base, with reddish markings and several callosities; column to 4 mm long, pollinia supported on a long stipe. *Fruit* a capsule

4 cm long (immature?). Probably flowering throughout the year. Common locally throughout the neotropics, but uncommon at La Selva.

This is an epiphyte of larger tree limbs and trunks in usually rather dense shade. It is easily recognizable by its large spidery flowers.

3. BULBOPHYLLUM Thouars

Epiphytic herbs, usually with 1- or 2-foliate, approximate or distant pseudobulbs. *Inflorescence* lateral from the base of the pseudobulb, a spike, raceme or rarely a single flower, never branched and sometimes swollen or conspicuously flattened. *Flowers* often with lurid colors for pollination by flies; dorsal sepal free, the lateral sepals free or connate and adnate to the column foot; lateral petals variable, smaller than the sepals, the lip variable but articulated to the column foot, usually fleshy; column erect, forming a foot at the base and with a pair of conspicuous auricles or wings above; anther incumbent, the pollinia 4, waxy.

A widespread pantropical genus of about 1,000 species best developed in the Asiatic tropics.

1. *Bulbophyllum* sp. FIGURE 3.

Repent epiphytes with much elongated rhizomes; roots fibrous, velamentous, to 1 mm in diameter; pseudobulbs 2-foliate, ovoid, 4-angled in cross section, to 4 cm long and 2 cm broad. *Leaves* elliptic-oblongate to linear, acute, chartaceous, to 20 cm long and 2 cm wide. *Inflorescence* a fleshy spike, lateral, probably pendulous, but supported on a long erect peduncle up to 20 cm long. *Flowers* and *fruit* of the La Selva plants unknown.

The elongate, erect peduncle strongly suggests that this is *Bulbophyllum aristatum* (Rchb. f.) Hemsl. which is unique in having acuminate and not rounded petals. This species ranges from Mexico to Colombia.

4. CAMPYLOCENTRUM Benth.

Epiphytic, monopodial herbs with leafy elongate or leafless condensed stems. *Leaves* oblong or ligulate, coriaceous. *Inflorescence* a short, densely flowered raceme produced from the axils of the leaves. Sepals subequal, free or partially connate with spreading apices; lateral petals subequal to the sepals, the lip sessile, 1–3-lobed, forming an elongate spur at the base; column short, wingless, lacking a foot; anther terminal, pollinia 2, waxy. *Fruit* a capsule.

A neotropical genus of about 45 species. This and *Dichaea* are the only genera of orchids at La Selva with a monopodial growth habit.

KEY TO THE SPECIES

1. Plants leafless and appearing stemless.
 1. *C. fasciola*.
 1. Plants with conspicuous coriaceous leaves on an
 elongate stem. 2. *C. micranthum*.

1. *Campylocentrum fasciola* (Lindl.) Cogn.

FIGURE 4.

Inconspicuous epiphytes with the shoot reduced to a cormlike body lacking leaves; roots elongate and conspicuous, velamentous, green, to 1 mm in diameter. *Inflorescence* a raceme, 1 to many per plant, the peduncle filiform, puberulent; floral bracts minute, triangular, much shorter than the pedicellate ovary. *Flowers* essentially white, distichous, about 2 mm long; sepals ovate, 1-nerved, to 1 mm long; lateral petals similar to the sepals but shorter, the lip simple to trilobate, to nearly 2 mm long including the conspicuous, basal, saccate, cylindrical to bulbous spur; column short. *Fruits* not seen. Probably flowering throughout the year. Widespread from West Indies and Central America to tropical South America.

2. *Campylocentrum micranthum* (Lindl.) Rolfe

FIGURE 5.

Straggle epiphytes; roots elongate, alternating with the leaves, up to 2.5 mm in diameter; stems terete, leafy above, ensheathed by withered leaf bases below, to about 5 mm in diameter. *Leaves* variable, narrowly elliptic to suborbicular, distichous, spreading, coriaceous, acute to obtuse at the sometimes unequally 2-lobed apex, the blade articulated with the tubular sheath, to 7 cm long and 3.5 cm wide but usually smaller. *Inflorescence* a distichous raceme, each side spreading in fruit, one or two below each root, usually less than half as long as the leaves. *Pedicellate ovary* about 1 mm long, much elongating in fruit. *Flowers* white; sepals lanceolate, acute, dorsal sepal 4 mm long, the lateral sepals somewhat longer; lateral petals similar to the sepals but slightly shorter, the lip 3-lobed below the middle, the lateral lobes broadly rounded, clasping the column, the midlobe lanceolate, acute, slightly concave, the whole about 4 mm long, with a cylindrical to clavate, down-turned to forward-curved spur to about 4.5 mm long; column short. *Fruit* a capsule, ellipsoidal at maturity, about 1 cm long and 3 mm broad. Flowering mostly in March. Widespread and locally common throughout the neotropics.

5. CATASETUM L. C. Rich. ex Kunth

Cespitose epiphytes with ovoid to fusiform pseudobulbs. *Leaves* large, plicate, becoming deciduous with the approach of the dry season, the persistent sheaths tipped with stiffly erect spines. *Inflorescence* lateral from the lower nodes of the pseudobulbs, an erect or pendulous raceme. *Flower* sexually dimorphic, usually large and conspicuous; the *pistillate flowers* with a calceolate labellum and lacking pollinia; the *staminate flowers* with diverse lips and with waxy pollinia forcefully ejected onto the pollinator.

Apparently rare at La Selva, it is distinguished from the vegetatively similar *Cycnoches* by the presence of spines on the persistent leaf sheaths, and by the inflorescence arising from the base of the pseudobulb and not towards the apex.

A neotropical genus of perhaps 76 species best developed in South America.

1. *Catasetum maculatum* Kunth FIGURE 6.

Robust epiphytes of larger branches and trunks; roots elongate and rarely branched; pseudobulbs to about 30 cm long, cigar-shaped, bearing several, deciduous, plicate leaves to 50 cm long and 10 cm wide which form persistent stiffly erect spines on the sheath after they abscise. *Inflorescence* a unisexual raceme producing several flowers. *Staminate flowers* green spotted with purple brown, nonresupinate; the sepals and lateral petals acute, to 5 cm long and 2 cm wide, the lip fleshy, green, deeply saccate with ciliate orifice, about 3 cm long; the column about 3 cm long with a pair of antennae extended into the lip. *Pistillate flowers* uncommon and poorly known, similar to the staminate flowers but with a larger lip and shorter column lacking antennae.

Only one sterile plant has been collected at La Selva and placed on the water tower near the former La Selva dining hall by Barry Hammel. *Catasetum maculatum* is the only species of *Catasetum* known from this part of Costa Rica so it is most likely this species.

6. CYCNOCHES Lindl.

GREGG, K. B. 1983. Variation in floral fragrances and morphology: incipient speciation in *Cycnoches*? Bot. Gaz. (Crawfordsville) 144: 566-576.

Epiphytic herbs usually growing on dead wood with elongate fusiform-cylindrical pseudobulbs and several distichous, thin, plicate, deciduous leaves. *Inflorescence* a raceme, erect or pendent, produced on the upper nodes of the pseudobulb; staminate inflorescences many-flowered, pendent; pistillate inflorescences few flowered, erect.

Staminate and pistillate flowers usually strikingly different; *staminate flowers* with column long, slender and arching, dilated at the apex, pollinia 2, waxy, forcefully ejected; *pistillate flowers* much larger than 5 cm high, with an unlobed lip; the column short and stout; pollinia lacking.

Cycnoches is a neotropical genus of about 17 species often found on decaying wood of trees.

1. *Cycnoches egertonianum* Batem. FIGURE 7.

Epiphytes often growing on decaying branches and therefore probably short-lived; pseudobulbs cylindrical, approximate, to 20 cm tall and 2.5 cm in diameter, covered when young by several leaf sheaths. *Leaves* plicate, elliptic to oblong, to 20 cm long and 5 cm wide. *Inflorescence* racemose, arising laterally from the apical portion of the pseudobulbs; pistillate inflorescences with 1 or 2 flowers, about 3 cm long; staminate inflorescences with up to 30 flowers, pendulous and elongate to 50 cm long. *Pistillate flowers* not seen, but most likely green with white entire lip and short column, much larger than the staminate flowers. *Staminate flowers* in the one example from La Selva green with white lip, lacking spots; dorsal sepal to 2.5 cm long and 6 mm wide, the lateral sepals slightly shorter; lateral petals similar, to about 20 mm long and 8 mm wide, the lip with 10 marginal digitate projections plus one median one and a triangular midlobe, about 1.2 cm long including the claw; column arching, about 2.5 cm long when straightened.

Cycnoches egertonianum as recognized here probably represents several species which differ in subtle details of the lip and by differences in fragrance profiles. The one specimen collected at La Selva (*Hammel 9516*) exhibits 11 projections on the lip. If one follows Gregg (1983), the best match seems to be *C. diana* Rchb. f. with variable lip. In the absence of floral fragrance data for species verification, it seems best to recognize the species at La Selva under the oldest name *C. egertonianum* Batem. The *C. egertonianum* complex is uncommon from Guatemala to Panama.

7. *DICHAEA* Lindl.

Epiphytic, erect or pendulous monopodial herbs lacking pseudobulbs; stems enveloped by distichously imbricating leaf bases. *Leaves* articulated or not, conduplicate, membranaceous to coriaceous. *Inflorescence* 1-flowered, supported on a short peduncle and borne in the axils of leaves. *Flowers* small, often with blue pigmentation; sepals subequal, free or the laterals somewhat connate, spreading; lateral petals subequal

to the sepals or narrower, the lip affixed to the base of the column, usually clawed, 3-lobed, rarely entire; column short, erect, often provided with an infrastigmatic ligule, and often forming a short foot; pollinia 4, waxy. *Fruit* a capsule, ovoid or oblong, muricate, setose or smooth.

A neotropical genus of about 45 species, the plants often growing on trunks and lower branches of trees. James Folsom, a specialist on *Dichaea*, was consulted for the identification of the five species known from La Selva.

KEY TO THE SPECIES

1. Leaves nonarticulated to their sheaths.
 2. Plant creeping, less than 15 mm across. 5. *D. tuerckheimii*.
 2. Plant pendulous, much more than 20 mm across. 1. *D. costaricensis*.
1. Leaves articulated to their sheaths.
 3. Leaves at least 5.5 cm long. 4. *D. trulla*.
 3. Leaves less than 5 cm long.
 4. Roots large, 1.5–2 mm in diameter; ovary glabrous. 2. *D. panamensis*.
 4. Roots small, much less than 1.5 mm in diameter; ovary echinate. 3. *D. standleyi*.

1. *Dichaea costaricensis* Schltr. FIGURE 8.

Cespitose, straggly, pendent epiphyte about 2.5 cm across; roots velamentous, white, 0.5 mm in diameter; stem about 2 mm in diameter. *Leaf* 5–7 mm apart, nonarticulated with the rugose sheath, the blade lanceolate-elliptic, acute, the apical margin serrulate, 7–12 mm long and 2–4 mm wide. Peduncle about half the length of the subtending leaf, about 5 mm long; the ovary very short at anthesis, muricate. *Flowers* purple or whitish with maroon markings; sepals elliptic, acute, 8–9 mm long and 3.5 mm wide; lateral petals somewhat rhombic-oblongate, acute, 7 mm long and 3.5 mm wide, the lip anchoriform, cuneate at the base, the apical half forming a pair of narrow retrorse lateral lobes; column stout, about 3 mm long, the stigma provided basally with a ligule about 1.5 mm long. Known from Nicaragua to Panama.

This apparently uncommon epiphyte may be found growing low on the trunks of trees such as pejibaye.

2. *Dichaea panamensis* Lindl. FIGURE 9.

Cespitose, somewhat straggly epiphytes, the shoots either upright or pendent with an upturned apex; roots velamentous, about 2 mm in diameter; stems about 2.5 mm in diameter. *Leaves* 8–10 mm apart, articulated to the sheath, narrowly elliptic, acute, the blade 1.5–2.5 cm

long and 2–4 mm wide. *Inflorescences* 1-flowered, supported on filiform peduncles about half the length of the leaves, about 1.5 cm long; the pedicellate ovary glabrous, about 2 mm long. *Flowers* greenish white marked with violet; dorsal sepal ovate, acute, 6 mm long and 3 mm wide, the lateral sepals somewhat falcate, 8.5 mm long and 2.5 mm wide; lateral petals obliquely ovate, 6 mm long and 4.5 mm wide, the lip trowel-shaped to sagittate, provided with a fleshy claw, about 7 mm long and 5 mm wide; column about 3 mm long, the stigmatic region provided basally with a glabrous ligule. Apparently flowering throughout the year. Locally common and widespread; Guatemala to Venezuela and Ecuador.

The combination of the more or less upright habit and glabrous ovary readily distinguish this species from other *Dichaea*s at La Selva.

3. *Dichaea standleyi* Ames FIGURE 10.

Cespitose epiphytes, each shoot 4.5–8 cm across; roots fibrous, about 0.5–1.0 mm in diameter; stems more or less erect, if pendent then upturned at the apex. *Leaves* articulated to the rugose sheaths, elliptic-oblong, acute, very minutely serrulate near the apex, about 1 cm apart, the blade 3–4.5 cm long and 3–4 mm wide. *Inflorescence* 1-flowered, supported on a filiform peduncle much less than half the leaf length, to about 1 cm in length; pedicellate ovary echinate. *Flowers* whitish, the sepals and petals spotted blue violet, the lip white; sepals lanceolate-ovate, acute, 7–8 mm long and 2.5 mm wide; lateral petals slightly larger than the sepals, obliquely ovate, acute 7.5 mm long and 3.2 mm wide, the lip anchoriform, cuneate at the base, the lateral lobes retrorse and originating near the apex; column stout, 3.2 mm long, provided with a pubescent ligule at the base of the stigmatic cavity. Flowering throughout the year. Uncommon in Nicaragua and Costa Rica.

4. *Dichaea trulla* Rchb. f. FIGURE 11.

Epiphytes, 7–14 cm across, upright or if pendent turned up at the apex; roots fibrous, about 1 mm in diameter; stems laterally compressed, 6–7 mm wide. *Leaves* linear, acute, articulated to the sheath, 1.3–1.6 cm apart, the blade 6–9 cm long and 5–7 mm wide. *Inflorescences* 1-flowered, supported on filiform peduncles to about half the subtending leaf length, about 3 cm long. *Flowers* greenish yellow with either a solid blue violet or spotted blue violet lip; sepals concave, ovate, acute, 9 mm long and 4.5 mm wide; lateral petals similar but smaller, 8 mm long and 4 mm wide, lip concave, hastate with a cuneate claw, fleshy, 9 mm long and 7 mm wide when flattened;

column 7 mm long and 4 mm wide, provided with a pilose ligule at the base of the stigmatic cavity. Flowering July to October and probably sporadically throughout the year. Uncommon; Nicaragua to Brazil.

This is the largest *Dichaea* at La Selva.

5. *Dichaea tuerckheimii* Schltr. FIGURE 12.

Creeping epiphytes on trunks of trees and on logs, very small, less than 12 mm across; roots filiform, less than 0.5 mm in diameter; stems about 1.5 mm wide. *Leaves* to 4 mm apart, ovate, acute, persistent, to 6 mm long and 2.5 mm wide. *Inflorescence* filiform, longer than the subtending leaves. Pedicellate ovary glabrous. *Flowers* greenish, spotted with blue violet; sepals and lateral petals ovate-elliptic, acute, about 5.5 mm long and 2 mm wide, the lip ovate-orbicular, shortly clawed and with 2 pilose calli at the base, shortly apiculate, 4–5 mm long and 4–5 mm wide; column fleshy, glabrous, 2 mm long. Flowering April to May and probably sporadically throughout the year. Belize to Panama.

This is the smallest *Dichaea* at La Selva, somewhat resembling a selaginella. It is also unique in the lack of leaf articulations and in the flowers extended on long peduncles beyond the leaves.

8. DRYADELLA Luer

LUER, C. A. 1978. *Dryadella*, a new genus in the Pleurothallidinae (Orchidaceae). *Selbyana* 2: 207–209.

Epiphytic cespitose herbs with abbreviated 1-foliate secondary stems. *Leaves* fleshy, linear, conduplicate. *Flowers* produced singly or in a sequentially flowered raceme; sepals similar, connate only at their bases; lateral petals much smaller than the sepals, the lip distinctly clawed, the blade usually bilobulate basally; column erect, winged or bidentate; pollinia 2.

A neotropical genus of about 25 species differing from closely related *Masdevallia* in the presence of a claw and of the basal lobules of the lip.

KEY TO THE SPECIES

1. Sepals unspotted; lip not strongly reflexed; column auricles extended as horns. 1. *D. pusiola*.
1. Sepals spotted with purple; lip strongly reflexed; column auricles not extended as horns. 2. *D. simula*.

1. *Dryadella pusiola* (Rchb. f.) Luer FIGURE 13.
(=*Masdevallia pusiola* Rchb. f.)

Cespitose very small epiphytes to 3 cm high; secondary stems 1-foliolate, less than one-third the leaf length, to 6 mm long. *Leaves* oblanceolate, obtuse to 2.5 cm long and 3 mm wide, but usually narrower. *Inflorescence* sequentially flowered, appearing 1-flowered, much less than one-half the leaf length, to 6 mm long. *Flowers* white to greenish yellow, variously striped with red; sepals united at the base, similar, ovate, to 3 mm long and 2 mm wide, the lateral sepals provided basally with a transverse ridgelike callus; lateral petals quadrate, rounded to acute, to 2 mm long and 1.5 mm wide, the lip clawed, sagittate, oblong-obovate, not reflexed, the lamina 1.5 mm long and 0.5 mm wide; column arching, about 2 mm long, provided apically with auricles extending into horns and provided basally with a conspicuous foot. Probably flowering throughout the year. Costa Rica to Colombia.

This minute twig epiphyte is among the more common orchids at La Selva. The unspotted sepals, slightly reflexed lip and column wings extended into horns readily distinguish this from *Dryadella simula*.

2. *Dryadella simula* (Rchb. f.) Luer

FIGURE 14.

(=*Masdevallia simula* Rchb. f.)

Plant a minute, cespitose, twig epiphyte to 3 cm tall; secondary stems 1-foliolate, less than one-third the leaf length, to about 6 mm long. *Leaves* narrowly oblanceolate, tapering at the base into a noticeable petiole, to 2.5 cm long and 4 mm wide. *Inflorescence* 1-flowered, provided with 2 sheaths, less than one-third the leaf length, to about 5 mm long. *Flowers* greenish white spotted with purple; sepals united at the base, the dorsal sepal ovate, shortly caudate, strongly arched forward, 3 mm long and 1.5 mm wide when spread out, the lateral sepals similar but reflexed and each provided with a fleshy callus united in the sepaline tube under the lip, 4 mm long and 2 mm wide; lateral petals short, somewhat 3-lobed above the middle, acute at the apex, less than 1.5 mm long and about 1 mm wide, the lip clawed, the lamina suborbicular, sagittate, strongly reflexed, 2 mm long and 1.5 mm wide, with a pair of central teeth; column arching, winged near the apex and provided with a conspicuous foot. Flowering throughout the year. Guatemala to Colombia.

This is one of the rarer twig epiphytes at La Selva, and is often found with the more common *Dryadella pusiola*. It is easily distinguished from *D. pusiola* by the spotted calyx and by the short-winged column. The leaves are seemingly broader and somewhat darker green than those of *D. pusiola*.

9. ELLEANTHUS Presl

Terrestrial or epiphytic herbs with leaves distributed distichously on canelike stems. *Leaves* with sheathing leaf bases, usually broad and plicate, but occasionally linear and conduplicate. Sepals subequal, less than 2 cm long at La Selva; lateral petals subequal to the sepals, usually narrower, the lip adnate to the column base, subsaccate, usually containing a pair of subovoid calli; column erect, footless; pollinia 8, soft and mealy.

A neotropical genus of about 70 species. Similar to closely related *Sobralia*, but *Elleanthus* has several flowers open at one time, all smaller than 2 cm across, and the lip is subsaccate.

KEY TO THE SPECIES

1. Leaves more than 2 cm wide; inflorescence spiraled. 1. *E. cynarocephalus*.
1. Leaves less than 5 mm wide; inflorescence distichous. 2. *E. graminifolius*.

1. *Elleanthus cynarocephalus* (Rchb. f.)

Rchb. f.

FIGURE 15.

Large, coarse, cespitose epiphytes to nearly 1 meter high, but usually much shorter; roots coarse, velamentous, to 4 mm in diameter in dried material; stems reedlike, provided with distichously arranged leaves on the upper half. *Leaves* 5–6 per stem, convolute, chartaceous, strongly ribbed, articulated to the sheath, narrowly to broadly elliptic-lanceolate with attenuate leaf apices. *Inflorescence* terminal, mucilaginous, sequentially flowered, initially capitate but sometimes elongating with age, the floral bracts lanceolate-attenuate, equal to or longer than the flowers, to about 5 cm long and 0.9 cm wide; pedicellate ovary about 15 mm long. *Flowers* purple; sepals oblong-elliptic, to 10 mm long and 3 mm wide, the lateral sepals shortly united at the base; lateral petals linear, obtuse, to 9 mm long and 1.5 mm wide, the lip rounded, flabellate, to 12 mm long and with a pair of calli at the base; column to 8 mm long, with a conspicuous chin. Flowering July and August. Locally common from Mexico to Costa Rica.

This is vegetatively similar to *Sobralia powellii* Schltr. but it differs in the capitate mucilaginous inflorescence and much smaller purple flowers.

2. *Elleanthus graminifolius* (Barb.-Rodr.) Lojtnant

FIGURE 16.

Cespitose epiphytes; roots velamentous, some of them with nodules, to 1.5 mm in diameter; stems wiry, to 30 cm tall, with up to 10 disti-

chously arranged leaves. *Leaves* narrowly linear, articulated with the sheath, conduplicate, chartaceous, strongly ribbed, to 6 cm long and 3 mm broad, the apex 2-lobed and mucronate. *Inflorescence* a raceme, terminal, rarely longer than the uppermost leaf, distichous, densely 12–16-flowered, as in *Heliconia*, subtended by a foliaceous bract up to 1.5 cm long; pedicellate ovary 1.5 mm long, furfuraceous. *Flowers* white, subtended and exceeded by light brown (in dried material), cymbiform, imbricate bracts; sepals elliptic-ovate, to 4 mm long; lateral petals oblong, to 3.5 mm long and 1.3 mm wide, the lip to 3.5 mm long and 6 mm broad, retuse, saccate at the base and provided with two calli next to the column; column about 1.6 mm long. Flowering in February, but probably also during other months. Widespread in Central and South America.

This species is distinct for its narrowly linear leaves on wiry stems and *Heliconia*-like inflorescences. The flowers of the single collection available are old but they exhibit the characteristic pair of calli at the base of the lip.

10. *ENCYCLIA* Hook.

DRESSLER, R. L. 1976. The genus *Encyclia* in Mexico, 2nd ed. Asociacion Mexicana de Orquideologia, A.C., Mexico. 151 pp.

Epiphytic herbs with ovoid or somewhat elongated pseudobulbs. *Leaves* oblong to linear, coriaceous, up to 3 borne at the apex of the pseudobulb. *Inflorescence* terminal, sometimes ensheathed at the base of the peduncle by a large spathaceous bract. Sepals subequal, free and spreading; lateral petals usually similar to the sepals, occasionally broader or narrower, the lip free from the column or attached only at its base, often brightly colored, simple or variously 3-lobed; column stout or slender, often winged apically with 4 waxy pollinia. Rostellum never deeply slit.

A neotropical genus of 130 species, often found in areas of extreme seasonal drought. Easily distinguished from closely related *Epidendrum* in which the lip is united to the column usually to or nearly to the apex.

KEY TO THE SPECIES

1. Sepals more than 10 mm long.
 2. Perianth segments with a single violet line arising at the base; plant straggly; leaves less than 1.0 cm wide. 1. *E. abbreviata*.
 2. Perianth segments not so marked; plants not straggly; leaves much more than 1 cm wide.
 3. Pseudobulbs 2-foliolate. 2. *E. chacaoensis*.
 3. Pseudobulbs 1-foliolate. 3. *E. fragrans*.
1. Sepals less than 10 mm long. 4. *E. pygmaea*.

1. *Encyclia abbreviata* (Schltr.) Dressler

FIGURE 17.

A somewhat creeping epiphyte, the shoots separated by a conspicuous rhizome; roots velamentous, 1.0–1.5 mm in diameter; pseudobulbs 2-foliolate, fusiform, somewhat stipitate, ensheathed when young by foliaceous bracts becoming dry and disintegrating with age, 4–6 cm tall and 4–6 mm in diameter. *Leaves* linear or somewhat lanceolate, 8–17 cm long and 5–9 mm wide. *Inflorescence* a terminal raceme much shorter than the leaves, 3–6-flowered, 1–2 cm long; pedicellate ovary glabrous, about 1 cm long. *Flowers* greenish white, the petal and sepal bases marked with violet, as well as the blade of the lip; sepals similar, oblong, 9–11 mm long and 2–3 mm wide; lateral petals similar to the sepals, oblanceolate, 9–11 mm long and 2–3 mm wide, the lip broadly elliptic, the base of the lamina somewhat recurved, provided basally with a pubescent callus; column stout, apically tridentate, 4–6 mm in diameter. Flowering in March. Locally common from Mexico to Panama but apparently rare at La Selva.

The leaves of the only specimen known from La Selva are much narrower than those shown in the accompanying illustration.

2. *Encyclia chacaoensis* (Rchb. f.) Dressler & Pollard

FIGURE 18.

Cespitose epiphytes, often forming large clumps. Roots somewhat fleshy, velamentous, 1.5–2 mm in diameter. Pseudobulbs fusiform to conic, ensheathed basally with bracts becoming dry with age, 2-foliolate, 3–10 cm tall and 1.5–2 cm wide. *Leaves* oblong-elliptic, acute, 12–20 cm long, 1.5–2.5 cm wide. *Inflorescence* a terminal raceme with 2–8 flowers, 3–5 cm long; pedicellate ovary glabrous, 12–14 mm long. *Flowers* fragrant, whitish green, the lip veined with purple; dorsal sepal elliptic, about 1.5 cm long and 4–5 mm wide, the lateral sepals similar, but slightly broader and falcate; lateral petals elliptic, about 1.2 cm long and 5–6 mm wide, the lip ovate to orbicular, apiculate, concave, basally fused to the column, 10–13 mm long and 9–12 mm wide when spread out, the base provided with a pubescent callus; column stout, apically tridentate, to 7 mm long. Flowering in March. Widespread from Mexico to South America but rare at La Selva.

3. *Encyclia fragrans* (Sw.) Lamée

FIGURE 19.

Epiphytes, often forming large clumps, the shoots separated by about 1 cm on the rhizome; roots velamentous, about 2 mm in diameter;

pseudobulbs variable, slender to stout, fusiform to lanceolate, 1-foliolate, ensheathed at the base by 2 conspicuous bracts becoming dry and disintegrating with age, 4–14 cm tall and 0.5–2 cm in diameter. *Leaf* coriaceous, elliptic, acute, 11–28 cm long and 2.5–4.5 cm wide. *Inflorescence* a terminal raceme much shorter than the subtending leaf, up to 6-flowered, to 10 cm long including the peduncle, provided at the base with an ovate to lanceolate sheath up to 5 cm long; pedicellate ovary 1.5 cm long. *Flowers* fragrant, whitish green, the lip striped with violet; dorsal sepal 2–2.5 cm long and 3–4 mm wide, the lateral sepals about as long but wider; lateral petals elliptic, 1.8–2.3 cm long, 6–7 mm wide, the lip broadly ovate and acuminate, concave, provided with a v-shaped glabrous callus near the base; column stout, 6.5–8 mm long. *Fruit* a 3-winged capsule, about 4.5 cm long and 2.5 cm wide. Flowering October to March. Widespread and locally common throughout the neotropics.

This, the most abundant *Encyclia* at La Selva, is easily recognized by the 1-foliolate pseudobulbs.

4. *Encyclia pygmaea* (Hook.) Dressler

FIGURE 20.

A somewhat straggly epiphyte owing to the wide spacing of shoots on the rhizome; roots velamentous, 0.7–1.5 mm in diameter; pseudobulbs 2-foliolate, fusiform, arising from a pair of sheaths at the base, 2–5 cm tall and 2–6 mm in diameter. *Leaves* narrowly to broadly elliptic, often on the same plant, 2–6 cm long and 0.8–1.3 cm wide. *Inflorescence* terminal, much shorter than the leaves, 1–3-flowered, 4–7 mm long;

pedicellate ovary about 6 mm long. *Flowers* cream or pale green, the lip white marked with purple on the midlobe; sepals lanceolate, acute, 5–6 mm long and 1.8–2 mm wide; lateral petals more narrowly lanceolate than the sepals, acuminate, 4–5 mm long and 0.8–1 mm wide, the lip 3-lobed, the lateral lobes rounded, the midlobe smaller than either lateral lobe, acute, 3 mm long and 4–5 mm wide; column about 3 mm long. *Fruit* a capsule, strongly 3-winged, about 10 mm long and 6–7 mm wide.

Locally common and widespread from Mexico and Florida into northern South America. The two available specimens are fruiting only, but the low elevation probably excludes *Encyclia pseudopygmaea* (A. Finet) Dressler, and the remnants of the perianth are too small for *E. polybulbon* (Sw.) Dressler.

11. EPIDENDRUM L.

HAGSATER, E. 1984. *Epidendrum trialatum*, una nueva especie Centroamericana. *Orquidea* 9: 355–364.

Epiphytic herbs or sometimes scandent shrubs occasionally with pseudobulbs. *Leaves* conduplicate, coriaceous or occasionally fleshy. *Inflorescence* terminal, rarely lateral, a panicle, raceme, or umbel, rarely 1-flowered. Sepals and lateral petals subequal, usually spreading, the lip united to the column, simple or lobed; pollinia 4, waxy.

A neotropical genus of about 500 species. Easily distinguished from *Encyclia* which has an essentially separate lip and column.

KEY TO THE SPECIES

1. Leaves lacking articulations and never deciduous. 11. *Epidendrum schlechterianum*.
1. Leaves articulate.
 2. Plants forming pseudobulbs.
 3. Sepals and petals more than 5 cm long, linear. 1. *E. ciliare*.
 3. Sepals and petals much less than 3 cm long.
 4. Flowers white; sepals more than 8 mm long. 8. *E. octomerioides*.
 4. Flowers green suffused with lavender; sepals less than 7 mm long. 13. *E. stangeanum*.
 2. Plants lacking pseudobulbs.
 5. Flowers bright red with yellow on the lip. 4. *E. hawkesii*.
 5. Flowers not bright red.
 6. Lip digitate, with several finger-like projections. 2. *E. cristatum*.
 6. Lip not digitate.
 7. Inflorescence and peduncle longer than the longest leaf.
 8. Lateral sepals forming a saccate vesicle at the base. 9. *E. physodes*.
 8. Lateral sepals lacking a saccate vesicle at the base. 10. *E. rigidum*.
 7. Inflorescence and peduncle shorter than the longest leaf.
 9. Stems with 1 or at most 2 leaves at the apex.
 10. Flowers white; sepals more than 8 mm long. 8. *E. octomerioides*.
 10. Flowers green suffused with lavender; sepals less than 7 mm long. 13. *E. stangeanum*.
 9. Stems with 3 or more leaves.

11. Lip white, deeply 3-lobed, more than 4 cm long. 7. *E. nocturnum*.
 11. Lip not white, at most shallowly 3-lobed, less than 2 cm long.
 12. Blade of lip at least 1.5 times broader than long when spread out.
 13. Petals 2–3 mm wide. 3. *E. difforme*.
 13. Petals filiform, less than 1 mm wide. 15. *E. trialatum*.
 12. Lip much less than 1.5 times as wide as long.
 14. Leaves more than 1.2 cm wide. 5. *E. hunterianum*.
 14. Leaves at most 1.2 cm wide.
 15. Leaves grasslike, at least 15 times longer than wide. 6. *E. isomerum*.
 15. Leaves not grasslike, much less than 15 times as long as wide.
 16. Floral segments more than 9 mm long. 12. *E. sculptum*.
 16. Floral segments less than 5 mm long. 14. *E. strobiliferum*.

1. *Epidendrum ciliare* L.

FIGURE 21.

Epiphytes or lithophytes, sometimes forming large clumps; roots velamentous, white when dry, 2–3 mm in diameter; pseudobulbs 1–3-foliolate, but apparently always 1-foliolate at La Selva, cylindrical to clavellate, to 16 cm tall and 1 cm in diameter. *Leaves* elliptic, acute to obtuse. *Inflorescence* a distichous raceme of up to 10 flowers arising above a peduncle covered with several conduplicate bracts, to 25 cm long including the peduncle; pedicellate ovaries 4.5–6 cm long, subtended by a conduplicate bract up to 5.5 cm long. *Flowers* fragrant at night, green with white lip turning yellowish with age; sepals linear, to 6 cm long and 2.5–4 mm wide; lateral petals similar to the sepals but more acuminate, to 6 cm long and 2.5–4 mm wide, the lip united to the end of the column, the lamina 3-lobed, the midlobe long, acicular, 2.5–4 cm long, the lateral lobes to about 2 cm long, strongly lacinate; column clavate, arched above the middle, with a ciliate anther bed, the whole 1.2–1.5 cm long. Flowering October to December. Widespread and locally common throughout most of the neotropics.

The flowers are similar to those of *Epidendrum nocturnum* Jacq. which, however, has entire lateral lobes to the lip and the stems have several leaves and never one or two.

2. *Epidendrum cristatum* Ruiz & Pavon

FIGURE 22.

(=*Epidendrum raniferum* Lindl.)

Epiphytes to 1.3 m tall, usually much shorter; stems leafy, arching when mature, supporting an unbranched, pendent raceme. *Leaves* narrowly elliptic, the apex acute to rounded, 12–19 cm long and 1.8–2.8 cm wide. *Inflorescence* a terminal raceme, the peduncle provided basally with 3 to several overlapping, laterally-compressed bracts, 7–15-flowered, 4–9 cm long; pedicellate ovary to 5 cm long, subtended by acute bracts up to 1 cm long. *Flowers* greenish yellow with red markings, column white; sepals similar, coriaceous, oblong-oblongate, obtuse, the margins somewhat involute, about 20 mm long and

5 mm wide; lateral petals similar but 3 mm wide, the lip adnate to the column apex, with 3 major lobes, each variously serrulate to lacinate, the lamina to 15 mm long and 23 mm wide; column bowed, expanded above, 15–18 mm long. Flowers July and August. Rare from Mexico to South America.

3. *Epidendrum difforme* Jacq.

FIGURE 23.

Loosely caespitose epiphytes; roots velamentous, 1–2 mm in diameter, some of them bearing distinct nodules in the material examined; stems elongate, bearing up to 9 leaves, to about 35 cm tall and 0.5 cm in diameter. *Leaf* elliptic-oblong, obtuse to emarginate at the apex, articulated to the tubular sheath, somewhat flared at the apex, the blade 4–12 cm long and 0.8–2.5 cm wide. *Inflorescence* umbellate and subsessile at the stem apex; pedicellate ovaries 3–4 cm long subtended by short obtuse bracts. *Flowers* pale green; sepals oblong-oblongate, acute, the lateral sepals somewhat falcate, 2–2.3 cm long and 3–5 mm wide; lateral petals linear-oblongate about 2 cm long and 2–3 mm wide, the lip united to the end of the column, the lamina 3-lobed, cordate at the base, the midlobe about 1 cm across, the whole 15 mm long and 2–2.5 cm wide when spread out; column clavate, slightly arched near the apex. Flowering March to April. Widespread from Mexico and Florida into South America.

Probably several distinct species are present in the *Epidendrum difforme* complex. Originally described from West Indian material, *E. difforme* differs from *E. trialatum* Hagsater by the nearly straight column, distinct midlobe on the lip, linear and not filiform petals, and by the much larger plant and flowers.

4. *Epidendrum hawkesii* A. H. Heller

FIGURE 24.

Loosely caespitose epiphytes to about 1.5 m tall; stems with several leaves, to about 9 mm in diameter. *Leaves* fleshy, elliptic-oblong, obtuse, 5–11 cm long and 2.5–5 cm wide. *Inflorescence*

a single raceme or few-branched panicle of racemes supported by a peduncle of variable length covered by sheaths; pedicellate ovaries lengthening with age, 3–7.5 cm long, subtended by subulate bracts up to 5 mm long. *Flowers* orange red; sepals and lateral petals elliptic acute, 14–18 mm long and 5–6 mm wide, the lip united to the end of the column, the lamina strongly 3-lobed, 8 mm long and 12 mm wide, the margins irregularly dentate, and provided with a pair of mammillate calli at the base plus a central linear callus extending to nearly the apex. Flowering in April. Local in eastern Nicaragua and Costa Rica, but rare at La Selva, collected only once on pejobaye.

The orange red flowers distinguish this species from all other cane-bearing epidendrums at La Selva.

5. *Epidendrum hunterianum* Schltr.

FIGURE 25.

Loosely caespitose epiphytes 16–40 cm tall, the shoots connected by an abbreviated rhizome; roots velamentous, to 2 mm in diameter, forming an occasional nodule in the material examined; stems with 3–8 leaves, laterally compressed, about 5 mm in diameter. *Leaf* articulated to a flared sheath, elliptic-oblong, obtuse or 2-lobed at the apex, 2.5–14 cm long and 1.2–4 cm wide. *Inflorescence* umbellate, 1–7-flowered, supported by a peduncle about 1 cm long; pedicellate ovaries 2.5–4.5 cm long. *Flowers* pea green with a disagreeable odor (nocturnal?); sepals lanceolate-elliptic, acute, 1.5–2 cm long and about 0.5 cm wide; lateral petals elliptic, acute, 1.5–2 cm long, the lip adnate to the end of the column, the lamina orbicular, subcordate at the base, rounded to retuse at the apex, with several raised veins radiating from the base in dried material, with two obtuse calli at the base, about 1.5 cm long and 1.5 cm wide; column stout, flared at the apex, with the anther bed dentate, to about 0.6 mm long. Flowering from March to December. Known from Costa Rica and Panama and one of the most abundant epiphytes at La Selva.

This is vegetatively similar to *Epidendrum difforme* and *E. trialatum* but the lip has a single lobe, and the column is much shorter.

6. *Epidendrum isomerum* Schltr. FIGURE 26.

Plant a straggly, pendent epiphyte; roots fibrous, to about 1 mm in diameter; stems wiry, to 2 mm in diameter and one-half meter long, with short branches to about 12 cm long terminated by a 1-flowered *inflorescence*. *Leaves* linear to slightly attenuate, spaced about 1 cm apart on the stem, to about 9 cm long and 3 mm

wide, articulated to the sheath and deciduous with age. Ovary sessile, about 1.5 cm long at anthesis. *Flowers* yellowish green, subtended by 2–3 bracts; sepals lanceolate, acute, 11–15 mm long and about 2.5 mm wide; lateral petals narrowly elliptic, 10–14 mm long and 2 mm wide, the lip adnate to the end of the column, shortly clawed, the blade attenuate, acute, the margins involute, with a conspicuous v-shaped callus forming a prominent keel at its apex, 9–12 mm long and 4 mm wide when spread out; column stout, 7 mm long. Probably flowering in summer. Widespread and locally common in wet lowland tropics from Mexico to Panama and rather common at La Selva, but rarely collected.

7. *Epidendrum nocturnum* Jacq. FIGURE 27.

Usually epiphytic herbs, erect or becoming pendent; roots velamentous, to 2.5 mm in diameter; stems to about 50 cm tall, 4–5 mm in diameter. *Leaves* several, spaced 1.5–3 cm apart, elliptic-oblong, articulated with the sheath, the blade 4–14 cm long and 1.2–3 cm wide, although broader in other parts of its range. *Inflorescence* a terminal, short, sequentially flowered raceme, ensheathed by 3–4 triangular bracts at the base. *Flowers* fragrant at night, the sepals green, the lip and column white, but turning yellow with age; sepals narrowly linear, 5–6 cm long and 3–5 mm wide; lateral petals similar to the sepals but slightly smaller, the lip adnate up to the end of the column, the lamina 3-lobed, usually deeply so, 5–6 cm long and 2–3 cm across, the midlobe acicular, the lateral lobes broad, triangular-ovate, the base of the lamina with a pair of yellow calli; column 1.4–1.8 cm long, broadened apically. Probably flowering throughout the year. Widespread and locally common from Mexico and Florida into tropical South America; apparently rare at La Selva.

8. *Epidendrum octomerioides* Schltr.

FIGURE 28.

Straggly creeping epiphytes with broadly spaced stems; roots fibrous, to about 1 mm in diameter; stems 1- or 2-foliate, 5–10 cm long and to about 3 mm in diameter, covered with sheaths. *Leaves* variable, linear-oblong to lanceolate, obtuse at the apex, 3.5–12 cm long, 6–12 mm wide. *Inflorescence* a fascicle or very short raceme produced at the stem apex, 2–10-flowered; pedicellate ovaries about 1 cm long, subtended by slightly longer cymbiform floral bracts. *Flowers* fragrant, white; sepals elliptic-oblong, acute, about 10 mm long and 2.5–3.5 mm wide; lateral petals linear, oblanceolate, the apex variably acute to obtuse, the lip united to about half the length of the column,

shortly clawed at the base, the blade broadly ovate, cordate at the base, about 5 mm long and wide, with an apiculate apex, and provided basally with a pair of mammillate calli; column terete, clavate, 4.0–4.5 mm long. Flowering November to December. Local from Honduras to Costa Rica; rather abundant at La Selva.

This species is distinguished from others by the combination of the straggly habit, stem with one or two leaves and short racemes.

9. **Epidendrum physodes** Rchb. f. FIGURE 29.
(=*Physinga physodes* (Rchb. f.) Brieger & Bicalho)

Loosely caespitose epiphytes lacking pseudobulbs, rarely forming large clumps; roots velamentous, to about 1 mm in diameter; stems erect to ascending, 2.5–3 mm in diameter, concealed by leaf sheaths. *Leaves* distichous, oblong-lanceolate, 8–15 per stem spaced at intervals of 1–1.5 cm on each side, each 2–4 cm long and 3–7 mm wide, articulated to the sheath. *Inflorescence* a panicle of densely but sequentially flowered racemes, each to about 3.5 cm long supported on a wiry peduncle somewhat longer than the leafy stem, to 20 cm long including the peduncle; pedicellate ovaries 6 mm long, each subtended by a cucullate bract about 1 mm long. *Flowers* cream to yellow, tinged with pink; dorsal sepal ovate, acute, 5 mm long and 3.5 mm wide, the lateral sepals obliquely ovate, acute, 6 mm long and 3.5 mm wide forming a saccate vesicle at the base; lateral petals linear lanceolate, falcate, 5 mm long and 1 mm wide, the lip adnate to the column, 2-lobed, 3–4 mm long and 4–6 mm wide, with a pair of calli plus a thickened midvein; column stout, about 4 mm long, with a denticulate anther bed. Probably flowering throughout the year. Uncommon from Mexico to Panama and represented at La Selva by a single specimen.

The illustration shows a single raceme at the end of the scape, but this inflorescence is usually a panicle.

10. **Epidendrum rigidum** Jacq. FIGURE 30.

Straggly creeping epiphytes with shoots spaced 2–6 cm apart; roots about 1 mm in diameter; stems 12–30 cm long and 2–4 mm in diameter. *Leaves* 3–6 per shoot, each articulated with the sheath, the blade broadly to narrowly elliptic, apically retuse to emarginate, 1.8–8 cm long and 0.8–1.5 cm wide. *Inflorescence* a terminal spike with 5–20 flowers; ovaries about 1.2 cm long, sessile, subtended by laterally compressed, carinate deltoid bracts about 1 cm long. *Flowers* green, very fleshy; sepals oblong-elliptic to oblong-lanceolate, acute, 5–8 mm long, 2.5–4 mm

wide; lateral petals narrowly elliptic to oblanceolate, 4.5–7.5 mm long, 1–2.5 mm wide, the lip adnate to the column, the blade orbicular, basally cordate, apically obtuse to retuse; column stout, 2.5–3 mm long. *Fruit* an elliptic capsule, about 2.5 cm long including the beak and with persistent floral parts. Flowering April to August. Widespread and locally common throughout the neotropics but poorly collected at La Selva despite its abundance.

11. **Epidendrum schlechterianum** Ames
FIGURE 31.
(=*Nanodes discolor* Lindl.)

Compact epiphytes lacking pseudobulbs, usually closely appressed to the host tree; roots velamentous, to 1 mm in diameter; stems 4–11 cm long, concealed by closely spaced leaf sheaths. *Leaves* spaced at intervals of 7–11 mm apart, distichous, 1.5–3 cm long and 4–6 mm wide, fleshy, obtuse and retuse apically, not articulated with the sheath and the margins somewhat revolute. *Inflorescence* with 1 or a pair of flowers at the stem apex. *Flowers* green or with reddish tinge or markings; sepals elliptic-lanceolate, 9–12 mm long and 3–4 mm wide; lateral petals obliquely lanceolate, the apical margins denticulate 8–12 mm long and 2.5–3.5 mm wide, the lip adnate to the column apex with the blade reniform, basally cordate, apically rounded and mucronate, 4.5–6 mm long and 5–7.5 mm wide; column stout 5.5–7 mm long. Apparently flowering throughout the year. Widespread and locally common from Mexico into South America.

The plant is unique in its compact habit with closely spaced fleshy leaves on short stems. Flowers are well disguised and easily mistaken for leaves.

12. **Epidendrum sculptum** Rchb. f. FIGURE 32.

A somewhat straggly pendent epiphyte; roots about 1 mm in diameter; stems simple or branched, somewhat flexuous, 4–7 mm in diameter. *Leaves* several to many, deciduous, especially on the lower portion of the stem, elliptic-oblong, retuse, 1–6 cm long and 0.5 to 1.2 cm wide. *Inflorescence* a single flower or pair of flowers at the stem apex; ovary about 1 cm long. *Flowers* greenish, fleshy; sepals lanceolate-oblong, acute, 1–1.5 cm long and 2–3 mm wide; lateral petals oblong-elliptic, 1–1.5 cm long and 1.5–2 mm wide, the lip clawed, adnate to the base of the column, the blade deltoid-ovate, the sides erect, and with a pair of mammillate calli at the base; column stout about 3.5 mm long. Flowers in December. Local from Honduras to Ecuador and not uncommon at La Selva but only represented by a single collection.

13. *Epidendrum stangeanum* Rchb. f.

FIGURE 33.

A somewhat creeping epiphyte, forming large masses; roots much branched, to 1.5 mm in diameter; stems erect, cylindrical to slightly swollen, to about 5 cm high, with 1 or 2 leaves. *Leaves* linear, 1.5–11 cm long and 1.5 to 3.5 mm wide, if two present the lower usually shorter. *Inflorescence* a terminal raceme, shorter than the subtending leaf, about 9 cm long including the peduncle; pedicellate ovary puberulent, 5 mm long, subtended by somewhat shorter lanceolate bracts. *Flowers* greenish, suffused with lavender; sepals puberulent externally, elliptic-lanceolate, somewhat acuminate, 5–6 mm long and 1.5–2.5 mm wide; lateral petals linear 4.5–5.5 mm long and 0.5 mm wide, the lip adnate to the base of the column, suborbicular, tricarinate centrally, acuminate at the apex, 2.5–3.5 mm long and wide when spread out; column short, 2–2.5 mm long. Flowering September and October. Locally abundant from Honduras to Panama.

14. *Epidendrum strobiliferum* Rchb. f.

FIGURE 34.

A branched and somewhat straggly epiphyte, ascending or pendent; roots less than 1 mm in diameter; stems covered by rugose sheaths, lightly fractiflex, each branch less than 8 cm long. *Leaves* coriaceous, elliptic-lanceolate, 1–2.6 cm long and 0.5–0.8 cm wide. *Inflorescence* a terminal, 2–5-flowered, strobiloid, distichous, condensed spike; ovaries sessile, 3.5 mm long, subtended by glumaceous bracts about the same length. *Flowers* green to yellow, coriaceous; sepals broadly ovate to lanceolate, 3 mm long and 1.3–1.8 mm wide; lateral petals linear-oblong, 3 mm long and 0.7 mm wide, the lip adnate to the lower half of the column, the blade strongly nerved, cordate, acute, the margins somewhat involute, 2.7 mm long and 2.5 mm wide; column stout, about 2.5 mm long, with a pair of porrect acute auricles at the apex. *Fruit* an ellipsoidal capsule, 7–9 mm long. Flowering period unknown. Locally common and widespread throughout the neotropics but represented by a single collection at La Selva despite its ubiquity there.

15. *Epidendrum trialatum* Hagsater

FIGURE 35.

A loosely cespitose epiphyte, to about 15 cm high; stems 3–4-leaved, 2–4 mm in diameter. *Leaves* linear, obtuse to retuse. *Inflorescence* subumbellate, subsessile, several-flowered; pedicellate ovary 2–3 cm long. *Flowers* greenish white; sepals similar, elliptic to oblanceolate, 11 mm

long and 3–4 mm wide; lateral petals filiform, 9 mm long and 0.5 mm wide, the lip fused to the end of the column, obscurely 3-lobed, cordate at the base, the lamina 7.5 mm long and 1.4 cm wide when spread out; column clavate, arched at or above the middle; the anther bed irregularly dentate. Flowering November to March. Uncommon from Nicaragua to Panama, usually found between 500 and 1,000 m elevation.

12. *ERYTHRODES* Blume

Terrestrial herbs; roots forming from the nodes of the usually creeping or decumbent stems; stems sympodial, usually elongate. *Leaves* convolute, thin, petiolate, often with white or greyish markings, usually reticulate-veined. *Inflorescence* a raceme or spike. *Flowers* small; sepals free, often variously pubescent; lateral petals coherent with the dorsal sepal, the lip with a spur, partially united with the column, entire or 3-lobed, the apical lobes often reflexed; anther dorsal, pollinia 2. A pantropical genus of about 75 species.

KEY TO THE SPECIES

1. Leaves when flowering or fruiting mostly basal, spaced less than 1.3 cm apart. . . . 1. *E. purpurea*.
1. Leaves cauline, spaced at least 1.4 cm apart. 2. *E. tuerckheimii*.

1. *Erythrodes purpurea* (Ames) Ames

FIGURE 36.

A creeping rosulate terrestrial herb 15–35 cm tall; roots single at each node of the rhizome, about 1 mm in diameter. *Leaves* 3–7 forming a rosette at the end of the creeping rhizome, dark green adaxially, purple to light green abaxially, convolute, with a petiole and expanded sheath about one-third the length of the blade, the blade with 3 abaxially raised veins, elliptic-ovate, acute, slightly acuminate, 1.5–6.5 cm long and 0.9–2.9 cm wide. *Inflorescence* a puberulent, terminal, sequentially flowered raceme to about 12 cm long when fully developed, supported by a puberulent scape 12–15 cm long ensheathed with 3–4 somewhat flared tubular bracts; pedicellate ovaries sparsely pilose, 5–6 mm long. *Flowers* white, to about 30 per inflorescence; sepals oblong, sparsely pilose near the base, about 4.25 mm long and 1 mm wide; lateral petals similar to the sepals, but more broadly rounded apically, 3.75–4.25 mm long and 1 mm wide, the lip spurred at the base, canaliculate, constricted above and forming a retuse, 2-lobed apex, its blade 3.2 mm long and 3 mm wide across the lateral lobes when spread out, the spur cylindrical, about 2.5 mm long; column about 2 mm long. *Fruit* an ellipsoidal capsule, 5–6 mm long and 3 mm wide.

Flowering June and July. Apparently rare in Guatemala and Costa Rica, but probably also native to Honduras and Nicaragua.

This is a most easily overlooked terrestrial species, especially when not in flower.

2. *Erythroides tuerckheimii* (Schltr.) Ames

FIGURE 37.

(=*Aspidogyne tuerckheimii* (Schltr.) Garay)

A creeping terrestrial herb about 35 cm tall; roots pubescent, formed at the nodes of the creeping rhizome, 2 mm in diameter. *Leaves* 4–6, about 1.5 cm apart on the aerial stem, forming a petiole with tubular base 5–7 cm long; the blade obliquely elliptic, acuminate, with 3 abaxially raised veins, 7–9 cm long, 3–4.5 cm wide. *Inflorescence* a terminal spike with about 40 flowers, about 12 cm long at maturity supported by a sparsely pubescent scape about 8 cm long; ovaries sparsely pilose, 7 mm long. *Flowers* at La Selva described as “outer perianth members brick red, inner white”; sepals lanceolate-ovate, 3–4 mm long, 1–1.2 mm wide; lateral petals oblong, 3.4 mm long and 0.7 mm wide, the lip spurred at the base, canaliculate above, constricted above the middle and with a broadened, strongly reflexed apex, the whole about 4.4 mm long in natural position; column 2.2 mm long. *Fruit* a capsule, 7 mm long and 4 mm wide. Flowering July and August. Rare, Guatemala, Honduras, Costa Rica and Ecuador.

13. **GONGORA** Ruiz & Pavon

Cespitose epiphytes; pseudobulbs stout, ovoid, ridged, the apex with 2 or rarely 3 thin, plicate, usually elliptic, petiolate *leaves*. *Inflorescence* elongate, pendent racemes formed at the base of the pseudobulbs. *Flowers* few to many, resupinate in such a way as to face the axis; sepals similar, the laterals often reflexed, the dorsal sepal and lateral petals partially fused to the column, the lip very fleshy and complex, forming two distinct, acropetally defined regions: the hypochile at the base and epichile at the apex. The column forming a foot at the base; pollinia 2, waxy,

A neotropical genus of 40 species.

KEY TO THE SPECIES

1. Flowers spotted (evident even in herbarium specimens). 1. *G. quinquenervis*.
1. Flowers unspotted. 2. *G. unicolor*.

1. **Gongora quinquenervis** Ruiz & Pavon

FIGURE 38.

A cespitose epiphyte on trunks and lower branches of trees; roots velamentous, 2–3 mm in diameter; pseudobulbs conic or ovoid, 2-foliate, strongly sulcate longitudinally, 3.5–8 cm long and 12–25 mm in diameter. *Leaves* plicate, elliptic-obovate, acuminate, and shortly petiolate, 27–35 cm long including the petiole and 5–10 cm broad. *Inflorescence* a pendulous raceme, 55–75 cm long including the peduncle; pedicellate ovaries 3–5 cm long, subtended by triangular bracts about 2.5 mm long. *Flowers* pleasantly fragrant, white spotted and striped with dull red; dorsal sepal basally adnate to the column, the free portion elliptic-lanceolate, about 20 mm long and 6 mm wide, the lateral sepals reflexed from the base, lanceolate-ovate, 2–3 cm long and 1.2 cm wide; lateral petals basally adnate to the column, lanceolate, the free portion about 8 mm long, the lip complex, fleshy, provided near the base with a pair of erect horns and near the middle with a pair of upturned horns, the apex triangular, 1.5–1.7 cm long; column long, arching, about 1 cm long from the point of divergence of the lateral sepals. Probably flowering throughout the year. Widespread from Mexico into South America.

This species is easily distinguished from the following by the spotted color pattern, and by the pleasantly sweet fragrance.

2. **Gongora unicolor** Schltr.

FIGURE 39.

Cespitose epiphytes on trunks and lower branches of trees; roots velamentous 1.5–2 mm in diameter; pseudobulbs conic to cylindrical, strongly sulcate, 2-foliate, to 12 cm long and 3 cm wide. *Leaves* elliptic-oblongate to 50 cm long and 12.5 cm wide, strongly 3-nerved and somewhat petiolate. *Inflorescence* a lateral, pendulous raceme to 40 cm long including the peduncle; pedicellate ovaries 2.5–3.5 cm long. *Flowers* pink or flesh colored, unpleasantly odoriferous; dorsal sepal strongly adnate to the column basally, the free portion about 2 cm long and 10 mm wide, the lateral sepals reflexed from the base, obliquely lanceolate-ovate, about 3 cm long and 1.5 cm wide; lateral petals adnate to the column basally, diverging above as a pair of obliquely lanceolate horns, the free portion about 1 cm long, the lip complex, fleshy, provided near the base with a pair of out-turned horns plus at about the middle a pair of upturned horns, the apex triangular, to 2.5 cm long; column about 1.6 cm long from the point of divergence of the

lateral sepals. Probably flowering throughout the year. Uncommon from Mexico to Costa Rica.

This is distinguished from the previous species by the uniform pink unspotted flowers with unpleasant odor.

14. *HEXISEA* Lindl.

Cespitose epiphytic herbs. Stems simple or branched, often superposed, terete or angled. *Leaves* usually 1 or 2 from the apex of each stem segment, deciduous. *Inflorescence* from the shoot apex, few-flowered, short. *Flowers* usually bright red. Sepals and lateral petals subequal; the lip simple or lobulate, adnate with the base of the footless column, the base of the lamina geniculate and usually callus-thickened; pollinia 4, waxy.

A neotropical genus of five species. Very similar to *Scaphyglottis* but flowers are red and the column is footless.

1. *Hexisea imbricata* (Lindl.) Rchb. f.

FIGURE 40.

A somewhat straggly cespitose epiphyte with superposed pseudobulbs; roots velamentous, to about 1 mm in diameter; pseudobulbs strongly grooved, 2-foliate, 3–15 cm tall and 5–10 mm in diameter, ensheathed at the base with several bracts becoming papery and disintegrating with age. *Leaves* linear-lanceolate, retuse, 4–16 cm long and 0.6–1.4 cm wide. *Inflorescence* a terminal, few- to several-flowered fascicle nestled among several glumaceous bracts; pedicellate ovaries 10–15 mm long. *Flowers* red, the lip with yellow at the base; sepals elliptic-lanceolate 1.2–1.5 cm long and 3–5 mm wide; lateral petals about 1.1 cm long and 2–4 mm wide, the lip forming a nectary at the base, the blade elliptic-lanceolate, acute, about 8 mm long and 3–4 mm wide, with a pair of yellow calli at the base; column cylindrical, about 5 mm long. *Fruit* an ellipsoidal capsule, about 13 mm long and 7 mm in diameter. Flowering June to August with fruits mature by about February. Widespread but local from Mexico to northern South America and Peru, and one of the most abundant epiphytes at La Selva.

This is the only orchid at La Selva with both superposed pseudobulbs and red flowers.

15. *IONOPSIS* H.B.K.

Epiphytic herbs with at most rudimentary pseudobulbs. *Inflorescence* lateral, slender, erect or arching, simple or paniculate scapes. Sepals subequal, the laterals connate at the base producing a short sac; lip clawed and adnate to the

column base, the limb much exceeding the sepals. Column footless, lacking wings; pollinia 2, waxy.

A neotropical genus of three species.

KEY TO THE SPECIES

1. Leaves terete. 1. *I. satyrioides*.
1. Leaves flat. 2. *I. utricularioides*.

1. *Ionopsis satyrioides* (Sw.) Rchb. f.

FIGURE 41.

An epiphyte of twigs and smaller branches; roots fibrous, velamentous, to 0.5 mm in diameter; the stem condensed and often hidden by subtending leaves. *Leaves* 3–6, terete, acute, 2.5–13 cm long, to 3 mm in diameter. *Inflorescence* a lateral sequentially flowered raceme to 18 cm long including the peduncle but usually much shorter; pedicellate ovaries about 1 cm long. *Flowers* in the material from La Selva white with yellow callus; sepals somewhat campanulate and not widely spreading, lanceolate-elliptic, acute, 6 mm long; lateral petals oblanceolate, elliptic, obtuse, 6.5 mm long, the lip cuneate, emarginate, with a pair of mammillate calli at the base, 7.5 mm long; column stout, 1.5–2 mm long. Flowering in September to October. Widespread from Costa Rica to northern South America and the West Indies but rare at La Selva and known by a single collection.

2. *Ionopsis utricularioides* (Sw.) Lindl.

FIGURE 42.

An epiphyte, with usually only 1–2 shoots; roots fibrous, velamentous, to 1 mm in diameter; stems short to 3 cm tall, forming an inconspicuous pseudobulb (always?) at the apex. *Leaves* distichous, coriaceous, with conspicuous raised veins adaxially, variable in shape from elliptic to oblong or oblanceolate, acute, 4–15 cm long and 0.6–2 cm wide. *Inflorescence* a somewhat sequentially flowered panicle borne laterally near the stem apex, 50 cm high including the peduncle, the pedicellate ovaries 5–9 mm long. *Flowers* white or pink, veined with magenta; dorsal sepal ovate, acute to obtuse, 4–6 mm long and 2.5–3.5 mm broad, the lateral sepals connate for about half their length, acute, 5–7 mm long; lateral petals ovate, 5–7 mm long and 3–4 mm wide, the lip shortly clawed at the base, flabellate, strongly emarginate, 10–15 mm long and to 10 mm wide, provided at the base with a pair of white calli; column cylindrical, 2 mm long. Probably flowering throughout the year. Widespread and locally

common throughout the lowland neotropics, but uncommon at La Selva.

16. JACQUINIELLA Schltr.

Epiphytes lacking pseudobulbs. *Leaves* distichous, semiterete or laterally flattened. *Inflorescence* fasciculate, subtended by a foliose bract. Lip free from the column, or basally adnate; column with a short foot; pollinia 4, waxy.

A neotropical genus of 11 species.

1. *Jacquiella globosa* (Jacq.) Schltr.

FIGURE 43.

Cespitose epiphytes; roots fibrous, velamentous, to 0.5 mm in diameter; stems wiry, 4–10 cm long and to 1 mm in diameter, with 5–10 distichously arranged leaves. *Leaves* fleshy, semiterete, linear, somewhat arcuate, each articulated to a tubular sheath, 1.2–3.5 cm long and 1.5 mm wide in pressed specimens. *Inflorescence* a terminal, sequentially few-flowered fascicle; ovaries sessile, about 5 mm long at anthesis, subtended by a broadly flaring tubular bract 1–1.5 mm long. *Flowers* greenish yellow, apparently autogamous and rarely opening normally; sepals basally connate, concave, ovate-oblong, 2.5–3 mm long; lateral petals elliptic, concave 2–2.5 mm long, the lip united to the column, the blade orbicular, apiculate, about 2.5 mm long and 2.5 mm wide, with a semiorbicular callus at the base; column cylindrical, slightly broadened near the apex. *Fruit* globose, about 5 mm long, with an apical beak about 1.5 mm long. Flowering throughout the year. Mexico to Ecuador.

This species is unique with several semiterete leaves on wiry stems.

17. KEGELIELLA Mansfeld

Epiphytic herbs with ovoid pseudobulbs and 2–3 broadly elliptic, plicate leaves. *Inflorescence* a pendent raceme from the pseudobulb base, the rachis densely covered with glandular trichomes. Sepals subequal, covered exteriorly with glandular trichomes; lateral petals similar to the sepals but smaller, the lip complexly 3-lobed; column elongate, broadly winged above, footless; pollinia 2, waxy.

A neotropical genus of four species. Plants similar to a broad leafed *Gongora*, but usually smaller and the rachis and sepals are densely covered with glandular trichomes.

1. *Kegeliella atropilosa* L. O. Wms. & A. H. Heller

FIGURE 44.

A cespitose epiphyte but with the pseudobulbs forming in one direction; roots velamentous, to

1 mm in diameter; pseudobulbs ovoid-conic, smooth, 2- or 3-foliate, 1.5–2.5 cm long. *Leaves* elliptic to ovate, abruptly acuminate, with 3–5 nerves raised on the abaxial surface, to 16 cm long and 7 cm wide, including the 1.5 cm long petiole. *Inflorescence* a pendent, lateral, dark-pilose, few-flowered spike up to 6 cm long supported by a dark-pilose scape up to about 11 cm long; ovaries sessile, dark-pilose. *Flowers* greenish white, the sepals and petals marked transversely with red bars, the lip yellow with red spots on either side of the callus; sepals similar, linear-lanceolate, dark-pilose dorsally, about 17 mm long and 3 mm wide; lateral petals linear-oblong, about 12 mm long and 1–1.5 mm wide, the lip complex, about 8 mm long, subcordate in outline, the base unguiculate, 3-lobed, the lateral lobes suberect, rounded, about 4 mm long, the apical lobe subcordate, provided with a narrow, sulcate, puberulent callus about 6 mm long; column about 12 mm long with a broad, thin wing gradually tapering towards the base. *Fruit* a capsule about 3 cm long. Flowering time at La Selva unknown. Nicaragua to Panama.

This species, like all kegeliiellas, is extremely rare. Flowers are ephemeral and rarely seen, and the only specimen from La Selva bears capsules.

18. LEOCHILUS Knowles & Westcott

Small epiphytic herbs; pseudobulbs ovoid to globose, laterally compressed, 1- to 2-foliate, subtended by 1–2 leaves. *Leaves* conduplicate, elliptic to oblong. *Inflorescence* a lateral raceme or panicle with slender peduncles and few successively borne flowers. *Flowers* small; sepals spreading, the laterals free to variously connate; lateral petals similar to the sepals, the lip simple to 3-lobed, with a fleshy callus near the base; column footless, short, often with arms on each side at about the middle; pollinia 2, waxy.

A neotropical genus of about 16 species.

1. *Leochilus labiatus* (Sw.) O. Ktze.

FIGURE 45.

A small cespitose epiphyte; roots velamentous, to 0.5 mm in diameter; pseudobulbs laterally compressed, orbicular to ovate, to 1.3 cm tall, apically 1-foliate and with 1–2 leaves at the base. *Leaves* elliptic, acute, to 5 cm long and 1.1 cm wide. *Inflorescence* a broomlike sequentially flowered panicle, to 20 cm long including the peduncle; pedicellate ovaries about 6 mm long. *Flowers* with sepals and petals green marked with chocolate and with a yellow lip; dorsal sepal ovate, acute, cucullate, 6.5 mm long and 2.5 mm wide, the lateral sepals united for about half their length, about 6 mm long; lateral petals 3-nerved, ovate-elliptic, about 4.5 mm long, the lip obovate,

emarginate, about 8 mm long and 3.5 mm wide, provided with a shallow basal nectary and a central fleshy callus most prominent below the middle; column about 2.5 mm long, with a pair of oblong arms at about the middle. Flowering September to October at La Selva. Locally common epiphyte from the West Indies and Central America into northern South America.

Apparently rare at La Selva, having been collected only once in guava trees at north end of property.

19. LEPANTHES Sw.

Small epiphytic herbs with 1-foliolate secondary stems concealed by enlarged, tubular, ciliate sheaths. *Leaves* conduplicate and coriaceous. *Inflorescence* terminal, 1 to several from the base of the leaves, with distichously arranged minute flowers. Sepals subequal, often variously connate; lateral petals shorter than the sepals, bipartite or transversely 2-lobed and usually adnate to the column, the lip 2–3-lobed with the lateral lobes usually appearing as wings; column footless, wingless, dilated at the apex; pollinia 2, waxy.

A neotropical genus of perhaps 500 species. Distinguished from closely related *Trichosalpinx* by the distichous inflorescence, the bipartite petals and the footless column.

1. *Lepanthes blepharistes* Rchb. f. FIGURE 46.

A small, loosely cespitose epiphyte to about 5 cm tall; roots fibrous, less than 0.5 mm in diameter; secondary stems 2–3 cm tall, wiry, covered by 3–5 black-hispidulous sheaths widely flared at the apex. *Leaf* purplish, broadly elliptic, very shortly petiolate, 1–2 cm long and 7–12 mm in diameter, with 3 prominent purple nerves. *Inflorescence* a sequentially few-flowered raceme, 0.5–1 cm long including the peduncle; pedicellate ovaries about 2 mm long, subtended by shorter triangular-ovate bracts. *Flowers* green, red, and yellow; sepals basally connate, ovate, the dorsal somewhat larger than the laterals, with ciliate margins 3 mm long and 1.2–2 mm wide; lateral petals 2-lobed, papillose, each lobe ovate-lanceolate, much broader than long, about 3.5 mm wide between the lobe apices, the lip complexly 3-lobed, the lateral lobes conspicuous, ovate-lanceolate, the midlobe reduced to an apicule, 1 mm across the lateral lobes; column stout, deflexed and inserted between the lateral lobes of the lip. Probably flowering throughout the year. Rare in Nicaragua and Costa Rica, but perhaps more common and only seldom seen because of its small size.

This species has been collected only twice at

La Selva, and only one to three plants have been at each site.

20. MASDEVALLIA Ruiz & Pavon

Epiphytic or terrestrial herbs with 1-foliolate secondary stems. *Leaves* conduplicate, often broadest toward the apex and attenuated into a petiole at the base; in the La Selva species the peduncles normally 1- or 2-flowered and at least half as long as the leaves. Sepals basally connate into a tube and spreading apically; lateral petals much smaller than the sepals, the lip small, articulated to the column foot, about as long as the column; column with a foot; pollinia 2, waxy.

A neotropical and principally high Andean genus of 400 species. Similar to *Dryadella* which in the La Selva representative has scapes much shorter than the leaves.

1. *Masdevallia tubuliflora* Ames FIGURE 47.

Cespitose and sometimes dense epiphytes; roots velamentous, to 1 mm in diameter; secondary stems short, to 1 cm long. *Leaf* oblanceolate, petiolate, broadly rounded, 3.5–9.5 cm long and 8–13 mm wide. *Inflorescence* 1-flowered, produced on a wiry peduncle reaching at most to the ends of the longest leaves, 3.5–9.5 cm long and 1 mm in diameter; pedicel articulated with the ovary, subtended by a tubular floral bract 3–4 mm long, the ovary plus pedicel 13–18 mm long. *Flowers* 13–17 mm long; sepals white with green apices and with purplish markings exteriorly, to 18 mm long, the dorsal sepal free for about the apical half, the lateral sepals free for about the apical third; lateral petals oblong, to 4 mm long and 1.5 mm wide, with a carinate callus on the adaxial surface near the lower margin, the lip oblong-lanceolate, with a pair of carinate calli on the apical half, about 4 mm long and 1.5 mm wide, articulated with the column foot; column about 4 mm long extended basally into a foot about 2 mm long. *Fruit* a capsule, 15–20 mm long. Flowering July to December. Local from Belize to Costa Rica.

21. MAXILLARIA Ruiz & Pavon

Epiphytic herbs with short to elongate, often branching stems, with or without apically 1- to 4-leaved pseudobulbs. *Leaves* conduplicate, usually ligulate and coriaceous or fleshy. *Inflorescences* one to many, apparently reduced to elongate 1-flowered peduncles at the base of the pseudobulb. Sepals subequal, the lateral sepals somewhat adnate to the column foot and forming a chin at the base; lateral petals similar to the

sepals but usually smaller, the lip concave, 3-lobed or entire, the disk usually with a fleshy or mealy callus; column semiterete, rarely winged, and usually with a conspicuous foot; pollinia 4, waxy.
A neotropical genus of perhaps 600 species.

KEY TO THE SPECIES

1. Pseudobulb with 2–4 leaves borne apically on the pseudobulb.
 2. Dorsal sepal less than 22 mm long, flowers white to greenish. 5. *M. friedrichsthalii*.
 2. Dorsal sepal more than 22 mm long, flowers greenish yellow to brick red. 1. *M. aciantha*.
1. Pseudobulb with 1 apical leaf or pseudobulb lacking.
 3. Leaves grasslike, at least 30 times as long as wide and pseudobulbs hidden from view. 8. *M. lueri*.
 3. Leaves less than 25 times as long as wide and/or pseudobulbs conspicuous.
 4. Plants never with elongate rhizomes or canes separating the pseudobulbs.
 5. Sepals at least 4 cm long. 4. *M. endresii*.
 5. Sepals less than 3.5 cm long.
 6. Midlobe of lip at least half the length of the lip.
 7. Leaves at least 17 cm long. 7. *M. hedwigae*.
 7. Leaves less than 17 cm long. 2. *M. acutifolia*.
 6. Midlobe of lip one-third as long as the whole lip or less.
 8. Column foot about as long as the column; leaves at least 1.4 cm wide. 3. *M. confusa*.
 8. Column foot much shorter than the column; leaves less than 1.2 cm wide. 13. *M. xylobiflora*.
 4. Plants with conspicuous rhizomes or canes separating the pseudobulbs.
 9. Plants with erect canes at least 12 cm long and about 5 mm in diameter between pseudobulbs. 6. *M. fulgens*.
 9. Plants with more or less straggly rhizomes, but lacking erect canes, the pseudobulbs separated by much less than 10 cm.
 10. Flowers red with odor of coconut, leaves narrowly linear and never terete. 11. *M. tenuifolia*.
 10. Flowers neither red nor with the odor of coconut.
 11. Column foot essentially lacking. 10. *M. nicaraguensis*.
 11. Column with a distinct foot.
 12. Flowers white, the lip with yellow midlobe; leaves thin, more than 8 cm long. 8. *M. neglecta*.
 12. Flowers lavender; leaves semiterete, less than 8 cm long. 12. *M. uncata*.

1. *Maxillaria aciantha* Rchb. f. FIGURE 48.

Loosely caespitose epiphytes, rarely forming a large clump, some of the shoots separated by a conspicuous rhizome covered with imbricate bracts; roots fibrous, velamentous, to 1 mm in diameter; pseudobulbs cylindric-fusiform, 3–8 cm tall and 0.7–1.2 cm wide, laterally flattened and with several vertical grooves more conspicuous when dried. *Leaves* 1–2 at the base of the pseudobulb as well as 2–4 at the apex, linear to elliptic-oblong, unequally apically 2-lobed, 3–15 cm long and 0.8–1.2 cm wide. *Inflorescence* lateral, 1-flowered, the peduncle about 1.5 cm long covered by 3–5 inflated bracts; pedicellate ovary about 2.5 cm long, usually much longer than the uppermost bract. *Flowers* coriaceous, not opening fully and difficult to spread, brick red to yellowish green; dorsal sepal lanceolate, acute, concave, 2.5–3 cm long and 5–6 mm wide, the lateral sepals falcate, 2.5–3 cm long and 5–7 mm wide; lateral petals narrower than the sepals, falcate, 2.3–2.8 cm long, the lip elliptic-oblong, thickened along the margin and the apex, articulated

to the column foot, 2–2.6 cm long and 5–6 mm wide, provided with a linear callus from the base to just below the middle; column cylindric about 1.6–2.5 cm long, forming a short foot at the base. Flowering in March and April. Uncommon from Mexico to Costa Rica and at La Selva only collected once.

This is closely related to the sympatric *Maxillaria friedrichsthalii* Rchb. f., but the plant and flowers are generally larger, and the flower color is reddish to yellow green, never white to yellow.

2. *Maxillaria acutifolia* Lindl. FIGURE 49.

Cespitose epiphytes, rarely forming large clumps; roots fibrous, to about 1 mm in diameter; pseudobulbs 1-foliate, narrowly conic to cylindric, to about 4 cm long and 1.5 cm in diameter. *Leaf* narrowly elliptic, to 13 cm long and 1.5 cm wide. *Inflorescence* usually shorter than the pseudobulbs; pedicellate ovary 1.3–1.8 cm long. *Flower* dull yellow, the lip yellow with red spots and a red central line; sepals 1.2–1.5 cm long, and about 4 mm wide; lateral petals elliptic,

1–1.4 cm long and 2–3 mm wide, the lip 3-lobed, articulated with the short column foot, 1–1.2 cm long, the lateral lobes arising at about the middle, the midlobe more or less oblong, truncate and retuse; column arcuate, clavate, 7 mm long. Flowering in February. Locally common from Honduras to Ecuador and the Caribbean.

Represented at La Selva by a single specimen. This is similar to *Maxillaria hedwigae* Hamer & Dodson but differs most strikingly in odor, floral color, and subtle shape of the lip, all of which are obscured in dried material. *Maxillaria hedwigae* is a much larger plant with proportionately broader pseudobulbs than *M. acutifolia*.

3. *Maxillaria confusa* Ames & Schweinf.

FIGURE 50.

Epiphytes, rarely forming large clumps, the shoots shortly creeping; roots to about 1 mm in diameter, pseudobulb 1-foliate, truncate, laterally compressed, ovoid, 2–3 cm long, provided basally with a petiolate, elliptic, foliate bract 6–12 cm long including the petiole and 1.4–2.3 cm wide. Apical leaf petiolate, elliptic, acute, 8–20 cm long including the petiole and 1.5–3 cm wide. Inflorescences lateral, several, 3–7 cm long including the pedicellate ovary, covered with 4–5 pale green bracts. Flowers white, the lip with purple markings; dorsal sepal elliptic-lanceolate, concave, 1.8–2.2 cm long and about 5 mm wide, the lateral sepals triangular lanceolate, somewhat attenuate, 2–2.5 cm long and 5 mm wide at the base forming a conspicuous chin; lateral petals lanceolate-falcate, 1.5–2 cm long and about 4 mm wide, the lip articulated with the column foot, strongly 3-lobed apically, 12–14 mm long and about 6 mm wide when spread out, the 3 lobes about equal in width, the midlobe verrucose, suborbicular, with an ovate callus just above the middle; column stout, about 5 mm long, forming a foot 5.5 mm long. Flowering in June. Rare from Nicaragua to Panama, and represented at La Selva by one collection.

This is similar to *Maxillaria xylobiiflora* Schltr. but is a much larger plant with proportionately broader leaves.

4. *Maxillaria endresii* Rchb. f. FIGURE 51.

Cespitose epiphytes, often forming large clumps; roots fibrous, to 2 mm in diameter; pseudobulbs laterally compressed, rugose, ovoid to orbicular, 1-foliate, 5–6 cm long and 3.5–4 cm wide. Leaf long-petiolate, the blade to 35 cm long and 7 cm broad, the petiole about half as long as the blade. Inflorescences ensheathed by 4–7 bracts soon becoming withered and papery.

Flowers spicy-scented, variable in floral segment attenuation; sepals light yellow within, lighter on the abaxial surface, the dorsal sepal oblong, acute, erect, 5.5–7 cm long and 0.9 cm broad, the lateral sepals lanceolate, falcate, 5.5–8 cm long and 1 cm wide; lateral petals light yellow, smaller than the sepals, broadened at the base, otherwise linear, acute, 4.5–6.5 cm long and 0.7 cm wide, the lip abruptly 3-lobed, 3 cm long and 2.2 cm wide when straightened out, the midlobe about $\frac{2}{3}$ the length of the whole lip, bright yellow with a white hyaline margin, lateral lobes whitish striped with purple, the callus simple, extending to about $\frac{2}{3}$ the length of the lip, more or less v-shaped in front; column white, lined with purple, cylindrical, somewhat arching, 2 cm long including the 8 mm long foot; the anther bed magenta, ciliate; anther cap brownish, 3 mm long. Flowering November to April. Costa Rica and probably Nicaragua and Panama.

This is a very abundant and spectacular epiphyte on larger branches at La Selva, especially in trees around the cabins on the south bank of the Río Puerto Viejo.

5. *Maxillaria friedrichsthali* Rchb. f.

FIGURE 52.

Loosely cespitose epiphytes, rarely forming large clumps, some of the shoots separated by a conspicuous rhizome covered with imbricate bracts; roots fibrous, velamentous, to 1 mm in diameter; pseudobulbs oblong, 3–5 cm tall and 6–13 mm wide, somewhat laterally flattened and with several vertical grooves more conspicuous in dried material. Leaves 1–2 at the base of the pseudobulb as well as 2–3 at the apex, linear to oblong, unequally 2-lobed apically, 3.5–15 cm long and 3.5–9 mm wide. Inflorescence lateral, the peduncles 1.5–3 cm long covered by 5–7 bracts; pedicellate ovary entirely concealed by bracts, shorter than the uppermost bract. Flowers coriaceous, not opening fully and difficult to spread, white to yellowish, turning greenish with age; dorsal sepal oblong-lanceolate, acute, concave, 15–20 mm long and 3.5–5 mm wide, the lateral sepals similar to the dorsal sepal but falcate, adnate to the column foot; lateral petals falcate, elliptic-oblong, 13–18 mm long, the lip elliptic oblong, very slightly 3-lobed, 12–17 mm long, articulated with the column foot and with a linear basal callus extending to about the middle; column to about 10 mm long including the foot. Flowering February to March. Locally common from Mexico to Panama.

This is closely related to the sympatric *Maxillaria aciantha*, but the plant and flowers are generally smaller and the flower color is white to yellow, never reddish except for spots on the lip.

6. *Maxillaria fulgens* (Rchb. f.) L. O. Wms.

FIGURE 53.

Large basally caespitose epiphytes with upright shoots forming canes, each terminated by a pseudobulb giving rise basally to a similar shoot; roots coarse, to 2 mm in diameter; stem 12–20 cm long and 5–7 mm in diameter, concealed by sheaths; pseudobulbs ovoid, about 3 cm tall, usually concealed by leaf bases. *Leaves* 3–5 below the pseudobulb, narrowly elliptic, 15–30 cm long and 1.4–2.3 cm wide. *Inflorescence* a fascicle of many flowers, each supported by a peduncle 2.5–3 cm long including the pedicellate ovary. *Flowers* globose, fleshy, red with a yellow to orange lip; sepals ovate, concave, 5–7 mm long and 4–5 mm wide, the lateral sepals adnate to the column foot; lateral petals ovate 4.5–6.5 mm long and 3–4 mm wide, the lip rigidly attached to the column foot, saccate at the base and constricted at about the middle, to 7 mm long, the apical half ovate and concave; column about 3 mm long, somewhat arcuate, forming a very short foot at the base. Flowering September to October. Local from Nicaragua to Panama and Venezuela and quite common at La Selva.

Maxillaria fulgens is distinguished by the robust habit with shoots separated by conspicuous aerial stems and by the globose red and yellow flowers.

7. *Maxillaria hedwigae* Hamer & Dodson

FIGURE 54.

A caespitose epiphyte consisting of a few shoots and rarely forming large clumps; roots fibrous, to 2 mm in diameter; pseudobulbs rugose, ovoid-conic, 1-foliolate, to about 4.5 cm long and 2.5 cm wide, ensheathed basally when young by 4–6, acute, nonfoliaceous bracts. *Leaf* thin, petiolate, the blade narrowly elliptic, acute, to 36 cm long and 3.5 cm wide. *Inflorescence* 3–5 cm long with 3 or 4 acute bracts about 1.5 cm long; the pedicellate ovary 2.5–3 cm long, exceeding the subtending bract. *Flowers* white to cream, probably turning greenish with age, lip bright orange; sepals elliptic, 17–19 mm long and 7–9 mm wide; lateral petals elliptic, 15–17 mm long and 6–7 mm wide, the lip 3-lobed at about the middle, the lateral lobes erect, lanceolate, the midlobe very fleshy, somewhat lanceolate but with a truncate to retuse apex, the callus spatulate, extending to about the middle; column arcuate, about 10 mm long, with a short foot and winged on the ventral side of the upper half. *Fruit* an ellipsoidal capsule 2 cm long. Flowering February to March. Locally common from Guatemala to Costa Rica.

This species is closely related to *Maxillaria*

acutifolia and the two are difficult to distinguish in dried material.

8. *Maxillaria lueri* Dodson

FIGURE 55.

A pendulous, somewhat straggly epiphyte; stem concealed by black-warty imbricate sheaths; pseudobulbs terete, surrounded by leaf sheaths, apically 1-foliolate and surrounded basally by 3–4 well developed leaves. *Leaves* narrowly linear, the larger ones at least 30 times as long as wide, articulate to the sheath, linear, to 40 cm long and less than 5 mm wide. *Inflorescences* borne on short peduncles concealed by the leaf bases. *Flowers* “pinkish-white”; dorsal sepal elliptic, acute, 1.8 cm long and 0.7 cm wide, the lateral sepals obliquely ovate, to 2.5 cm long and 1 cm wide, adnate to the column foot; lateral petals obliquely elliptic, to 1.5 cm long and 6 mm wide, the lip about 2 cm long, apically 3-lobed, the midlobe about one-fourth the length of the lip, its blade with a central ligulate callus; column 7–8 mm long with a conspicuous foot of about the same length. Flowering time unknown. Uncommon in Ecuador, Panama and Costa Rica (new record for Costa Rica).

The single sterile plant collected resembles no species other than *Maxillaria lueri*, and R. L. Dressler (pers. comm.) reports that it is common in Panama, so the occurrence of this lowland species in Costa Rica is not surprising.

9. *Maxillaria neglecta* (Schltr.) L. O. Wms.

FIGURE 56.

A straggly, usually somewhat pendent epiphyte forming large loose clumps, the shoots separated on an elongate rhizome; roots rather fine, 0.5 mm in diameter; rhizomes concealed by bracts, 2–7 cm long between the pseudobulbs and 2.5–4 mm in diameter; pseudobulbs oblong, somewhat laterally compressed, 1-foliolate, 1.8–3.5 cm long and 4–12 mm wide. *Leaf* thin, linear-lanceolate, acute, 7–20 cm long and 5–13 mm wide. *Inflorescence* a cluster of single flowers each borne on a peduncle formed in the axils of bracts at the base of the pseudobulb, the peduncle plus pedicellate ovary less than 1 cm long. *Flowers* fleshy, white, the lip with yellow midlobe; dorsal sepal ovate, concave, 5–6 mm long and 4–5 mm wide when flattened, the lateral sepals united up to half their length, forming a conspicuous chin, obliquely ovate, 5–7 mm long and 4.5–5.5 mm wide; lateral petals similar to the sepals but smaller, the lip about 6 mm long, 3-lobed, the lateral lobes quadrate and upturned, the midlobe articulate with the base of the lip, subcordate; column cylindrical, about 2.5 mm long, forming a conspicuous foot at the base. Flow-

ering August to November. Locally common from Guatemala to Panama, and very abundant at La Selva.

10. *Maxillaria nicaraguensis* (Hamer & Garay) Atwood FIGURE 57.
(=*Neourbania nicaraguensis* Hamer & Garay)

A straggly decumbent epiphyte lacking pseudobulbs; roots velamentous, to 1 mm in diameter; stems ascending, to about 20 cm tall, unbranched above and provided with 6–12 distichously arranged leaves. *Leaves* spaced 2 cm apart on each side, 4–7.5 cm long and 5–8 mm wide, oblanceolate-oblong, slightly unequally 2-lobed at the obtuse apex, articulated to the somewhat inflated rugose sheath. *Inflorescences* appearing singly or in pairs in the leaf axils, the peduncle plus pedicellate ovary 1–2 cm long. *Flowers* creamy yellow marked with red; sepals oblong-lanceolate, 8–9 mm long and 1.5 mm wide; lateral petals obliquely oblong-lanceolate, 6–7.5 mm long and 1.5–2 mm wide, the lip oblong-pandurate, constricted in the middle, rigidly attached to the base of the column, the basal half concave and parallel to the column, the apical half reflexed and with a crenulate margin, 5–8 mm long and 2–2.5 mm wide; column arcuate, about 4 mm long. Flowering in December. Local and apparently rare in Nicaragua and Costa Rica, represented at La Selva by a single collection, although it is quite common there.

11. *Maxillaria tenuifolia* Lindl. FIGURE 58.

Densely cespitose epiphytes, forming large clumps, producing many loosely erect to ascending stems with pseudobulbs distributed at intervals; roots velamentous, to 1 mm in diameter; pseudobulbs 1-foliate, distributed at intervals of 1.5–6 cm on the stems, ellipsoid-ovoid; somewhat laterally compressed, 2–3 cm tall. *Leaves* thin, narrowly linear to 45 cm long and 6 mm wide. *Inflorescences* produced in the axils of bracts surrounding the pseudobulb, 1-flowered, with peduncles to 2 cm long, hidden by bracts; pedicellate ovary 2–4.5 cm long. *Flowers* with the fragrance of coconut, red to greenish yellow spotted with red, the lip white to yellow spotted with red; sepals with revolute margins, elliptic-lanceolate, the lateral sepals somewhat obliquely so, 15–20 mm long and 5–7 mm wide; lateral petals lanceolate, the apical margins serrulate, 14–19 mm long and 4–6 mm wide, the lip elliptic, the apex serrulate, reflexed, articulated with the column foot, 15–18 mm long and 5–8 mm wide, provided basally with a ligulate callus extending to just below the middle; column arcuate, 11–13

mm long, forming a short foot at the base. Flowering apparently restricted to April and May. Locally common from Mexico to Costa Rica, but uncommon at La Selva.

This species is readily recognized by the long linear leaves on conspicuous pseudobulbs, and the usually red flowers with odor of coconut.

12. *Maxillaria uncata* Lindl. FIGURE 59.

Cespitose epiphytes, straggly when large, the pseudobulbs distributed at intervals of 1–2 cm along the aerial stem; roots velamentous, to 1 mm in diameter; pseudobulbs cylindrical, 1-foliate, to about 12 mm long. *Leaf* coriaceous, linear-elliptic, oblanceolate, 3–7 cm long and 1.5–3.5 mm wide. *Inflorescences* lateral, the peduncle plus pedicellate ovary 1.5–2 cm long. *Flowers* light lavender with darker veins, never opening fully; dorsal sepal elliptic to lanceolate, 7–11 mm long and 2–4 mm wide, the lateral sepals obliquely triangular-lanceolate, 10–16 mm long and 3–5 mm wide; lateral petals lanceolate, 6–11 mm long and 2–4 mm wide, the lip oblong, to 15 mm long and 5 mm wide, constricted on the upper third forming a suborbicular apical lobe, articulated with the column foot, and with a ligulate callus terminating just below the constriction; column dilated and winged apically, to 12–16 mm long including the foot. *Fruit* an ellipsoidal capsule, 12–13 mm long. Apparently flowering throughout the year. Widespread and locally common from Mexico to South America; quite common at La Selva.

At La Selva, the apically dilated arcuate column is unique to this species of *Maxillaria*.

13. *Maxillaria xylobiiflora* Schltr. FIGURE 60.

A small, compact, cespitose epiphyte; roots fine, to 0.5 mm in diameter; pseudobulbs 1-foliate, oblong-ovate, less than 1 cm long, mostly concealed by 1–2 foliate basal sheaths. *Leaves* variable, linear-elliptic to oblanceolate, acute to rounded at the apex, shortly petiolate, 2.5–7 cm long and 3–9 mm wide. *Inflorescences* with the peduncles 1.5–4.5 cm long including the pedicellate ovary, almost totally concealed by 3–4 laterally compressed bracts. *Flowers* greenish white, the lip buff yellow lined with purple and with a deep yellow midlobe; sepals lanceolate to elliptic-lanceolate, 1.2–1.8 cm long, and about 3 mm wide; lateral petals elliptic lanceolate 1–1.7 cm long and about 3 mm wide, the lip articulated with the column foot, apically 3-lobed, to about 1 cm long and 4 mm wide, the lateral lobes upturned, the apical lobe $\frac{1}{4}$ – $\frac{1}{3}$ the length of the lip, ovate, verrucose; column cylindrical, about 4 mm long, with a short foot. *Fruit* an ellipsoid-ob-

ovoid capsule about 1.3 cm long. Flowering time variable, at least March and October. Widespread but apparently rare from Nicaragua to Bolivia.

This is very similar to *Maxillaria confusa* but is a much smaller plant, and the column foot is much shorter than the column.

22. MENDONCELLA A. D. Hawkes

Epiphytic, caespitose herbs; pseudobulbs ovoid, smooth to slightly ribbed, topped by 2 or 3 elliptic leaves. *Inflorescence* a lateral few-flowered raceme. *Flowers* large and showy; sepals and lateral petals similar, green marked with brownish purple, the lip 3-lobed, provided with a pectinate callus; column stout, arching; pollinia 4, in unequal pairs.

A neotropical genus of up to seven species.

1. *Mendoncella grandiflora* (A. Rich.) A. D. Hawkes

FIGURE 61.

Cespitose epiphytes, forming a cluster of pseudobulbs, but only the most recent retaining leaves; roots velamentous to about 3 mm in diameter; pseudobulbs ovoid-cylindric, 2-foliolate at the apex and occasionally with a smaller leaf sheathing the base. *Leaves* elliptic-oblongate, to about 50 cm long and 10 cm wide. *Inflorescence* a lateral raceme formed in the axils of the lower bracts of the immature shoot, 2-6-flowered, the peduncle 14-20 cm long with one inflated sheath 3.5 cm long, the flowers spaced 3-5 cm apart; pedicellate ovaries about 5 cm long, subtended by much inflated bracts 3.5-4.5 cm long and 2-2.5 cm wide when spread out. *Flowers* large and showy; sepals green with 5-7 reddish stripes, lanceolate, somewhat attenuate and recurved at the apex, 4-4.5 cm long and 1-1.5 cm wide; lateral petals similar to the sepals in color and shape, lanceolate, attenuate, decurrent on the column foot and apically recurved, 3.8-4.4 cm long and 1.5 cm wide, the lip white with magenta lines, articulated with the column foot, 3-lobed, the margin coarsely serrate to fimbriate, the lateral lobes more or less ovate, porrect, the midlobe much larger, to 3 cm long and 2 cm wide, attenuate and decurved, the whole provided by a pectinate callus of several keels terminating as blunt teeth at the base of the midlobe; column white to yellow with reddish stripes, arcuate, apically winged, 2.5-3 cm long including the foot. *Fruit* an obovoid capsule 8 cm long. Flowering in April. Rare from Mexico to Colombia, represented at La Selva by a single specimen.

This is one of the most spectacular orchids at La Selva.

23. MYOXANTHUS Poepp. & Endl.

Epiphytic, 1-foliolate, often prolific and scandent herbs with secondary stems clothed in densely hispidulous sheaths. *Inflorescence* a fascicle of flowers which may open together or sequentially. Sepals free or variously connate; petals elongate, often thickened; column short, and 2-winged, with a distinct foot.

A neotropical genus of 34 species. Easily recognized among the pleurothallids by the hispidulous sheaths of the secondary stems.

1. *Myoxanthus scandens* (Ames) Luer

FIGURE 62.

(=*Pleurothallis scandens* Ames)

Very loosely caespitose, pendent, straggly, prolific, epiphyte with plantlets forming at the tops of the secondary stems; roots velamentous, to 1 mm in diameter; secondary stems 1-foliolate, few to several to a cluster, 2-18 cm long, even on the same plant, wiry, covered with 2-3 scurfy to glandular pilose sheaths. *Leaves* grasslike, to 10.5 cm long and 4 mm wide, but usually smaller, linear to very narrowly elliptic. *Inflorescence* fascicled at the base of the leaf subtended by dilated bracts; pedicellate ovaries about 4 mm long. *Flowers* greenish yellow; dorsal sepal ovate-elliptic, concave, about 4 mm long and 1.7 mm wide, the lateral sepals united at the base, obliquely ovate, 4 mm long and 2 mm wide; lateral petals lanceolate-attenuate, somewhat constricted towards the middle, thickened apically, the lip articulated with the column foot, arcuate, 3-lobed, fleshy, 1.5 mm long, the lateral lobes arising at about the middle, the apical lobe obtuse to rounded; column dilated above, with a pair of lateral teeth anteriorly near the summit, about 2 mm long forming a right angle with the column foot. Probably flowering throughout the year. Apparently rare and local in Costa Rica and Panama.

This unusual, spindly and unattractive orchid is easily overlooked by collectors. The prolific shoot habit and scurfy to glandular-pilose pubescence are unique among the orchids of La Selva.

24. NIDEMA Britt. & Millsp.

Cespitose, epiphytic herbs; pseudobulbs 1-foliolate; leaves linear. *Inflorescence* a terminal raceme. *Flowers* appear similar to those of *Scaphyglottis* with which it is related. Sepals and lateral petals lanceolate-elliptic, the lip hinged at the base of the short column foot; pollinia 4, in unequal pairs.

Sometimes confused in the field with *Maxillaria* which differs in its lateral, 1-flowered inflorescences. A neotropical genus of two species.

1. *Nidema boothii* (Lindl.) Schltr. FIGURE 63.

A straggly epiphyte forming large clumps, the erect shoots distributed at intervals of 1.2–2 cm along the rhizome; roots velamentous, to 1 mm in diameter; pseudobulbs 1-foliolate, cylindrical-ellipsoidal, sometimes stipitate, 3–4.5 cm tall and 3–5 mm in diameter, hidden when young by 4–6 closely appressed, acute sheaths. *Leaves* linear to narrowly oblanceolate, 6–14 cm long and 5–9 mm wide. *Inflorescence* a few-flowered raceme, apical, very often developing before shoot maturity, shorter than the leaf, to 10 cm long including the peduncle; pedicellate ovaries black-scurfy, 12–16 mm long, subtended by lanceolate bracts 12–16 mm long. *Flowers* fragrant, creamy yellow; sepals elliptic-lanceolate, 11–18 mm long and 3–4 mm wide; lateral petals obliquely narrowly elliptic, 10–12 mm long and 2–4 mm wide, the lip oblong-elliptic to linear-spatulate, recurved near the base, to 10 mm long and 4 mm wide; column cylindrical, arcuate, 5–6 mm long. *Flowers* mostly from March to August. Widespread and locally common from Mexico to Panama; West Indies.

One of the most abundant orchids at La Selva, it superficially resembles some maxillarias in plant habit, but bears flowers in terminal racemes among other differences.

25. **OCTOMERIA** R. Br.

Epiphytic herbs; secondary stems 1-foliolate, with 1–several sheaths. *Leaves* sessile or shortly petiolate, coriaceous, subrotund to linear. *Flowers* in dense fascicles at the base of the leaf, rarely single or twinned; sepals and petals similar, elliptic to attenuate, the lateral sepal often variously connate, column much shorter than the petals, forming a foot at the base; pollinia 8, waxy. *Fruit* a capsule.

A neotropical genus of 134 species, best developed in South America. Easily distinguished from other pleurothallids by the number of pollinia.

KEY TO THE SPECIES

1. Plants creeping; leaves less than 4 cm long.
 1. *O. graminifolia*.
 1. Plants caespitose; leaves at least 5 cm long.
 2. *O. sp.*

1. *Octomeria graminifolia* (L.) R. Br.

FIGURE 64.

Creeping epiphyte, the shoots spaced at intervals of 2–2.5 cm along every 3 nodes of the rhizome; roots velamentous, to 0.5 mm in diameter forming at the nodes; secondary stems ascending, 1-foliolate, 2–3 cm tall, consisting of 3 internodes, covered when young by somewhat flaring sheaths which turn papery and shred with age. *Leaf* narrowly elliptic, coriaceous, acute and cuspidate apically, carinate abaxially, 2.6–3.5 cm long and 4–7 mm wide. *Inflorescence* a few-flowered fascicle at the base of the leaf; pedicellate ovary 3–5 mm long. *Flowers* pale yellow; sepals and lateral petals ovate-lanceolate, 6–7 mm long and 2 mm wide, the lip trilobulate at the base, the apex truncate, about 5 mm long; column somewhat arcuate, 2 mm long forming a short foot at the base. Flowering in May and June. West Indies; Nicaragua and Costa Rica.

This rhizomatous epiphyte is locally common on tree trunks.

2. *Octomeria* sp.

FIGURE 65.

A caespitose epiphyte; roots velamentous, to 1.5 mm in diameter; secondary stems wiry, ascending, 1-foliolate, to 12 cm long, covered by somewhat flaring sheaths becoming papery and shredding with age. *Leaves* fleshy, elliptic, petiolate, carinate abaxially, 6–9 cm long and 7–11 mm wide. *Inflorescence* a dense fascicle at the base of the leaf. *Flowers* not seen.

This matches a vegetative description of *O. costaricensis* Schltr., and is probably too small to be *O. valerioi* Ames & Schweinf. A flowering specimen is needed for comparison.

27. **ONCIDIUM** Sw.

Epiphytic or rarely terrestrial herbs with short, foliaceous stems thickened into pseudobulbs in the species at La Selva. *Leaves* subcoriaceous to fleshy, flat, terete or triquetrous, elliptic to linear. *Inflorescences* usually 1 or 2 of various types produced from the pseudobulb base. *Flowers* very often yellow with brown markings, but may exhibit diverse color patterns. Sepals subequal, the laterals often at least partially united, but never forming a spur as in *Ionopsis*; lateral petals very often similar to the sepals but sometimes different, the lip simple or more often 3-lobed and pandurate, usually forming more than a right angle with the column, and usually with a complex callus; column often winged apically, lacking a foot; pollinia 2, waxy.

A neotropical genus of perhaps 432 species

depending on the generic circumscription. A key to the following species is provided for those who follow the older and broader interpretation of the genus *Oncidium*, even though two of them are currently considered under other genera.

KEY TO THE SPECIES

1. Plant psygmoid (the shoots fanlike).
 *O. pusillum* (see *Psychmorchis pusilla*).
1. Plant not psygmoid.
 2. Inflorescence a sequentially flowered raceme; sepals strongly reflexed, more than 4 cm long.
 *O. kramerianum*
 (see *Psychopsis krameriana*).
 2. Inflorescence a panicle of racemes, the flowers opening simultaneously; sepals not reflexed, much less than 3 cm long. 1. *O. stenotis*.

1. *Oncidium stenotis* Rchb. f. FIGURE 66.

A robust epiphyte sometimes forming large masses; roots velamentous, to 1.5 mm in diameter; pseudobulbs ovate, laterally compressed, apically 1-foliate, several-ribbed, to 15 cm tall and 5 cm wide, each separated at intervals of 2–5 cm on the rhizome. Lateral leaves produced at the base of the pseudobulb 2–4, the blades thin, elliptic or oblong, obtuse to rounded at the apex, to 25 cm long and 5 cm wide, articulated with the sheath; apical leaf similar to the lateral leaves, to 40 cm long and 6 cm wide. *Inflorescence* pendent, a panicle of fractiflex racemes, to about 1.5 m long and produced laterally at the base of the pseudobulb; pedicellate ovaries 1.8–3 cm long, subtended by lanceolate bracts 6–9 mm long, separated on the peduncle at intervals of 1.5–2 cm. *Flowers* yellow barred with reddish brown, the midlobe of the lip sulfur yellow above the isthmus; sepals and lateral petals similar, elliptic-lanceolate, 1.5–2 cm long and 4–7 mm wide, the lip deeply 3-lobed, to 15 mm long, the lateral lobes broadly rounded, the isthmus reddish brown and the apical lobe broadened, emarginate, the disc below the isthmus with a complex callus of 7–9 tubercles; column complex, stout, about 6 mm long with a pair of dolabriform auricles on the anterior side near the apex. Flowering throughout the year. Widespread and locally common from Honduras to Panama and Ecuador.

29. PALMORCHIS Barb.-Rodr.

Terrestrial herbs with elongate stems ensheathed by the bases of plicate leaves and bladeless sheaths. *Inflorescence* a terminal or axillary raceme or panicle. Sepals subequal and variously connate; lateral petals similar to the sepals but

smaller, the lip broader than the sepals and petals, retuse or 3-lobed, adnate with the column towards the base along the median line; column elongate, slender, footless; anther incumbent with 4 pollinia, granular or somewhat waxy.

A small pantropical genus of 12 species. Very similar to *Corymborkis* which has an erect rather than incumbent anther.

KEY TO THE SPECIES

1. Plant over 30 cm high; flowers more than 1.8 cm long. 1. *P. powellii*.
1. Plant 15–30 cm high; flowers less than 1.3 cm long. 2. *P. silvicola*.

1. *Palmorchis powellii* (Ames) Schweinf. & Correll FIGURE 67.

A palmlike terrestrial herb forming indurate canes and plicate leaves; roots fibrous, brown, to 1 mm in diameter; stems lacking pseudobulbs, 30–80 cm tall. *Leaves* 5–10 on the upper portion of the stem, petiolate, elliptic, attenuate, plicate, the blade 15–35 cm long, 2.5–8 cm wide. *Inflorescences* a somewhat arching terminal or lateral raceme often borne on the basal as well as the distal portion of the stem, about 10 cm long including the peduncle, somewhat angular in cross section, each with about 15 sequentially borne flowers; ovaries sessile or shortly pedicellate, 11–12 mm long. *Flowers* with sepals green, petals and lip white; sepals and lateral petals linear elliptic to oblanceolate, 20–22 mm long, the lip somewhat flabellate, 20–22 mm long with 5 keels near the apex; column 15 mm long. *Fruit* linear, 2–3 cm long. Flowering July to August. Costa Rica and Panama.

This species may be readily distinguished from *Palmorchis silvicola* L. O. Wms. by the larger plant and flower size and by the lateral inflorescences often borne on the lower parts of the stem. Dried material is difficult to rehydrate in *Palmorchis*, and the flowers are somewhat larger than those described originally by Ames, but the lip shape and presence of five lamellae are clearly evident in one flower of the four specimens available from La Selva.

2. *Palmorchis silvicola* L. O. Wms. FIGURE 68.

A palmlike terrestrial herb rarely exceeding 30 cm high; roots fibrous, brown, to about 1 mm in diameter, borne on a nearly vertically oriented subterranean rhizome often deeply embedded; stems forming indurate canes to 3 mm in diameter. *Leaves* 5–8, elliptic, petiolate, the blades thin, plicate, 5–20 cm long and 2–7 cm wide.

Inflorescence a terminal sequentially flowered spike to about 8 cm long including the peduncle; ovaries sessile, subtended by ovate, scarious bracts to about 1 cm long. *Flowers* white or cream; sepals and lateral petals linear-spatulate, 6–7 mm long and 2.5 mm wide, the lip cuneate, pubescent, about 5 mm long, weakly trilobate above, the midlobe provided with a pair of fleshy lamellae; column cylindric, pubescent below, 7 mm long. Flowering May to June. Nicaragua to Ecuador.

The flowers are much smaller than those described for the closely related *Palmorchis trilobata* L. O. Wms. Furthermore the line drawing provided with the original description of *P. trilobata* shows the lip exceeding the column whereas in the La Selva material the lip is definitely shorter. The La Selva material also matches well the Nicaraguan species determined by Garay as *P. silvicola*.

28. PLATYSTELE Schltr.

Small epiphytic herbs often forming dense tufts; secondary stems 1-foliolate. *Inflorescence* a terminal raceme. *Flowers* usually stellate with similar nonconnate sepals and petals; column footless, dilated above; pollinia 2, waxy.

A neotropical genus of about 60 species. Among the smallest of orchids, *Platystele* is unusual among the pleurothallids for its lack of a column foot.

1. *Platystele lancilabris* (Rchb. f.) Schltr.

FIGURE 69.

A minute, cespitose twig epiphyte 1–2 cm high; roots velamentous, to 0.5 mm in diameter; sec-

ondary stems to about 1.5 mm tall, 1-foliolate. *Leaves* elliptic to oblanceolate, somewhat petiolate, the apex variably acute to rounded, 3.5–9 mm long and 1.5–2.5 mm wide. *Inflorescence* a laxly, sequentially flowered, distichous, fractiflex raceme held above the leaves by a filiform, erect to ascending peduncle, the whole less than 2 cm tall; pedicellate ovaries 2–3 mm long subtended by membranaceous bracts to 1 mm long, articulated to the pedicel giving aged inflorescences a herringbone appearance. *Flowers* yellowish with red or maroon lip; sepals ovate, attenuate, 2–3 mm long and 0.8–1.2 mm wide, the lateral sepals free as for the genus; lateral petals ovate to lanceolate, attenuate, 1.5–2.5 mm long and 0.5–0.8 mm wide, the lip fleshy, ovate, attenuate, about 1 mm long and 0.5 mm wide; column stout, broadly winged apically, footless, about 1 mm long. Probably flowering throughout the year when sufficient precipitation permits. Widespread from Mexico to Ecuador.

This minuscule epiphyte is easily overlooked and probably more common than available specimens would indicate. *Platystele lancilabris* is very variable in size over its geographic range, and the above description was prepared strictly from material from La Selva.

29. PLEUROTHALLIS R. Br.

Cespitose or repent epiphytic herbs with 1-foliolate secondary stems at least partly concealed by unadorned sheaths. *Inflorescence* a terminal raceme. Sepals subequal, free or variously connate; lateral petals usually smaller than the sepals, the lip simple or 3-lobed. Column usually forming a foot at the base; pollinia 2 or 4.

A neotropical genus of 1,500 species.

KEY TO THE SPECIES

1. Plant minute, the secondary stem plus leaf at most 1 cm long; surface of leaf verrucose-bullate even when fresh, and flowers with dark petals and lip. 8. *P. lewisii*.
1. Plant not with the above combination of characters.
 2. Inflorescence including peduncle shorter than the subtending leaves.
 3. Secondary stems less than one-fourth the length of the leaves they bear. 7. *P. guanacastensis*.
 3. Secondary stems much longer than one-fourth the length of the leaves they bear.
 4. Leaves cordate. 12. *P. phyllocardioides*.
 4. Leaves never cordate.
 5. Leaf decurrent on the secondary stem, the inflorescence appearing epiphyllous. 10. *P. pantasmi*.
 5. Leaf and inflorescence otherwise.
 6. Plant with nonappressed sheaths; sepals over 1.2 cm long. 14. *P. uncinata*.
 6. Plant with closely appressed, not flaring sheaths; sepals under 1 cm long.
 7. Leaves over 3.5 cm long, coriaceous. 15. *P. verecunda*.
 7. Leaves under 3.2 cm long, fleshy. 13. *P. pruinosa*.
 2. Inflorescence including peduncle longer than the subtending leaf.
 8. Secondary stems distinctly longer than the leaves they bear. 13. *P. pruinosa*.
 8. Secondary stems distinctly shorter than the leaves they bear.

9. Leaf lacking a thickened marginal vein.
 10. Inflorescence and scape hispidulous. 6. *P. glandulosa*.
 10. Inflorescence and scape glabrous.
 11. Inflorescence a raceme held on a long peduncle; lateral sepals free to the base.
 2. *P. aristata*.
 11. Inflorescence a fascicle held on long peduncle; lateral sepals united to about the middle.
 12. Peduncles more than 6.5 cm long. 1. *P. acrisepala*.
 12. Peduncles under 6 cm long. 11. *P. periodica*.
 9. Leaves with a conspicuously thickened marginal vein.
 13. Flowers cleistogamous. 4. *P. corniculata*.
 13. Flowers chasmogamous.
 14. Plant distinctly creeping; leaves orbicular to suborbicular. 9. *P. microphylla*.
 14. Plant caespitose; leaves obovate to elliptic.
 15. Leaves to 1 cm long. 3. *P. biglandulosa*.
 15. Leaves at least 1.2 cm long. 7. *P. grobyi*.

1. ***Pleurothallis acrisepala*** Ames & Schweinf.

FIGURE 70.

A densely caespitose epiphyte; roots velamentous to 1 mm in diameter; secondary stems abbreviated, to about 7 mm long. *Leaves* narrowly elliptic, oblanceolate, greyish green when dried, 4–9 cm long and 3–7 mm wide. *Inflorescence* a sequentially flowered fascicle, almost always held at least 1.5 times the length of the subtending leaf on a filiform peduncle; pedicellate ovaries 6–10 mm long. *Flowers* with segments basically white and the sepals with purple apices, the lip mostly purple; dorsal sepal elliptic-lanceolate, acute, 8–12 mm long and 2–2.5 mm wide, the lateral sepals connate for half their length, obliquely lanceolate, acute; lateral petals rhombic to spatulate, acute, 3–4 mm long, the lip papillose, oblong-lanceolate, obtuse to rounded apically, 4 mm long and 2 mm wide, minutely auricled on both sides at the base; column broadly winged, apically 3-toothed, 2.5–3 mm long. Flowering throughout the year. Local in Costa Rica and Panama.

This is very similar to the much more common *Pleurothallis periodica* Ames, but that species is smaller, and the smaller flowers are white striped with purple. Both *P. acrisepala* and *P. periodica* have been occasionally “lumped” as synonyms under the name *P. brighamii* S. Wats., but the flowers of the latter species have somewhat broader and differently colored segments. That the two members occur sympatrically at La Selva without known hybrids argues for recognition of both as distinct species.

2. ***Pleurothallis aristata*** Hook. FIGURE 71.

A small, densely caespitose twig epiphyte; roots velamentous, very slender, to 0.3 mm in diameter; secondary stems to 6 mm long. *Leaves* petiolate-elliptic or obovate to oblanceolate, 1.5–2.5 cm long and 3–5 mm wide, drying greyish

green. *Inflorescence* a fractiflex, sequentially flowered raceme, supported far above the leaves on a filiform scape; pedicellate ovaries slender, 8–15 mm long. *Flowers* from La Selva described as pale burgundy; sepals free except the lateral sepals very shortly united at the base, ovate, attenuate, 6–7 mm long and 2–3 mm wide; lateral petals ovate-elliptic, acute, the margins ciliate, 3–4 mm long and 1–1.5 mm wide, the lip oblong to rhombic, fleshy, apically rounded, with minute auricles at the base and a pair of crests on each side of the middle; column denticulate towards the apex, about 2 mm long. Probably flowering throughout the year with sufficient precipitation. Local from Costa Rica to Ecuador, northern South America and the West Indies.

The stellate flowers on long pedicellate ovaries are unique among other species of *Pleurothallis* at La Selva. This is known from La Selva by only a single collection.

3. ***Pleurothallis biglandulosa*** Schltr. vel aff.

FIGURE 72.

A densely caespitose epiphyte closely appressed to the trunks and larger branches of trees; roots velamentous, to 0.5 mm in diameter; secondary stems abbreviated, to 3 mm long. *Leaves* red spotted, obovate, 7–11 mm long and 4–5 mm wide, with a thickened marginal vein. *Inflorescence* a sequentially and few-flowered raceme held on filiform peduncles, to about 3 cm including the peduncle, but usually much shorter; pedicellate ovary 2 mm long. *Flowers* white or greenish white, lacking red stripes; dorsal sepal oblong to ovate-lanceolate, 4 mm long, the lateral sepals united to almost the entire length (at least in the La Selva material), 4 mm long and 2–2.5 mm wide; lateral petals oblong, about 2 mm long, the lip canaliculate, oblong, arcuate, 2–2.5 mm long; column arcuate, dilated and 3-lobulate above, 1.5–2 mm long, with two glandular processes towards the base (but questionably so in the dried

material seen from La Selva) and forming a short foot articulated with the lip. Probably flowering throughout the year. Costa Rica to Brazil and the West Indies.

The two glandular processes are oddly lacking in specimens from La Selva (Feddes Repert. Beih. 58: 119) and this may consequently represent another species.

4. *Pleurothallis corniculata* (Sw.) Lindl.

FIGURE 73.

A small, densely cespitose epiphyte of trunks and larger branches; roots velamentous, less than 1 mm in diameter; secondary stems abbreviated, to 5 mm long. *Leaves* strongly keeled abaxially, elliptic-oblancoate, rounded to acute apically, 1–3 cm long and 4–7 mm wide, with a conspicuously thickened marginal vein. *Inflorescence* 1- or 2-flowered developing sequentially and held well above the leaves on a filiform peduncle, at most 6 cm from the rhizome to the uppermost flower; pedicellate ovaries 9–12 mm long. *Flowers* cleistogamous in La Selva specimens; dorsal sepals oblong, acute, concave, 3–5.5 mm long and 1.5–2 mm wide, the lateral sepals somewhat united, concave, more or less lanceolate, to 5.5 mm long and 2.5 mm wide; lateral petals rhombic, acuminate, to 2 mm long, the lip oblong, arcuate, 2–2.5 mm long, with a pair of pointed auricles below the middle; column nearly straight, 2.5 mm long, with a pair of acute auricles apically, and forming a short foot at the base. Probably flowering throughout the year. Widespread throughout most of the neotropics.

This trunk epiphyte is the only truly cleistogamous pleurothallid known from La Selva, and is often seen on cacao together with *Pleurothallis glandulosa* Ames and *P. guanacastensis* Ames & Schweinf.

5. *Pleurothallis glandulosa* Ames FIGURE 74.

A small, cespitose epiphyte; roots velamentous, to 0.5 mm in diameter; secondary stems abbreviated to 5 mm long. *Leaves* petiolate, oblanceolate to oblong or linear, acute to obtuse, the margin somewhat revolute but lacking a thickened marginal vein, much longer than the secondary stems, 1.5–4 cm long and 1.5–3.5 mm wide. *Inflorescence* a single flower or a few- and sequentially flowered fascicle held barely above the leaves, subtended by one or more hispidulous funnelliform bracts, the peduncle filiform, hispidulous, at most 3.5 cm from the rhizome to the uppermost flower; pedicellate ovary hispidulous, 3–4 mm long. *Flowers* yellow orange with darker veins, rarely translucent white with darker veins; dorsal sepal lanceolate, ovate, acute, externally

hispidulous towards the base, 5–7 mm long and 2 mm wide, the lateral sepals connate to above the middle, concave, lanceolate-ovate, acute, 5–7 mm long and together 3 mm wide; lateral petals oblong, to spatulate, broadened on the posterior, not anterior margin, acuminate, 2.5 mm long, the lip oblong, rounded to truncate apically, biauriculate at the base, with a pair of auricles at about the middle, arcuate, 3–3.5 mm long; column arcuate, cylindrical, 3 mm long, forming a foot at the base 1 mm long. Flowering throughout the year. Widespread and locally common from Mexico to Panama.

The orange yellow flowers on hispidulous peduncles are unique among the pleurothallid orchids of La Selva.

6. *Pleurothallis grobyi* Batem. ex Lindl.

FIGURE 75.

A densely cespitose epiphyte; roots velamentous, to 1 mm in diameter; secondary stems abbreviated, to 7 mm long, usually shorter, 1-foliate. *Leaf* oblanceolate to obovate and long petiolate, acute to broadly rounded apically, 2–3.5 cm long and 5–7 mm wide and with a conspicuously thickened marginal vein. *Inflorescence* a simultaneously flowered raceme of 4–8 flowers, about 3 cm long held on a filiform peduncle up to 6 cm long; pedicellate ovaries 3–5 mm long subtended by obliquely funnelliform bracts up to 1 mm long. *Flowers* yellow or white, variously striped with red; the dorsal sepal ovate, lanceolate, acute to acuminate, 3–5 mm long and 2–2.5 mm wide, the lateral sepals fused into a concave, oblong, obtuse synsepal 3.5–6 mm long and 2–3 mm wide; lateral petals elliptic, clawed, 1.5–2 mm long, the lip arcuate, oblong, sulcate, 1.5–1.8 mm long and 0.5–1 mm wide; column slightly arcuate, broadly winged above, 2 mm long, forming a foot at the base 1–1.5 mm long with a pair of glands. Flowering throughout the year. Widespread and locally common from Mexico and the West Indies into South America, but represented at La Selva by only two collections, each with flowers of markedly different size.

Pleurothallis grobyi, *P. biglandulosa* and *P. microphylla* A. Rich. & Galeotti are easily confused and have all been considered as synonyms. All three species have a strong marginal vein on obovate, oblanceolate to suborbicular leaves, but *P. biglandulosa* has sequentially flowered inflorescences extending at most to 3 cm above the rhizome, the others have simultaneously flowered, much longer inflorescences, and *P. microphylla* has nearly orbicular leaves and a creeping habit whereas the others have much longer leaves and cespitose habit.

7. *Pleurothallis guanacastensis* Ames & Schweinf. FIGURE 76.

A caespitose epiphyte of trunks and larger branches; roots velamentous, to 1 mm in diameter; secondary stems abbreviated, 1-foliolate, 0.8–2 cm long, less than one-third the length of the leaf. *Leaves* oblanceolate, acute, 4–9 cm long and 1–2 cm wide, lacking a conspicuously thickened marginal vein, drying greyish green on the abaxial surface. *Inflorescences* 1–4 produced at the leaf base, each a sequentially flowered fascicle supported on a filiform peduncle extending far short of the end of the leaf, 3.5–6 cm long including the peduncle; pedicellate ovaries to 1 cm long. *Flowers* brick red to orange; dorsal sepal lanceolate-oblong, 8–10 mm long and 2–3 mm wide, the lateral sepals falcate, connate basally, 8–10 mm long and 2.5–3.5 mm wide at the point of union; lateral petals obliquely pandurate-oblong, acute, dilated above and constricted below, 4–5 mm long and 1–2 mm wide, the lip fleshy, arcuate with incurved margins, oblong, dilated at the middle, rounded apically, 3.5–4.5 mm long and about 2 mm wide, biauriculate basally, and provided with a long sulcate callus; column winged above, 3-toothed at the apex, 2–3 mm long, forming a foot about 2 mm long. Flowering throughout the year. Locally common in Nicaragua and Costa Rica, and rather common at La Selva, especially on branches overhanging streams and on cacao.

This is frequently found growing with *P. corniculata*, *P. glandulosa* and *P. periodica*.

8. *Pleurothallis lewisii* Ames FIGURE 77.

A minute, creeping epiphyte of twigs, larger branches and trunks; roots velamentous, to 0.5 mm in diameter; secondary stems distributed along the rhizome, abbreviated, 1-foliolate, 2–3 mm long, covered when young by 2 tubular, apiculate sheaths, less than one-third the length of the leaves. *Leaves* obovate to broadly elliptic, apically rounded, verrucose-bullate, lacking a conspicuously thickened marginal vein, 0.5–1.3 cm long and 3.5–7 mm wide. *Inflorescences* 1- or if 2-flowered then sequential, to 1 cm long, extending to at most the end of the subtending leaf; pedicellate ovaries 2–3 mm long. *Flowers* with green sepals and maroon petals and lip; dorsal sepal oblong, bluntly acute at the apex, 5–6 mm long and 1.5–2 mm wide, the lateral sepals free except at the base, lanceolate-oblong, 5–6 mm long and 1.2–1.7 mm wide; lateral petals oblong, apiculate, minutely glandulose, 3–4.5 mm long, the lip oblong-elliptic, with a pair of triangular auricles at or below the middle; minutely glandulose, 2–2.5 mm long and under 1 mm wide; column arcuate, about 2 mm long, forming a

short foot at the base. Probably flowering throughout the year. Guatemala to Costa Rica and probably locally common but small size renders it unnoticed by most collectors.

Vegetatively this is similar to *Pleurothallis microphylla*, but that species possesses smooth, not bullate leaves with a conspicuously thickened marginal vein, and its inflorescence is several times the length of the subtending leaf.

9. *Pleurothallis microphylla* A. Rich. & Galeotti. FIGURE 78.

A minute creeping epiphyte; roots velamentous, to 0.5 mm in diameter; secondary stems one-third of the leaf length to as long as the leaves, 3–5.5 mm long, 1-foliolate. *Leaves* obovate to orbicular, rounded apically, 4–9 mm long and 3–6 mm wide. *Inflorescence* gregarious, 4–8-flowered, to 2.5 cm long held several times the leaf and secondary stem length above the leaves on a filiform peduncle up to 4 cm long; pedicellate ovaries 2.5–3.5 mm long. *Flowers* yellow with red lines; dorsal sepal lanceolate-ovate, 4–5 mm long and 2 mm wide, the lateral sepals concave, united nearly to the apex into a synsepal, 5–6 mm long and 2.5 mm wide; lateral petals oblong-spatulate, acute, 1.7–1.9 mm long and under 0.5 mm wide, the lip oblong-spatulate, articulated with the column foot, obtuse, sulcate for nearly its entire length, the groove broadened towards the apex and keeled on each side; column broadly winged above, tridentate apically, 2 mm long forming a short foot to 1 mm long with a pair of glands. Flowering April to October and probably throughout the year with sufficient precipitation. Mexico to Panama, but little collected owing to its small size.

This is similar to *Pleurothallis grobyi* but the smaller leaves and creeping habit distinguish it from that species, and the long inflorescence distinguishes it from *P. biglandulosa*.

10. *Pleurothallis pantasmi* Rchb. f. FIGURE 79.

A caespitose epiphyte; roots velamentous, coarse, to 1.5 mm in diameter; secondary stems erect to ascending from an abbreviated rhizome, 4–17 cm long, winged above and passing into the decurrent leaf base, triangular in cross section. *Leaves* usually much shorter than the secondary stem, elliptic oblong, decurrent on the similarly winged secondary stem, 4–8 cm long to the articulation and 1–1.5 cm wide. *Inflorescence* consisting of 1 or more abbreviated, few-flowered racemes below the articulation, but appearing epiphyllous, to 1.5 cm long; pedicellate ovaries 2 mm long, subtended by somewhat shorter broadly flaring bracts. *Flowers* fleshy, deep wine

red to reddish brown; dorsal sepal oblong-obovate, 5–7 mm long and 2–2.5 mm wide, the lateral sepals joined to form an obovate synsepal with emarginate to bifid apex, 5–7 mm long and 4–5 mm wide; lateral petals elliptic-rhombic, acute, 2.5–3 mm long with erose margins above, the lip fleshy, arcuate, deltoid, biauriculate at the base and obtuse at the apex, 2–2.5 mm long and 1.5–2 mm wide when spread out, margins erose towards the apex; column arcuate, winged apically, 2 mm long with a short foot. *Fruit* a banana-shaped capsule, to 2.5 cm long. Locally common in Nicaragua and Costa Rica.

This species is readily distinguished vegetatively by the long decurrent leaves on the secondary stems and pseudo-epiphyllous inflorescences.

11. *Pleurothallis periodica* Ames FIGURE 80.

A small densely caespitose epiphyte of twigs and larger branches; roots velamentous, to much less than 1 mm in diameter; secondary stems abbreviated, less than 5 mm long, 1-foliate. *Leaves* narrowly elliptic-oblancoate, acute, carinate abaxially and apically cuspidate, 2–4.5 cm long and 2–6 mm wide, drying greyish green. *Inflorescence* of several flowers borne sequentially in a fascicle held 1.5–2.5 times the height of the leaves on a filiform peduncle; pedicellate ovaries 5–7.5 mm long. *Flowers* whitish, lined with deep purple; dorsal sepal oblong-ovate, acute, 5–10 mm long and 2–3 mm wide, with somewhat revolute margins, the lateral sepals united to about the middle, obliquely elliptic, acute, each 5–10 mm long and 2–3 mm wide; lateral petals elliptic-rhombic, acute, 3–4 mm long, the lip oblong, apically rounded, minutely erose, with a pair of bluntly triangular lobes below the middle and a pair of minute, retrorse auricles at the base, 3.5–4.5 mm long; column narrowly winged, arcuate, about 3 mm long. *Fruit* an obovoid capsule, 6–10 mm long. Flowering throughout the year. Honduras and Costa Rica, and to be expected in Nicaragua.

This is one of the most abundant and certainly most frequently collected orchids at La Selva. It is closely related to the sympatric *Pleurothallis acrisepala* which is not only a much larger and rarer plant but also has the sepals apically suffused with purple, but not lined as in *P. periodica*. Both species have been considered by some as synonyms of *P. brighamii*.

12. *Pleurothallis phyllocardioides* Schltr.
FIGURE 81.

A caespitose epiphyte on branches; roots velamentous, to 1 mm in diameter; secondary stems ascending, flexuous, wiry, 1-foliate, 4–11 cm long

with 1–2 closely appressed tubular sheaths. *Leaf* narrowly cordate, acuminate, 3.5–5.5 cm long and 1–2.5 cm wide, the mature leaves much shorter than the secondary stems. *Inflorescence* a sequentially, few-flowered fascicle at the base of the leaf, sometimes with 2 flowers open at once; pedicellate ovary 5–7 mm long. *Flowers* greenish yellow; dorsal sepal and synsepal similar, concave, the dorsal sepal 4–5 mm long and 1.8–2.2 mm wide, synsepal 4–5 mm long and 2.5–3 mm wide; lateral petals lanceolate, acute spreading, 1.5–2 mm long, the lip ovate, apically obtuse, basally cordate, the margin minutely erose, 0.5–0.8 mm long. Flowering throughout the year. Nicaragua and Costa Rica.

This species is easily distinguished among other orchids at La Selva by the cordate-acuminate leaves on long wiry secondary stems.

13. *Pleurothallis pruinosa* Lindl. FIGURE 82.

A caespitose epiphyte of twigs and smaller branches; roots velamentous, to 1 mm in diameter; secondary stems wiry, ascending, flexuous, 1-foliate, covered basally by 1–2 tubular sheaths, to 7 cm long, longer than the leaves they bear in mature shoots. *Leaves* fleshy elliptic, 2–4 cm long and 3–6 mm wide, keeled abaxially, shorter than the secondary stems. *Inflorescence* a raceme of 3–5 flowers reaching to the end of the leaves or slightly more, produced singly or in pairs at the base of the leaf; pedicellate ovaries 1–2 mm long, each subtended by a funnelform bract. *Flowers* pale greenish yellow; dorsal sepal ovate, acuminate, concave, 4–4.5 mm long and 2–2.5 mm wide, the lateral sepals united into a concave, ovate synsepal 4–4.5 mm long and 2.5–3 mm wide; lateral petals linear, 4–5 mm long, the lip fleshy cordate, acute, with a fleshy linear callus adaxially near the apex; column stout, 1.5 mm long. *Fruit* a broadly ellipsoidal capsule, 4–6 mm long. Flowering throughout the year. Widespread but local from Honduras into South America.

14. *Pleurothallis uncinata* Fawc. FIGURE 83.

A caespitose epiphyte of larger branches and trunks of trees, up to 45 cm tall; roots velamentous to 1.2 mm in diameter; secondary stems approximate on the rhizome, 1-foliate, somewhat shorter than the leaf, 7–17 cm tall, clothed by 3–4 somewhat flared sheaths becoming papery and disintegrating with age. *Leaves* coriaceous, linear to elliptic, acute, coarsely veined, 15–25 cm long and 1.2–3.6 cm wide. *Inflorescence* consisting of a fascicle of peduncles each bearing a single flower, the peduncles 2.5–3.5 cm long, subtended by a spathe 2.5–3.5 cm long; pedicellate ovaries short for the size of the plant,

5–7 mm long. *Flowers* yellowish or purplish with darker veins, the lip and column dark purple; dorsal sepal concave, sparsely puberulent exteriorly, ovate-elliptic, 12–15 mm long and 6–8 mm wide, the lateral sepals united forming a synsepal with bifid apex, ovate, obtuse, 12–15 mm long and 8–10 mm wide; lateral petals oblong-oblancheolate, acute, 7–9 mm long and 2–3 mm wide, the lip complexly 3-lobed, 6–7 mm long and 4–5 mm wide, the lateral lobes acute, diverging at about the middle, the midlobe with revolute margins, but the apex flattened giving it a pandurate appearance; column arcuate, winged at apex, 6 mm long. Flowering May to December, and probably throughout the year with sufficient precipitation. Local from Jamaica and Nicaragua south into Panama.

This is among the larger pleurothallids at La Selva.

15. **Pleurothallis verecunda** Schltr. FIGURE 84.

A somewhat creeping, pendent epiphyte; roots velamentous, to 1 mm in diameter; secondary stems 1-foliolate, wiry, erect to ascending, covered basally by 2–3 closely appressed, tubular sheaths, 7–15 cm long. *Leaf* elliptic, acute to acuminate, coriaceous, shorter than the secondary stems on mature specimens, 6–10 cm long and 1–2.5 cm wide. *Inflorescence* 1–several per secondary stem, a raceme, shorter than the subtending leaf, subtended by an acute spathe 5–20 mm long; pedicellate ovaries 2–3 mm long. *Flowers* greenish spotted with intense red purple; dorsal sepal fleshy, oblong, 8–9 mm long and 2 mm wide, the lateral sepals connate nearly to the apex forming a concave, ovate, apically bifid synsepal 8–9 mm long and 4.5–5.5 mm wide; lateral petals elliptic-lanceolate, arose at the margin, 3 mm long, the lip fleshy, clawed, ovate, basally sagittate with a pair of acute retrorse lateral auricles, apically rounded and lightly papillose, 4 mm long and 2 mm wide; column arcuate, 3 mm long, apically winged. *Fruit* a banana-shaped capsule, 5–6 cm long and 8 mm in diameter. Flowering in April and perhaps throughout the year with sufficient precipitation. Uncommon from Nicaragua to Ecuador.

30. **POLYSTACHYA** Hook.

Epiphytic, cespitose herbs with pseudobulbs exceeded by 2 to several thin to coriaceous *leaves*. *Inflorescence* terminal, a raceme, spike or panicle. Sepals subequal, the laterals united with the column foot forming a chin basally; lateral petals usually linear, the lip entire to 3-lobed; column short with a foot; pollinia 4, waxy.

A pantropical genus of 150 species, best developed in Africa.

KEY TO THE SPECIES

1. Leaves more than 8 mm wide; ovaries glabrous. 1. *P. foliosa*.
1. Leaves less than 6 mm wide; ovaries pubescent. 2. *P. masayensis*.

1. **Polystachya foliosa** (Hook.) Rchb. f.

FIGURE 85.

Epiphytes with 1–few shoots and inconspicuous flowers; roots velamentous, to 2 mm in diameter; pseudobulbs 1.5–4 cm long, covered by leaf bases and membranaceous sheaths. *Leaves* 2–4, articulated with the sheath, elliptic, acute, distichous, to 14 cm long and 2 cm wide. *Inflorescence* a panicle held well above the foliage on a sheath-covered peduncle, to 20 cm long including the peduncle, each branch about 1 cm long; ovaries sessile or essentially so, 2–4 mm long, subtended by triangular acute bracts 1–1.5 mm long. *Flowers* fleshy, greenish yellow; dorsal sepal ovate, 2.5–3 mm long and 1.5–2 mm wide, the lateral sepals more broadly ovate, 2.5–3 mm long and 1.8–2.3 mm wide; lateral petals linear-spatulate, rounded, 2 mm long and 0.5 mm wide, the lip 3-lobed, farinose adaxially, with a large farinose callus at the base, 3 mm long and 2.5 mm wide across the lateral lobes, the lateral lobes diverging below the middle, rounded, the midlobe quadrate, emarginate; column stout, less than 1 mm long forming a very short foot at the base. *Fruit* an ellipsoidal capsule 7–9 mm long. Probably flowering throughout the year. Reportedly ranging throughout most of the neotropics.

Vegetatively this is similar to pantropical *Polystachya concreta* (Jacq.) Garay & Sweet, which may also occur at La Selva, but that species has larger flowers and proportionately longer column feet. *Polystachya foliosa* forms a much larger plant than does *P. masayensis* Rchb. f. and lacks the pubescent peduncle and ovaries of that species.

2. **Polystachya masayensis** Rchb. f.

FIGURE 86.

A small epiphyte less than 10 cm high, sometimes becoming deciduous with the dry season; roots velamentous, to 2.5 mm in diameter; pseudobulbs small, 1–1.5 cm long, entirely hidden by bracts and leaf bases. *Leaves* several, linear, acute to obtuse, each articulated to the sheath, 1.5–6.5 cm long and 3–5 mm wide. *Inflorescence* a pubescent spike about 3 cm long held on a bract-covered peduncle about 3 cm long; ovaries ses-

sile, pubescent, 3–4 mm long. *Flowers* greenish yellow with white callus on the lip; dorsal sepal ovate, concave, 2.2–2.5 mm long and 1.2–1.7 mm wide, the lateral sepals obliquely and broadly ovate, 2.2–3 mm long and 2 mm wide; lateral petals falcate-oblong, 2–2.5 mm long, the lip 3-lobed at the middle, 2–3 mm long and 2.5–2.8 mm wide when spread out, lateral lobes acute in front, broadly rounded on the margins, the midlobe suborbicular, the entire surface farinose; column about 1 mm long, forming a short foot. *Fruit* a capsule 5–7 mm long. Flowering December and January. Locally common usually in deciduous or semideciduous tropical forests from Mexico to Panama.

This forms a much smaller plant than does *Polystachya foliosa* and exhibits larger roots, deciduous leaves and pubescent inflorescences and ovaries. The only specimen available from La Selva is in fruit.

31. PSYCHOPSIS Raf.

Cespitose epiphytes; pseudobulbs globose, laterally compressed, often coarsely rugose, 1-foliate. *Leaf* coriaceous, elliptic to oblong, dark green, often flushed or spotted with purple. *Inflorescence* a lateral raceme or few-branched panicle with sequentially borne flowers. *Flowers* yellow with red brown markings, rarely pure yellow or yellow and white; sepals linear, reflexed; lateral petals falcate, much shorter than the sepals, the lip 3-lobed, provided with a complex basal callus, the midlobe broadly expanded and emarginate; column short, with complex auricles; pollinia waxy, 2.

A neotropical genus of about four species, with only one very rare species in Costa Rica.

1. *Psychopsis krameriana* (Rchb. f.) H. G. Jones FIGURE 87.
(=*Oncidium kramerianum* Rchb. f.)

Cespitose epiphytes usually not forming large clumps; roots velamentous, about 2 mm in diameter; pseudobulbs ovate in outline, 1-foliate, laterally compressed, 2–3 cm high and 2.5–3 cm wide. *Leaf* coriaceous, elliptic-oblong, acute, 1.8–35 cm long and 4–7 cm wide, intensely spotted with red. *Inflorescence* a sequentially flowered raceme or few-branched panicle, supported on a laterally borne peduncle to 1 m high with numerous bracts; pedicellate ovaries about 3 cm long. *Flowers* yellow, spotted with brick red; sepals (especially the lateral sepals) strongly reflexed, linear-oblong, acute, with crenulate margins, to 7 cm long and 4 mm wide; lateral petals falcate, acute, with undulate margins, 4.5–

5.5 cm long and 1.5 cm wide, the lip pandurately 3-lobed, 4 cm long, the lateral lobes subquadrate, the midlobe suborbicular, emarginate, 3–4 cm across, centrally yellow, red spotted on the margin, the callus between the lateral lobes with 3 tubercles; column 7–8 mm long, with a pair of rounded wings apically. Flowering throughout the year. Costa Rica to Ecuador.

Extremely rare perhaps owing in part to the activities of commercial collectors. Only one collection from La Selva.

32. PSYGMORCHIS Dodson & Dressler

DODSON, C. H. AND R. L. DRESSLER. 1972. Two undescribed genera in the Orchidaceae—Oncidiinae. *Phytologia* 24: 285–292.

Plants epiphytic on small twigs, fanlike, short lived. *Leaves* ensiform. Peduncle axillary, 1-flowered or with 2–few flowers borne in succession. Sepals and lateral petals similar, yellow, free and spreading, the lip strongly 4-lobed and provided with a complex fleshy callus; column short, 2-winged; pollinia 2, waxy.

A neotropical genus of perhaps six species, *Psychmorchis* has been interpreted as a paedomorphic oncidium.

1. *Psychmorchis pusilla* (L.) Dodson & Dressler FIGURE 88.
(=*Oncidium pusillum* (L.) Rchb. f.)

A psygmoid cespitose epiphyte of small twigs; roots velamentous, to 1 mm in diameter; stems abbreviated, lacking pseudobulbs, entirely concealed by leaf bases. *Leaves* psygmoid, falcate when viewed laterally, lacking articulations with the sheath, 1–8 cm long and 3–8 mm deep when measured from the margin to the midrib. *Inflorescences* lateral in the leaf axils, sometimes 12 per shoot, consisting of a sequentially flowered, condensed raceme (rarely with 1 branch) to 1.5 cm long supported on a peduncle 1.5–5 cm long covered by 2–3 laterally compressed sheaths which diverge into a subulate, incurved apex; pedicellate ovaries glabrous, 5–8 mm long, subtended by a laterally flattened subulate bract 2–3 mm long. *Flowers* bright yellow, the petals and base of the lip spotted with brick red and the callus and column usually white marked with red; sepals inconspicuous, yellow, about 5 mm long; lateral petals longer than the sepals, ovate-elliptic, 6–8 mm long and 3–5 mm wide, the lip 3-lobed but the midlobe 4-lobulate, 10–18 mm long and 9–20 mm wide, the lateral lobes broadly rounded, the lobules of the midlobe similarly rounded, the callus consisting of a few plates; col-

umn stout, broadly winged. Flowering throughout the year. Locally common and widespread throughout most of the neotropics.

This is a short-lived twig epiphyte, which can flower well within a year from seed.

33. REICHENBACHANTHUS Barb.-Rodr.

Plant epiphytic, pendent, straggly, with proliferating superposed shoots. *Leaves* fleshy, terete, much longer than the stem, somewhat canaliculate above. *Flowers* small, single; sepals subequal, free, recurved; lateral sepals spreading, a little smaller than the sepals, the lip clawed; column extended into a distinct foot at the base; pollinia 4.

A neotropical genus of perhaps five species. Florally similar to *Scaphyglottis* but the terete leaves of *Reichenbachanthus* readily distinguish it.

1. *Reichenbachanthus reflexus* (Lindl.) Brade vel aff. FIGURE 89.

Plant a straggly, pendent epiphyte; roots velamentous, about 1 mm in diameter; stems wiry, superposed, sheathed in bracts when young, 4–13 cm long, 2-foliolate, each terminated by a fasciculate inflorescence up to 2 cm long concealed by bracts and by a continuation of the stem. *Leaves* subterete, linear, 13–30 cm long and 1.5–3 mm wide. *Flowers* dull yellow with a crimson stain centrally on the lip; sepals narrowly ovate, acuminate, 4.5–6 mm long and 2.5–4 mm wide; lateral petals lanceolate, somewhat acuminate, 4–5 mm long and 1–2 mm wide, the lip rigid, 5–6 mm long and 4.7–5.5 mm wide when spread out, 4-lobed; column cylindrical, about 4 mm long with a short foot at the base. Flowering time unknown. Widespread in West Indies and Costa Rica to South America. Known from La Selva by a single sterile collection (*Atwood 85-89* at SEL).

The widespread *Reichenbachanthus reflexus* is the species most likely to be found at La Selva but others cannot be excluded.

34. RODRIGUEZIA Ruiz & Pavon

Epiphytic herbs with short, ovoid or elliptic-oblong 1- or 2-leaved pseudobulbs often nearly hidden by 1 or 2 conduplicate foliaceous bracts. *Leaves* conduplicate, coriaceous, ligulate to elliptic. *Inflorescences* 1–several, each a raceme formed in the axils of the foliaceous bracts. *Flowers* usually showy; sepals dissimilar, the dorsal erect, the lateral sepals variously connate forming a spur; lateral petals subequal to the dorsal

sepal, the lip usually exceeding the sepals, entire or emarginate; column erect, the apex dilated and often with a pair of auricles, the base footless; pollinia 2, waxy.

A neotropical genus of about 34 species.

1. *Rodriguezia compacta* Schltr. FIGURE 90.

Epiphytes, never forming large clumps; roots velamentous, to 1 mm in diameter; pseudobulbs laterally compressed, ovate, nearly covered by leaf sheaths, 1.5–3.5 cm long. *Leaves* 1–4 at the base of the pseudobulb as well as 1 at the apex, oblong to elliptic, broadly rounded apically, appearing unequally 2-lobed in pressed specimens, 3.5–15 cm long and 1.5–2.7 cm wide. *Inflorescences* 1–several in the leaf axils and bracts below the pseudobulb, each a raceme of 1–5 flowers to 5 cm long including the peduncle, much shorter than the leaves; pedicellate ovaries to about 1 cm long, each subtended by a conduplicate bract 5–12 mm long; sepals and petals light yellow, the lip deeper yellow; dorsal sepal oblanceolate, 1.8–2.8 cm long, the lateral sepals connate, more or less saccate at the base, and bifid apically, 1.5–3 cm long; lateral petals oblanceolate, rounded when flattened and apiculate apically, 2–2.5 cm long, the lip with margins inrolled forming a tube, cuneate when flattened, emarginate, 2–3 cm long and with a recurved spur at the base; column clavate, 1–1.7 cm long with a pair of falcate auricles at the summit. Flowering September to November. Local from Nicaragua to Panama.

Although rather common at La Selva, only two specimens are available.

35. SCAPHOSEPALUM Pfitzer

Cespitose or repent epiphytic herbs; secondary stems very short and 1-foliolate. *Leaves* conduplicate, oblanceolate. *Inflorescence* a distichous raceme. Sepals dissimilar, the lateral sepals variously united and often callus-thickened near their apices; petals much shorter than the sepals; column forming a foot at the base, pollinia 2, waxy.

A neotropical genus of 26 species.

1. *Scaphosepalum microdactylum* Rolfe

FIGURE 91.

A cespitose epiphyte, sometimes densely so; roots velamentous, 1 mm in diameter; secondary stems 1-foliolate, much abbreviated, less than 5 mm long, concealed when young by 1–2 tubular sheaths. *Leaves* oblanceolate, attenuate to the petiolate base, obtuse to rounded and cuspidate at the apex, 4–10 cm long and 6–11 mm wide. *Inflorescence* a dense sequentially flowered ra-

cence 0.3–4 cm long, apparently producing more flower buds with time, produced on a filiform peduncle 3–9 cm long; pedicellate ovaries 2–3 mm long, subtended by laterally compressed, subulate bracts 2 mm long. *Flowers* nonresupinate, with the lip uppermost; dorsal sepal oblong, concave, 4.5–5.5 mm long, the lateral sepals connate to well above the middle, each with a keel prolonged at the apex into a horn, and provided apically with an obovate callus; lateral petals ovate, 3 mm long, the lip oblong, obtuse, dilated centrally and with a pair of elongate calli centrally; column 2–3 mm long, extended at the base into a conspicuous foot. Probably flowering throughout the year. Rare and local from Mexico to Colombia.

The nonresupinate flower and lateral sepals with conspicuous apical calli are unique to this species among the many pleurothallids at La Selva.

36. SCAPHYLOTTIS Poepp. & Endl.

Epiphytic, caespitose or creeping herbs with inurate or pseudobulbous stems. Stems simple or superposed. *Leaves* 1–several at the stem apex, thin and linear to coriaceous and elliptic. *Inflorescence* terminal, a sequentially flowered fascicle or raceme. Sepals subequal, the lateral sepals adnate to the column foot forming a chin; lateral petals usually smaller than the sepals, the lip articulated to the common foot, geniculate or reflexed and curved, entire, 3-lobed or emarginate; column forming a foot at the base; pollinia 4, waxy.

A neotropical genus of about 52 species.

KEY TO THE SPECIES

1. Leaves 10 times as long as broad or less.
 2. Most of the leaves less than 7 mm wide; column cylindrical. 6. *S. prolifera*.
 2. Most of the leaves more than 8 mm wide; column conspicuously dilated at the apex. 1. *S. gracilis*.
1. Leaves narrowly linear, much more than 10 times as long as broad.
 3. Column less than 2.5 mm long.
 4. Petals oblong-elliptic, less than 5 times as long as wide. 5. *S. minutiflora*.
 4. Petals linear, at least 6 times as long as wide. 2. *S. graminifolia*.
 3. Column more than 4 mm long.
 5. Column with a pair of triangular, acute auricles towards the apex. 3. *S. huebneri*.
 5. Column lacking a pair of triangular acute auricles toward the apex. 4. *S. longicaulis*.

1. *ScaphyloTTIS gracilis* (Schltr.) Schltr.

FIGURE 92.

Cespitose epiphytes but with superposed shoots giving them a straggly appearance; roots fibrous, to 1 mm in diameter; pseudobulbs terete, linear, 2-foliate, basally covered by 2 or more somewhat flared sheaths becoming papery with age, variable in length, 3.5–18 cm tall, 2–4 mm in diameter. *Leaves* linear-elliptic, 5–10 cm long, 0.6–1.6 cm wide. *Inflorescence* a single flower or a fascicle borne at the apex of the pseudobulb. *Flowers* white to greenish, with purple flushed anther and column; dorsal sepal oblong, acute at the apex, 7 mm long and 2 mm wide, the lateral sepals oblong, oblique, 8.5 mm long and 2 mm wide; lateral petals linear to somewhat oblanceolate, 3-nerved, 7 mm long and 1 mm wide, the lip cuneate, slightly constricted above the middle, rounded to retuse; column nearly straight, narrowly winged, much expanded above, 5 mm long excluding the foot. Probably flowering throughout the year. Costa Rica and Panama.

ScaphyloTTIS gracilis has been considered to be synonymous with *S. prolifera* Cogn. However, not only does it form a much larger plant but Schlechter's diagnostic drawing shows the column greatly expanded toward the apex while that of *S. prolifera* is not expanded. Both species occur at La Selva and no hybrids have been reported.

2. *ScaphyloTTIS graminifolia* (Ruiz & Pavon) Poepp. & Endl.

FIGURE 93.

A straggly, pendent epiphyte with superposed 2-foliate stem segments; roots velamentous, to 1 mm in diameter; stem segments cylindrical to fusiform, sometimes stipitate, 3–13 cm long and 1.5–2.5 mm in diameter. *Leaves* linear, 5–11 cm long and 2.5–6 mm wide, rounded and unequally 2-lobed at the apex. *Inflorescence* a fascicle of flowers at the apex of each stem segment; ovaries 3.5–4 mm long. *Flowers* white; sepals concave, 2.5–3 mm long; lateral petals linear, obtuse, 2.5 mm long and less than 0.6 mm wide, the lip rhombic-obovate, truncate and retuse apically, 2.5 mm long and 1–1.5 mm wide, articulated with the short column foot; column stout, 2 mm long, dilated above. Probably flowering throughout the year. Widespread from Mexico to South America; represented at La Selva by a single collection.

This is closely related to *ScaphyloTTIS minutiflora* Ames & Correll, but that species has more numerous and conspicuous floral bracts and broader petals.

3. *Scaphyglottis huebneri* Schltr. FIGURE 94.

A straggly pendent epiphyte with superposed stem segments; roots velamentous, to about 1 mm in diameter; stem segments uniformly thickened, 2-foliolate, wiry, 2–15 cm long and 1–2 mm in diameter (dried material). *Leaves* narrowly linear-lanceolate, 4–20 cm long and 1.5–6.5 mm wide. *Inflorescence* of 1–2 flowers at the apex of the stem segments. *Flowers* yellowish green to cream; dorsal sepal elliptic-oblong, 4–6 mm long and 2–3 mm wide, the lateral sepals obliquely and narrowly ovate-oblong, 4–6 mm long and 2.5–3.5 mm wide; lateral petals falcate, acute, 3.5–5.5 mm long, the lip rhombic in outline, auricled above the middle, 4.5–5.5 mm long and 3 mm wide, with an elevated callus from the base to near the apex; column cylindric, about 5 mm long, provided with a pair of acute, triangular auricles about one-quarter of the column length from the apex. Flowering probably during most of the year. Widespread from Nicaragua and Costa Rica into South America.

This straggly species can be distinguished by the rhombic lip and pair of triangular auricles on the column. It is vegetatively very similar to *Scaphyglottis graminifolia* and *S. minutiflora*.

4. *Scaphyglottis longicaulis* S. Wats.

FIGURE 95.

A caespitose, somewhat straggly epiphyte; roots velamentous, about 1 mm wide; stem segments terete, wiry, 2-foliolate, uniformly thickened, sometimes superposed, 4–9 cm long, 1–1.5 mm wide, invested at the base by 1–2 sheaths. *Leaves* narrowly linear, 7–15 cm long and 1–2.5 mm wide. *Inflorescence* 1- to few-flowered, at the apex of the stem segments, somewhat pendent; pedicellate ovaries 0.9–1.5 cm long. *Flowers* purple; dorsal sepal oblong-oblongeolate, 6 mm long and 2 mm wide, the lateral sepals obliquely oblong, oblongeolate, 7 mm long and 2 mm wide; lateral petals linear-oblongeolate, acute, 5.5–6.5 mm long and less than 1 mm wide, the lip articulated to the column foot, cuneate, the apex divided into 3 more or less equal lobes, 6 mm long and 4 mm wide; column lacking auricles, broadened above, 6 mm long forming a short foot. Probably flowering throughout the year. Widespread from Guatemala into South America.

The 3-lobed apex to the lip is unique among similar species at La Selva.

5. *Scaphyglottis minutiflora* Ames & Correll

FIGURE 96.

A straggly, pendent epiphyte with clustered shoots of superposed 2-foliolate stem segments;

roots velamentous, 1–1.5 mm in diameter; stem segments terete, uniformly thickened or swollen centrally, 3.5–20 cm long and 1–6 mm in diameter, invested at the base by 2 flared tubular bracts becoming papery and disintegrating with age. *Leaves* linear, 6–18 cm long and 3.5–11 mm wide. *Inflorescence* a sequentially flowered fascicle with a dense tuft of bracts; pedicellate ovaries 4–5 mm long. *Flower* minute, white; dorsal sepal oblong-elliptic, concave, acute, 2.5–3 mm long and 1–1.5 mm wide, the lateral sepals obliquely oblong-ovate, 3 mm long and 1.5–2 mm wide; lateral petals oblong-elliptic, acute, 2–2.5 mm long and less than 1 mm wide, the lip more or less oblong, broadened centrally and with a crenulate margin, apically truncate and retuse, 3 mm long and 2 mm wide when spread out; column stout, dilated apically, 2 mm long, forming a short foot. Without definite flowering time. Locally common from Belize to Panama and well represented at La Selva.

Scaphyglottis minutiflora is difficult to distinguish from *S. graminifolia*, but the latter species has less densely flowered inflorescences and broader petals.

6. *Scaphyglottis prolifera* Cogn. FIGURE 97.

Cespitose epiphytes, often densely so, erect to pendent, producing numerous shoots with superposed 2-foliolate stem segments; roots velamentous, to 1 mm in diameter; segments of the aerial stems uniformly thickened, wiry, 2–11 cm long and 1.5–2.5 mm in diameter, 2-foliolate, invested at the base with 2–3 flared tubular sheaths. *Leaves* linear-elliptic, obtuse and retuse at the apex, 11–25 mm long and 4–5 mm wide. *Inflorescence* a 1–several flowered fascicle borne at the apex of each stem segment. *Flowers* white and lavender, nonresupinate; sepals oblong, acute, to 5 mm long; lateral petals linear-elliptic, acute to obtuse apically, 4 mm long, the lip cuneate, considerably expanded above, 5–6 mm long, the apical third reflexed; column cylindric, never dilated apically, 2.5–4.5 mm long. Flowering November to March. Presumably widespread from Belize into South America and the West Indies, but the range is unclear due to the confounding of several species as one by various authors. See notes under *Scaphyglottis gracilis*.

37. *SOBRALIA* Ruiz & Pavon

Reedy terrestrial or epiphytic herbs with coriaceous, plicate *leaves* articulated with elongated sheaths. *Flowers* ephemeral, usually large, in a terminal (rarely axillary), sequentially flowered raceme; sepals subequal, basally connate; lateral petals similar to the sepals, the lip adnate to the

column base, entire or emarginate, the basal portion involute enclosing the column; column footless, semiterete, often narrowly winged, 3-lobed at the apex; pollinia 8, mealy. *Fruit* an elongate capsule.

A neotropical genus of 96 species. *Sobralia* is similar to closely related *Elleanthus* but has much larger flowers.

KEY TO THE SPECIES

1. Stems branched above; flowers purple with darker lip. 1. *S. decora*.
1. Stems never branched above; flowers white to cream.
 2. Mature shoots at least 60 cm long; sepals at least 6 cm long. 4. *S. powellii*.
 2. Mature shoots less than 50 cm long; sepals much less than 4.5 cm long.
 3. Leaves at least 2 per shoot; flowers creamy white with yellow on the lip. 3. *S. mucronata*.
 3. Leaves only one per shoot, with a much reduced expanded floral bract at the top of a long, winged peduncle; flowers pure white with yellow on the lip. 2. *S. fragrans*.

1. *Sobralia decora* Bateman FIGURE 98.

A pendent, erect or ascending, caespitose epiphyte; roots velamentous, to 5 mm in diameter; stems lacking pseudobulbs, 0.6–2 m tall, branched above and rooting at the base of the branch, covered by rugose sheaths below and by leaf sheaths above, 4–6 mm in diameter near the base. *Leaves* chartaceous, distichous, restricted to the upper half of the stem, each articulated to the sheath, plicate, narrowly ovate and attenuate, 6–22 cm long and 2–8 cm wide. *Inflorescence* a sequentially flowered fascicle at the stem apex, flowering at approximately monthly intervals over several months; pedicellate ovaries about 4 cm long subtended by lanceolate bracts to 3 cm long. *Flowers* purple with a darker lip; sepals elliptic, mucronate, 5–6 cm long and 1.6–2 cm wide; lateral petals narrowly obovate-oblong, 5–6 cm long and 1.6–2 cm wide, the lip obovate, the apex crenulate and reflexed, 5–6 cm long and 3.2–4 cm wide when spread out; column clavate, 3–3.5 cm long. Flowering mostly November to March. Widespread from Mexico to Andean South America.

The branching aerial stem distinguishes this from most purple flowered sobralias.

2. *Sobralia fragrans* Lindl. FIGURE 99.

A caespitose epiphyte of branches and tree trunks, often forming large clumps; roots velamentous, pubescent, to 5 mm in diameter; stems 1-foliate, rarely 2-foliate, laterally flattened, wiry,

to 15 cm long at the point of divergence of the leaf. *Leaf* plicate, elliptic, acute, cuspidate, 10–20 cm long and 2.5–4.5 cm wide. *Inflorescence* a terminal, sequentially flowered fascicle subtended by a leaflike bract and supported on a winged peduncle 10–25 cm long from the point of divergence of the leaf; pedicellate ovaries to 2.5 cm long. *Flowers* white, the lip veined with yellow, lasting at most 1 day; sepals oblanceolate, 3.5–4 cm long and 9–11 mm wide; lateral petals oblanceolate, 3.3–3.8 cm long and 9–11 mm wide, the lip ovate when spread out, the basal half enrolled around the column, the apical half truncate with a long shaggy pubescence, 3.8–4.5 cm long and 2–2.5 cm wide; column clavate, provided with a pair of auricles apically, 1.5–2 cm long. Probably flowering throughout the year. Locally common from Belize to Andean South America. Quite abundant at La Selva but rarely seen in flower and therefore rarely collected.

3. *Sobralia mucronata* Ames FIGURE 100.

A caespitose epiphyte of large branches and tree trunks; roots velamentous, to 5 mm in diameter; stems wiry, 2–4-foliate, to 40 cm long and 3–3.5 mm in diameter, covered by rugose leaf sheaths. *Leaves* chartaceous, elliptic, lightly attenuate, forming a “drip tip,” 2-dentate and cuspidate at the apex, 7–17 cm long and 1.7–4.3 cm wide. *Inflorescence* a terminal, sequentially flowered fascicle with up to 3 flowers open at a time, usually subtended by a leaf which is sometimes much reduced; pedicellate ovaries 2.5–3 cm long. *Flowers* cream, the lip strongly reticulated with yellow; sepals elliptic-oblong, strongly mucronate apically, 3–3.7 cm long and 7–10 mm wide; lateral petals elliptic-oblong, mucronate apically, 2.7–3.3 cm long and 7–9 mm wide, the lip ovate to obovate when spread out, the lower one-half to two-thirds enrolled around the column, the upper one-third to one-half expanded, crenulate on the margin and provided with 5 somewhat elevated nerves fragmented apically, 2.5–3 cm long and 1.6–1.8 cm wide; column clavate, 1.5–1.7 cm long, provided with a pair of acute auricles apically. *Fruit* a cylindrical capsule to 10 cm long including the persistent column. Flowering mostly during October to March. Locally common from Guatemala to Costa Rica, and quite abundant at La Selva.

The flowers somewhat resemble those of *Sobralia fragrans*, but have a cream base color and the plants have more leaves.

4. *Sobralia powellii* Schltr. FIGURE 101.

A large, caespitose, erect, pendent or ascending epiphyte of larger branches and tree trunks; stems

distichously leafy above, sheathed below by persistent, rugose leaf sheaths, 0.7–1.5 m tall and about 5 mm in diameter near the base. *Leaves* 3–7, chartaceous, plicate, elliptic-ovate, attenuate, forming a “drip tip,” 10–25 cm long and 2–7 cm wide, each articulated to the sheath. *Inflorescence* a terminal, sequentially flowered fascicle; pedicellate ovaries 3.5–4 cm long. *Flowers* large and showy, white, the lip with dark yellow reticulation; sepals elliptic, acute, to 10 cm long and 2–2.5 cm wide; lateral petals rhombic, obovate, about 9 cm long and 4 cm wide, with a crenulate margin, the lip obovate, cuneate basally and truncate and deeply retuse apically, the basal half enrolled around the column, the apical half expanded, revealing the conspicuously crenate margin; column clavate, 4–5 cm long, with a pair of acute auricles at the apex. *Fruit* a cylindrical capsule about 12 cm long including the persistent column. Flowering sporadically throughout the year. Local from Nicaragua into Andean South America.

This is the largest flowered *Sobralia* at La Selva. Note that the Ecuadorean plant from which the illustration was prepared shows a nonretuse lip and therefore may be a closely related species.

39. STANHOPEA Frost ex Hook.

Plants rather large, caespitose, epiphytic or lithophytic with ovoid or conic 1-foliate pseudobulbs. *Leaf* large, petiolate, the blade plicate. *Inflorescence* a lateral, 2–12-flowered, pendent raceme; peduncle bracts large and often inflated. *Flowers* medium to very large and grotesque, usually very fragrant; sepals free, cucullate and usually reflexed; lateral petals much smaller than the sepals, the lip fleshy, complex, rigid, usually forming 3 distinct portions called the hypochile, mesochile, and epichile; column long, arcuate, wingless to very broadly winged; pollinia 2, waxy.

A neotropical genus of about 50 species including some of the most bizarre members of the orchid family.

1. *Stanhopea* sp. FIGURE 102.

A caespitose epiphyte with many ovoid, furrowed, 1-foliate pseudobulbs 4–7 cm long. *Leaf* plicate, coriaceous, somewhat rubbery in texture, dark to deep green, elliptic to obovate, petiolate, to 40 cm long and 17 cm wide. *Inflorescence* pendent, supporting 2–10 waxy flowers at least 6 cm across and probably much larger.

The large size of the plant combined with the ovoid furrowed pseudobulbs supporting a single, large, plicate leaf is unique to *Stanhopea* at La Selva. This species represented by one sterile col-

lection is included here only for completeness. All stanhopeas are vegetatively similar, but the most likely species at La Selva is *S. ecornuta* Lemaire, a widespread species of tropical lowland rainforests. That species is unusual in having only two flowers per inflorescence and the lip lacking horns.

39. STELIS Sw.

GARAY, L. A. 1979. Systematics of the genus *Stelis* Sw. Bot. Mus. Leaflet. 27: 167–259.

Epiphytic caespitose herbs with 1-foliate secondary stems. *Leaves* coriaceous or fleshy, conduplicate. *Flowers* numerous, small, green, brown or maroon; sepals subequal or the dorsal sepal largest, the lateral sepals often variously connate; lateral petals much shorter than the sepals, usually truncate and with thickened margins, the lip sessile, simple or 3-lobed, about as long as the petals; column without a foot, short, thickened above; pollinia 2, waxy.

A neotropical genus of more than 300 species, many of which are very similar and difficult to separate.

KEY TO THE SPECIES

1. Lateral sepals united for one-half their length or greater. 4. *S. purpurea*.
1. Lateral sepals united for much less than half their length, the calyx appearing equilaterally triangular.
 2. Sepals over 4 mm long. 5. *S. superbiens*.
 2. Sepals less than 3 mm long.
 3. Sepals over 2 mm long. 3. *S. parvula*.
 3. Sepals under 2 mm long.
 4. Secondary stems less than one-third the length of the leaf. 2. *S. endresii*.
 4. Secondary stems one-third as long as the leaf or greater. 1. *S. cleistogama*.

1. *Stelis cleistogama* Schltr. FIGURE 103.

Cespitose epiphytes and usually densely so; roots velamentous, to 0.8 mm in diameter; secondary stems wiry, 1-foliate, 4–7 cm tall and 1–1.5 mm in diameter, invested partly by 1–2 tubular sheaths. *Leaf* coriaceous, linear-elliptic, basally petiolate, obtuse to rounded and apiculate apically and carinate abaxially, 4–8.5 cm long and 5–11 mm wide. *Inflorescence* a raceme, extending well beyond the leaves, borne singly or up to 4 per shoot; pedicellate ovaries to 2 mm long, each subtended by a funnelform bract about 1 mm long. *Flowers* about 2 mm across, purple to brown; sepals basally connate, ovate, covered adaxially by a fine glandular pubescence, about 1.5 mm long and 1.2 mm wide; lateral petals

broadened apically, truncate, about 0.7 mm long, the lip enlarged and concave apically, somewhat apiculate, about 0.7 mm long and 0.5 mm wide; column stout and broad. Flowering in April and May. Reported from Honduras to Costa Rica.

The long secondary stems, thick fleshy leaves, and minute flowers with white-velutinous vestiture on the adaxial surface of the sepals distinguish this species at La Selva.

2. *Stelis endresii* Rchb. f. vel aff. FIGURE 104.

A caespitose epiphyte of branches; roots velamentous, to 1 mm in diameter, some of them forming nodules in the material from La Selva; secondary stems wiry, 1-foliate, 1–4 cm long, invested at the base when young by 1–2 loosely appressed, tubular sheaths. *Leaves* thin, elliptic, petiolate, acute to obtuse and cuspidate apically, 4–11 cm long and 0.9–2.5 cm wide. *Inflorescence* usually of 1(2) raceme(s) extending well beyond the leaves, to 20 cm long including the peduncle; pedicellate ovaries 2 mm long, subtended by a funnellform bract about 1 mm long. *Flowers* dark brown purple; sepals united at the base, broadly ovate, about 1.5 mm long; lateral petals broadened and truncated apically, about 0.5 mm long, the lip concave, conspicuously apiculate, about 0.5 mm long; column stout and broad. *Fruit* an ellipsoidal capsule, 6–7 mm long. Flowering time probably throughout the year. Nicaragua and Costa Rica.

This is similar to *Stelis cleistogama*, but the leaves are thinner, more elliptic, and at least twice as long as the secondary stem. The La Selva plants conform to the concept of *S. endresii* in Williams and Allen (1946–1949), which some authors suggest is a synonym of *S. argentata* Lindl.

3. *Stelis parvula* Lindl. vel aff. FIGURE 105.

A caespitose epiphyte; roots velamentous, to 1 mm in diameter; secondary stems 1-foliate, 1–2.5 cm long invested at the base by 2 flared tubular sheaths. *Leaves* elliptic-oblongate, obtuse and cuspidate, at least 3 times as long as the secondary stems, 3–7.5 cm long including the petiole, 6–10 mm wide. *Inflorescence* a raceme, much longer than the leaves; pedicellate ovaries about 2 mm long. *Flowers* greenish yellow with some purple in the center; sepals connate at the base, broadly ovate, obtuse, about 3 mm long and wide; lateral petals fleshy, truncate, less than 1 mm long, the lip fleshy, triangular when viewed from the front, with a fleshy raised margin and an oblong sulcate depression at the base, less than 1 mm long; column stout and broad. *Fruit* a

capsule about 7 mm long. Flowering time probably throughout the year. Reported from Guatemala to Costa Rica.

This is represented at La Selva by a single collection. The flowers are similar to those of *Stelis clesitogama* but are larger, and the floral bracts are much larger and more broadly flared.

4. *Stelis purpurea* (Ruiz & Pavon) Willd. vel aff. FIGURES 106, 107.

Plant a caespitose epiphyte; roots velamentous, to 1 mm in diameter; secondary stems 1-foliate, 1–4 cm long, concealed by 2 somewhat flared tubular sheaths. *Leaves* elliptic to narrowly ovate, rounded and cuspidate apically, 4–10 cm long and 0.9–2.5 cm wide, with a distinct petiole at the base 0.5–1.5 cm long. *Inflorescence* a raceme to 15 cm long, 1–3 per secondary stem; pedicellate ovaries 1.5–2.5 mm long, subtended by broadly funnellform, sometimes apiculate bracts 1.5–2.5 mm long. *Flowers* brownish purple; sepals connate at the base, the lateral sepals connate to the apex but rarely nearly free, 3.5–5.5 mm long and 1.8–4 mm wide; lateral petals deltoid in outline, about 1 mm long and 0.8 mm wide, the lip concave, with a thickened, fleshy margin, less than 0.6 mm long; column stout and broad. Flowering from May to December. Costa Rica to Peru; rather common at La Selva.

Among the species of *Stelis* at La Selva this is the only one with connate lateral sepals, at least in most flowers.

5. *Stelis superbiens* Lindl. FIGURE 108.

A densely caespitose epiphyte; roots velamentous, to 1.5 mm in diameter; secondary stems 1-foliate, somewhat shorter than the leaves, 3.5 to 11 cm long, partially concealed when young by a somewhat flared tubular bract shorter than the base of the inflorescence. *Leaves* obovate, attenuate at the base, apically rounded, 6–15 cm long and 1.8–3.5 cm wide. *Inflorescence* a raceme extending well beyond the leaves, 1–3 produced per secondary stem; pedicellate ovaries 4–5 mm long. *Flowers* brownish green to purple; sepals connate only at the base, broadly rhombic-ovate, 4–6 mm long and 5–6 mm wide; lateral petals lunate to reniform, with a thickened margin, about 2 mm long and 1.7 mm wide, the lip lunate, sometimes mucronate apically and sulcate towards the base, about 1.5 mm long and 1.5 mm wide; column stout, about 0.5 mm long. Flowering May to December. Costa Rica and Panama.

This is the largest flowered *Stelis* at La Selva. The mucro at the lip apex is not always apparent

in rehydrated specimens and it is not shown in the accompanying drawing.

40. TRICHOSALPINX Luer

LUER, C. A. 1983. *Trichosalpinx*, a new genus in the Pleurothallidinae. *Phytologia* 54: 393-398.

Plants epiphytic, caespitose to scandent or prolific. Secondary stems covered with flared sheaths with ciliate margins. *Inflorescence* usually racemose, rarely 1-flowered. Sepals subequal, the laterals often variously connate; lateral petals entire to fimbriate, the lip entire to 3-lobed, often fimbriate; column usually elongated and winged, the foot usually well developed; pollinia 2.

A neotropical genus of about 90 species, vegetatively similar to *Lepanthes*, but the flowers resemble those of *Pleurothallis*.

KEY TO THE SPECIES

1. Secondary stems 2-3 foliate; leaves less than 7 mm wide. 2. *T. foliata*.
1. Secondary stems 1-foliate; leaves more than 7 mm wide.
 2. Petals obtuse, coarsely fringed. 1. *T. blaisdellii*.
 2. Petals acute, ciliate. 3. *T. orbicularis*.

1. *Trichosalpinx blaisdellii* (S. Wats.) Luer

FIGURE 109.

(=*Pleurothallis blaisdellii* S. Wats.)

A caespitose epiphyte, often densely so; roots velamentous, to 1 mm in diameter; secondary stems ascending, 1-foliate, longer or shorter than the leaves, 1-5 cm long, covered by 2-5 widely flaring hispidulous sheaths. *Leaves* broadly to narrowly elliptic, 2-4.2 cm long and 1-2.5 cm wide, with 3 purple nerves on the abaxial surface, and a conspicuously thickened marginal vein. *Inflorescence* a fascicle of several-flowered racemes at the base of the leaf; pedicellate ovaries 2 mm long, subtended by funnellform bracts 1-1.5 mm long. *Flowers* dark purple, the column white; dorsal sepal elliptic-oblong, acute, ciliate, 3.5-5 mm long and 2-2.5 mm wide, the lateral sepals united at the base, oblong-falcate, 4-5.5 mm long and 2-3 mm wide; lateral petals oblong, truncate to rounded and fimbriate apically, the lip oblong, somewhat arcuate, minutely ciliate on the margin and minutely and retrorsely biauriculate at the base, 2.5-3 mm long and about 1 mm wide; column 1.5-2 mm long, denticulate apically. *Fruit* a capsule, about 6.5 mm long. Indefinite flowering time. Widespread from Mexico into Andean South America; uncommon at La Selva.

This is similar to *Trichosalpinx orbicularis* (Lind.) Luer, but the leaves are usually proportionately longer and the petals are truncate to rounded and never acute.

2. *Trichosalpinx foliata* (Griseb.) Luer

FIGURE 110.

(=*Pleurothallis foliata* Griseb.)

A small, somewhat straggly twig epiphyte; roots velamentous, to about 0.5 mm in diameter; stems ascending, bearing 2 or more leaves, covered by several flared hispidulous sheaths, 1-4 cm long. *Leaves* elliptic-obovate, 5-13 mm long and 3-6 mm wide, rounded apically, with 3 purple veins abaxially and with a conspicuously thickened marginal vein. *Inflorescence* a raceme, much longer than the subtending leaf; pedicellate ovaries about 1.9-2.5 mm long, subtended by funnellform bracts about 0.5-1 mm long. *Flowers* yellow green; dorsal sepal tricarinate, ovate, attenuate, 3-4.5 mm long and 2 mm wide, the lateral sepals lanceolate, 3-4.5 mm long; lateral petals ovate, rounded apically, 1.5-2 mm long, the lip oblong and bicarinate adaxially, 1.5-2.5 mm long and about 1 mm wide; column arcuate, 1-1.5 mm long, auriculate above and extended at the base into a short foot. Flowering time probably throughout the year. Widespread throughout most of the neotropics.

This species is unusual among other species of *Trichosalpinx* at La Selva by the stems with two or more smaller leaves, by the yellow green flowers and by the long inflorescences.

3. *Trichosalpinx orbicularis* (Lindl.) Luer

FIGURE 111.

(=*Pleurothallis orbicularis* (Lindl.) Lindl.)

A caespitose epiphyte, sometimes densely so; roots velamentous, to 1.5 mm in diameter; secondary stems ascending, 1-foliate, wiry, 1.8-6 cm long, covered by 3-5 rugose, flared, hispidulous leaf sheaths. *Leaf* elliptic to orbicular, 2.5-4.5 cm long and 1.1-2 cm wide, with a conspicuously thickened marginal vein and 3 purple nerves abaxially. *Inflorescences* a fascicle of condensed racemes at the leaf base; pedicellate ovary 3.5-4.5 mm long subtended by a funnellform bract. *Flowers* reddish purple; dorsal sepal oblong, acute, 5-7 mm long and 1.5-2.5 mm wide, the lateral sepals connate to just below the middle, acute, lanceolate, 6-7 mm long and 1.5-2 mm wide; lateral petals acute, ciliate, 2.5-3 mm long, the lip lanceolate, articulated with the column foot, about 3 mm long, minutely ciliate on the margin and minutely and retrorsely biauriculate at the base; column about 2 mm long, form-

ing a foot about 1 mm long. Flowering time indefinite. Widespread from Nicaragua into South America.

This species differs from the closely related *Trichosalpinx blaisdellii* by the usually proportionately broader leaves and by the acute to acuminate petals.

41. *TRIGONIDIUM* Lindl.

Epiphytic caespitose or creeping herbs; pseudobulbs 1–4-leaved. *Leaves* chartaceous to coriaceous, linear to elliptic-oblong. Peduncles elongated, bracteate, 1-flowered, produced at the base of the pseudobulb or in the flush of new growth. Sepals similar when spread out, although held differently in natural position; lateral petals much smaller than the sepals, with a blue "eye" at the apex, the lip 3-lobed, shorter than the lateral petals, and with a simple callus; column nearly straight, wingless, forming at most a very short foot at the base; pollinia 4, waxy.

A perplexing neotropical genus of perhaps 12 species, all differing mainly in floral size and growth habit.

KEY TO THE SPECIES

1. Flowering mostly November to June; flowers never arising from the axils of bracts of immature shoots; pedicellate ovaries 4.7–7 cm long; narrowest leaves at least 14 mm wide. 1. *T. egertonianum*.
1. Flowering mostly August to October; flowers arising from the axils of bracts of immature growth; pedicellate ovaries 4–4.5 cm long; widest leaves 13 mm wide. 2. *T. riopalenquense*.

1. *Trigonidium egertonianum* Bateman ex Lindl. FIGURE 112.

A caespitose epiphyte of larger branches and trunks of trees, often forming massive clumps; roots velamentous, to 2.5 mm in diameter; pseudobulbs approximate, ovate in outline, somewhat laterally flattened, 2-foliolate, 4.5–7 cm long and 1.7–3 cm wide, with several longitudinal furrows becoming more apparent on drying, and invested basally by several papery bracts. *Leaves* narrowly oblanceolate, arching near the apex in live material, acute, 30–48 cm long and 1.2–2.5 cm wide. *Inflorescences* 1-flowered, arising laterally at the base of the most recently completed shoot on peduncles 25–45 cm long, covered by 8–10, closely appressed, tubular sheaths; pedicellate ovaries 4.7–7 cm long. *Flowers* green to orange, reticulated with purple, the petals provided with a metallic blue spot near the apex; sepals closely appressed, appearing tubular at the

base but broadly expanded apically, quadrate, obovate, acuminate, 3–4 cm long and 1–2 cm wide; lateral petals lanceolate, acute, shortly clawed, 15–20 mm long and 4–6 mm wide, the apex a metallic blue, the lip 8–10 mm long with 3 lobes diverging above the middle, the lateral lobes turned upward around the column, and provided centrally with a ligulate callus, the apical lobe orbicular, verrucose and reflexed; column terete, 4–6 mm long. Flowering November to June. Widespread from Mexico into South America, and rather common at La Selva.

This and the following species, *Trigonidium riopalenquense* Dodson, are often found growing on the same tree. They are readily distinguished by the features given in the key, although their appearances are similar. Apparently barriers to hybridization are phenological and the flowers are essentially indistinguishable.

2. *Trigonidium riopalenquense* Dodson FIGURE 113.

Cespitose epiphytes, sometimes shortly creeping, rarely forming large clumps; roots velamentous, 2 mm in diameter; pseudobulbs approximate, even when exhibiting a creeping habit, ovoid, laterally compressed, never conic, with furrows formed rather irregularly on drying, 2–3.5 cm long and 1.7–2.3 cm wide, 2-foliolate, sheathed basally by 2 or more bracts disintegrating with age. *Leaves* linear to very narrowly oblanceolate, acute, 30–40 cm long and 0.6–1.2 cm wide. *Inflorescence* lateral, 1-flowered, arising from the axils of the bracts protecting the recently developing shoots, supported on a peduncle 17–25 cm long covered by 7–9 closely appressed bracts; pedicellate ovaries 4–4.5 cm long. *Flowers* greenish to pinkish yellow to brown; sepals rhombic, obovate, acuminate, 2.8–3.4 cm long and 1–1.5 cm wide; lateral petals with a metallic blue "eye" apically, lanceolate, acute, 1.5 cm long and 5–6 mm wide, the lip 6–8 mm long, with a ligulate callus, with 3 lobes diverging above the middle, the lateral lobes turned upward around the column, the apical lobe orbicular, verrucose and reflexed; column terete, 4–5 mm long. Flowering August to October. Uncommon from Nicaragua to Ecuador, but rather common at La Selva. See note under *Trigonidium egertonianum*.

42. *VANILLA* Sw.

Large and branched vines with flowers often forming only in the forest canopy rendering them difficult to observe and collect. *Leaves* coriaceous or fleshy, sometimes reduced to scales. *Inflores-*

cence a short raceme borne in leaf axils. Sepals and lateral petals subequal, the lip with a claw adnate to the column, often enfolding the column and with a callus of many scales; column footless and wingless; pollen powdery or granular. *Fruit* an elongate berry at least in some species.

A pantropical genus of 100 species.

1. *Vanilla pauciflora* Dressler FIGURE 114.

A vine with stems 4–5 mm in diameter (at least in the dried material seen); roots produced singly at each node, 2–3 mm in diameter. *Leaves* distichous, ovate-elliptic oblong, acuminate, 8–12 cm long and 1.8–5 cm wide, petiole 1–2 cm long. *Inflorescence* lateral, sessile, with 1–2 flowers; pedicellate ovaries (only one flower seen) 4.3 cm long. *Flowers* white; dorsal sepal 12 cm long, clawed, the blade elliptic and 6.5 cm long, the lateral sepals clawed, 11 cm long, the blade elliptic and 7.5 cm long; lateral petals narrowly oblanceolate, 11 cm long, the lip clawed, 10.5 cm long, the claw about 4 cm long, the margin of the blade ruffled and provided centrally with a callus of several lacinate scales; column 8 cm long. Flowering time unknown, at least November. Costa Rica and Panama.

Two specimens have been collected at La Selva of which only one has a single flower. The inflorescence has two flower scars on the lower stem, which along with the size of the floral parts and their clawed bases agrees very well with the original description. However, the stem diameter and leaf sizes are smaller. For the illustration the flower was not rehydrated, and the lip may be much broader in life.

43. *WARREA* Lindl.

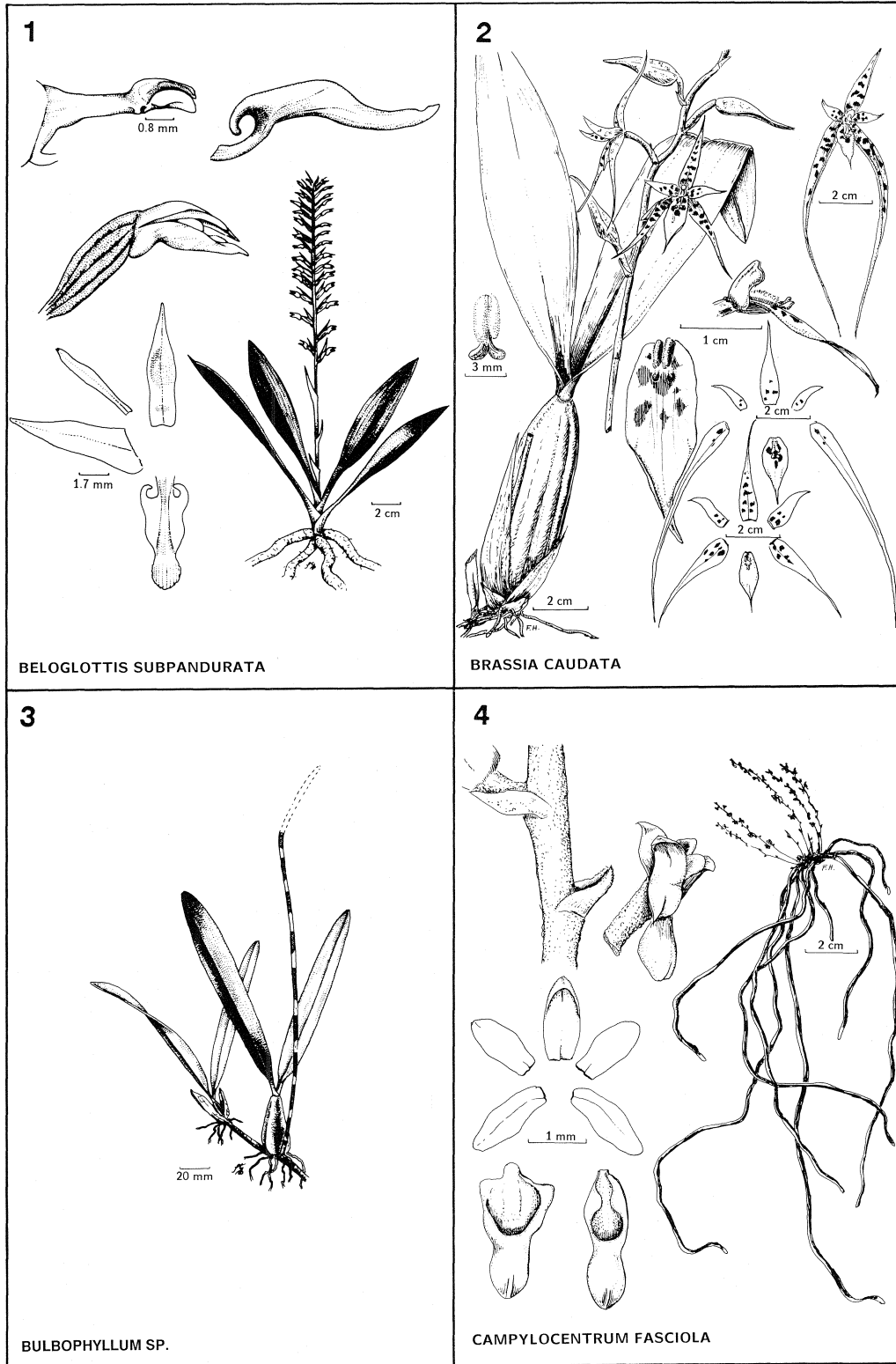
Terrestrial herbs with or without pseudobulbs topped with plicate, strongly veined *leaves* forming short sheathing petioles at the base. *Inflorescence* an erect raceme formed laterally from the leaf axil. *Flowers* large; sepals subequal, concave, the lateral sepals adnate basally to the column foot; lateral petals similar to the sepals but usually broader, the lip entire, the base adnate to the column foot, the apex entire to emarginate; column semiterete with a short foot; pollinia 2 to 4, waxy.

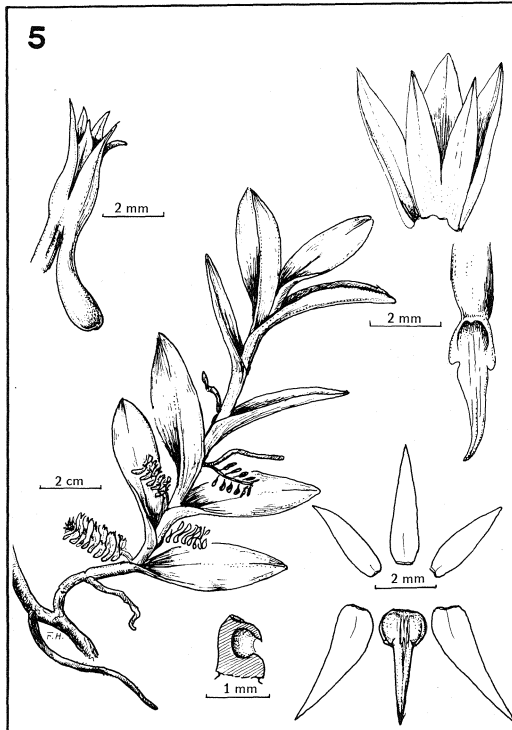
A neotropical genus of three species.

1. *Warrea costaricensis* Schltr. FIGURE 115.

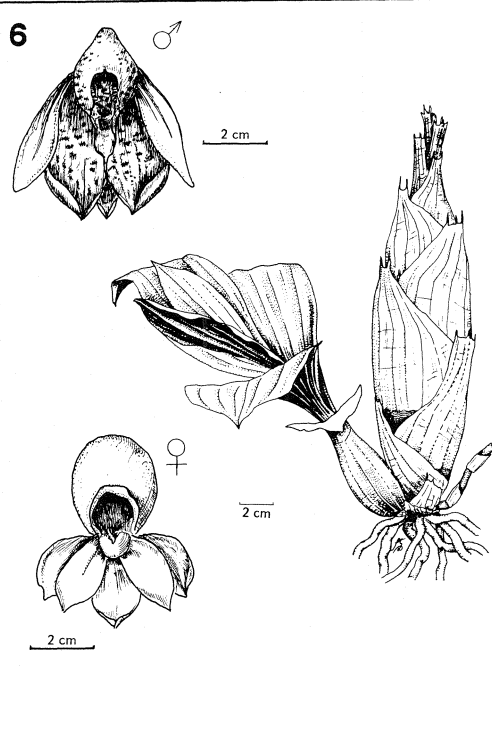
A rare terrestrial to about 80 cm high; roots velamentous, whitish gray, to 4 mm in diameter; pseudobulbs mostly hidden from view; *leaves* at base as well as at apex of pseudobulb, thin, plicate, petiolate, elliptic, attenuate apically, the blade to about 75 cm long and 15 cm wide. *Inflorescence* a lateral, erect, few-flowered raceme about 90 cm high including the peduncle, the flowers spaced 2–3 cm apart; pedicellate ovaries 2 cm long. *Flowers* large and showy, the sepals and lateral petals elliptic, about 3 cm long and 1.5 cm wide, the lip fleshy, elliptic-ovate, retuse with a basal elevated callus 3 cm long and 2.5 cm wide; column cylindrical, about 2.5 cm long and extended into a short foot. Flowering in October. Rare, Guatemala to Panama.

This, the largest and most showy terrestrial orchid at La Selva, is a very rare species from usually higher elevations. It is represented at La Selva by a single collection.

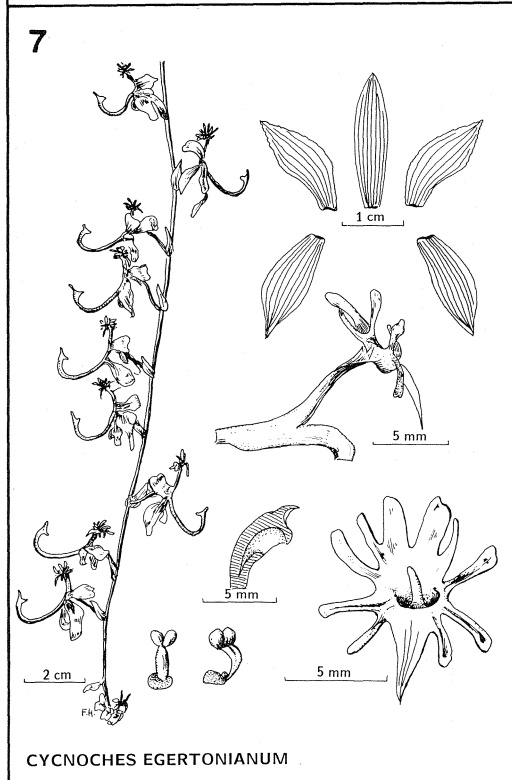




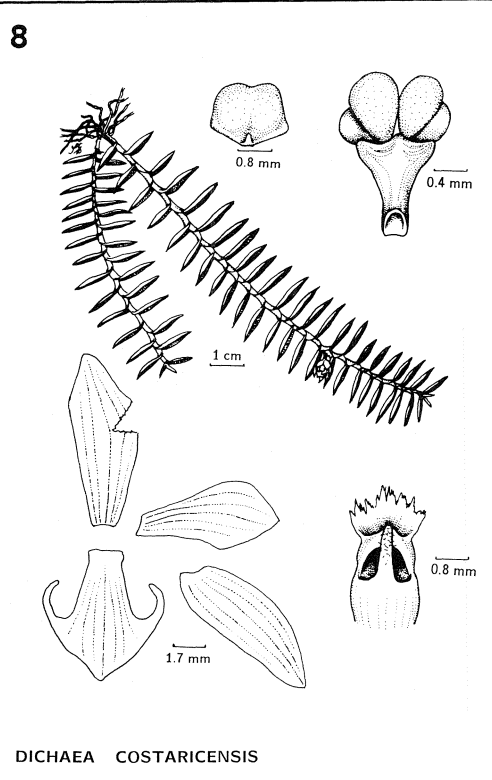
CAMPYLOCENTRUM MICRANTHUM



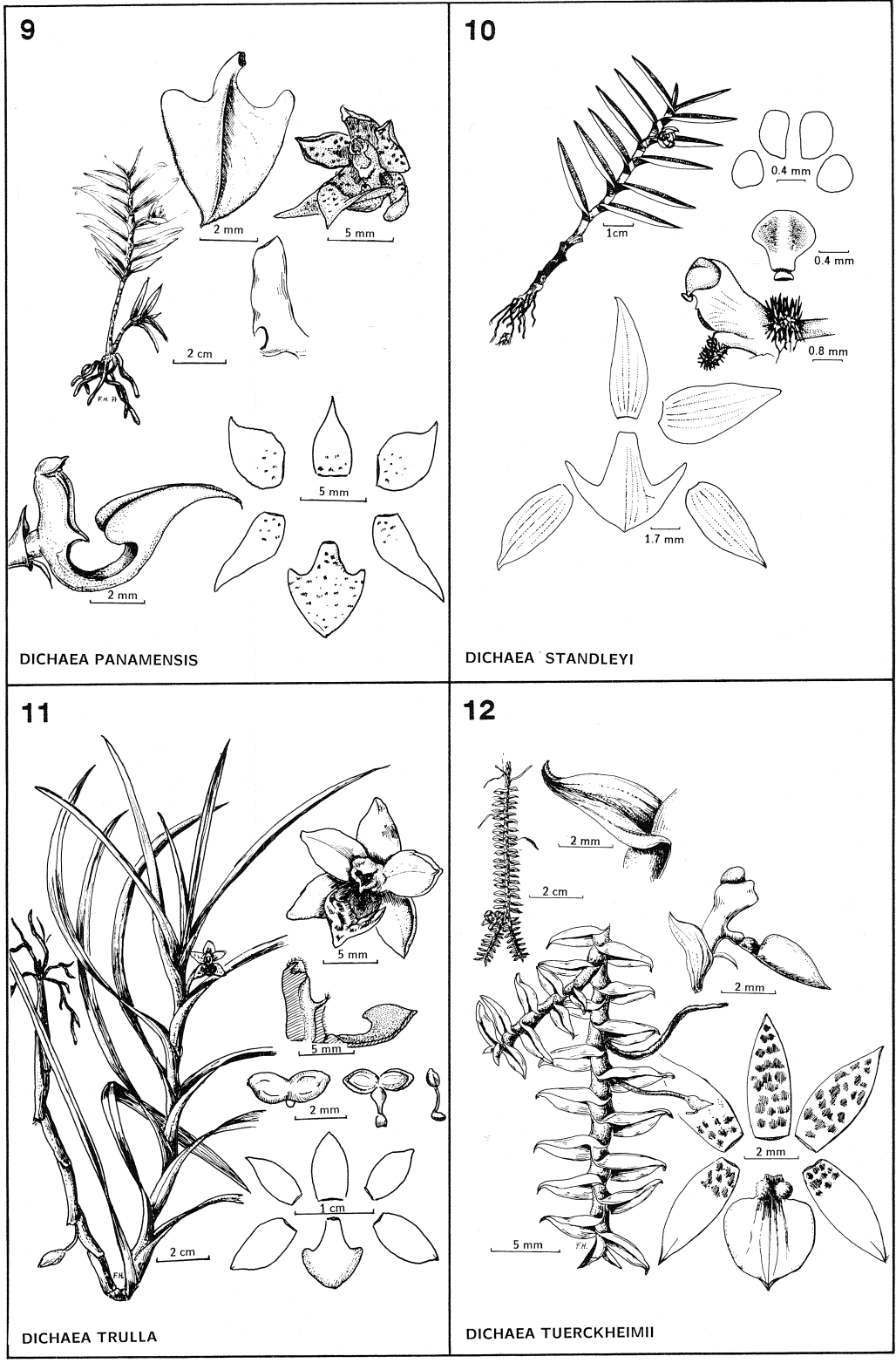
CATASETUM MACULATUM



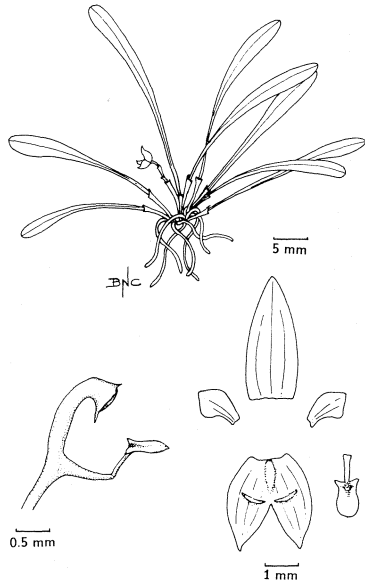
CYCNOCHESES EGERTONIANUM



DICHAEA COSTARICENSIS

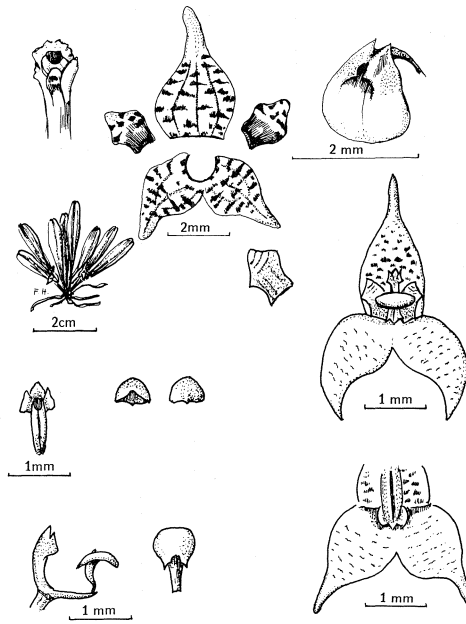


13



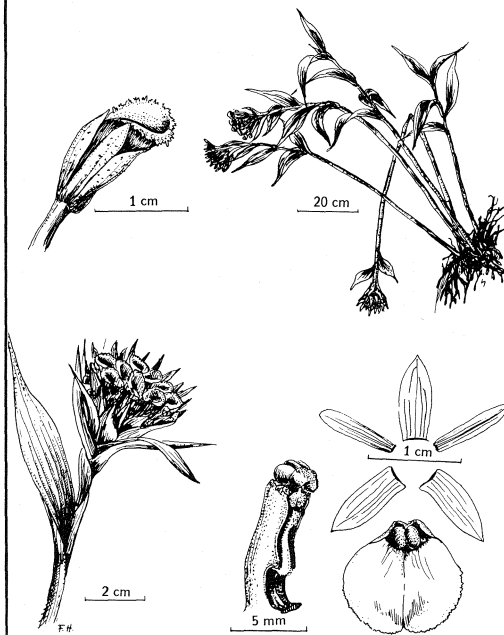
DRYADELLA PUSIOLA

14



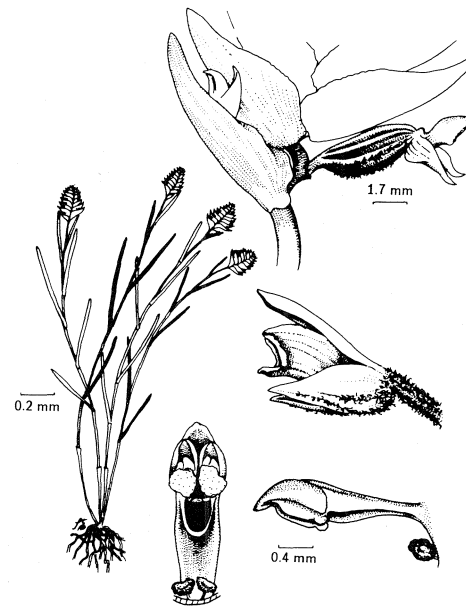
DRYADELLA SIMULA

15

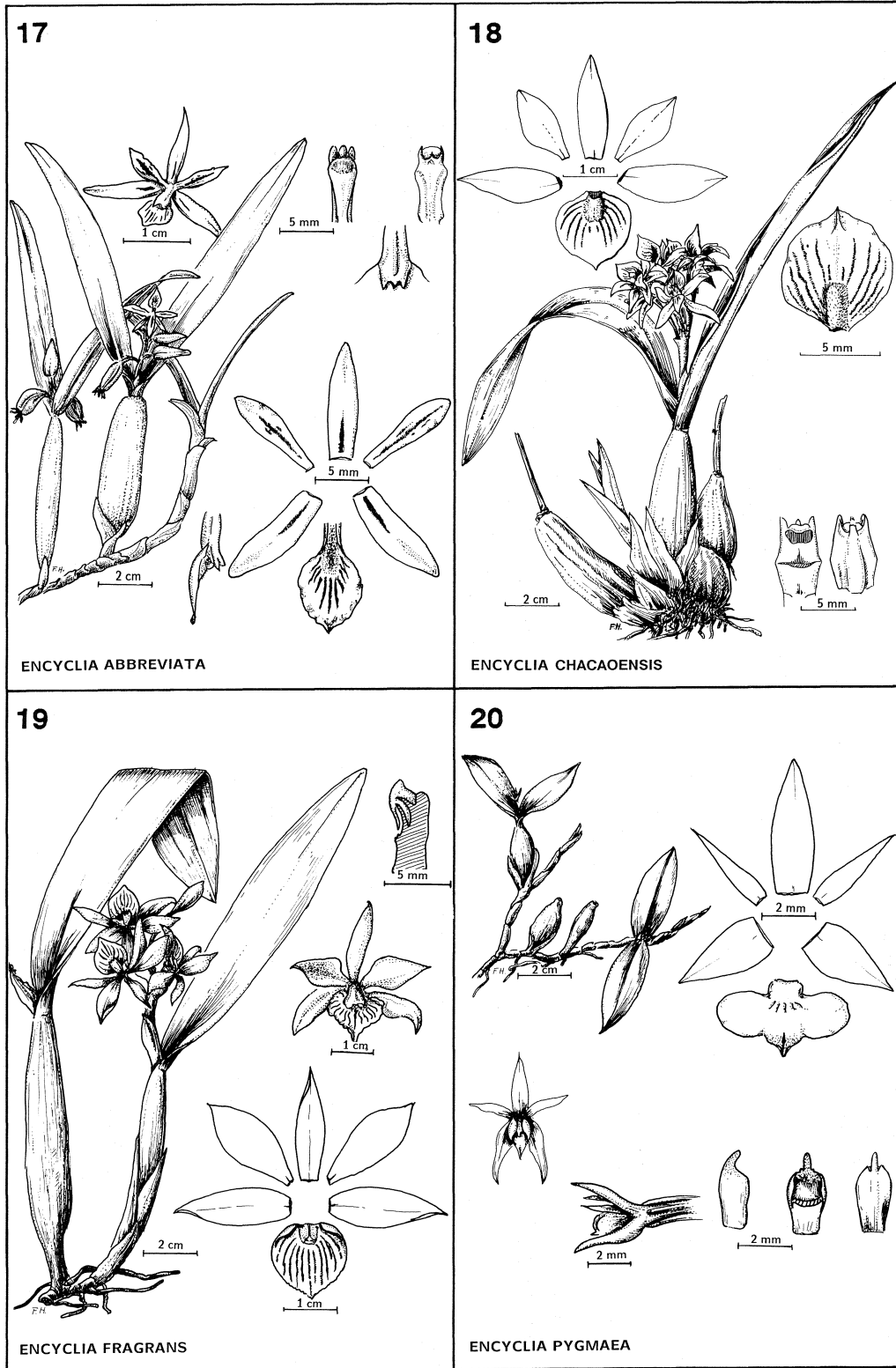


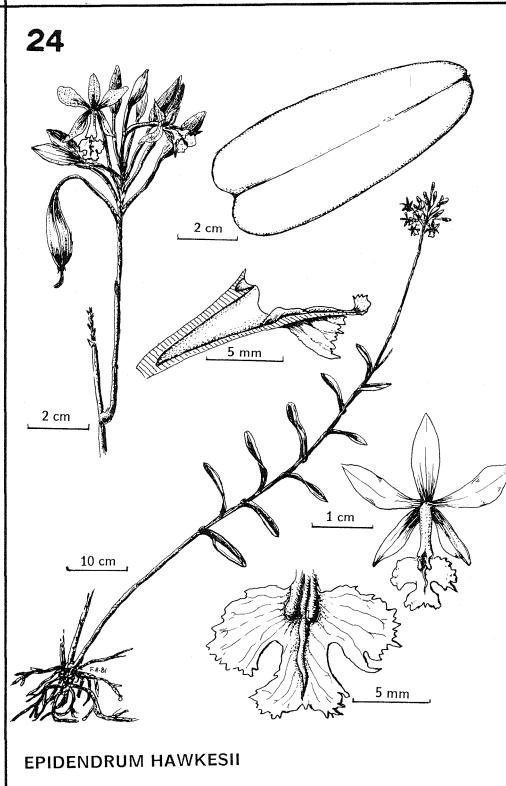
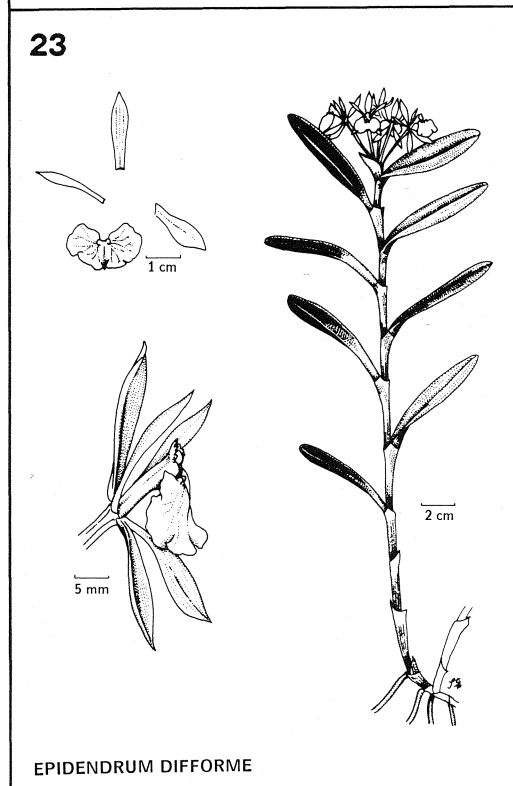
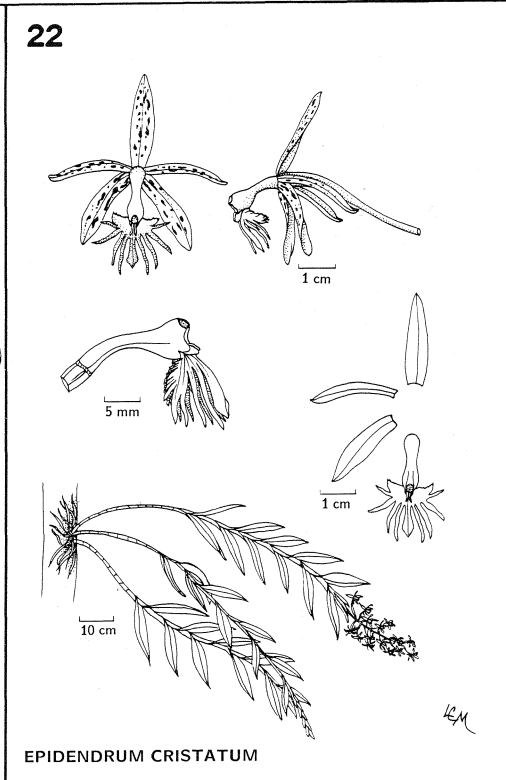
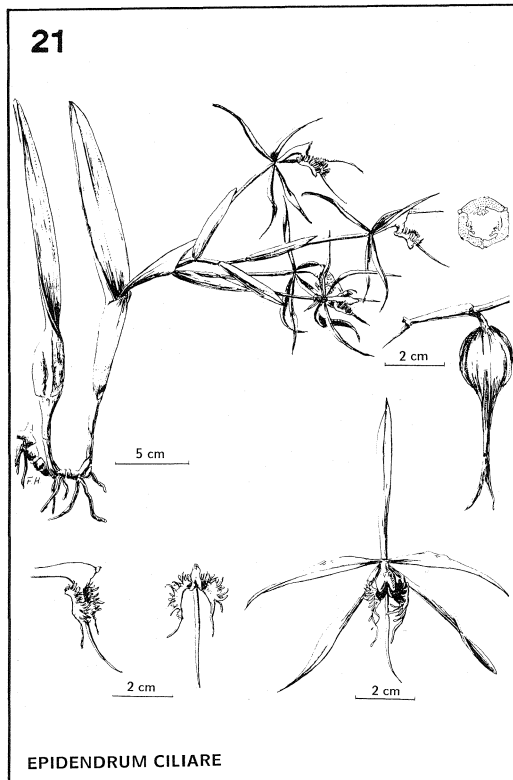
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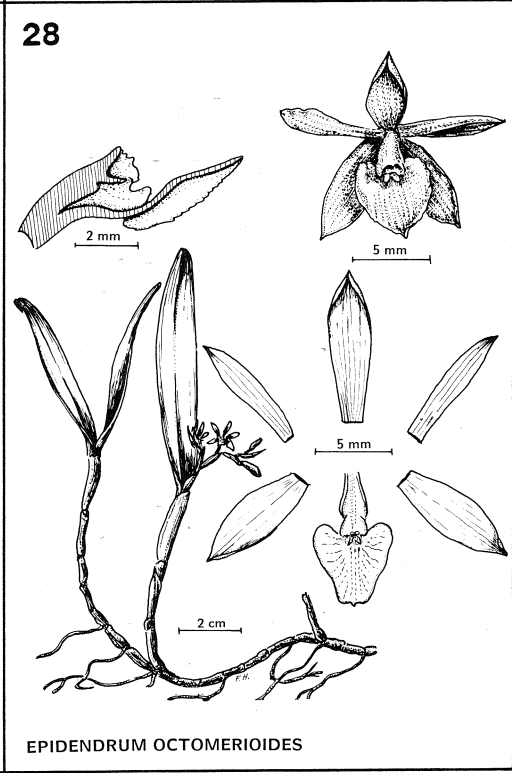
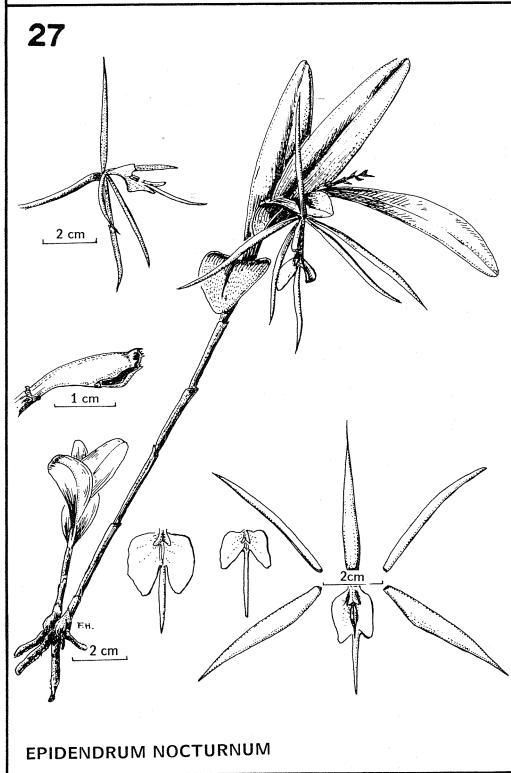
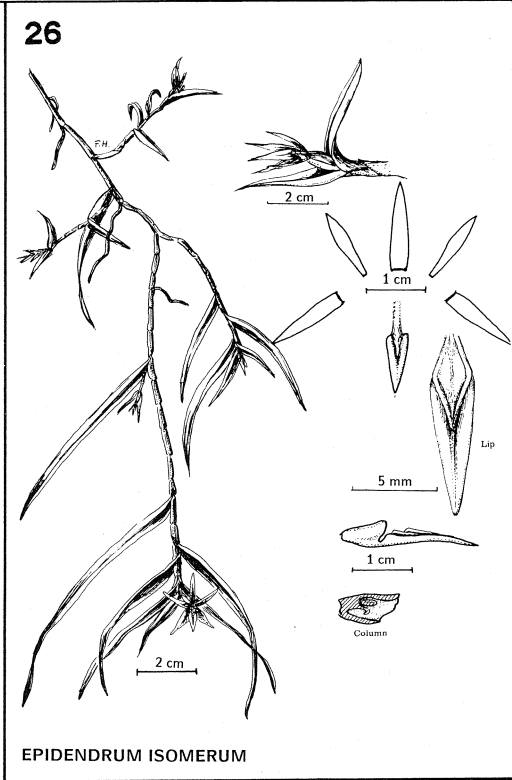
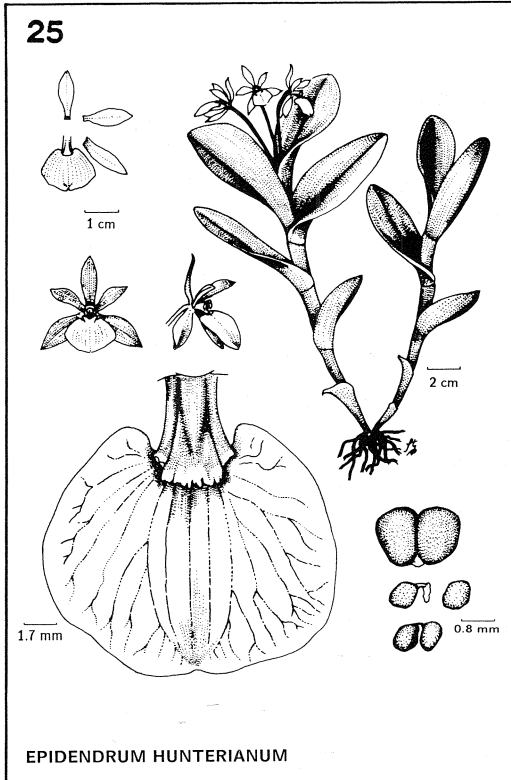
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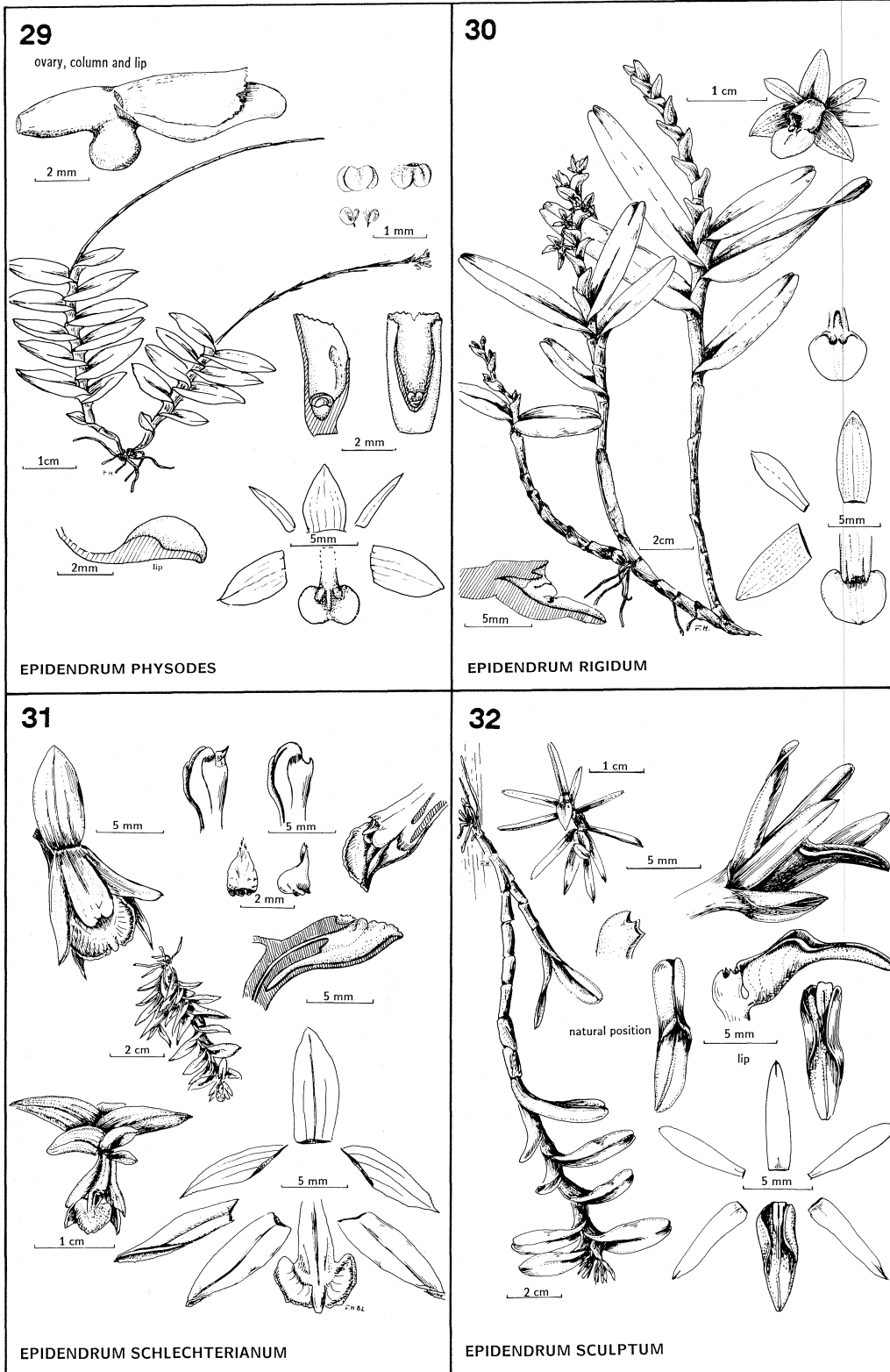


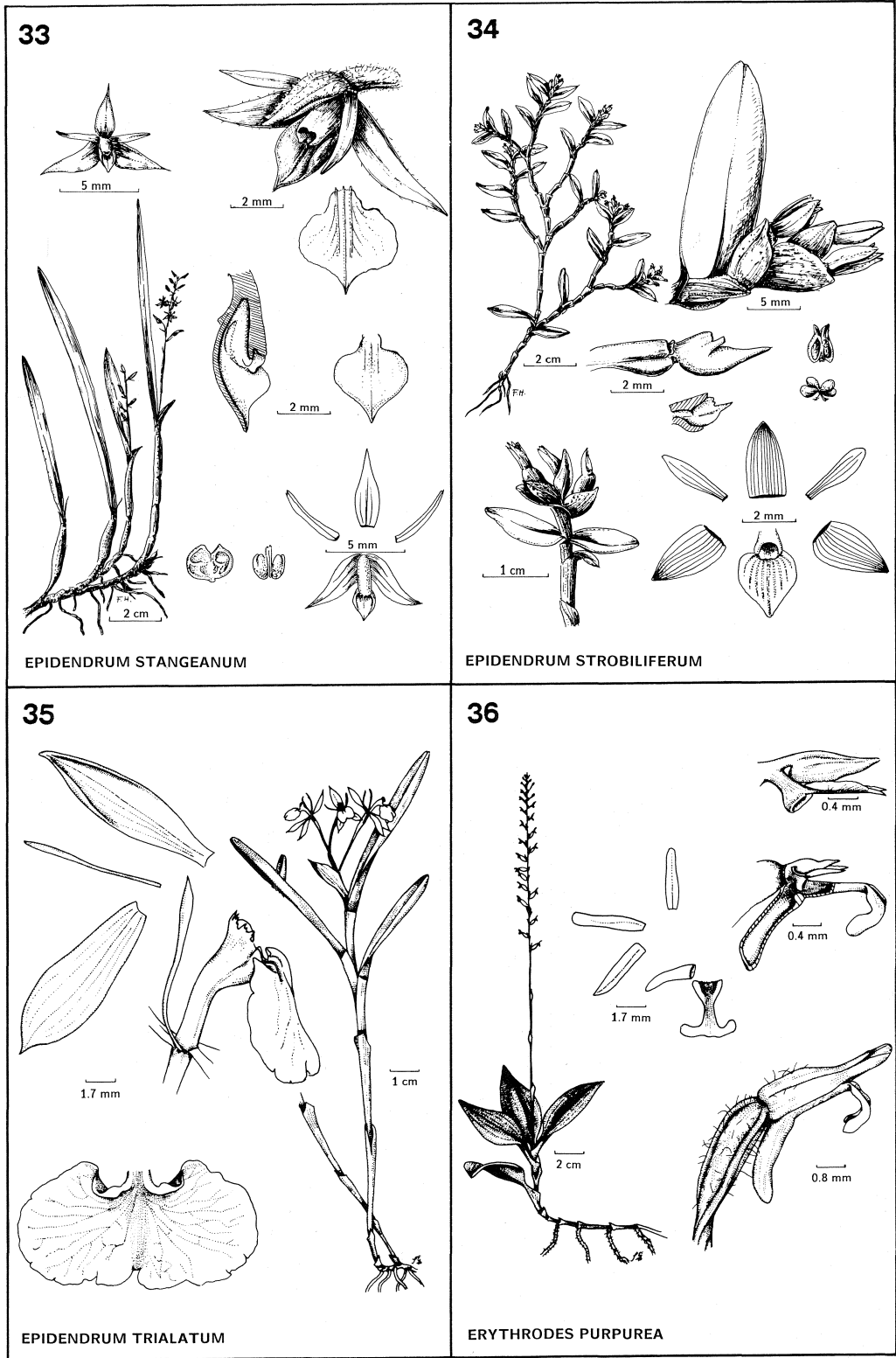
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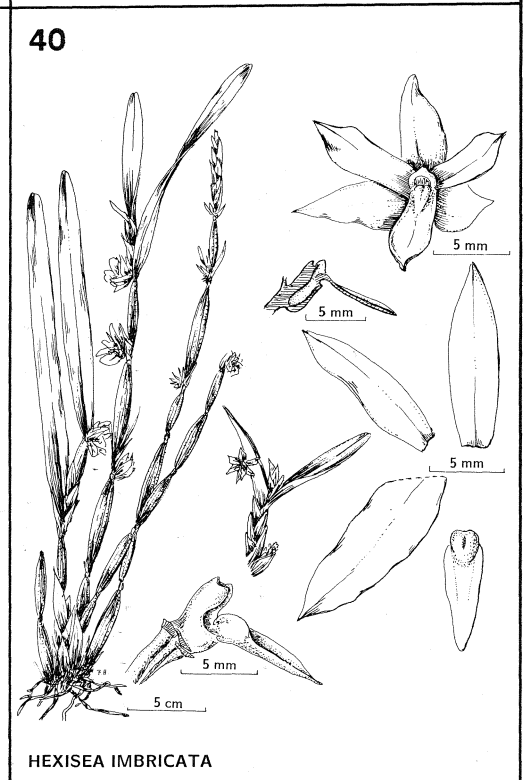
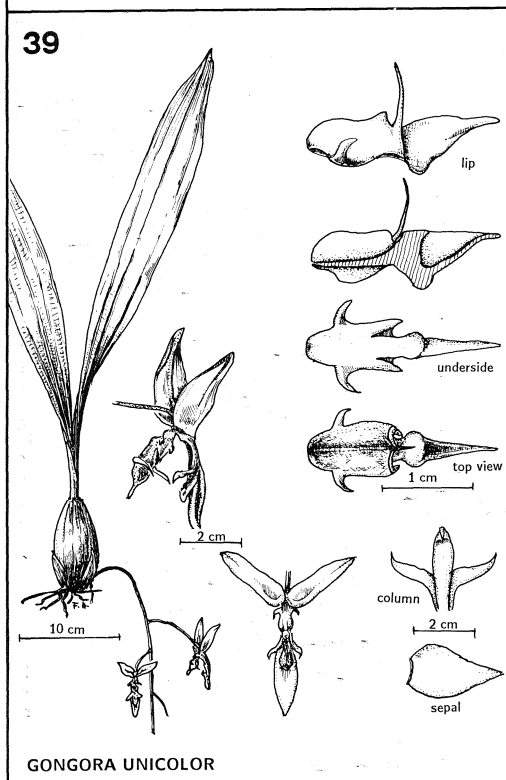
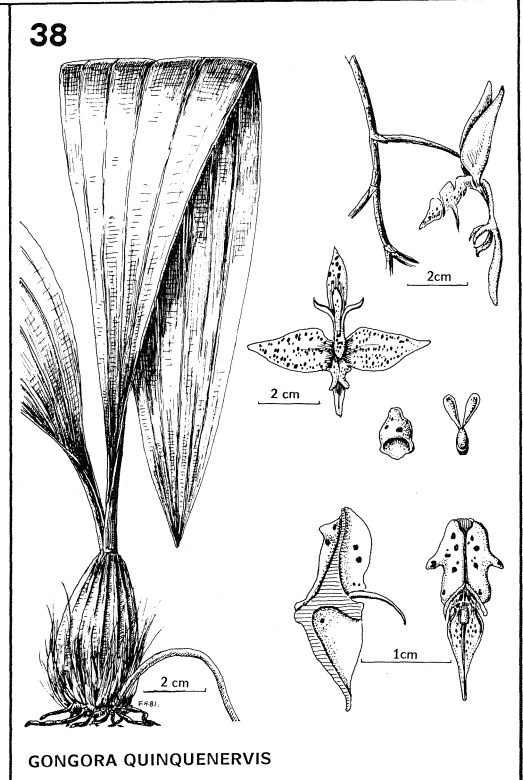
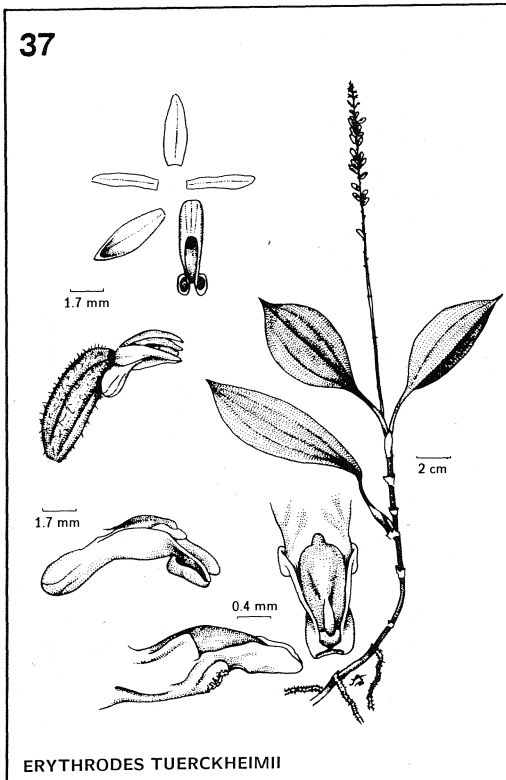


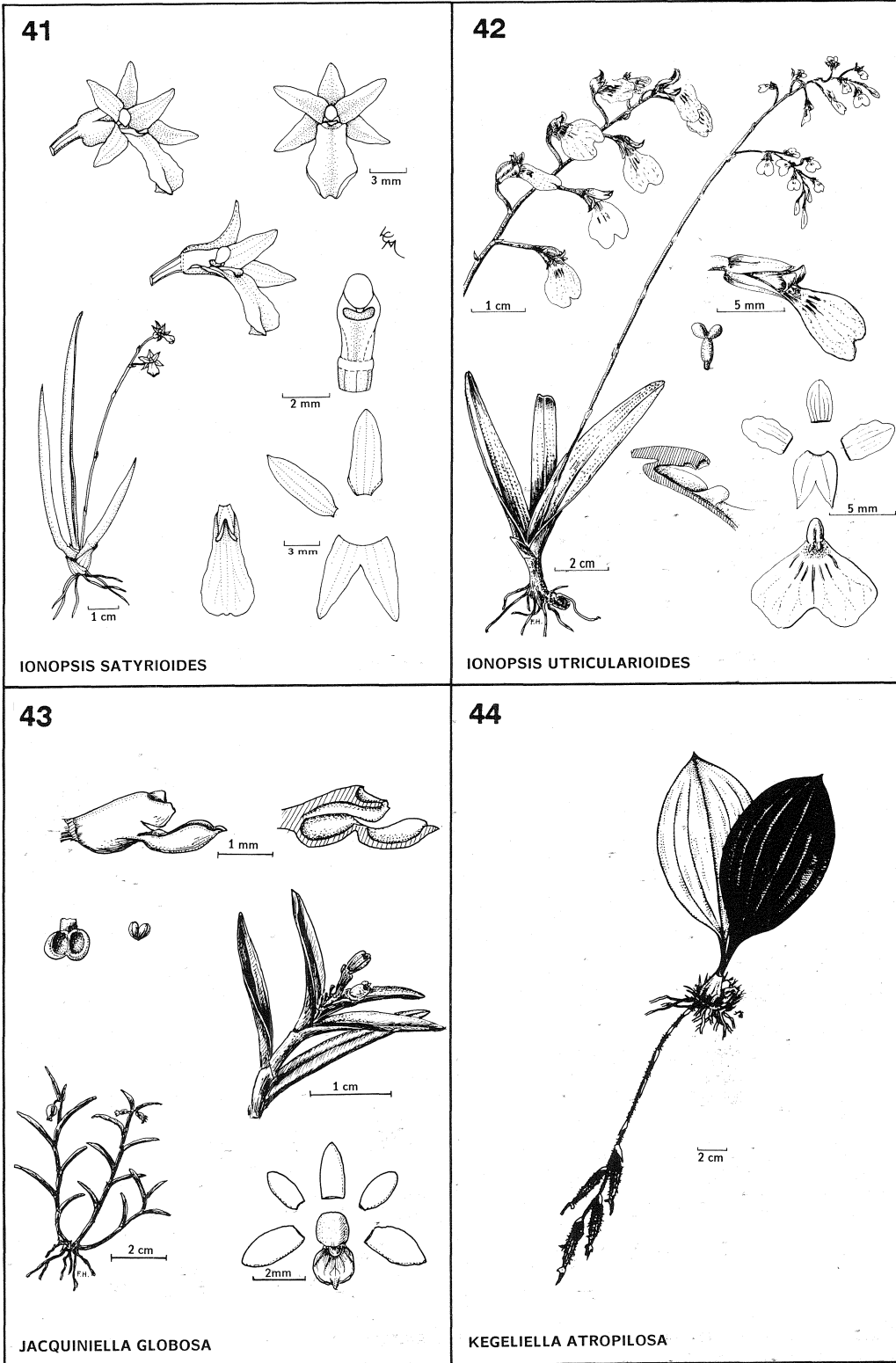




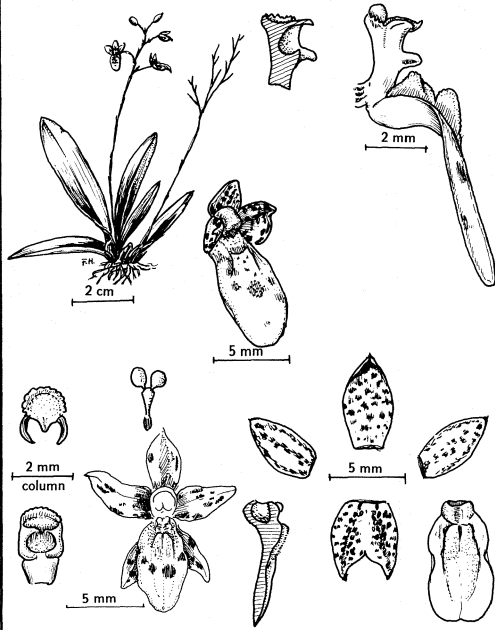






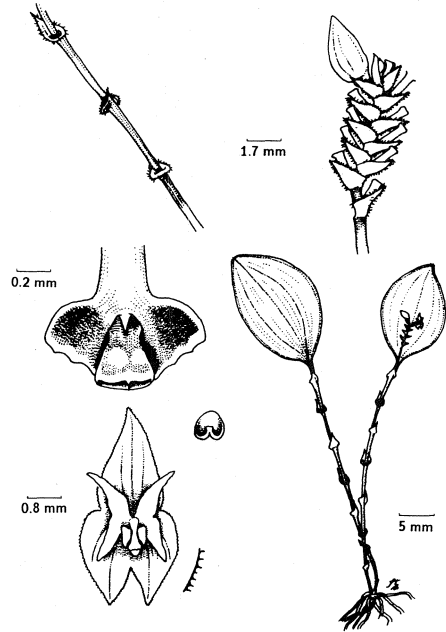


45



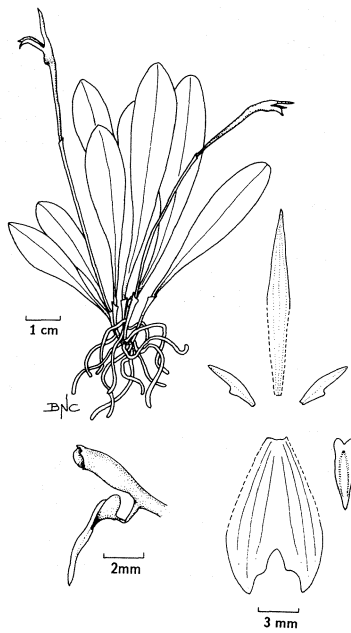
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46



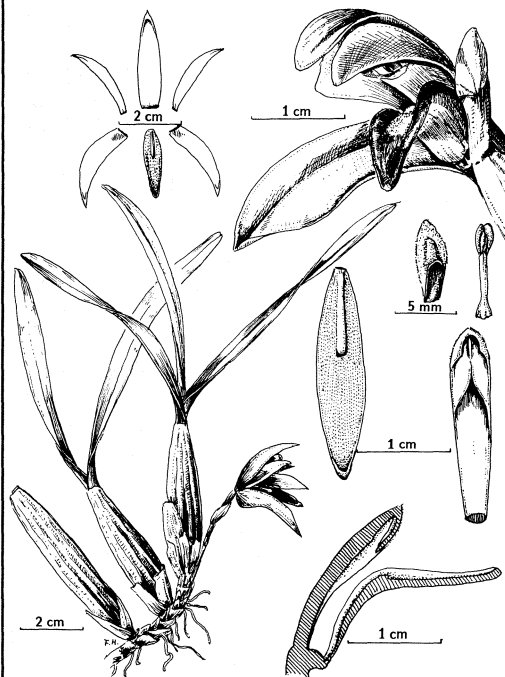
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47

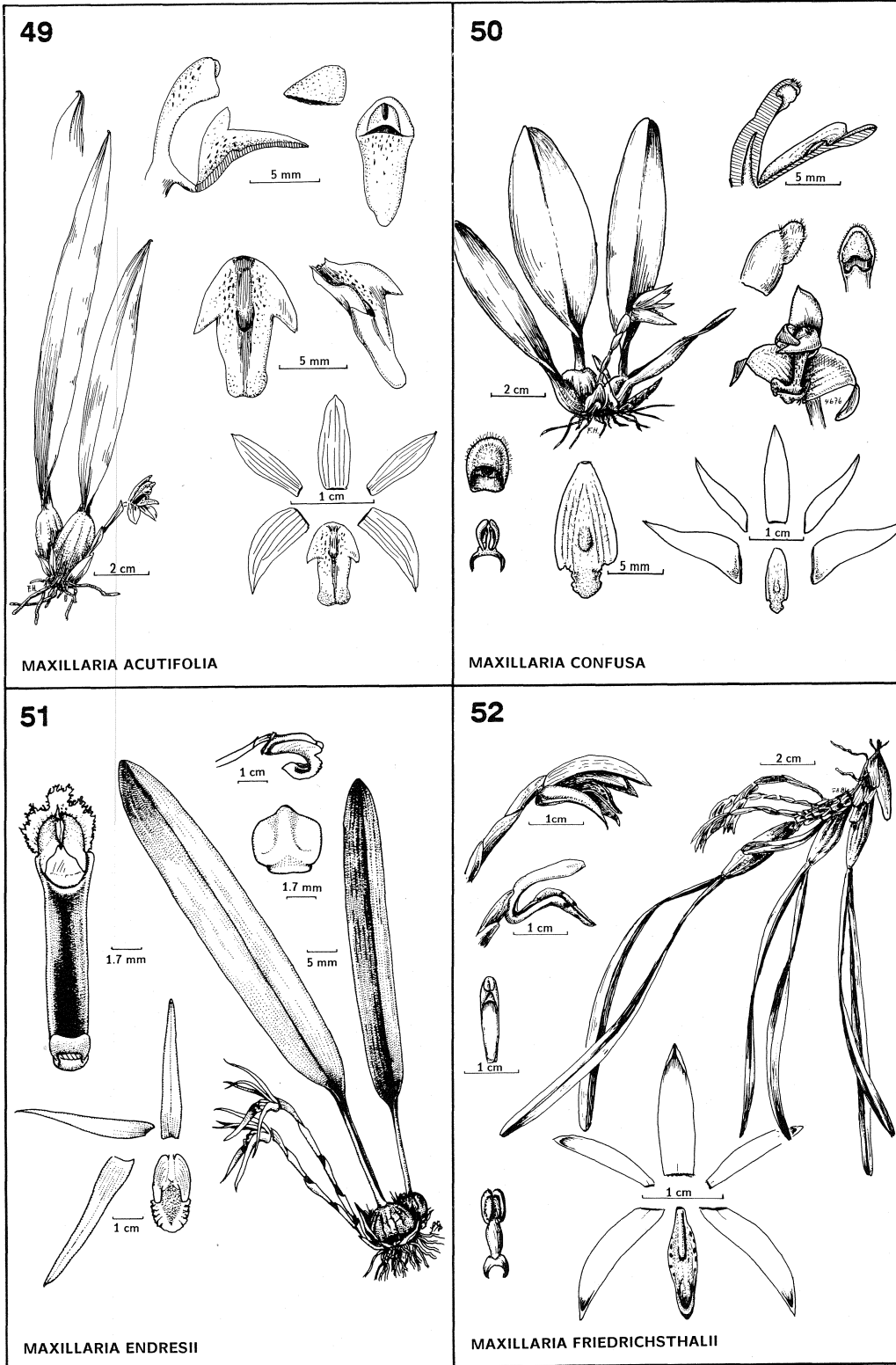


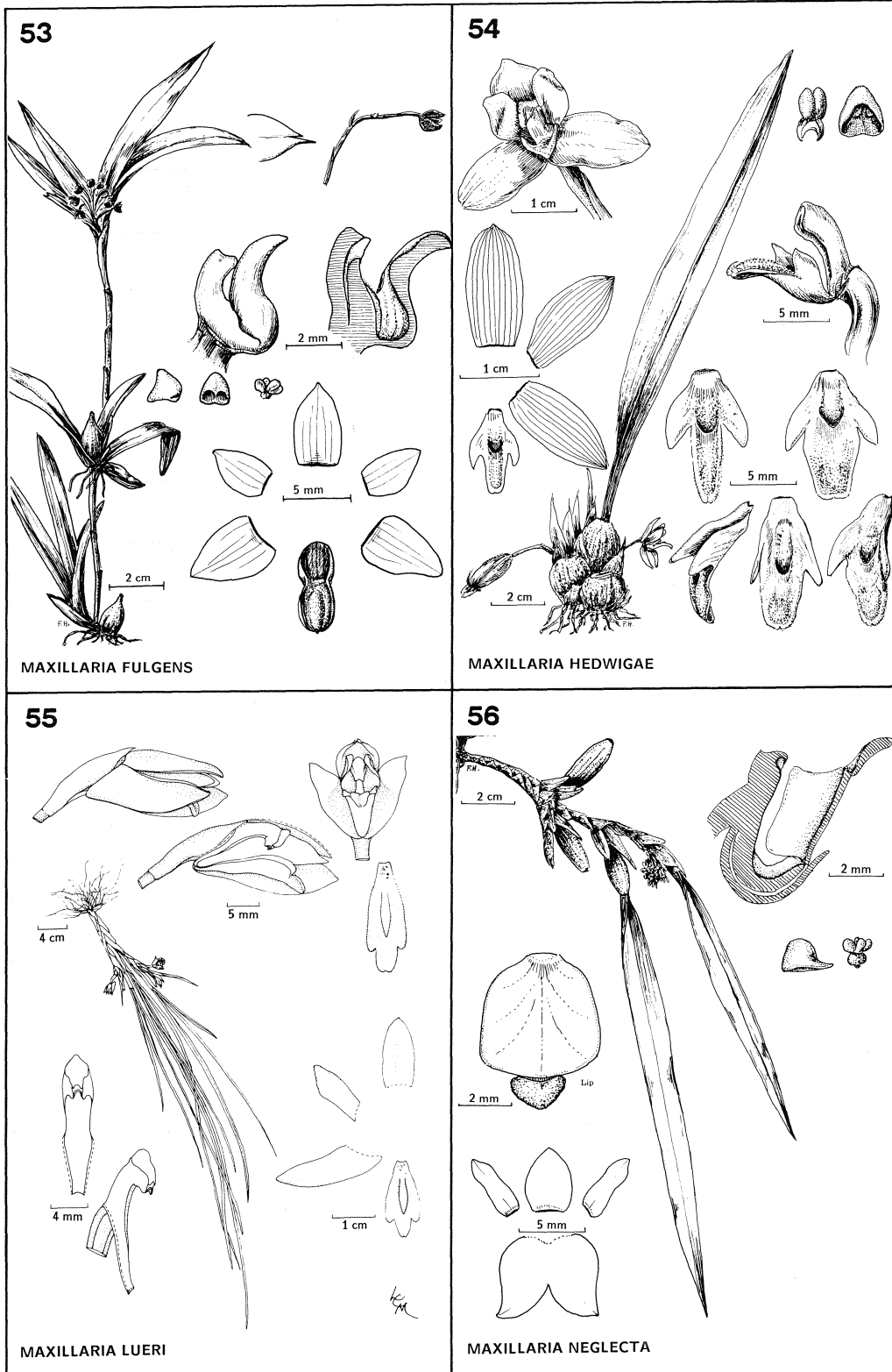
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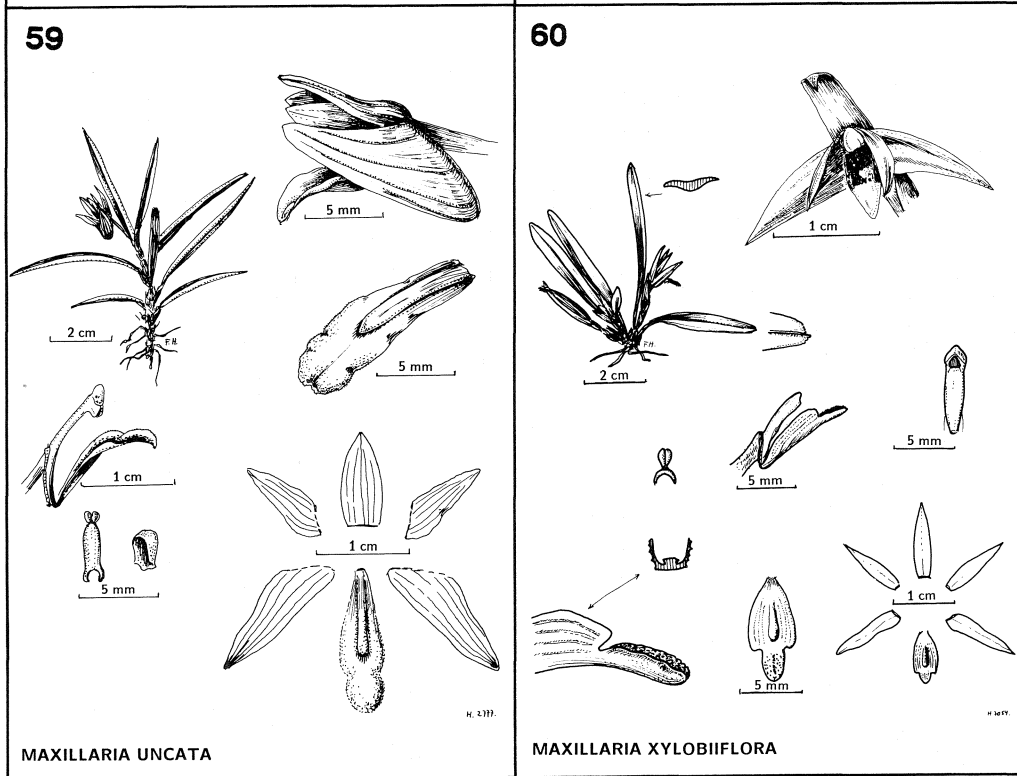
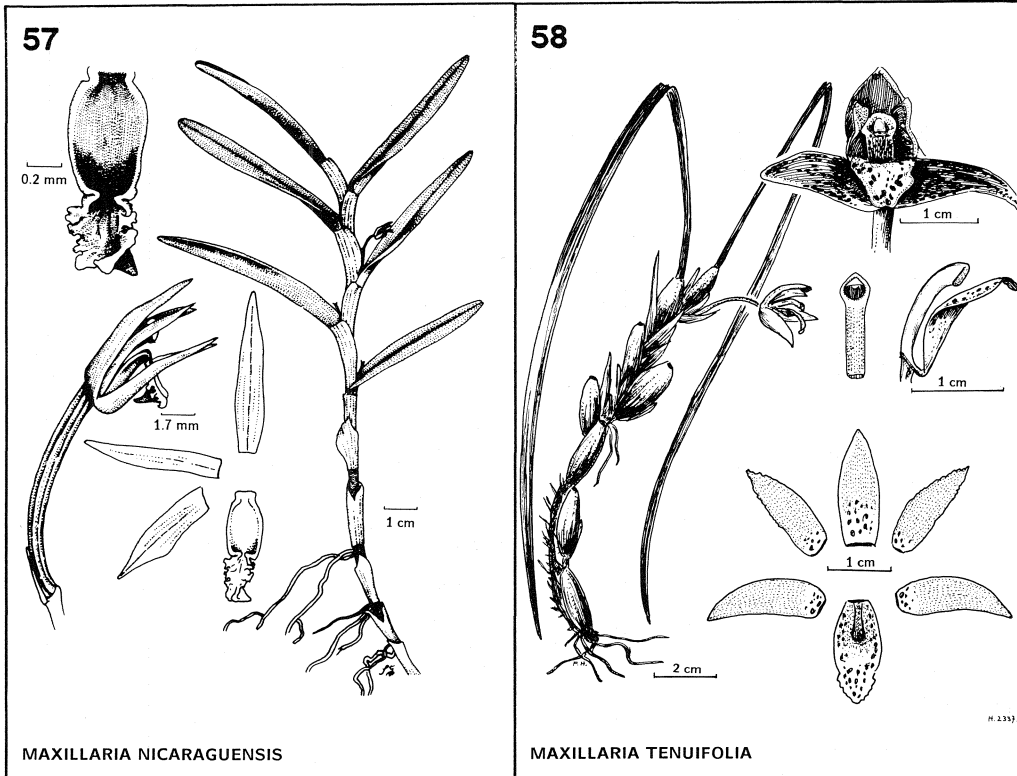
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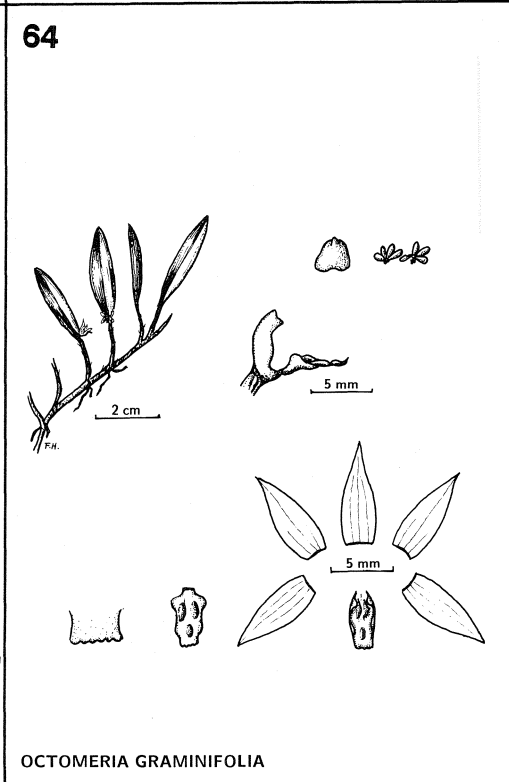
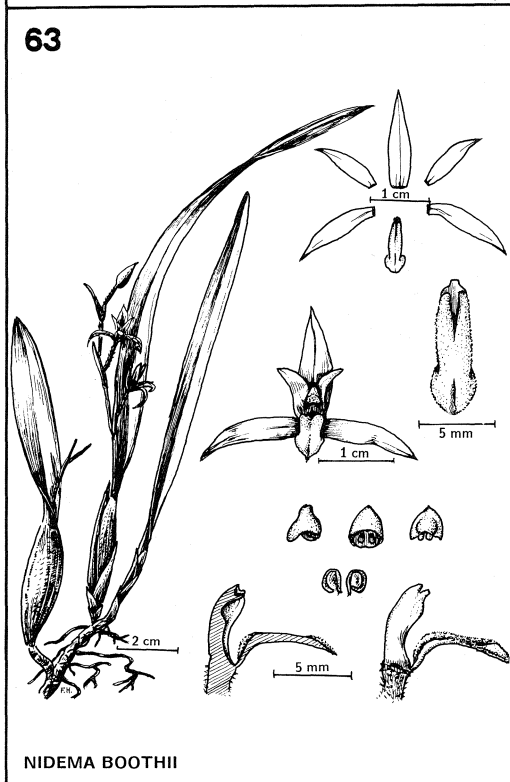
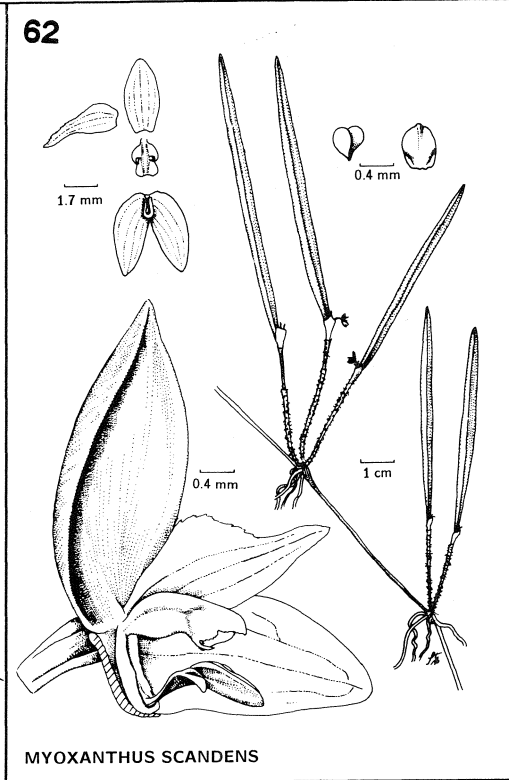
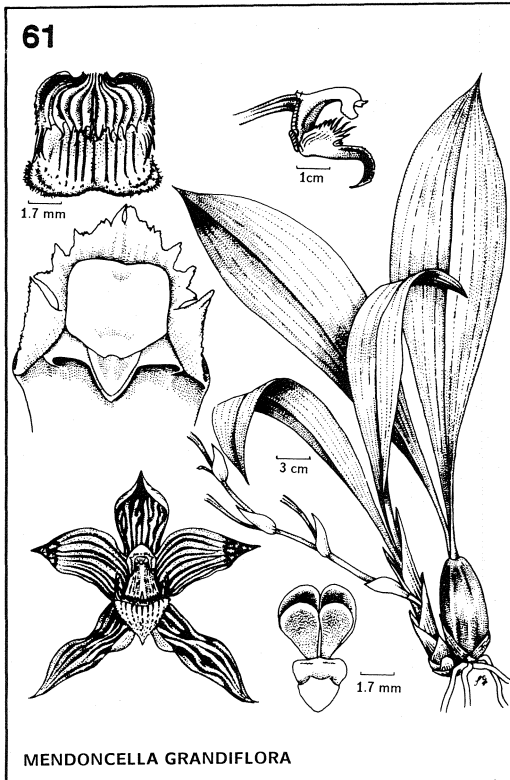


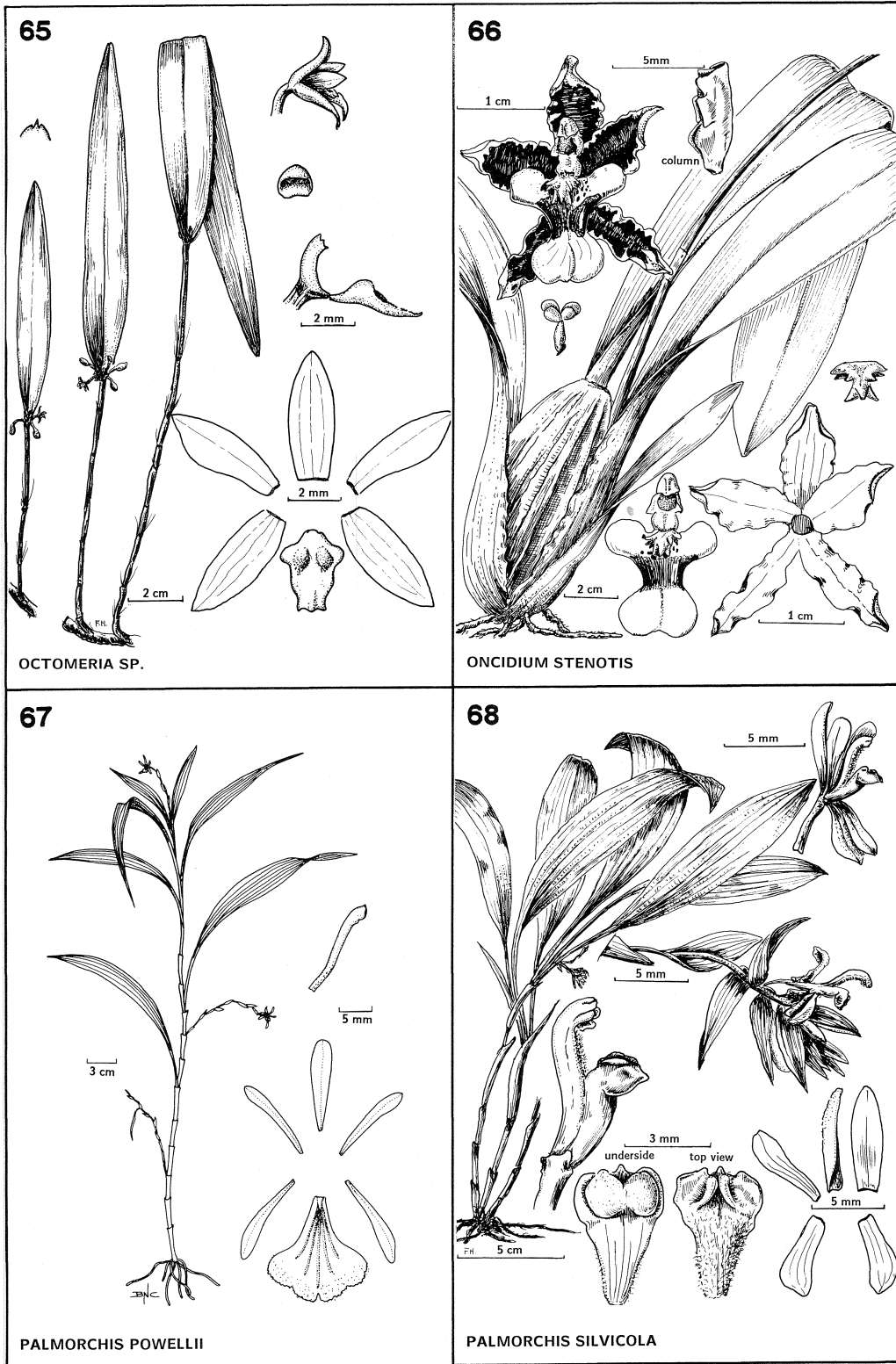
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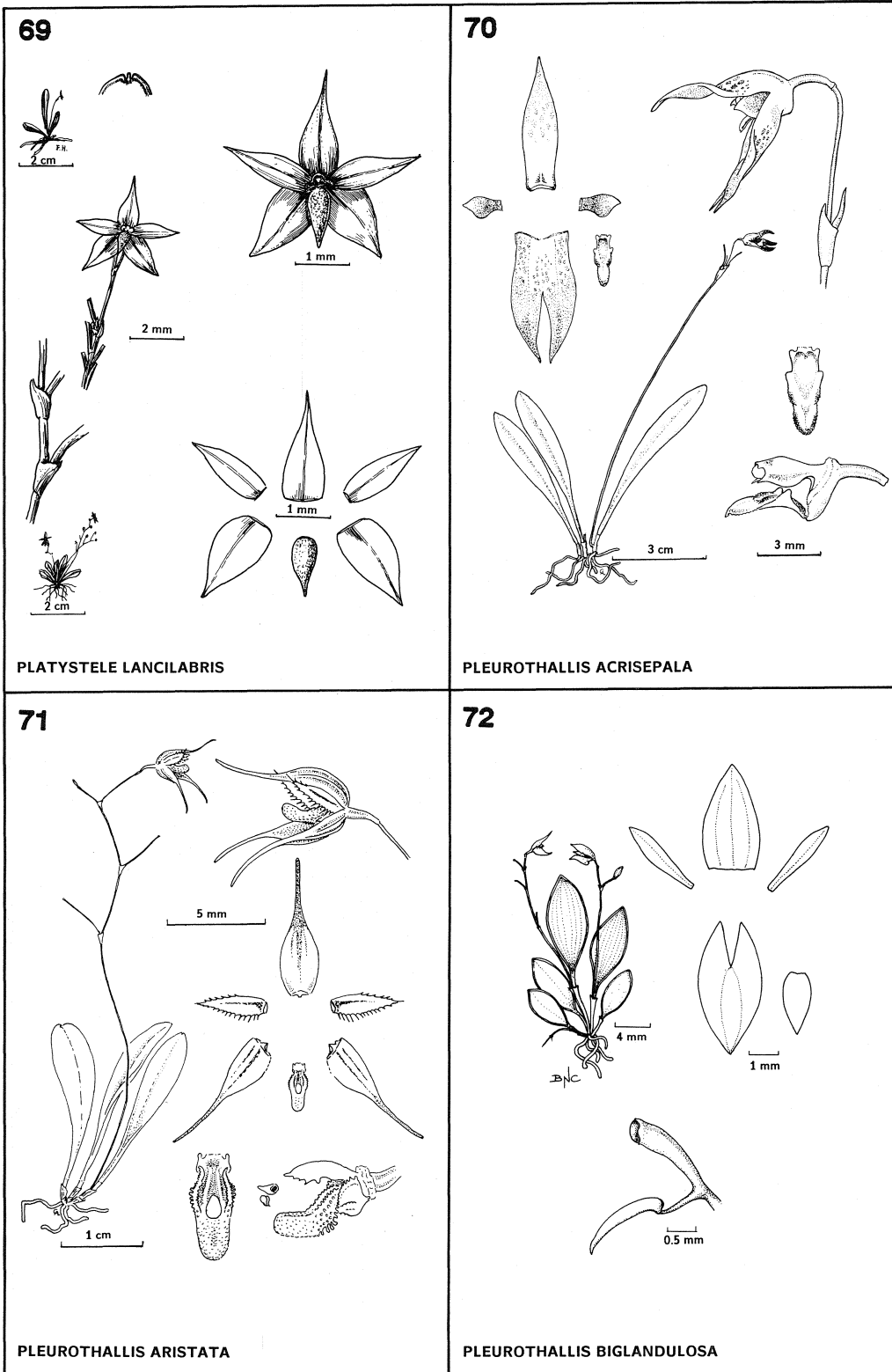


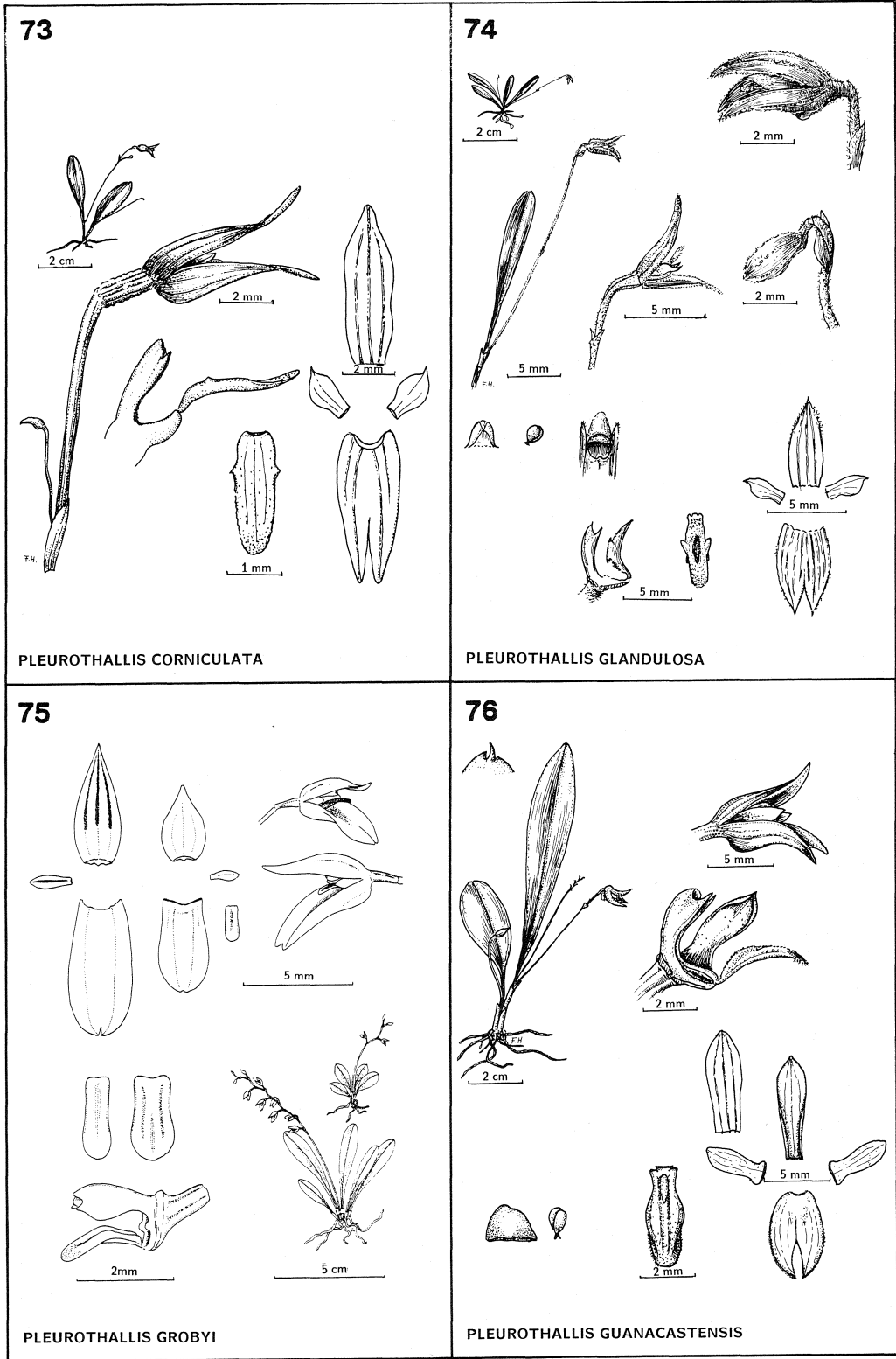




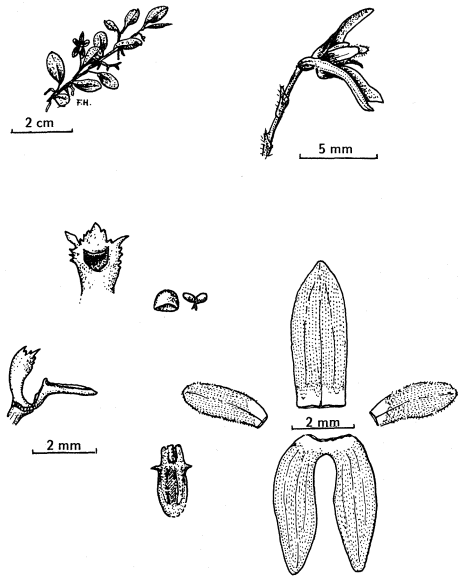






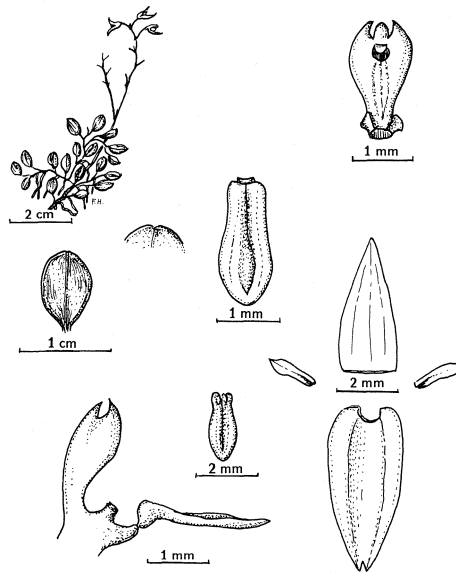


77



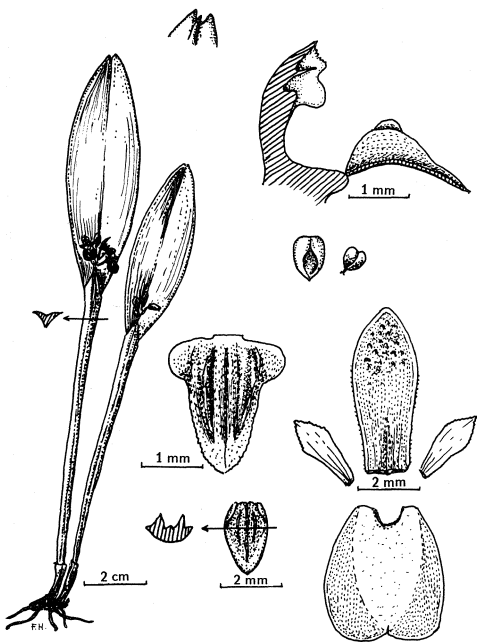
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78



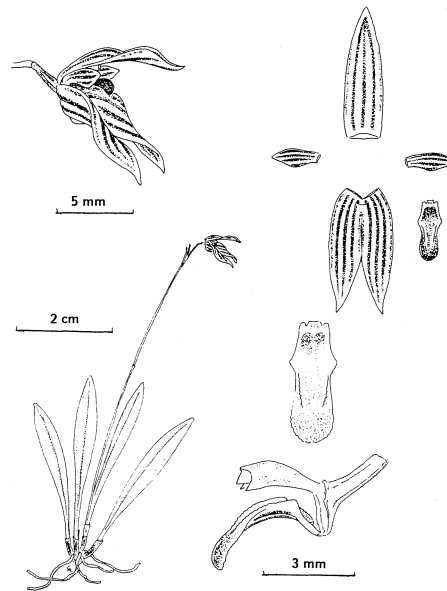
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79

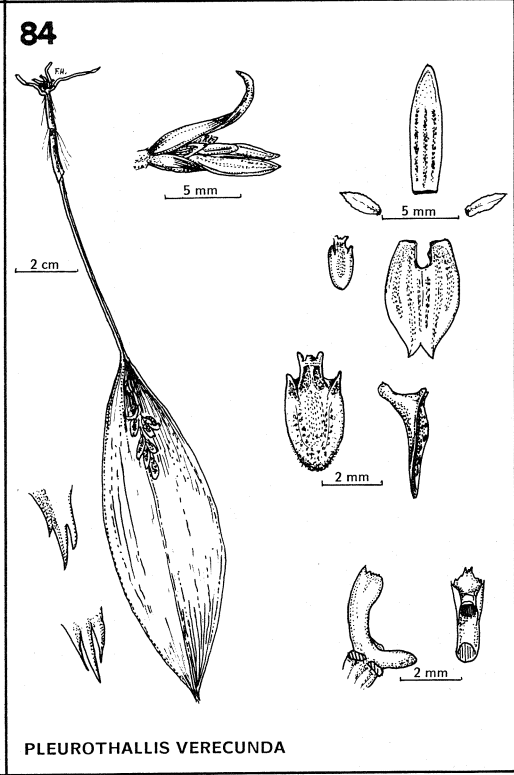
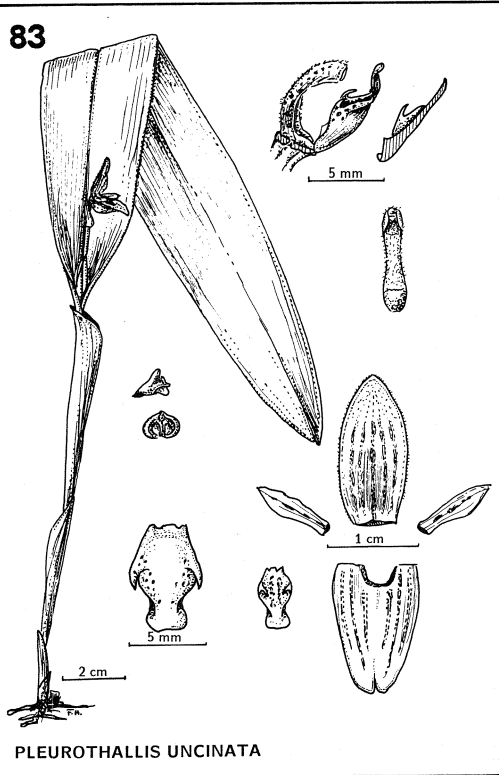
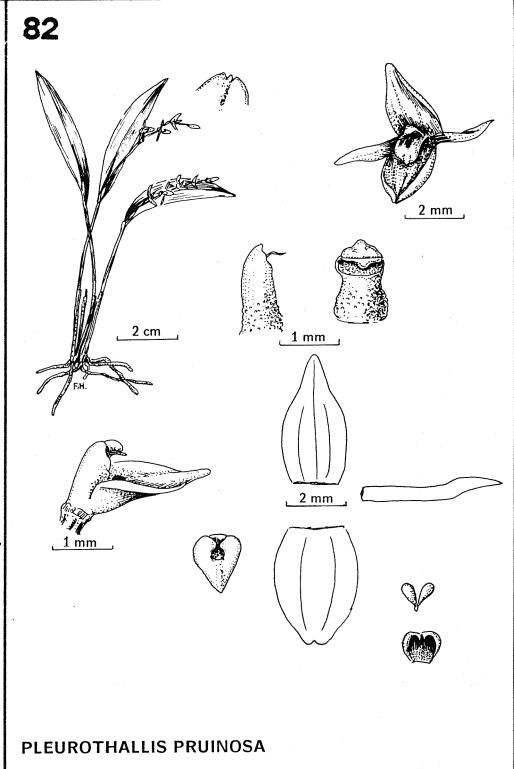
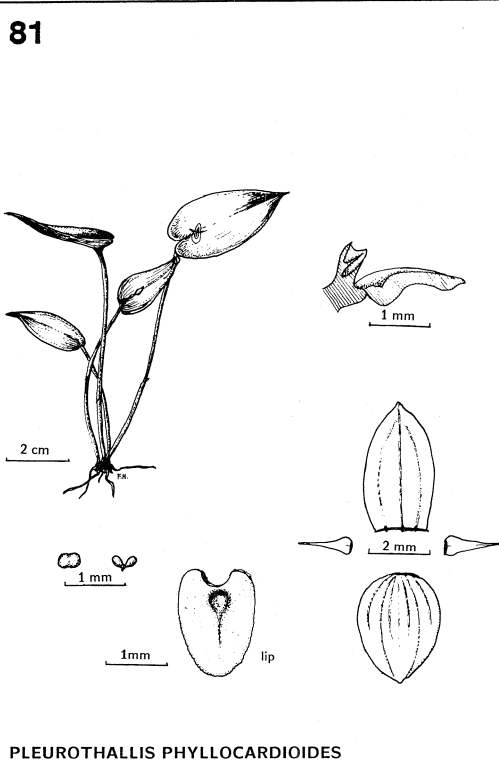


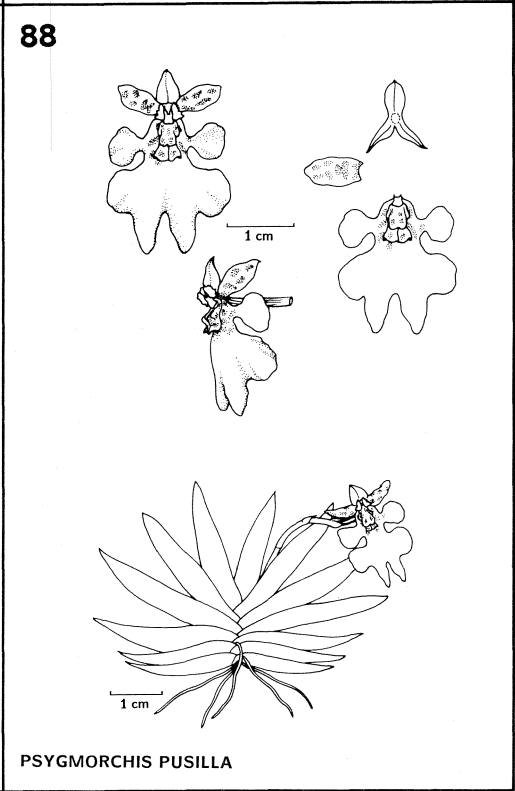
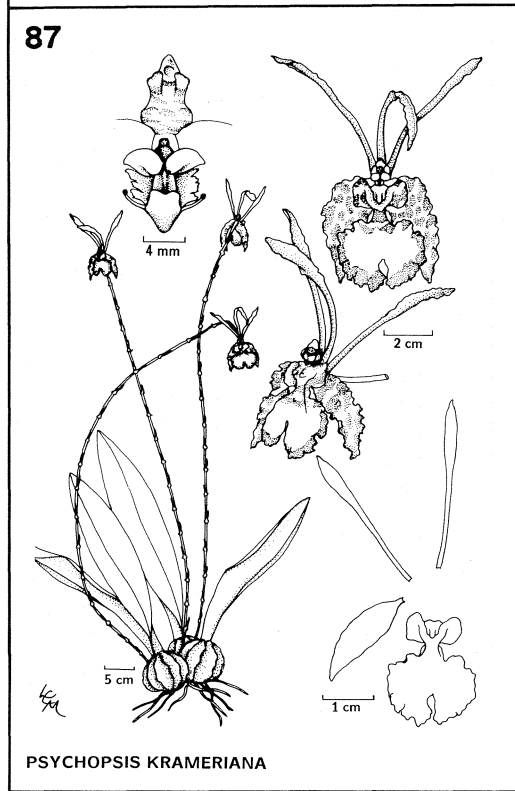
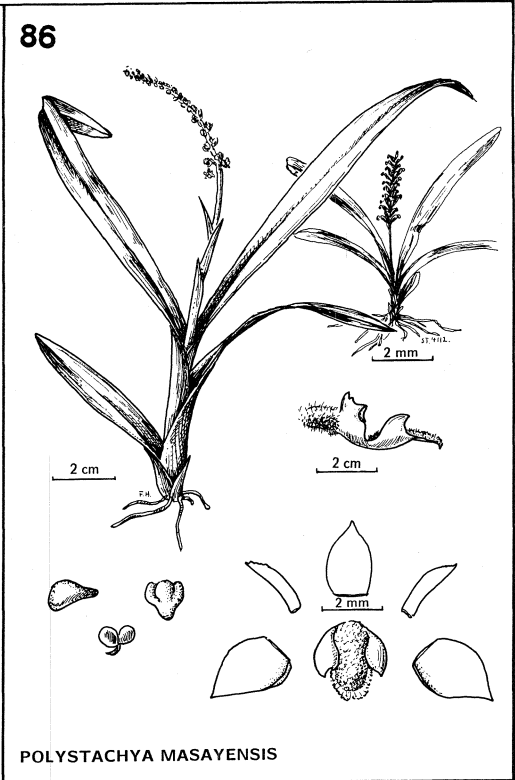
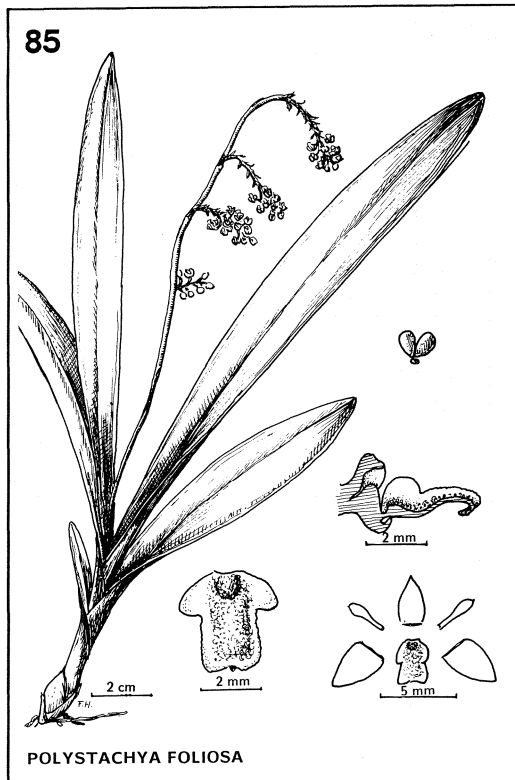
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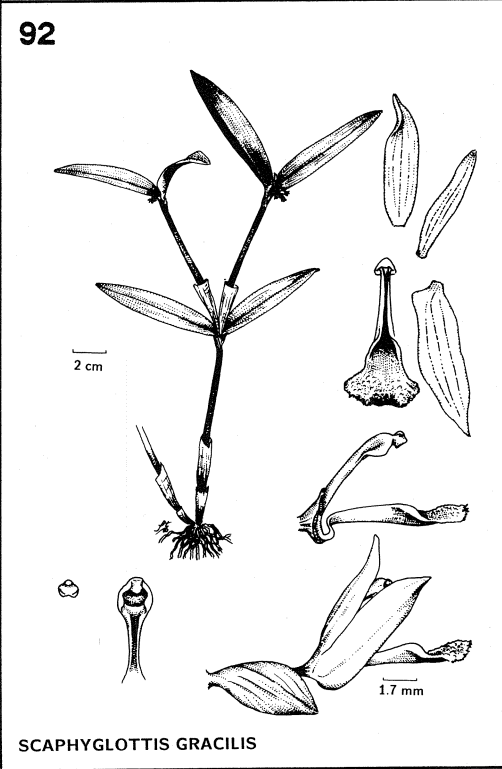
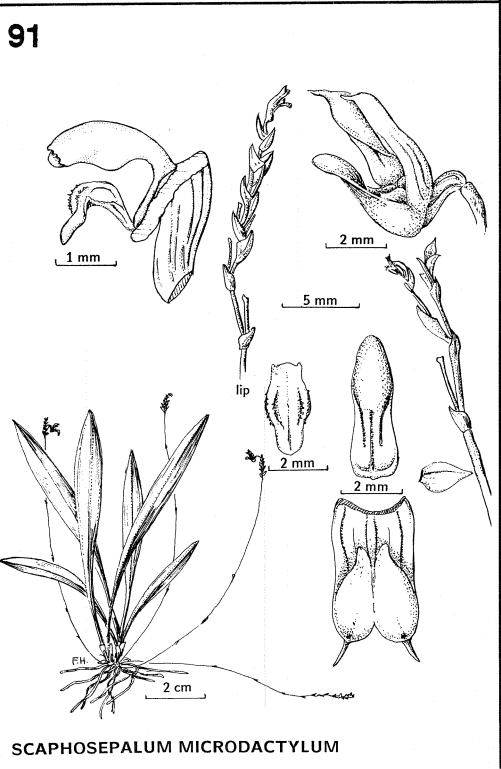
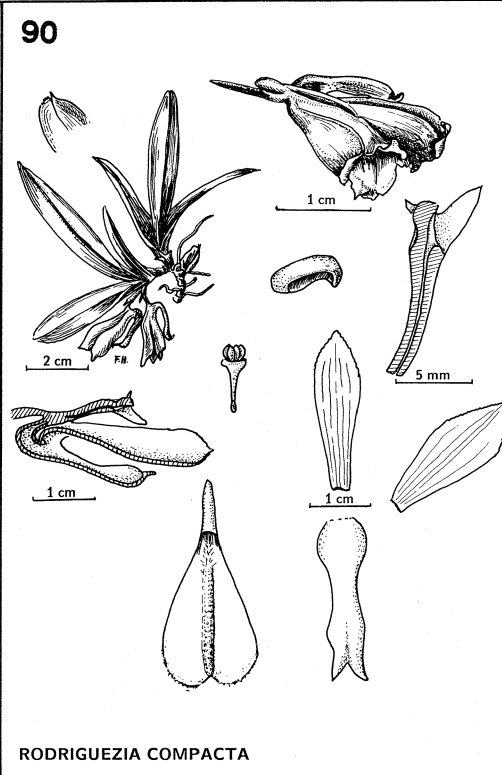
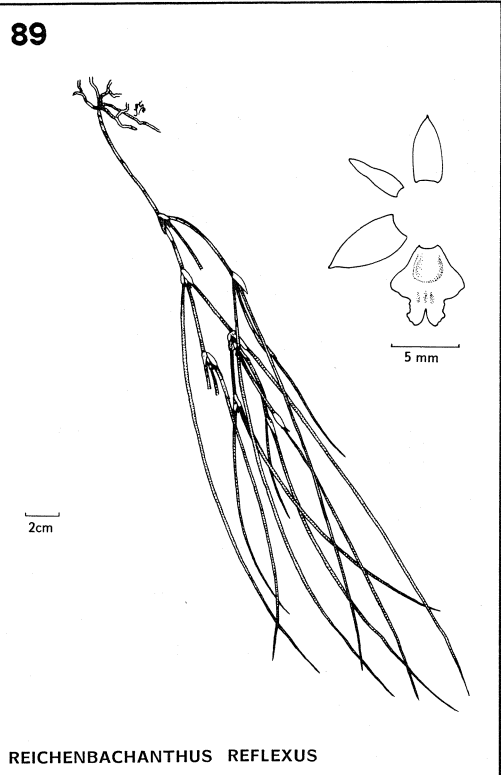
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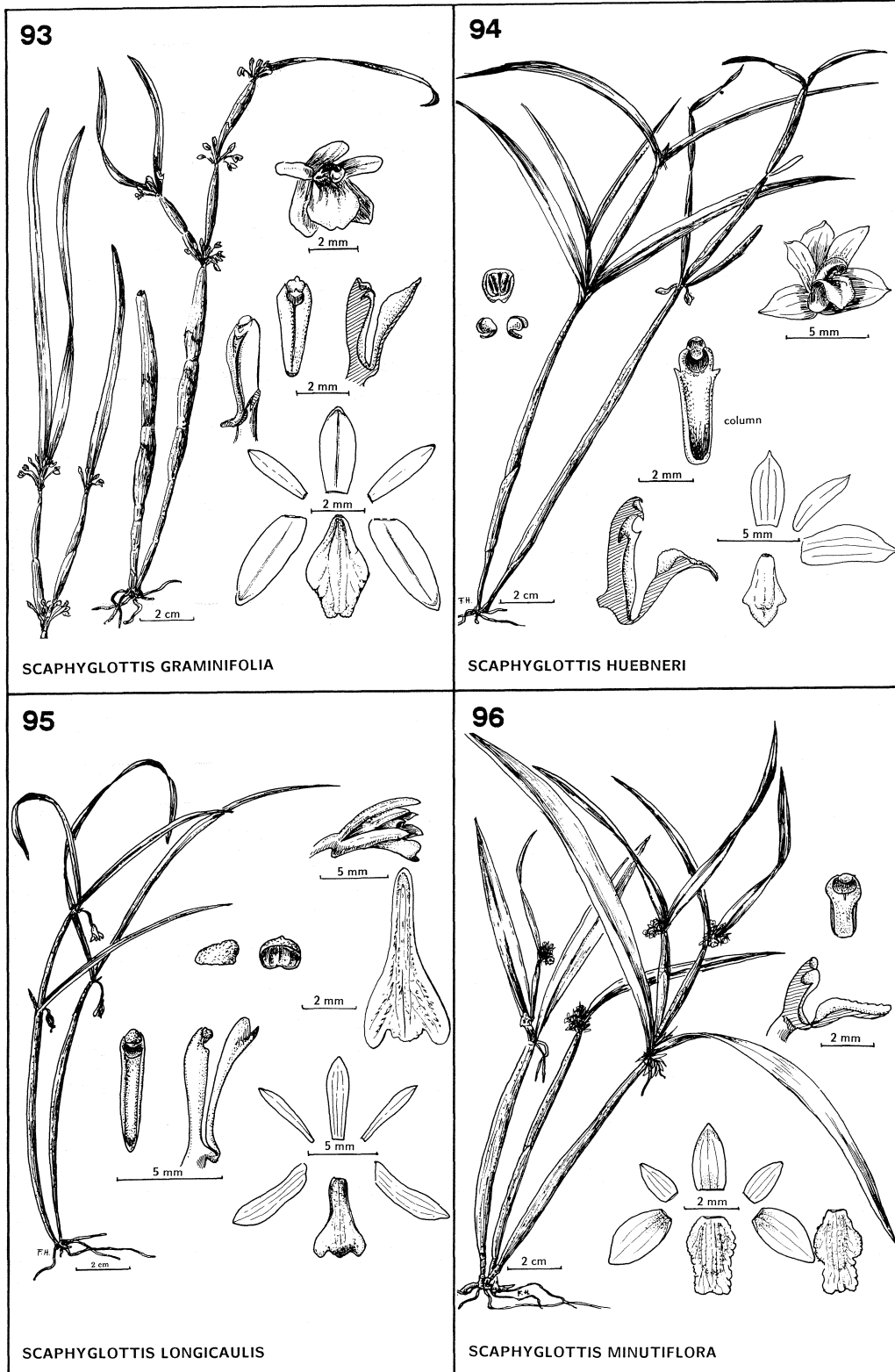


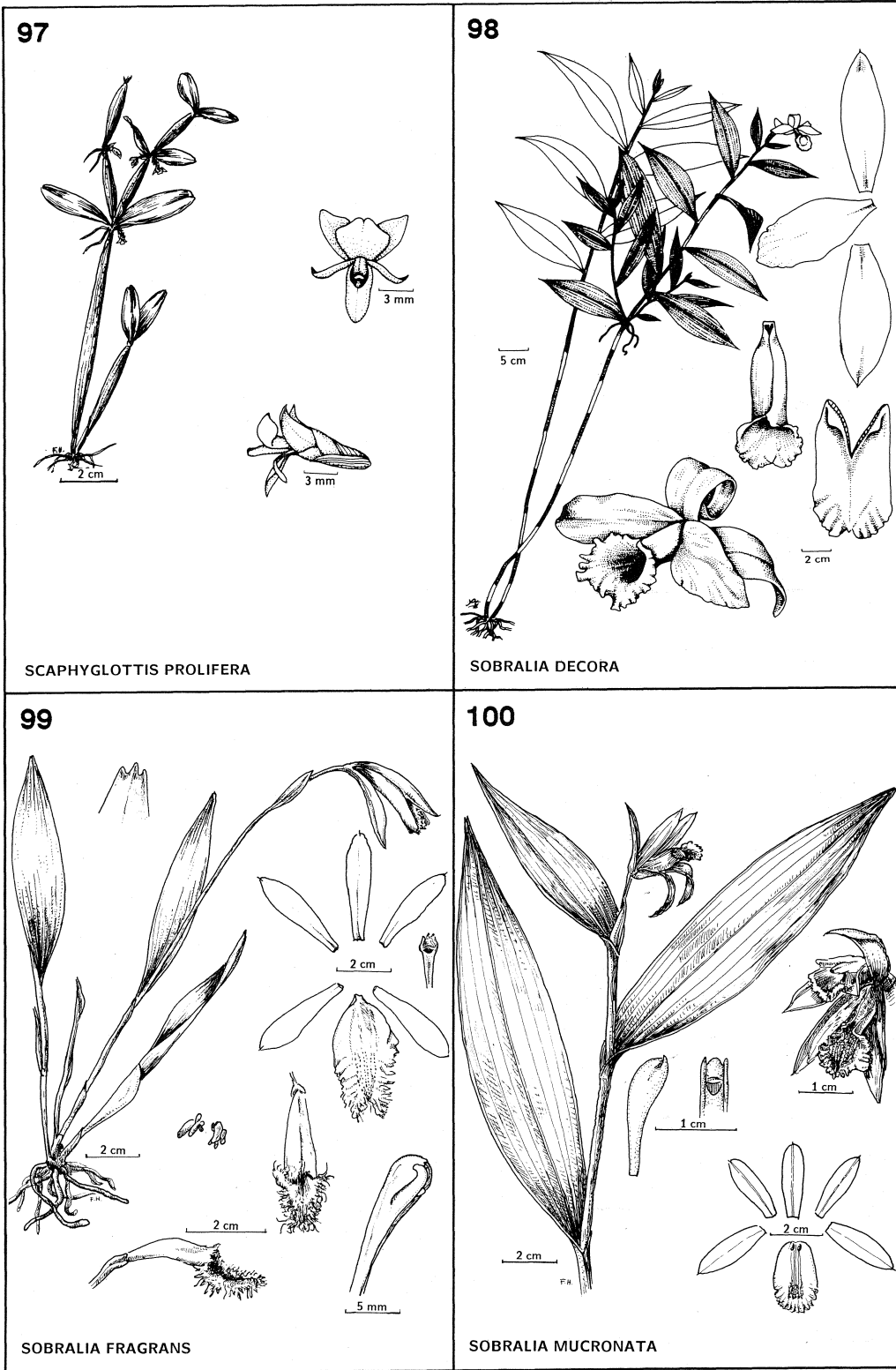
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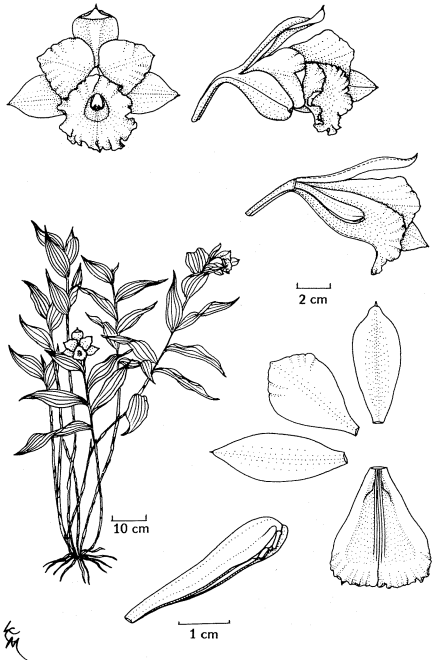






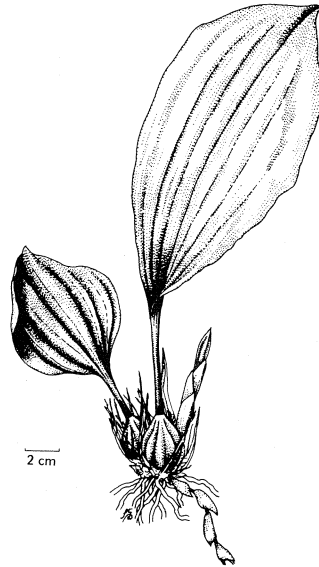


101



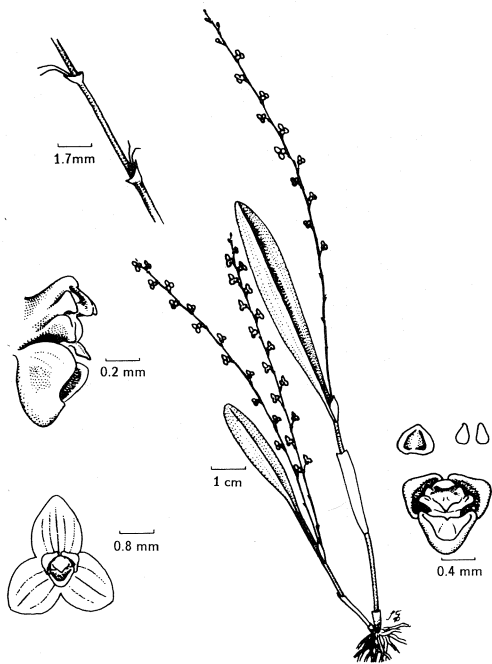
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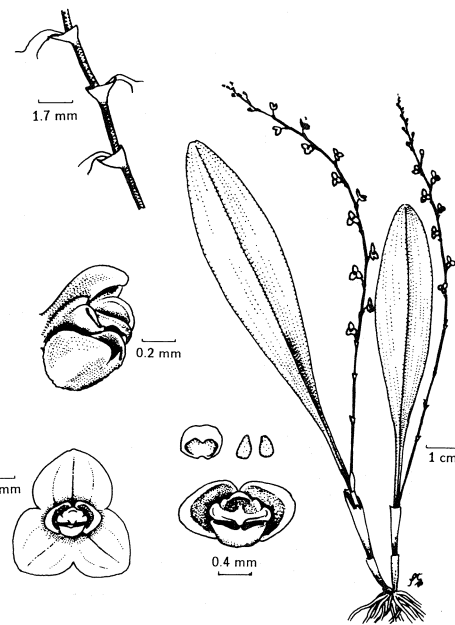
STANHOPEA SP.

103



STELIS CLEISTOGAMA

104



STELIS ENDRESII

