

A REVISION OF *SPATHIPHYLLUM* (ARACEAE)

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INTRODUCTION

The genus *Spathiphyllum* forms an inconspicuous element in the flora of tropical America, although it is widespread from Mexico to Peru and Brazil. Two species occur only on Pacific islands, one on Cocos Island (some 300 miles off the Costa Rican coast) and another in Indonesia and the Philippines. Most species of *Spathiphyllum* grow at elevations between 100 and 1000 m above sea level, frequently in the foothills of mountains or in river valleys. They are plants of permanently wet or moist, shady places that may be inundated at times. They often form colonies along the margins of rivers and streams.

Attempts to identify recent Guayanian collections and other material of *Spathiphyllum* suggested the need to further investigate the classification of this genus. Subsequently, about 1000 specimens were critically examined. Deep appreciation is expressed to the directors and curators of the many herbaria from which specimens were borrowed.¹

HISTORY OF THE GENUS

Before the publication of *Spathiphyllum* in 1832, two species had been described that are now included in this genus. Jacquin in 1790 (*Collectanea* 4: 118) described *Dracontium lanceaefolium*. In 1803, *Pothos cannaefolia* was clearly illustrated and characterized in *Curtis's Botanical Magazine* (pl. 603).

Schott, having described *Spathiphyllum* in 1832 (*Melet. Bot.* 22), listed "*Sp. lanceaefolium* Schtt. (*Dracontium lanceaefolium* Jacq.)" and "*Sp. sagittae-folium* Schtt." It appears that he followed Sprengel, who in his revision of Linnaeus' *Systema naturae* (*Syst. Veg.* 3: 766. 1826) had included these two species in the genus *Dracontium* along with *D. podophyllum* L. Schott correctly excluded the last species.

The two species included with the original description of *Spathiphyllum* are not congeneric, though both have trimerous flowers with perianth, a superficially acaulescent habit, and long petioles geniculate at the apex. Schott's treatment was followed by Endlicher (*Gen. Pl.* 1: 240. 1836) and by Kunth (*Enum. Pl.* 3: 83. 1841).

In 1849, Liebmann described the genus *Hydnostachyon* (*Vid. Meddel.* 1-2: 23), differentiated from *Spathiphyllum* by its unilocular ovary. Critical examination of the specimens referred to that genus fails to verify this unilocular condition. Schott placed *Hydnostachyon* in synonymy under *Spathiphyllum* in 1853.

¹Abbreviations for herbaria used in the text are those of Lanjouw and Stafleu, *Index Herb.* 2(1):106-117 (1952).

In 1852, Carl Koch, impressed by the truncate, cuplike perianth of a plant then cultivated as "*Pothos cannaefolia*" and "*Monstera cannaefolia*," designated this plant as type of a new genus, *Massowia*, and published the combination *M. cannaefolia* (Bot. Zeit. 10: 277-278). Apparently he was unaware that this species had been described in the genus *Spathiphyllum* by Poeppig and Endlicher (Nova Gen. Sp. Pl. 3: 85. 1845) as *S. candicans*.² *Massowia* was placed in synonymy under *Spathiphyllum* by Schott in 1853, when he finally delimited his diagnosis of *Spathiphyllum* to exclude *S. sagittaeifolium*³ and expanded it to include related genera of other authors. Koch in 1856 (Bonplandia 4: 10-12) published a sharp rebuttal of Schott's nomenclatural action.

Schott, in his *Genera Aroidearum* (1858), described *Spathiphyllum* and presented a full-page plate of the reproductive structures of *S. blandum*. Two years later he presented his *Prodromus Systematis Aroidearum*, a monograph of the entire family with partial keys to the species, in which 22 species of *Spathiphyllum* were treated.

Engler (Gard. Chron. II. 7: 140. 1877) erected the genus *Amomophyllum*, distinguished by the shape of the ovary and its uniovulate locules. In 1879 (in DC. Monogr. Plan. 2: 227) he altered the rank of *Amomophyllum* to that of a section of the genus *Spathiphyllum*.

The last monograph of *Spathiphyllum*, prepared by Engler and Krause, appeared in *Das Pflanzenreich* (4^{23B}: 118-134. 1908). It was a good treatment, obviously representing new investigations undertaken since publication of the *Monographie*. Twenty-seven species and four varieties were treated.

GENERIC RELATIONSHIPS

The aroid genus *Spathiphyllum* is generally considered rather primitive.⁴ Its perfect flowers (with perianth) are borne on a spadix without a sterile appendage, and the spadix is subtended by a more or less flat or cochleariform, persistent, rather foliaceous spathe. The geniculate apex of the petiole and the well-developed spathe are its only advanced characteristics, except in the few species whose perianth is formed into a 4-6-sided, truncate cup.

Engler and Krause (*Pflanzenreich* 4^{23B}: 118-134. 1908) considered *Spathiphyllum* to be most closely related to *Holochlamys* because the perianth in the latter genus is a 4-sided cup similar to that in *S. commutatum*. *Holochlamys* is similar in habit and foliage to *Spathiphyllum*, but is more advanced. Its ovary is unilocular with many ovules arising on long funiculi from a basal placenta, and generally the spathe is convolute about the spadix.

Hutchinson (Fam. Fl. Pl. 2: 119. 1934) placed *Holochlamys* in the *Lasieae* near *Podolasia* because its spathe more or less embraces the spadix. On the contrary, the unfurled and rather foliaceous spathe of *Spathiphyllum* led Hutchinson to retain only this genus in the *Spathiphyllae*, which he considered to be more primitive than the *Anthurieae*, and advanced only in relation to the *Acoreae*

²*S. candicans* = *S. cannaefolium*

³Schott erected the new genus *Urospatha* to receive *S. sagittaeifolium*.

⁴The advanced conditions are: unisexual flowers (without perianth), and a spadix with a sterile appendage, enveloped in a well-differentiated spathe.

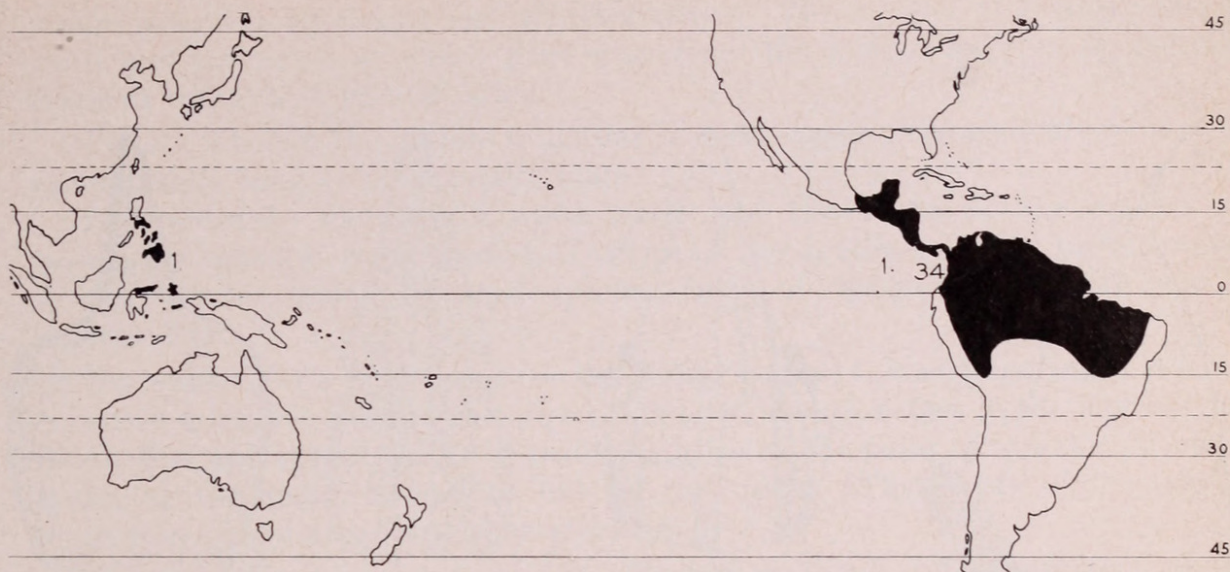


FIG. 1. Geographic distribution of *Spathiphyllum*. Numerals indicate the number of species in each area. Note the presence of a single species (*S. laeve*) on Cocos Island, and another (*S. commutatum*) in the Indonesian-Philippine area.

and *Orontieae*. This treatment appears to be completely natural, and suggests that of Schott (Gen. Aroid. 1858), who placed *Spathiphyllum* between *Anthurium* and *Orontium*.

Spathiphyllum is often confused with *Stenospermatum* and *Rhodospatha*. The latter two genera differ from *Spathiphyllum* in having flowers without perianth, a somewhat convolute spathe deciduous at anthesis, and a stem with elongate internodes.

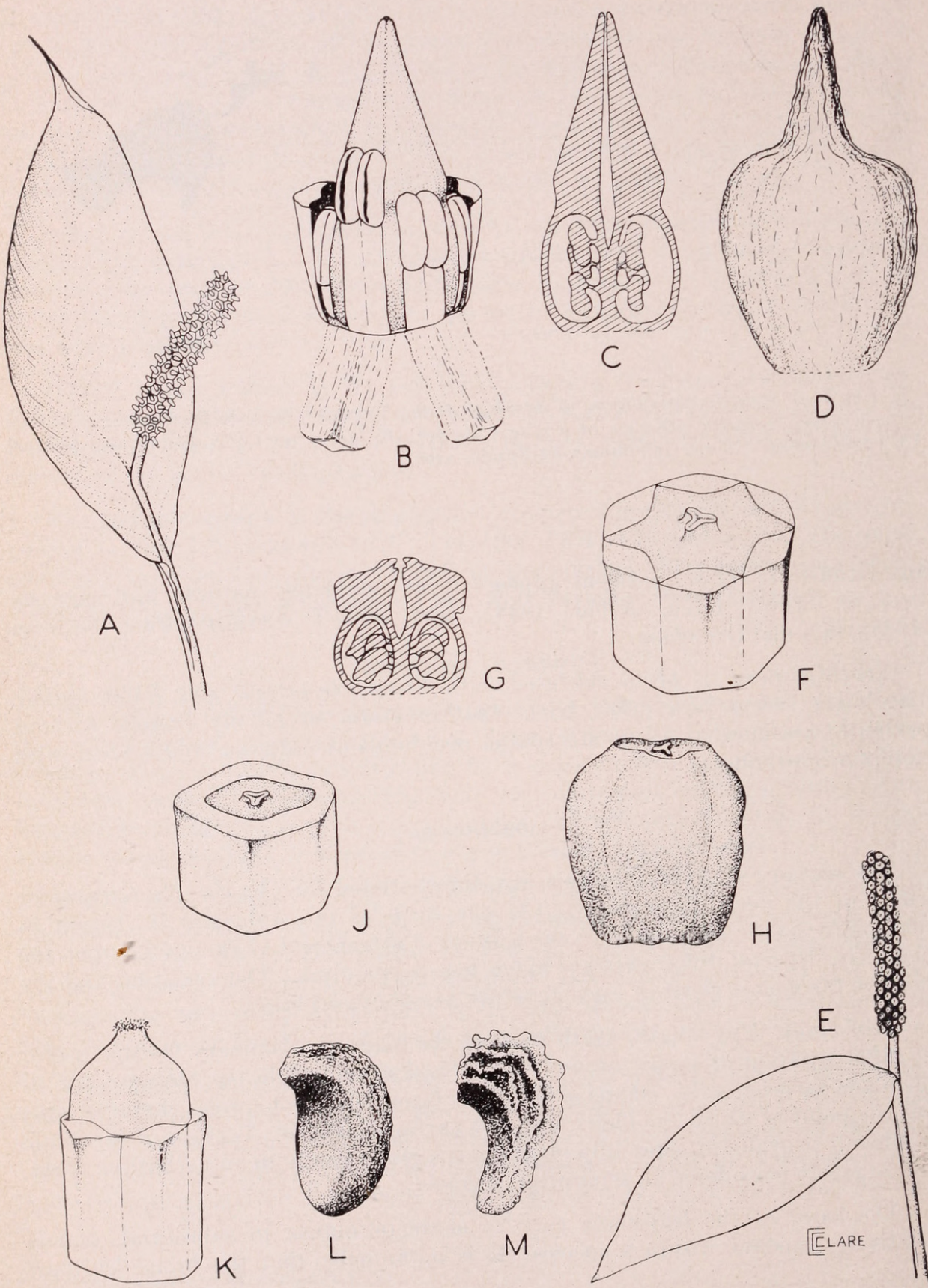
MORPHOLOGY

The sections of *Spathiphyllum* are differentiated by (1) the discreteness or union of the perianth segments, (2) the form of the style and its length in relation to the perianth, and (3) the manner of attachment of the spathe upon the peduncle. Species differences are much less outstanding. The variation and the relative taxonomic merit of each structure are discussed below.

Leaf-blade. The length/width ratio of the blade is a constant feature useful in differentiation of many species of *Spathiphyllum*, while the absolute size of the blade varies greatly. Shape of the blade is an important species characteristic, but the point at which the blade is widest varies somewhat. Texture of the blade is difficult to evaluate, especially in specimens glued firmly to an herbarium sheet, and is rarely considered in separating species.

The base⁵ of the leaf-blade may be acute or obtuse to subrotund, and is relatively constant within a species. It is noteworthy that the broad leaf-base

⁵The "base" of the leaf-blade here indicates the lower one-third or one-fourth of the blade where the leaf-margins converge toward the midrib; it should not be confused with the ultimate narrowing of the blade in some species into a small deltoid process.



occurs mostly in species of sect. *Spathiphyllum*. The number of primary lateral veins and the angle at which they arise from the midrib seem to be constant features valuable in identification.

Petiole. Though the petiole is similar in most species, the geniculum⁶ may be exceptionally long or occasionally alate.

Inflorescence. The length/width ratio and the shape of the spathe are essentially constant for a species. Texture of the spathe is rarely an important species characteristic. In most species, color of spathe varies with age of inflorescence.

The spadix (as a unit) has little taxonomic value. In many species, it is borne on a free stalk, here called the stipe; this term always refers to the more or less terete, free apical portion of the peduncle between the point of attachment of the spathe on the peduncle and the base of the spadix. The length of the stipe is sometimes a good diagnostic characteristic.

Flowers. The perianth furnishes adequate sectional differences only, except in two species in which the apex of the perianth is distinctively modified. This characteristic has not been previously recorded. In most other works on aroids, the perianth segments are designated as sepals or tepals. Since the 4-6(-7) perianth segments occur in a single series in *Spathiphyllum*, the terms "perianth" and "perianth segments" are used throughout this paper.

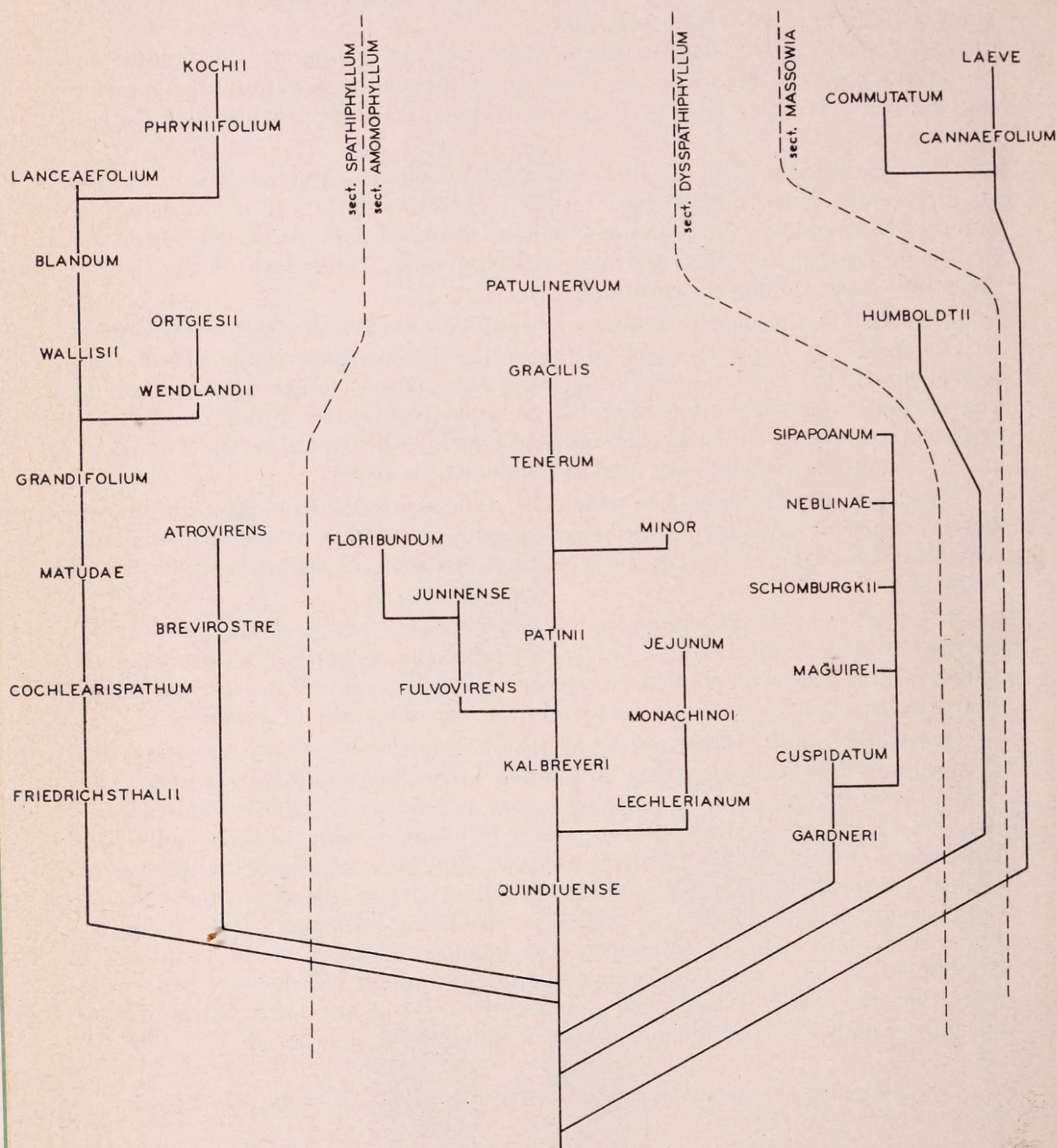
Specimens were examined in which the stamens appear to be of reduced size, but my study of these structures was inconclusive because of the small amount of material and the variability in the size of the stamens within a single flower (Fig. 2B).

The pistil may be attenuate and exerted beyond the perianth, or inflated, annular, and/or truncate and scarcely exceeding the perianth. The proportional length of the exerted portion in respect to the length of the perianth may characterize a species, but more commonly a group of species, or a section.

Ovary differences, relied upon heavily by Engler and others for separation of species of *Spathiphyllum*, are of limited taxonomic value in this genus. In some species the number of locules per ovary is reduced from the usual three to two, yet the bilocular situation may result by abortion only in some individual flowers of a spadix. In his key to the species, Engler emphasized the number of ovules per locule. My investigations have shown that this characteristic may be misleading. The number of ovules is sometimes inconstant from flower to flower and plant to plant. Moreover, the number of ovules in the locules of a single pistil is not equal; one locule tends to have one or occasionally two ovules more than the others. The largest number of ovules in any locule is significant, a smaller number simply indicating that a reduction has occurred.

⁶The geniculum is the thickened distal end of the petiole found in several genera of *Araceae* and in other families.

FIG. 2. A-D. Reproductive structures typical of species of *Spathiphyllum* sect. *Spathiphyllum*. A. Inflorescence (somewhat reduced). B. Flower, $\times 10$. C. Longitudinal section of pistil. D. Fruit, $\times 6$. E. Inflorescence typical of species of sections *Massowia*, *Amomophyllum*, and *Dysspathiphyllum* (somewhat reduced). F-H. Reproduceive structures typical of species of sect. *Amomophyllum*. F. Flower, $\times 10$. G. Longitudinal section of pistil. H. Fruit (also typical of species of sect. *Massowia*), $\times 6$. J. Flower typical of species of sect. *Massowia*, $\times 10$. K. Flower of *S. humboldtii* (sect. *Dysspathiphyllum*), $\times 10$. L. Seed with more or less smooth surface, $\times 12$. M. Seed with furrowed and verrucose surface, $\times 12$.

FIG. 3. Suggested relationships in *Spathiphyllum*.

DEVELOPMENTAL TRENDS

The species of sect. *Massowia* appear to represent a phylogenetic offshoot of great age. The union of their perianth segments into a 4–6-sided cup probably was an evolutionary advance of ancient occurrence, since each of the three species with this characteristic occurs in an area widely separated from the others. *S. cannaefolium*, the most widespread of all the species of *Spathiphyllum*, is restricted to northern South America east of the Andes, and is the only species on the island of Trinidad. *S. laeve* is restricted to Cocos Island in the eastern Pacific. *S. commutatum* occurs in the same latitude as *S. cannaefolium*, but on the opposite side of the Pacific Ocean, where it is distributed on several islands in Indonesia and the Philippines. These species are remarkably similar, and surely must be monophyletic in origin.

S. humboldtii, the sole species of sect. *Dysspathiphyllum*, appears to be a variable species of wide range in South America. It is an enigmatic group of obscure alliance. Its flowers are frequently reduced to a bimerous condition, while the locules of the ovary are mostly multiovulate. There is a remote resemblance between this species and *S. cuspidatum* and *S. gardneri* (here placed in sect. *Amomophyllum*). Possibly these three species arose from a common ancestral stock, or perhaps hybridization has been a prime factor in their derivation.

Species of the sections *Spathiphyllum* and *Amomophyllum* occur in Colombia in close contact. This investigation has revealed little to suggest that one of these groups developed from the other. It is more probable that they arose from a common ancestral stock that no longer persists. That stock may have possessed characteristics similar to those of *S. quindiuense*, and perhaps also gave rise to the species of sect. *Massowia*.

There is clearly a progressive reduction in the number of ovules per locule in species of sections *Spathiphyllum* and *Amomophyllum*, which trend is correlated with a reduction in size of the plant in the latter section. This reduction has guided me in arrangement of the species within each section.

The diagram of relationships (Fig. 3) suggests the possible origin and inter-relationships of the species.

COLLECTIONS AND TYPIFICATION

The most important single assemblage of aroids, deposited at Vienna where Schott had worked, was totally destroyed by fire in 1945. Nearly as serious was the loss (through war action) of many aroid collections at Berlin, where Engler had worked. Most species of *Spathiphyllum* whose types were destroyed may be recognized from their descriptions and illustrations.⁷ A few, however, have been difficult to distinguish because of the lack of definitive material, especially *S. lanceaefolium*, the type species of the genus. It has seemed appropriate to designate neotypes from some of these species.⁸ For others the original descriptions are considered as types,⁹ and a representative collection is cited to exemplify my interpretation of each.

⁷Excellent illustrations accompanied the original descriptions of many species of this genus; at Vienna original plates by Schott are preserved that illustrate many species; for two species there are authentic photographs of the type specimens made before those specimens were destroyed.

⁸International Code of Botanical Nomenclature (1956), Art. 7.

⁹Op. cit., Art. 10.

Of several species described from living plants in cultivation apparently no specimens were preserved by their authors. The fine illustrations that accompany the original descriptions of most of these species serve to differentiate them.

POLLEN STUDY

Following Wodehouse's technique of pollen preparation (Erdtman, *Introd. Pollen Anal.* 31, 1943), observations were made of pollen grains from about ten species of *Spathiphyllum* (selected at random). The grains were found to be subprolate or ovoid, without pores, and the sexine is vaguely striate but smooth at the ends of the grains. The principal difference between species appears to be the size of the grains, which probably has taxonomic significance only statistically. Erdtman in 1952 (*Pollen Morph. Pl. Taxon.* 56, 57) described the pollen grains of *S. cannaefolium* and *S. patinii*; he illustrated a grain of the latter species.

Very detailed comparative studies of pollen, in conjunction with chromosome studies¹⁰ of the Pacific *S. commutatum* and the American species, especially *S. cannaefolium*, may be rewarding.

ECONOMIC IMPORTANCE

Several species of *Spathiphyllum* are prized for the unique beauty of their inflorescences, and are cultivated either under glass or out-of-doors in warm regions. *S. wallisii* (*S. "clevelandii"*) is most often grown, and it is not exceptional to see the blossoms offered for sale at better flower shops in New York. Plants of *S. wallisii* are quite tolerant of artificial light and low atmospheric humidity. They make excellent additions to large combination planters, although flowering may be reduced under such conditions. *S. floribundum* and *S. cochlearispathum* are often seen in cultivation, and several other species thrive in the conservatory of The New York Botanical Garden.

In the Soconusco region of Chiapas, Mexico, and along the Pacific slope of Guatemala and El Salvador, the natives eat the young spadices (called "huisnay") of *S. matudae* either cooked with eggs or cooked and pickled in vinegar.

ACKNOWLEDGEMENTS

This investigation was conducted primarily at The New York Botanical Garden. I am deeply indebted to that institution for making available its entire facilities to me, and to its director and staff for their untiring assistance throughout the pursuit of this project. Most sincere thanks are due Dr. Bassett Maguire, who directed the research, facilitated field work in Venezuela for me, and offered valuable suggestions in preparation of this manuscript. The kind assistance of the following persons has been most valuable in the completion of this work: Dr D. D. Keck, Head Curator, Dr H. W. Rickett, Bibliographer, and Miss Elizabeth C. Hall, Librarian (all of The New York Botanical Garden).

A note of thanks is due Dr Thomas Pray, who arranged study facilities for me at the herbarium of the Hancock Foundation at the University of Southern California, and to Dr E. Y. Dawson of the Los Angeles County Museum for his assistance.

¹⁰Darlington & Ammal (*Chromosome Atlas Cult. Pl.* 303, 1945) reported the somatic chromosome number of *S. patinii* as 18 ($x = 9$), determined by Matsuura & Suto (1935). This entry was deleted from the latest edition of the *Chromosome Atlas* (Darlington & Wylie 1955).

I am grateful to Mr Alfred B. Graf for making available for study all the aroids growing at the Julius Roehrs Company, Rutherford, New Jersey, and to the numerous other horticulturists who have shared their knowledge and collections in an effort to clarify the nomenclature of cultivated plants.

SYSTEMATIC TREATMENT

Spathiphyllum Schott, Melet. Bot. 22. 1832.

Hydnostachyon Liebm. Vid. Meddel. 1-2: 23. 1849.

Massowia K. Koch, Bot. Zeit. 10: 277-278. 1852.

Spathiphyllopsis Teijsm. & Binn. Natuurk. Tijdsch. Ned. Indie 25: 400. 1863.

Amomophyllum Engl. Gard. Chron. II. 7: 139. 1877.

Perianth of 4-6(-7) green or white segments, separate or confluent or connate toward the base, apically thickened and often truncate, inflexed, imbricate, accrescent in age, or the perianth a 4-6-sided fleshy cup, the apex truncate; pistil commonly white in flower, green in age, subcylindric or obpyramidal, apically truncate or attenuate-conic, equaling or exceeding the perianth, the stigma coronate or elevated, (2-)3-lobed, often brush-like; ovary (2-)3-locular, the ovary walls containing trichosclereids; septa membranous, \pm free from one another above, connate below along their inner margins, forming a hollow, cylindrical axis (axile placenta) bearing the ovules, (the septum centrally pierced in 2-locular ovaries); ovules \pm oblong in lateral outline, anatropous, (8-)5-1 per locule, superposed or collateral, imbedded in a transparent, insoluble but hydrophilous matrix that fills each locule; placentation axile; stamens as many as the perianth segments and opposite them, the filaments broad, oblong, lengthening in age, the anthers basi-dorsifixed, not versatile, yellow or whitish, nearly as wide as long, 2-celled, the sides subparallel, their dehiscence longitudinal and extrorse; fruiting spadix smooth or tuberculate; fruit obovoid to ovoid, often long- or short-rostrate; seeds few to many, oblique-ovoid to reniform or oblong in profile, often very angular, yellowish, the surface smooth or verruculose between \pm vertical rows of foveola.

Glabrous herbs 2-12 dm tall, the many leaves arising from an abbreviated rhizome partially visible above the soil and rooted on the lower side; cataphylls very narrowly attenuate-lanceolate, abaxially bicarinate, often two-thirds as long as the petiole or longer; petioles mostly equaling or longer than the blade, terete above, alate and vaginate below, equitant, apically geniculate; the geniculum to 5 cm long, sulcate above and occasionally alate; leaf-blades arching outwardly, simple, entire, marginally undulate, lanceolate or oblong to elliptic or oblanceolate, 2-many times longer than wide, the apex acuminate-cuspidate and the base attenuate or acute to obtuse or subrotund, the midrib wide, flattened and prominent above, very conspicuous beneath, triangular to semicircular in cross section, the few to many pairs of primary lateral veins subparallel and arcuate toward the apex, impressed upon the usually glossy upper surface, salient on the paler under surface, with usually one secondary and two tertiary lateral veins between two primary veins. Inflorescence scapoid, the peduncle geniculate at the apex, commonly holding the spathe and spadix erect above the arched foilage; spathe at first convolute, becoming cucullate or plane and erect or reflexed, white or green, lanceolate or elliptic to ovate, rarely oblanceolate, the apex pointed, the base acute to obtuse and decurrent upon the peduncle or non-decurrent; spadix terminal on the peduncle, erect, cylindrical throughout, (the flowers congested or loosely arranged), shorter than the spathe, sessile or on a free stipe to 4 cm long.

Type species: *Spathiphyllum lanceaefolium* (Jacq.) Schott, Melet. Bot. 1: 22. 1832.

Key to the Sections and Species of *Spathiphyllum*

- A. Spathe usually non-decurrent on the peduncle; style various, never attenuate-conic.
- B. Perianth a 4-6-sided cup, the apex entire, truncate. sect. 1. *Massowia*.
- C. Blade of the leaf 1.5-3 times as long as wide; spathe mostly 3-4 times as long as wide.
- D. Leaf-blade typically oblanceolate to narrow elliptic, 2.5-3 times as long as wide; spathe 3-5 times as long as wide. South America, Trinidad.
 - 1. *S. cannaefolium*.
- DD. Leaf-blade typically broad elliptic, 1.5-2.5 times as long as wide; spathe mostly 2.5-3 times as long as wide. Indonesia, Philippines. 2. *S. commutatum*.
- CC. Blade of the leaf narrower, 3.5 times as long as wide; spathe more than 5 times as long as wide. Cocos Island. 3. *S. laeve*.
- BB. Perianth segments separate, at least apically.
- E. Pistil scarcely exceeding the perianth, the apex subtruncate. sect. 2. *Amomophyllum*.
- F. Ovules 6-3(-2) in each locule, totaling 14-6 ovules per ovary; if totaling 7-6, the primary lateral veins rising at an angle of 15-30° (to 45° in *S. cuspidatum*, *kalbreyeri*).
- G. Plants 4 dm or more tall (sometimes shorter in *S. quindiense*).
- H. Leaf-blade narrowly elliptic, 5-9 times as long as wide.
 - J. Spathe pergameneous; stigma coronate, not conspicuous above the perianth. Colombia, Panama. 4. *S. quindiense*.
 - JJ. Spathe chartaceous; stigma nipple-like, conspicuous above the perianth. Venezuela. 5. *S. monachinoi*.
- HH. Leaf-blade wider, 3-5 times as long as wide.
 - K. Spathe to 10 cm long, 2-3 times as long as wide; stipe of the spadix ca. 0.5 cm long. Brazil. 6. *S. gardneri*.
 - KK. Spathe to 20 cm long, 3-5.5 times as long as wide; stipe of the spadix 1-2.5 cm long.
 - L. The spathe lanceolate or elliptic, 3-5 times as long as wide. British Guiana. 7. *S. cuspidatum*.
 - LL. The spathe oblong, 5-5.5 times as long as wide. Colombia. 8. *S. kalbreyeri*.
- GG. Plants 3 dm or less tall.
 - M. Ovules superposed, totaling 14-10 ovules per ovary. Peru, Colombia (?). 9. *S. lechlerianum*.
 - MM. Ovules collateral, affixed on a sub-basal pad in each locule, totaling 9-5 ovules per ovary.
 - N. Peduncle subequaling the petiole; leaf-blade 7-9 times as long as wide. West-central Venezuela. 10. *S. jejunum*.
 - NN. Peduncle twice as long as the petiole; leaf-blade wider.
 - O. Blade of the leaf lanceolate, the base short acute. British Guiana. 11. *S. maguirei*.
 - OO. Blade of the leaf elliptic, widest at the middle and equally attenuate toward either end.
 - P. Spadix 3-4 times as long as the stipe; leaf-blade 6-8 times as long as wide. Mt. Roraima, Venezuela. 12. *S. schomburgkii*.
 - PP. Spadix equaling to twice as long as the stipe; leaf-blade wider, 4.5-5.5 times as long as wide. Cerro de la Neblina; Venezuela. 13. *S. neblinae*.
 - FF. Ovules (3-)2-1 in each locule, totaling 7-2 ovules per ovary; if totaling 7-6, primary lateral veins arising at an angle of 45-75°.
 - Q. Leaf-blade 2-3 times as long as wide; primary lateral veins arising at an angle of 60-75°.
 - R. Petiole subequaling the leaf-blade. Colombia. 14. *S. floribundum*.
 - RR. Petiole much longer than the leaf-blade.

- S. Spathe 4-6 times as long as wide; stipe of the spadix ca. 0.5 cm long.
Panama, Andean Colombia. 15. *S. fulvovirens*.
- SS. Spathe 3-4 times as long as wide; stipe of the spadix to 1.5 cm long.
Eastern side of Andes in Peru. 16. *S. juninense*.
- QQ. Leaf-blade 4-8 times as long as wide; angle of the primary lateral veins
various; or the blade wider with the primary laterals arising at an angle
of 25-45° (except in *S. tenerum*).
- T. The locules of the ovary 2-1-ovulate, totaling 6-4 ovules per ovary.
- U. Primary lateral veins arising at an angle of 45° or less.
- V. Blade of the leaf 4-5 times as long as wide; primary lateral veins
arising at an angle of ca. 45°. Cultivated. 17. *S. patinii*.
- VV. Blade of the leaf 7-8 times as long as wide, primary lateral veins
arising at an angle of ca. 25°. Cerro Sipapo, Venezuela. 18. *S. sipapoanum*.
- UU. Primary lateral veins arising at an angle of 60-65°. Amazonian Peru. 19. *S. tenerum*.
- TT. The locules of the ovary uniovulate, totaling 3-2 ovules per ovary.
- W. Plant ca. 2 dm tall; leaf-blade ca. 4 times as long as wide. Peru. 20. *S. minor*.
- WW. Plant 3-4 dm tall; leaf-blade 6-7 times as long as wide.
- X. Primary lateral veins arising at an angle of 30-40°. Peru. 21. *S. gracilis*.
- XX. Primary lateral veins arising at an angle of 75-80°. Ecuador. 22. *S. patulinervum*.
- EE. Pistil 1.5-2 times as long as the perianth, the style \pm oblong, apically blunt and
shortly narrowed into a brush-like stigma. sect. 3. *Dysspathiphyllum*. 23. *S. humboldtii*.
- AA. Spathe conspicuously decurrent upon the peduncle for 2-10 cm; style usually
attenuate or conic and exceeding the perianth. sect. 4. *Spathiphyllum*.
- Y. Ovules mostly 8-6 per locule; exerted portion of the style 3 or more times as long
as the perianth; base of the leaf-blade cuneate-acute. Nicaragua to Panama and
Pacific-coastal Colombia. 24. *S. friedrichsthalii*.
- YY. Ovules 5-1 per locule; exerted portion of the style not more than twice as long
as the perianth; base of the leaf-blade various; or the exerted portion of the style
3 times as long as the perianth, the base of the leaf-blade obtuse.
- Z. Base of the leaf-blade broadly obtuse to subcordate; some locules of the ovary
5-4-ovulate; style attenuate or conic.
- a. Geniculum 2.5-5 cm long.
- b. Leaf-blade mostly 50-65 cm long. Gulf-coastal Mexico. 25. *S. cochlearispathum*.
- bb. Leaf-blade mostly 35-45 cm long. Pacific Mexico, Guatemala, El Salvador. 26. *S. matudae*.
- aa. Geniculum 2 cm long. Southern Colombia. 27. *S. grandifolium*.
- ZZ. Base of the leaf-blade acute, or if obtuse, all locules of the ovary 2-1-ovulate or
the pistil apically subtruncate.
- c. Leaf-blade lanceolate, 3.5-4.5 times as long as wide; petiole slender, never alate
in upper portion. Much cultivated. 28. *S. wallisii*.
- cc. Leaf-blade various, mostly 2-3 times as long as wide; petiole stout, often alate
nearly to the geniculum.
- d. Base of the leaf-blade decurrent and forming a wing on the geniculum.
- e. Apex of the perianth segments fimbriate and/or deeply notched. Costa
Rica. 29. *S. wendlandii*.
- ee. Apex of the perianth segments entire, erect and forming a collar around
the style. Mexico. 30. *S. ortgiesii*.
- dd. Base of the leaf-blade non-decurrent; geniculum not alate.
- f. Pistil subtruncate, constricted between the annular style and the ovary.
- g. Base of the spathe decurrent on the peduncle 5.5-10 cm. Costa Rica. 31. *S. atrovirens*.
- gg. Base of the spathe decurrent on the peduncle 2.5-4.5 cm. Mexico. 32. *S. brevirostre*.
- ff. Pistil not truncate, the style attenuate or conic.
- h. Base of the leaf-blade acute.

- j. Leaf-blade widest at the middle. Caribbean Honduras, Guatemala, British Honduras. 33. *S. blandum*.
- jj. Leaf-blade widest below the middle. Coastal Venezuela. 34. *S. lanceaefolium*.
- hh. Base of the leaf-blade obtuse.
- k. Primary lateral veins arising at an angle of ca. 45°; spadix on a stipe 1.5–3 cm long. Venezuela. 35. *S. kochii*.
- kk. Primary lateral veins arising at an angle of ca. 60°; spadix subsessile. Costa Rica, Panama. 36. *S. phryniifolium*.

Section 1. *Spathiphyllum* sect. *Massowia* (K. Koch) Engl. in DC. Monogr. Phan. 3: 228. 1879. Figure 2J.

Massowia subg. *Eumassowia* K. Koch. Bonplandia 4: 11. 1856.

Spathe generally flat, reflexed, and typically non-decurrent upon the peduncle; perianth formed into a usually fleshy, 4–6-sided cup, apically truncate, entire; pistil cylindric-obpyramidal, apically truncate or subtruncate and not exceeding the perianth (sometimes attenuate and exceeding the perianth in *S. commutatum*). Plants of various sizes.

Type species: *Spathiphyllum cannaefolium* (Dryand.) Schott, Aroid. 1: 1. pl. 1. 1853.

Distribution: northern South America east of the Andes; Pacifica.

1. *S. cannaefolium* (Dryand.) Schott, Aroid. 1: 1. pl. 8. 1853. Figure 4.

Pothos cannaefolia Dryand. Bot. Mag. 17: pl. 603. 1803.

Pothos cannaeformis H. B. K. Nova Gen. Sp. 1: 76. 1815.

Monstera cannaefolia Kunth, Enum. Pl. 3: 61 (p.p.). 1841.

Spathiphyllum candicans Poepp. & Endl. Nova Gen. Sp. Pl. 3: 85. pl. 295. 1845.

Massowia cannaefolia C. Koch, Bot. Zeit. 10: 277–278. 1852.

Spathiphyllum bonplandii Schott, Oesterr. Bot. Wochenbl. 7: 158. 1857.

Anthurium dechardi André, Ill. Hortie. 24: 28. pl. 159. 1877.

Massowia dechardi Koch, Gard. Chron. II. 10: 623. 1878.

Spathiphyllum cannaeforme (Curtis) Engl. in Mart. Fl. Bras. 32: 103. pl. 16, fig. 2. 1879–1882.

Leaf-blade typically oblique, narrowly to broadly oblanceolate varying to elliptic, 25–45(–52) cm long and (5–)8–16(–24) cm wide, commonly widest above the middle, the apex acute or acuminate, or broadly rounded and ending in a deltoid cusp, the base mostly long-cuneate or simply acute; primary lateral veins many, close together, arising at an angle of 35–45°; petiole equaling the blade, 18–40(–59) cm long, prominently alate quite to the geniculum or less, the wing apically auriculate, early deteriorating into fibrous remains on older leaves; geniculum (1.2–)2–3.5(–5) cm long. Peduncle mostly 1.5–2 times as long as the blade, 35–70(–100) cm long; spathe reflexed, typically lanceolate, varying to oblong or elliptic, 10–22(–28) cm long and 2.5–6.5(–9) cm wide, the apex short- to long-acuminate, the base commonly cuneate to somewhat obtuse, ± clasping the peduncle or narrowed into a short handle, white above, green below; spadix 4.5–12(–20) cm long, smooth, on a stipe 0.5–2(–3) cm long; perianth formed into a fleshy, 4–6-sided truncate cup, nearly concealing the pistil and stamens within; pistil cylindric-obpyramidal, the apex truncate, the stigma coronate; anthers exerted in anthesis; ovary 3(–4)-locular, the ovules ± collateral, affixed on a sub-basal pad in each locule, varying from 6–2 in each of the 3 locules, totaling (24–)19–6 ovules per ovary; fruiting spadix smooth; fruit spheroid, the apex truncate; seeds as many as the ovules, mostly irregularly ovoid and very angular, to 3.5 mm long and half as wide, the surface furrowed and foveolate, especially on the outer face, the ridges irregular and verruculose.

Type Collection: "Hort. Kew, 1790." (holotype BM). Though described from a plant growing in the Royal Garden at Kew, the original description (Bot. Mag. 17: pl. 603. 1803) states that "a specimen which flowered there in the month of April 1790, is preserved in the Banksian Herbarium."

Distribution: Widespread in moist forests of northern South America, throughout the Guayana highlands westward to the base of the Andes, northward to the Atlantic coast in Venezuela, eastward to Trinidad and British Guiana, but apparently absent from the Amazon basin east of the Río Negro.

BRAZIL: Amazonas: Bocca do Tefé, June 1906, *Ducke 7325* (MG); no Rio Papuri, Rio Uaupés, Oct 1945, *Fróes 21187* (NY); Trinidad, Rio Papuri, Dec 1913, *Luetzelburg 23873* (M); Varadouro, Rio Uaupés, Nov 1916, *Luetzelburg 23969* (M).

BRITISH GUIANA: Bonisika Landing, Arawau R., Jul 1934, *Archer 2333* (US); Arakyma Falls, Potaro R., Nov 1907, *Bartlett 8745* (K); Macea Falls, Waini R., Jul 1906, *Beckett & Kortright 8502* (K); Mabaruma, Aruka R., Northwest Dist., Mar 1945, Br. Guiana For. Dept. 5124 (NY); Northwest Dist., Waini R., Sep 1921, *de la Cruz 1121* (G, NY, US); Pomeroon R., Pomeroon Dist., Dec 1922, *de la Cruz 3128* (NY); Kamakusa, Upper Mazaruni R., ca. 59°50' W long., Jul 1923, *de la Cruz 4095* (F, G, MO, NY, US); Issorora, Aruka R., lat. 8°10' N, long. 59°50' W, *Hitchcock 17570* (G, NY, S, US); Pomeroon R., Dec 1882, *Jenman 1625* (NY); Warm Falls, Pomeroon Dist., Feb 1883, (*Im Thurn*) *Jenman 1952* (K); Nov 1886, (*Sherring*) *Jenman 3577* (K); Barima R., Mar 1896, *Jenman 6989* (NY).

COLOMBIA: Arauca or Boyaca: Esmeralda, Río Casanare, Los Llanos, Oct 1938, *Cuatrecasas 3843* (US), *3844* (US), *3844b* (US). Caquetá: Florencia, cerro de La Sardina, Mar 1940, *Cuatrecasas 8927* (COL, US); Florencia, orillas Río Sombra, Dec 1930, *Arbeláez 710* (COL, US). Meta: Villavicencio, Jan 1876, *André 1175* (K); orillas del Río Guatiquía, en los alrededores de Villavicencio, Nov 1948, *Araque M. & Barkley 18M011* (US); Villavicencio, Nov 1938, *Cuatrecasas 4540* (F, COL, US); Llanos de San Martín, Jun 1916, *Dawe 279* (K); Río Guayariba Valley, 15 km w of Villavicencio, on road to Acacias, *Grant 9942* (US); San Juan de Arama, nacimiento del caño "El Mico," Aug 1950, *Idrobo 494* (COL, US); Sabanas de San Juan de Arama, margen izquierda del Río Güejar, alrededores del aterrizaje "Los Micos," Dec 1950, *Idrobo & Schultes 593* (COL, US); Cordillera La Macarena, trocha entre el Río Güejar y el caño Guapayita, Caño Yerli, Dec 1950, *Idrobo & Schultes 741* (COL, US); Cordillera La Macarena (extremo nordeste), macizo Renjifo, cumbre y alrededores, Jan 1951, *Idrobo & Schultes 1031* (COL, US); Llanos orientales, alrededores de Villavicencio, ca. del caño Quenane, Jul 1946, *Jaramillo, Mesa, Idrobo & Fernandez 318* (COL), *321* (COL, US); Acacias, Aug 1946, *Jaramillo, Mesa, Idrobo & Fernandez 420* (COL, US); ca. 20 km. SE of Villavicencio, Mar 1939, *Killip 34258* (COL, F, US); Villavicencio, Feb 1948, *Landeman 5794* (K); Villavicencio, Sep 1917, *Pennell 1599* (NY, US); "Buenavista" (Villavicencio), Jan 1930, *Arbeláez 31* (COL); Sierra de la Macarena, Río Guapaya, Nov 1949, *Philipson, Idrobo & Fernandez 1583* (US); hill back of Molina Tres Esquinas, Villavicencio, Jul 1945, *Schiefer 792* (COL, G, US); Caño Tiranás, Cordillera La Macarena (extremo nordeste), macizo Renjifo, cumbre y alrededores, Mar 1951, *Schultes 12130* (US); Villavicencio, Jan 1899, *Sprague 121* (F, K, US); Llano de San Martín, *Triana s. n.* (BM); Acacias, margenes del Río Acacitas, Apr 1950, *Uribe U. 2088* (COL); Acacias, en lugares inundadas, Apr 1950, *Uribe U. 2089* (COL). Norte de Santander: región del Sarare, Hoya del Río Cubugón, El Indio, Nov 1941, *Cuatrecasas 13097* (US); Salazar, Ocaña to Pamplona, Dec 1878, *Kalbreyer 832* (K). Putumayo: along Río Putumayo en Puerto Ospina, Nov 1940, *Cuatrecasas 10861* (COL, F, US); along Río San Miguel, margenes del río entre los afluentes Bermeja y Conejo, Dec 1940, *Cuatrecasas 11055* (COL, US); between Mocoa and Urcusique, near Quebrada Obandoyaco, Jan 1945, *Ewan 16791* (US); Umbria, 0°54' N, 76°10' W, Oct–Nov 1930, *Klug 1663* (BM, F, G, MICH, MO, NY, S, US); Mocoa and vicinity, Mar 1953, *Schultes & Cabrera 19044* (US). Vaupés: Caño Grande (selva entre Calamar y San José de Guaviare), Nov 1939, *Cuatrecasas 7369-A* (COL); riberas del Río Inírida (long. 69°45' W) sitio "Raudal Alto" o Mariapiri, Cerro del Varador, Feb 1953, *Fernandez 2091* (COL, US); Río Taraira, at first rapids upstream, Jul 1948, *Schultes & Lopez 10217* (US); Río Kananari, Cachivera Palito, Jul 1951, *Schultes & Cabrera 13107* (US); Río Vaupés, Mitú y alrededores, Sep 1957, *Schultes & Cabrera 13975* (NY, US); Río Piraparaná (trib. of Río Apaporis), between lat. 0°15'S, long. 70°30'W and lat. 0°25'N, long. 70°30'W, Caño Teemeña, Sep 1952, *Schultes & Cabrera 17452* (US); Río Vaupés between Mitú and Javareté, mouth of Kerari, Mai 1953, *Schultes & Cabrera 19340*

(US); Río Paca (trib. of Río Papurí), Wacaricuara and vicinity, ca. lat. 0°30'N, long. 70°10'W, Jun 1953, *Schultes & Cabrera 19523* (US). Vichada: San José de Ocuné, Río Vichada, Jan 1944, *Hermann 11052* (COL).

ECUADOR: Santiago-Zamora ("Oriente"): near Méndez, uplands along Río Upano just n of junction with Río Chupiantza, Nov 1944, *Camp 1005* (NY).

PERU: Loreto: Santa Rosa, lower Río Huallaga below Yurimaguas, Sep 1929, *Killip & Smith 28775* (NY, US); Balsapuerto, Apr 1933, *Klug 2981* (BM, F, G, MO, NY, S, US); Pébas on the Amazon R., Jul 1929, *Williams 1706* (F).

TRINIDAD: *Anderson s.n.* (G); Ortinola Estate, Mar 1920, *Britton & Hazen 237* (G, NY, US); Caura, Jan 1929, *Broadway 7082* (S, US); Aripo Road, 3¼ mile post, Mai 1927, *Broadway 7371* (F, G-DEL, MO, S); Aripo Rd., at bathing pool, Apr 1933, *Broadway 9189* (BM, G, MO); *Fendler 747* (BM, NY); Mrs. Proctor's estate at Macqueripe ca. Port-of-Spain, Aug 1939, *Friend 142* (NY); J. Maracas Falls, Jun 1903, *Johnston 30* (G, NY); Apr 1874, *Kuntze 608* (NY); sides of rivers, *Lockhart s.n.* (K); near Four Roads, Mai 1924, *Riley 216* (C, K, NY); *de Schack s.n.* (K).

VENEZUELA: *Maraval 777* (28/1191) (C); Eleanor Creek, lower Orinoco, Mai, *Rusby & Squires 115* (BM, F, G, M, MO, NY, US). Amazonas: Salto Salas, alto Orinoco, Aug 1951, *Croizat 459* (NY); Radual Monserrat, alto Orinoco, Sep 1951, *Croizat 697* (NY); Jacare, Río Cunucunuma, Jun 1950, *Curran 226b* (NY); Cerro Yapacana, alto Orinoco, Apr 1931, *Holt & Blake 724* (US); Intermediate Camp, Cerro Sipapo, Feb 1949, *Maguire & Politi 28751* (NY); along Base R. (Caño Negro), at se base of Cerro Duida, Aug 1944, *Steyermark 57926* (F, NY); Foothills Camp, slopes of Mount Duida, Nov 1928, *Tate 390* (NY, US). Barinas: Carretera Sta. Bárbara de Barinas-Cd. Bolivia (Pedraza), Feb 1953, *Aristeguieta 1601* (NY, VEN). Bolívar: woods 1-10 km nw of Upata, on road to San Felix, between Upata & Altigracia, Jul 1944, *Steyermark 57669* (F, NY, VEN); at base of Cerro Negro Peron, range on right bank of Río Parguaza just below El Carmen, Dec 1955, *Wurdack & Monachino 40986* (NY). Delta Amacuro: Pto. Carijuto, Jun 1943, *Cardona 585* (VEN); along Río Acure 1-10 km above mouth, Apr 1955, *Wurdack 347* (NY). Mérida: along Río Onia, near Bolero, n of Mesa Bolívar, Mai 1944, *Steyermark 56711* (F, NY, S, VEN). Monagas: Caicara, Mai 1952, *F. Smith 236* (NY, US). Sucre: Cumaná, *Humboldt & Bonpland 397* (P). Trujillo: La Ceiba, along shore of Lake Maracaibo, Dec 1931, *Reed 916* (US); Zulia: Perijá, *Gines 1920* (US).

CULT.: Hort. Kew., 31 Jul 1878, labeled "Anthurium Dechardi André."

Vernacular names: Colombia (Vaupés): "pee-ka-sa-la-ree" (Gwanano); "a-na-too-roo," "tö-mee-ka-ma-re" (Kubeo); "pee-a-ro," "ka-po" (Tukano). Trinidad: "Arum Lily." Venezuela: "picatón" (Delta Amacuro); "saca frio" (Mérida); "vainilla" (Monagas, Sucre).

This is a very distinct species, widely separated geographically from closely related species by the Andes and the Pacific Ocean. The original material sent to Kew in 1789 apparently was not a "native of the West-India Islands," as stated in *Curtis's Botanical Magazine* (pl. 603. 1803). Not a single collection from any West Indian island is known, except from Trinidad, which is floristically related to continental South America rather than to the Antilles. It would therefore seem that the British colonials passed the plant from Trinidad to St. Vincent before it was sent to England.

In this genus *S. cannaefolium* is the most widely distributed species, but it varies remarkably little except in size, despite its wide range. In Trinidad the species reaches its maximum stature, and the leaves are proportionally broader (about twice to two and one-half times as long as wide). The specimens found near the Río Orinoco from Puerto Ayacucho to Cerro Duida are small; the smallest specimens seen were collected on the slopes of the sandstone tabletop mountains of Venezuela (in which the leaf-ratio varies to four times as long as wide).

This species differs from *S. commutatum* by its narrower leaves which are typically oblanceolate and widest above the middle. The spathe is commonly wider in this species than in *S. laeve*.

2. *S. commutatum* Schott, Oesterr. Bot. Wochenbl. 7: 158. 1857. Figure 1.

Spathiphyllopsis minahassae Teijsm. & Binn. Natuurk. Tijdsch. Ned. Indie 25: 400. 1863.

Massowia commutata Ender, Ind. Ar. 52. 1864.

Spathiphyllum minahassae (Teijsm. & Binn.) Regel, Gartenflora 19: 1,2. pl. 637. 1870.

Spathiphyllum micronesicum Hatusima, Jour. Jap. Bot. 15: 19. 1939.

Spathiphyllum funereum Tuyama, Jour. Jap. Bot. 16: 194. 1940.

Plants often very robust. Leaf-blade somewhat oblique, typically broadly elliptic, uncommonly varying to elliptic-rotund or narrowly elliptic, 35–50(–85) cm long and (11–)14–24(–30) cm wide, widest just at the middle, rounded toward the apex and ending in an acuminate-cuspidate point 2–5 cm long, the base mostly obtuse or sometimes acute; petiole subequaling or a little longer than the blade, 30–45(–63) cm long, prominently alate to the base of the geniculum or less, the wing early deteriorating; geniculum 1.8–2.5(–5) cm long. Peduncle 1.5–2 times as long as the blade, (35–)50–75(–90) cm long; spathe reflexed, lanceolate or oblong-lanceolate to elliptic-ovate, rarely ovate-rotund, 14–24(–35) cm long and (3–)5.5–8(–14) cm wide, long-attenuate or acuminate, the base obtuse to subrotund or cordate (!), sometimes decurrent on the peduncle 0.4–2(–4) cm; spadix 5–9(–16) cm long, on a stipe 0.3–3(–5) cm long; perianth fleshy, formed into a round or 4–6-sided truncate cup nearly concealing the pistil and 5 or 6 stamens within; pistil cylindric-obpyramidal, the apex subtruncate varying to conic or occasionally attenuate or dome-shaped in age; ovary 3-locular, the ovules superposed, varying from 7–2 in each of the 3 locules, totaling 21–10(–6) ovules per ovary; fruiting spadix smooth, the fruit cylindric and rostrate, or the apex truncate and crowned by the persistent stigma; seeds nearly as many as the ovules, oblique-reniform or ovoid to comma- or horseshoe-shaped in profile, tan-colored, the surface quite smooth or sparsely foveolate.

Type collection: *H. Cuming s.n.*, "Philippines" (holotype BM). That collector visited Pacific islands and the East Indies between 1836 and 1839. It is unknown from which island of the Philippines this specimen came.

Distribution: northern Celebes (Manado), Ceram, Batjam, and Halmahera, in Indonesia, and on many of the Philippine Islands northward to Laguna province, Luzon.

INDONESIA: "Toeáre-Móa rug boren de S. Kóro: Manádo. o.a. Páloe," Aug 1937, *Eyma 1709* (BO); along footpath from Kakakaşfen to top of Lokon, Jan 1895, *Koorders 492* (BO); Pakoe-oere, Apr 1895, *Koorders 3543* (BO), *3545* (BO); *Rachmat 559* (BO). Batjan: Sambaki, nw coast, Mai 1940, *Curran 364* (GH, US). Celebes: Manado, o.a. Paloe, to e of Lindoe-meer, from Kali Tôkararoe to the sea, w slope Goenoeng Ngilalaki, Jul 1939, *Bloembergen 4117* (BO); Northwestern Tetahi, o.a. Masamba, Aug 1937, *Eyma 1544* (BO); Oeloeánsó, o.a. Malili, Aug 1938, *Eyma 3367* (BO); *Eyma 3548* (BO, L, U); Pinapoeang, G. Lolóa, G. Beábis, Sep 1938, *Eyma 3822* (BO); in forest near Lake Tondano, Jul 1860, *Forchez s.n.* (L); Gocroepohi, n Celebes, Mar 1917, *Kauderns 11* (L); Todjamboe, Jun 1929, *Kjellberg s.n.* (BO, S); Manado, afd. Donggala, Palu near Tomado, Nov 1930, *Posthumus 2480* (BO, L); *de Vriese & Teijsmann s.n.* (L); Manado, Tonsealama, Tanggari, Dec 1932, *Wisse 99* (BO). Ceram: Hoále pas-Hátoeméten, Dec 1937, *Eyma 2385* (BO). Halmahera: Loa Tobaroe, Mai 1922, *van der Brink 1983* (BO).

PHILIPPINES: Leyte: Mt. Abucayan, Feb 1923, *Edaño* (Bur. Sci.) *41835* (P, US); Dagami, Aug 1912, *Ramos* (Bur. Sci.) *15385* (BM, US); Jun 1913, *Wenzel 235* (G-DEL, MO). Luzon: Sarapan, Camarines Sur, Oct 1928, *Edaño* (Bur. Sci.) *76170* (NY); Lucban, Tayabas prov., Mai 1906, *Elmer 7540* (BO, G-DC, L); Paete, Laguna prov., ne of Sta. Cruz, 1894, *Langlassé s.n.* (G-BOIS); Umiray, Tayabas prov., Mai 915, *Loher 13599* (M); Lucban, Tayabas prov., Mai 1926, *McGregor 47379* (NY); Mayon Volcano, Albay prov., Mai-Jun 1953, *Mendoza 18160* (L); Sorsogon prov., Jul-Aug 1915, *Ramos* (Bur. Sci.) *23574* (P); Mt. Binuany, Tayabas prov., Mai 1917, *Ramos & Edaño* (Bur. Sci.) *28523* (BO); Paracale, Camarines prov., Nov-Dec 1918, *Ramos & Edaño* (Bur. Sci.) *33596* (L); Mt. Mayon, Albay prov., Sep 1908, *Robinson 6476* (L); Bo. Sn. Bartolome, Nagcarlon, Laguna prov., Apr 1929, *Sulit*

& Flores 31119 (NY). Mindanao: Todaya, Davao dist., Apr 1904, Copeland 1263 (US); Zamboanga, Hiapan Mt., near Kabasalan, Nov 1940, Eballo 699 (G); Malangas, Zamboanga dist., Oct-Nov 1919, Ramos & Edaño (Bur. Sci.) 36810 (US). Mindoro: Baco R., Apr-Mai 1905, McGregor 189 (NY, US); Baco R., Mar 1905, Merrill 4080 (NY, US); Mt. Halcon, Nov 1906, Merrill 5486 (NY, US); Mt. Halcon, Mar 1922, Ramos & Edaño (Bur. Sci.) 40704 (BO).

CULT.: Jun 1922, van der Brink 1217 (U); H.B. 5270 (BO), 5299 (U); Koorders 15898 β (BO), 16144 β (L), 16145 β (BO), 16148 β (BO, L); Conservatories, Wilson 01561 (NY), etc.

Vernacular names: Indonesia: "matoetoenak," "toenak," "toendak," "tus-schen," "kebareasoe," "gogotola." Philippines: "pusao" (Mindanao).

S. commutatum is separated from the other species of this genus by a wide stretch of Pacific Ocean, yet it is very closely allied to *S. cannaefolium* of South America and *S. laeve* of Cocos Island (Costa Rica). *S. commutatum* differs from those species by its broadly elliptic leaf-blade which is widest just at the middle, and its spathe that is somewhat decurrent on the peduncle. The isolation of *S. commutatum* from related American species must have occurred long ago.

In the northern range of this species are found plants of very great vigor and size, with the spathe subcordate at the base, and the rostrate pistils conspicuously exceeding the perianth. Pending further investigation, this form was not named.

3. *S. laeve* Engl. Bot. Jahrb. 37: 120. 1905. Figure 1.

Leaf-blade oblique, oblong-elliptic, 35–41 cm long and 10.5–12.5 cm wide, the apex acuminate, the base acute, marginally undulate, primary lateral veins many, arising at an angle of 55–65°; petiole ca. 60 cm long, alate in the lower half; geniculum ca. 1.2 cm long. Peduncle 71–92 cm long; spathe oblong, 16–20 cm long and 2.7–3.8 cm wide, marginally undulate, attenuate-acuminate at the apex, the base acute and decurrent on the peduncle ca. 1 cm; spadix 8.4–10.2 cm long, on a stipe 1.4–1.8 cm long; perianth a membranous, 4–6-sided cup; pistil obpyramidal, the apex truncate, only the elevated stigma exceeding the perianth; ovary 3-locular, the ovules affixed upon a sub-basal pad in each locule, varying from 5–3 in each of the 3 locules, totaling 13–9 ovules per ovary; fruiting spadix smooth; fruit subcylindric or with a constriction near the center, the seeds located above the constriction; mature seeds only 1 per locule, reniform-rotund in profile, the surface slightly furrowed and foveolate, \pm evenly verrucose.

Type collection: *H. Pittier* 12370, "commune dans les bois, Vallée Gissler, Ile Cocos, Pacifique," Costa Rica, 18 Jun 1898 (holotype B, isotype US).

Distribution: Shady, cool, wet places on Cocos Island.

COCOS ISLAND (Costa Rica): Wafer and Chatham Valleys, common in shady and cool places, Jan 1902, *Pittier* 16244 (GH, US); in densely shaded places on banks of streams near sea-level, 1905–1906, *Stewart* 278 (GH, US).

S. laeve is endemic to Cocos Island (in the Pacific some 300 miles off the Costa Rican coast). Known from only three collections taken within eight years of each other, it has not been recollected since 1906! This species links the one American species with a cup-like perianth and the closely allied Indonesian-Philippine species. The presence of a single distinct species on Cocos Island sheds a dim light on the possible history of the dispersal of this genus.

S. laeve is closely related to the other two species of sect. *Massowia*, but differs from them by its narrower spathe; it is further distinguished from *S. commutatum* by the placement of the ovules upon a sub-basal pad rather than being superposed.

It is noteworthy that Engler incorrectly identified *Pittier* 16244 as *S. wendlandii* Schott.

Section 2. *Spathiphyllum* sect. *Amomophyllum* (Engl.) Engl. in DC. Monogr. Phan. 3: 227. 1879. Figure 2F-H.

Spathe flattened, commonly reflexed and non-decurrent upon the peduncle; perianth segments separate, or conglutinate or connate below; pistil subcylindric to obpyramidal, apically subtruncate, scarcely exceeding the perianth. Often slender plants 2–5 dm or more tall.

Type species: *Spathiphyllum gardneri* Schott, Aroid. 1: 2. pl. 3A. 1853.

Distribution: northern South America, Panama, and Costa Rica.

The sect. *Amomophyllum* previously embraced only four species. I have referred to it nineteen species, six transferred from other sections, and nine species newly described. This breakdown appears to be completely natural.

4. *S. quindiense* Engl. Bot. Jahrb. 37: 120. 1905. Figure 5.

Leaf-blade somewhat oblique, narrowly elliptic-oblong or lanceolate-oblong, widest at the middle and narrowed equally toward either end, 12–40 cm long and 2–5.2 cm wide, the apex attenuate, the base acute, with ca. 5 pairs of primary lateral veins arising at an angle of ca. 20–35°; petiole equaling or shorter than the blade, 8–25 cm long (or possibly more; absent in type specimen), alate nearly to the geniculum or less; geniculum ca. 1–1.8 cm long. Peduncle 16–50 cm long; spathe elongate-lanceolate to narrowly oblong-elliptic, (4–)7.5–16 cm long and 1–3 cm wide, the apex attenuate, the base acute, somewhat clasping or decurrent to 1 cm, white within, green outside (at least in age); spadix 2–7 cm long, on a stipe 0.5–2 cm long; perianth of separate segments; pistil obpyramidal, angular, apically truncate, slightly constricted between the annular style and the ovary, only the coronate stigma exceeding the perianth, ovary 3-locular, the ovules superposed or \pm collateral and affixed near the base of the locules, varying from 5–2 in each of the 3 locules, totaling 14–6 ovules per ovary; fruiting spadix smooth; fruit subglobose, ca. 3 mm high, apically truncate; seeds fewer than the ovules, oblique-ovoid, the surface slightly roughened or verruculose, somewhat furrowed and foveolate.

Type collection: *J. J. Triana 693*, “Quindío, 1000 m.,” Tolima, Colombia (holotype BM).

Distribution: Along rivers in the Magdalena Valley of Colombia, and in adjacent Panama.

PANAMA: along Charare R. above Chepo, prov. Panamá, Oct 1911, *Pittier 4724* (US); western slope and summit of Cerro Valle Chiquito, prov. Coelé, Jul 1935, *Seibert 507* (F, GH, MO, NY).

COLOMBIA: 12 leguas se de Barranca Bermeja, de la margen derecha del Río Opon, Santander, Sep 1954, *Castañeda 4860* (COL, US); Río San Pedro, Nariño, Antioquia, Dec 1891, *Lehmann 7590* (F, GH, S, U, US).

Until the present, *S. quindiense* was known from the type only. Several other collections from Colombia and Panama have been referred to this species. Before examination of the type specimen (*Triana 693*), it had been concluded that a distinct taxon existed in that region, represented especially by *Seibert 507* and *Lehmann 7590*. Only much later did I have the opportunity to study the type specimen of *S. quindiense*; although I have been unable to actually compare it side by side with the other specimens, all appear to be conspecific.

Specimens referred here vary considerably in size, yet all have similar proportions. The distinguishing features of *S. quindiense* are the narrow leaf and spathe of coarse texture, and typically the 5–4 ovules per locule. *Lehmann 7590* and *Pittier 4724* possess only 3–2 ovules per locule, but in all other characteristics

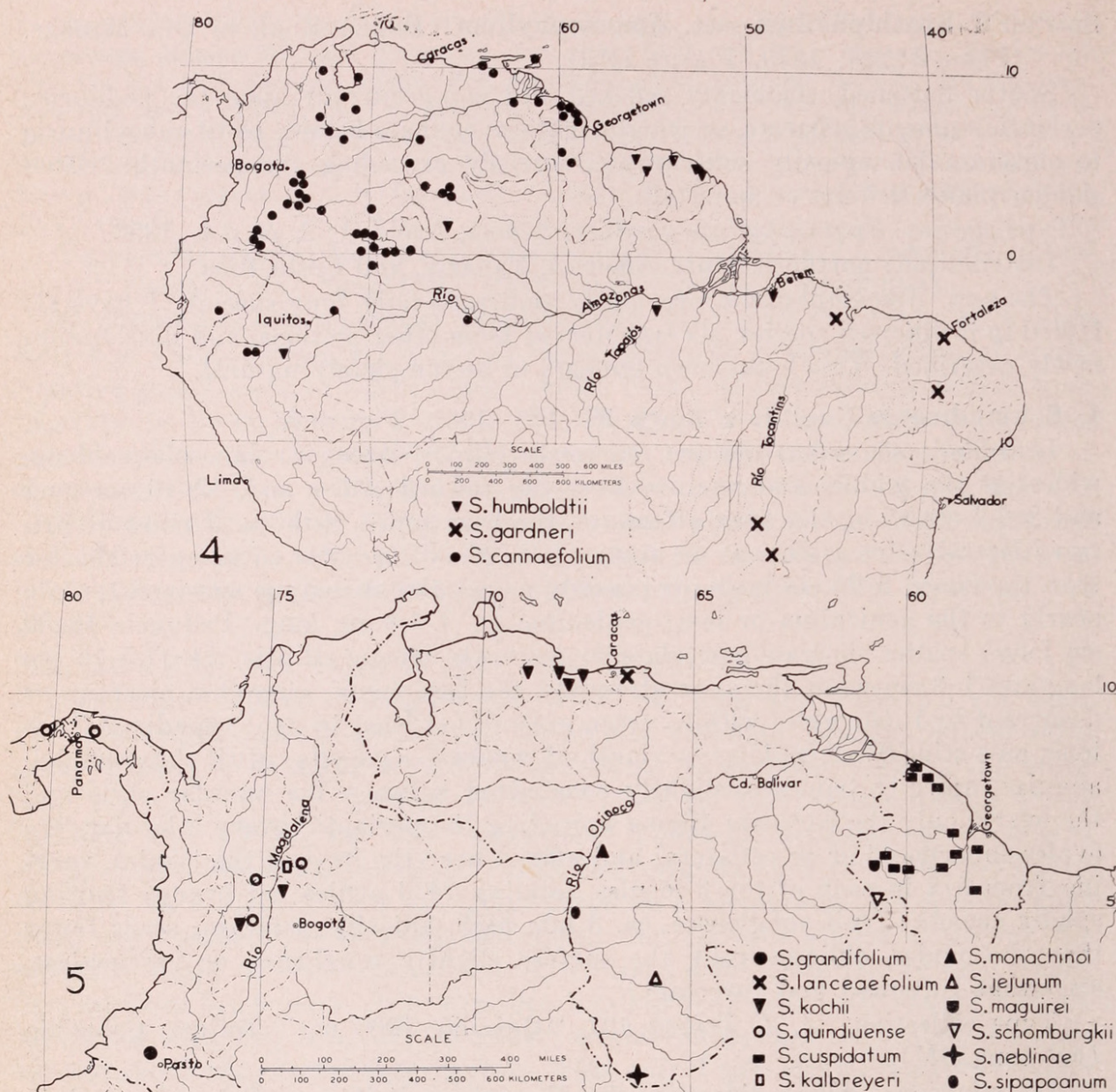


FIG. 4. Geographic distribution of three species of *Spathiphyllum* widespread in northern South America. FIG. 5. Geographic distribution of nine species of sect. *Amomophyllum* and three species of sect. *Spathiphyllum* of northern South America and Panama.

they are typical. Most nearly identical to the type is *Seibert 507*, which has served to guide me in the amplification of this species.

The Peruvian species *S. lechlerianum* is probably the closest ally of this species. From it *S. quindiuense* is separated by its proportionally narrower spathe.

S. quindiuense is considered primitive among the species of section *Amomophyllum*, and indeed may have arisen from stock similar to that which gave rise to *S. friedrichsthali* of sect. *Spathiphyllum*. Both species tend toward a multi-ovulate condition of the ovary, and both grow in the Panama-Colombia area where the greatest concentration of species of *Spathiphyllum* occurs.

5. *S. monachinoi* Bunting, sp. nov. Figure 5.

Foliorum lamina valde anguste oblonga ad lanceolato-ellipticam, 30–34 cm longa et 3.5–4.3 cm lata, ad apicem acuminata, ad basim acuta, venis primariis 5-jugatis angulo 15–20° divergentibus; petiolus gracilis, 27–32 cm longus, ad dimidium conspicue vaginatus; geniculum ca. 1.7 cm longum. Pedunculus petiolum longitudine subaequans, ca. 30 cm longus; spatha anguste lanceolata, 11.8 cm longa et 2.6 cm lata, apice attenuato, basi acuto et in pedunculo ca. 0.5 cm decurrenti, intra viridi-alba, extus viridis (fide Wurdack et Monachino); spadix albus, ca. 4 cm longus, stipite ca. 2 cm longo; perianthii segmenta separata; pistillum obpyramidale, apice subtruncato, solum stigmate papilliformi perianthium superanti; ovarium 2-loculare, loculis 6–5-ovulatis, ovulis ad pulvinum subbasilarem in loculo quoque affixis, 12–11 in toto ovario; fructus ignotus.

Type collection: *J. J. Wurdack & J. V. Monachino 41056*, "Spathe greenish-white above, green beneath, spadix white, in rocky moist ravine just below Raudal Maraca (ca. 110 river km from mouth), alt. 115 m," Rio Parguaza, Edo. Bolivar, Venezuela; 31 Dec 1955 (holotype NY). Uricate. Known only from the type collection. The collectors told me that they encountered numerous sterile plants in the locality, but only one flowering plant was found and collected.

It is with much pleasure that this species is named for Mr. J. V. Monachino, one of the collectors of the type specimen and Associate Custodian of the herbarium of the New York Botanical Garden. His keen taxonomic ability and willing assistance has greatly benefited the author during the course of this investigation.

S. monachinoi is the most robust Guayana species of sect. *Massowia*. Its bilocular ovary contains twelve or eleven ovules per ovary, in contrast to the trilocular ovary of *S. jejunum* which contains a total of only seven to six ovules. *S. monachinoi* was collected in lower elevations along the Río Parguaza, some 200 air miles north of the Río Cunucunuma where *S. jejunum* was collected. Between these points lies the broad Río Ventuari drainage, which Maguire and his associates have explored botanically without procuring a single specimen of *Spathiphyllum*.

The greater number of ovules per locule in *S. monachinoi* easily sets it apart from *S. sipapoanum* from nearby Cerro Sipapo. It differs from the other species of Guayana by its outstandingly larger size and narrower leaves.

There are similarities between this species and *S. quindiuense*. They differ in these characteristics: (1) the texture of the leaf-blade and spathe (in dried specimens) is chartaceous in *S. monachinoi*, pergameneous in *S. quindiuense*; and (2) the stipe of the spadix is proportionally shorter in the latter species.

6. *S. gardneri* Schott, Aroid. 1: 2. pl. 3A. 1853. Figure 4.

Leaf-blade oblanceolate to oblong-elliptic, (10–)14–34 cm long, and 3–7.5 cm wide, the apex acute-acuminate, the base acute or subattenuate, with ca. 4–6 pairs of arcuate primary lateral veins arising at an angle of ca. 45°; petiole 15–35 cm long, alate in the lower half or more; geniculum 0.8–2.4 cm long. Peduncle exceeding the petiole, 21–45 cm long; spathe cucullate, lanceolate or elliptic, 7–10 cm long and 2.2–3.4 cm wide, the apex long-acuminate, the base acute to subtruncate, conspicuously oblique and decurrent on the peduncle to ca. 1 cm, white with a green central rib (fide Gardner); spadix 2.3–5.3 cm long, on a stipe ca. 0.5(–1.2) cm long; perianth segments separate above, sometimes conglutinate below, at least in age; pistil obpyramidal, scarcely exceeding the

perianth, apically conic-subtruncate, constricted between the annular style and the ovary, the stigma coronate; ovary 3-locular, the ovules superposed, varying from 6–3 in each of the 3 locules; totaling 15–11 ovules per ovary; fruiting spadix somewhat tuberculate; fruit obovoid, rostellate; seeds as many as the ovules, \pm oblong in profile and very angular, the inner faces smooth, the outer face smooth or somewhat verruculose along the angles.

Type collection: *G. Gardner* 1867, "about 2 feet high, banks of the river near Crato; spathe white with a green central rib," Ceará, Brazil; Nov 1838 (lectotype K, isotypes BM, G-BOIS, G-DC, G-DEL, S, US).

Distribution: River banks in the forests of Maranhão and Goiás, Brazil.

BRAZIL Ceará: *Gardner* 1868 (P); Serra do Araripe, Procendencia do Granjeiro, Sep 1933, *Luetzelburg* 25842 (M). Goiás: region of southern Serra Dourada at long. 48°50'W. lat. 13°45' S, forest along road 13 km east of Formosa, Mai 1956, *Dawson* 15135 (LAM). Maranhão: *Don* 2 (BR).

This is the southernmost species of *Spathiphyllum* in eastern South America. For nearly a century *S. gardneri* was known from the type collection only. I am the first to assign *Don* 2 to this species. Though Lanjouw included *G. Don* among the West Indian collectors only, there can be little question that the specimen in the Martius Herbarium that bears his name was collected in Brazil and represents *S. gardneri*. The original set of *Don*'s collections is at Edinburgh; unfortunately, I have not seen that material.

Two modern collections are identified as *S. gardneri*. Although *Luetzelburg* 25842 was collected in the type locality, the leaves are very small in comparison to those of other specimens of this species. Nearly identical to the type material is *Dawson* 15135, collected in the province of Goiás.

Schott originally described the sepals of *S. gardneri* as connate; Engler described the perianth as 6-lobed apically with the segments connate below, which is essentially accurate. Such a criterion, however, is no good reason for their placing this species in sect. *Massowia* with those species which have a cup-like perianth. *S. gardneri* appears to be closely allied to *S. cuspidatum*, and is included in sect. *Amomophyllum*. From the latter species, *S. gardneri* differs in its shorter spadix which is nearly sessile, and in the ovules which are superposed and affixed well up in the locules.

7. *S. cuspidatum* Schott, Oesterr. Bot. Wochenbl. 7: 158. 1857. Figure 5.

Leaf-blade lanceolate to oblong-elliptic, 24–38(–51) cm long and 5–10(–13) cm wide, the apex acuminate, the base acute, with ca. 9 pairs of primary lateral veins arising at an angle of 35–45°; petiole somewhat longer than the blade, (11–)25–45(–66) cm long, conspicuously alate in the lower two-thirds; geniculum 1.2–2(–3) cm long. Peduncle ca. 2–2.5 times as long as the blade, 35–70(–100) cm long; spathe lanceolate to elliptic, 10–20(–26) cm long and 3–6 cm wide, the apex acuminate to subcaudate, the base acute or narrowed into a short handle; spadix 4–9(–13) cm long, on a stipe 1–2.5(–3.8) cm long; perianth of separate segments; pistil obpyramidal, apically truncate, slightly constricted between the \pm annular style and the ovary, only the nipple-like stigma exceeding the perianth; ovary 3-locular, the ovules affixed near the base of the locules, varying from 4–2 in each of the 3 locules, totaling 12–6 ovules per ovary; fruiting spadix smooth; fruit obovoid, apically truncate; seeds as many as the ovules, oblique-oblong-ovate in profile, the surface quite smooth or shallowly furrowed and foveolate.

Type collection: *C. C. Parker s.n.*, "Demerara," British Guiana (lectotype K). Apparently a unicate, collected in 1824. A Splitgerber collection from Suriname was also cited by Schott in the original publication of this species, but it has not been seen, or even located.

Distribution: Swampy forested areas of British Guiana.

BRITISH GUIANA: Mazaruni R., *Appun 230* (K); *Appun 848* (K); Smote Creek, Waini R., Jul 1906, *Beckett & Kortright 8487* (K); Kaow Creek, Mazaruni Station, Jul 1939, B. G. For. Dept. 2976 (K); Potare, Mahdia R., Jan 1943, B. G. For. Dept. 3904 (K), 3909 (K); in swamp, Huradaiah, Moruka R., Pomeroon Dist., Aug 1921, *de la Cruz 1026* (GH, NY, US); Pomeroon R., Pomeroon Dist., Jan 1923, *de la Cruz 2940* (F, GH, MO, NY, US); Pomeroon R., Dec 1922, *de la Cruz 3128* (F, GH, US); Waini R., Northwest Dist., 8°20' N, 59°40' W, Apr 1923, *de la Cruz 3610* (F, GH, MO, NY, US); along creek, Kartabo Station, junction of Mazaruni R. & Cuyuni R., Jul 1924, *Graham 310* (NY); swamp in forest by Kawow Creek, Penal Settlement, Dec 1919, *Hitchcock 17235* (GH, NY, S, US); *Hooker s.n.* (NY); Pomeroon R., Mar 1884, *Jenman 1985* (K); Demerara R., Jan 1896, *Jenman 6868* (K); Barima R., Mar 1896, *Jenman 6989* (K); Kamakusa, Nov 1922, *Leng 49* (NY); Kamakusa, Dec 1922, *Leng 353* (NY); wet places, Comaka, Demerara R., Mai 1923, *Persaud 269* (F); in mora swamp, Moraballi Creek, near Bartica, Essequibo R., Aug 1929, *Sandwith 153* (K).

Engler and Krause (Pflanzenreich 4^{23B}: 128. 1908) cited *Jenman 6989* as *S. cuspidatum*, but incorrectly stated its locality as "Roraima." It is a mixed collection from along the Barima River; the New York sheet represents *S. cannaefolium*, the two Kew sheets *S. cuspidatum*. Engler described the locules of the ovary of this species as biovulate; my observations are that there are 4–2 ovules per locule.

S. cuspidatum appears to be limited to British Guiana. However, Jonker & Jonker (Fl. Suriname 1: 28, 29. 1953) included this species in their treatment on the basis of a Splitgerber collection from Sarumassa, cited by Schott (Prodr. Syst. Aroid. 428. 1860). Although no subsequent investigator appears to have seen that specimen, it is possible that *S. cuspidatum* occurs in Suriname.

S. cuspidatum may represent a terminal element in phylogenetic development in this genus. It varies very little, and is common within narrow geographical limits. It is most similar to *S. kalbreyeri*, from which it differs in its lanceolate or elliptic spathe which is somewhat broader than in the latter species. There is also a tendency toward a slightly greater number of ovules per ovary than is found in *S. kalbreyeri*.

Of considerable interest is the possible relationship between *S. cuspidatum* and *S. humboldtii*, which latter species exhibits such diverse ovary characteristics as to be placed in a separate section. It is a reasonable conjecture that these two species, as well as *S. gardneri*, may have arisen from a common primal stock.

8. *S. kalbreyeri* Bunting, sp. nov. Figure 5.

Foliorum lamina e oblongo- ad lanceolato-ellipticam, 33–40 cm longa et 9–10.5 cm lata, ad apicem acuminato-cuspidata, ad basim acuta; venis primariis multis angulo 35–45° divergentibus; petiolus 32–43 cm longa, ad $\frac{1}{3}$ vel plus vaginatus; geniculum ca. 2 cm longum. Pedunculus 40–58 cm longus; spatha oblonga, 13.5–15 cm longa et 2.5–3 cm lata, apice attenuato-acuminato, basi acuto et leviter complexo; spadix 7–8.5 cm longus, stipite ca. 1 cm longo; perianthii segmenta separata; pistillum obpyramidale, apice truncato, solum stigmate papilliformi perianthium superanti; ovarium 3-loculare, loculis 4–2(–1)-ovulatis, ovulis ad pulvinum subbasilarem in loculo quoque affixis, 9–5 in toto ovario; fructus ignotus.

Type collection: *Kalbreyer* 1413, "tufted habit, 2½–3'; leaf erect, thin; spathe 5–6" l., green, nerved when old inside white; spadix bent greenish or yellowish; forest shady marshy spaces 3000'; Rastrojas," Colombia, 15 Feb 1880 (holotype K).

COLOMBIA: Sur de Santander: Amarilla Creek, vic. of Barranca Bermeja. Magdalena Valley between Sogamoso and Carare Rivers, Jul 1936, *Haught* 1894 (US).

PANAMA: Darién: trail between Paya & Puero, wet forested area, Jun 1959, *Stern, Chambers, Dwyer & Ebinger* 404 (MO).

S. kalbreyeri is limited to the Magdalena Valley of Colombia and adjacent Darien, Panama. It is remarkably similar to *S. cuspidatum*, but is probably distinct. Each of these species has a very limited range, and is separated from the other by all Guayana and the Cordillera Oriental of the Andes. *S. kalbreyeri* is distinct in its oblong spathe which is proportionally somewhat narrower than in *S. cuspidatum*. There is a tendency toward a small reduction in the number of ovules per ovary in this species, and the blade of the leaf and the spathe are coarser in texture than in *S. cuspidatum*.

9. *S. lechlerianum* Schott, Prodr. Syst. Aroid. 425. 1860. Figure 6.

Leaf-blade oblique, narrowly lanceolate-elliptic to oblong-elliptic, 16–25 cm long and 2.5–4 cm wide, the apex attenuate-acuminate, the base attenuate or acute, the 5 or 6 pairs of primary lateral veins arising at an angle of 25–30°; petiole 15–25 cm long, prominently alate in the basal two-thirds or nearly to the geniculum in reduced floral leaves; geniculum 1.3–1.8 cm long. Peduncle 27–42 cm long; spathe cucullate, broadly lanceolate, 7–12 cm long and 2.2–3 cm wide, the apex acuminate to subcaudate, the base subacute and decurrent on the peduncle to 1.4 cm (!), white within, medium green outside (fide Spruce); spadix 2–3.7 cm long, on a stipe 0.5–1 cm long; perianth segments separate or possibly conglutinate below in age; pistil obpyramidal, apically truncate, the elevated stigma scarcely exceeding the perianth; ovary 3-locular, the ovules superposed, varying from 5 to 3 in each of the 3 locules, totaling 14–10 ovules per ovary; fruit unknown.

Type collection: *W. Lechler* 2338, "St. Gavan in umbros," Peru, Jul 1854 (holotype K). According to Weberbauer (El Mundo Vegetal de los Andes Peruanos 14. 1945) this locality is San Gaban, in "el Oriente andino de la provincia de Carabaya," which is northwest of Lake Titicaca and east or southeast of Cuzco.

Distribution: Wooded slopes in southeastern and northeastern Peru, and the Magdalena Valley of Colombia (possibly).

PERU: prope Tarapoto, Feb 1856, *Spruce* 4496 (BR, K).

COLOMBIA: Sur de Santander: camp on Margarita Creek, vic. of Barranca Bermeja, Magdalena Valley, between Sogamoso R. & Colorado R., Sep 1934, *Haught* 1367 (US).

CULT. (probably): *Davis* 152, "Hort. Veitch, Aug 1876, teste N. E. Brown," and on same sheet an individual element labeled "with the Peruvian plants of Mr. Davis, coll. Mess. Veitch," Jul 1884 (K).

This species extends almost to 14° S latitude. Specimens collected in widely disjunct localities have been identified as *S. lechlerianum*. The Colombian collection (*Haught* 1367) must be referred to this species, despite the great distance between its collection locality and that of other specimens. However, it was not considered in the preparation of the description of *S. lechlerianum*.

The original description of *S. lechlerianum* gives no details of the ovary, but Schott placed this species in a group which he characterized as having the sepals connate in a truncate cup! Engler retained this species in sect. *Massowia*, but emended the description of that group to account for the six-lobed nature of the apex of the perianth found in this species. N. E. Brown later annotated the type sheet "Perianth segments all free to the base." I made careful examination of this structure in the type specimen and in *Davis 152*, and concluded that the perianth segments are free from one another. It appears that the segments may be conglutinate in age as in many other species.

S. lechlerianum is closely allied to *S. quindiense*, and is here included in sect. *Amomophyllum*. Though the locules of the ovary are characteristically 5-4-ovulate in both these species, the leaf-blade of *S. lechlerianum* is proportionally narrower and its lanceolate spathe is proportionally wider and of more delicate texture than that of *S. quindiense*. From *S. jejunum* this species differs in the greater number of ovules per locule.

10. *S. jejunum* Bunting, sp. nov. Figure 5.

Foliorum lamina obliqua, anguste oblongo-elliptica, 18-20 cm longa et 2-2.5 cm lata, ad apicem attenuata, ad basim acuta, venis primariis 4-5-jugatis angulo 15-20° divergentibus; petiolus 10-14 cm longus, ad $\frac{2}{3}$ vaginatus; geniculum ca. 0.6 cm longum. Pedunculus 16 cm longus; spatha angustissime elliptica, 5.8 cm longa et 1 cm lata, apice attenuato, basi acuto, albo (fide Curran); spadix 1.6 cm longus, stipite ca. 1 cm longo; perianthii segmenta separata; pistillum cylindrico-obpyramidale, apice obtuso-subtruncato, solum stigmatelato perianthium superanti; ovarium ut videtur 2-loculare, loculis 3-2-ovulatis, 7-6 in toto ovario; fructus ignotus.

Type collection: *H. M. Curran 226a*, "found growing on rock along river banks, white flowers, Jacare, Río Cunucunuma," Terr. Amazonas, Venezuela, "4. 6. 1950" (holotype NY). Ulicate, presumably. Known only from the type collection.

The two plants that represent *S. jejunum* were found mixed in a collection of *S. cannaefolium*. This is the only collection representing sect. *Amomophyllum* from the region near Cerro Duida. It is likely that they were collected at a low elevation, though the altitude was not stated on the label. *S. jejunum* is related to *S. monachinoi*, but differs in its much smaller size (which suggested the specific epithet), and the 2-3-ovulate locules of the ovary are very different from the multiovulate locules of *S. monachinoi*. The proportionally narrower leaf-blade and spathe and the shorter geniculum serve to differentiate this species from *S. sipapoanum*. From *S. maguirei*, *S. jejunum* can be separated by its narrower leaf-blade and its apparently persistent spathe.

11. *S. maguirei* Bunting, sp. nov. Figure 5.

Foliorum lamina lanceolata, 13-15 cm longa et 2.3-3 cm lata, ad apicem attenuato-acuminata, ad basim acuta, venis primariis ca. 4-jugatis angulo ca. 25° divergentibus; petiolus 9.5-12 cm longus, ad $\frac{3}{4}$ vaginatus; geniculum 0.6-0.9 cm longum. Pedunculus ad 23 cm longus; spatha anguste lanceolata, ut videtur mature deciduo, 5.2-5.6 cm longa et 1 cm lata, apice attenuato, basi late acuto, viridis (fide Maguire); spadix 1.5-3.3 cm longus, stipite ca. 1 cm longo; perianthii segmenta separata vel ad basi conglutinata vel connata; pistillum obpyramidale, apice subtruncato, solum stigmatelato perianthium superanti;

ovarium 3-loculare, loculis 3-2-ovulatis, ovulis ad pulvinum subbasilarem in loculo quoque affixis, 7-6 in toto ovario; spadix fructiferus plus minusve levi; fructus angulari-sphaeroidens, latitudine longitudinem subaequant, apice truncato; semina ovulos numero aequantia, obliquo-ovoidea, superficie foveolato.

Type collection: *B. Maguire & D. B. Fanshawe 32469*, "terrestrial, spathe green; spadix green; on rocks in stream, Moruka Creek, locally common, 1200 m alt., Kamarang River, Wenamu Trail," British Guiana, 9 Nov 1951 (holotype NY, isotype US). Known only from the type collection.

Though *S. maguirei* occurs in eastern Guayana, it seems as closely related to the western Venezuelan species (*S. neblinae* and *S. sipapoanum*) as to *S. schomburgkii* from nearby Mt. Roraima. The lanceolate leaf-blade of *S. maguirei* is distinctly different from the narrowly elliptic blade of *S. schomburgkii*.

S. maguirei finds its closest relative in *S. neblinae*, from which it is geographically separated by some 500 air miles. The spathe is often deciduous in these species and their floral characteristics are similar. *S. maguirei* differs by its proportionally narrower leaf-blade which is widest below the middle, and in the shorter stipe of the spadix.

No *Spathiphyllum* has been found in the intermediate area of great sandstone mountains of Bolívar to the west of Mt Roraima.

12. *S. schomburgkii* Schott, Oesterr. Bot. Wochenbl. 7: 158. 1857. Figure 7.

S. candolleanum Schott var. *schomburgkii* (Schott) Engl. in DC. Monogr. Phan. 2: 225. 1879.

Leaf-blade oblique, narrowly elliptic, to 18 cm long and 2.5 cm wide, the apex acute-acuminate, the base attenuate, primary lateral veins ca. 4 pairs arising at an angle of 15-25°; petiole to 12.5 cm long, prominently alate nearly to the geniculum; geniculum ca. 0.8 cm long. Peduncle 26 cm long; spathe lanceolate-elliptic, 6.2 cm long and ca. 1.6 cm wide, the apex acute-acuminate, the base acute; spadix ca. 2.5 cm long, on a stipe ca. 0.7 cm long; perianth of separate segments; pistil obpyramidal, scarcely exceeding the perianth, the apex obtuse-subtruncate, the stigma coronate; ovary 2-locular(?), the ovules affixed on a sub-basal pad in each locule, (apparently) 4-3 in each of the locules, totaling 7-6 ovules per ovary; fruit unknown.

Type collection: *R. H. Schomburgk s.n.*, "1st Coll. M. Roraima," Venezuela (holotype K). Ulicate(?). Probably found at lower elevations on slope of Mt. Roraima. Known only from the type collection.

S. schomburgkii stood for a long time as the only known species of this genus from a sandstone mountain of Guayana. Subsequent exploration of this region has yielded several collections of *Spathiphyllum*. All represent plants of small size. The pistil is nearly identical in all, viz., cylindrical-obpyramidal and scarcely exceeding the perianth, the apex obtuse-subtruncate, the stigma nipple-like or coronate. The pistil of *S. schomburgkii* was described initially as attenuate with a conical apex exceeding the sepals. On this basis (apparently), Engler made it a variety of *S. candolleanum*. Considerable attention to the nature of the pistil of this species has led me to conclude that it is unquestionably similar to that in other collections from sandstone areas of Guayana.

It is difficult to determine the number of taxa represented among the Guayana collections. In view of the small number of collections, I was reluctant to create new names that might later fall in the light of further collections. Nevertheless, it is felt that no collections are conspecific, and six species are described as new to science.

S. schomburgkii seems to be closely related to *S. sipapoanum* from which it differs by its narrowly elliptic leaf-blade, its perianth of five or six segments,¹¹ and the greater number of ovules per ovary. It is separated by its narrower leaves and the shorter stipe of the spadix from *S. neblinae*. Inflorescence characteristics serve to set apart *S. schomburgkii* from the Andean species.

13. *S. neblinae* Bunting, sp. nov. Figure 5.

Foliorum lamina elliptica vel rare lanceolato-elliptica, (10.5–)15–19 cm longa et (2.3–)2.9–3.9 cm lata, ad apicem acuminata, ad basim acuta, venis primariis 4–5-jugatis angulo 20–30° divergentibus; petiolus (4–)7.5–12 cm longus, ad dimidium vel plus vaginatus; geniculum 0.5–1.3 cm longum et supra sulcatum. Pedunculus (6–)18–25 cm longus; spatha recta, e oblonga ad lanceolatam, (4.4–)5.7–6.8 cm longa et (0.9–)1.3–2.4 cm lata, apice attenuato-acuminato, basi attenuato et aliquando breviter ansato, albo florescenti, in aetate viridescenti et ut videtur deciduo; spadix viridis, (1–)1.8–3.8 cm longus, stipite (1.2–)1.7–2.4 cm longo; perianthii segmenta separata; pistillum obpyramidale, apice truncato, leviter constrictum inter ovarium annulare et stylum, solum stigmate elato perianthium superanti; ovarium ut videtur 2-loculare, loculis 5–2-ovulatis, ovulis ad pulvinum subbasilarem in loculo quoque affixis, 9–5 in toto ovario; spadix fructiferus levis; fructus cylindrico-obpyramidalis; semina ovulos numero aequantia, valde angularia et irregulariter reniformia vel obliquo-ovoidea, superficie conspicue foveolato.

Type collection: *B. Maguire, J. J. Wurdack & G. S. Bunting 36797*, "spathe white in flr., green in frt., spadix green; geniculum grooved above; rainforest; streamside at Camp 2; locally frequent; elev. 180 m; lowland & slope forests, Cerro de la Neblina, Río Yatua"; Terr. Amazonas, Venezuela; 14 Dec 1953 (holotype NY, isotype US).

VENEZUELA: *Maguire et al. 36799*, same data as the type collection (NY).

S. neblinae is allied to the other species of Guayana (discussed under *S. schomburgkii*). Its closest relative is *S. maguirei*. Both share the peculiarity of a deciduous spathe, but from all other species of the sandstone area *S. neblinae* differs by its proportionately wider leaf-blade and the longer stipe of its spadix. It resembles *S. minor* of Amazonian Peru, but the latter differs in the shorter stipe of its spadix and the uniovulate condition of the locules of its ovary.

14. *S. floribundum* (Lind. et André) N. E. Br. Gard. Chron. II. 10: 783. 1878. Figure 7.

Anthurium floribundum Lind. et André, Ill. Hortie. 21: 24. pl. 159. 1874.

Amomophyllum floribundum (Lind. et André) Engler, Gard. Chron. II. 7: 140. 1877.

Spathiphyllum floribundum var. *cuneatum* Engl. Bot. Jahrb. 6: 281. 1885.

Leaf-blade conspicuously oblique, elliptic to oblong or oblanceolate, widest at or just above the middle, 13–20(–26) cm long and 5.5–9(–10.5) cm wide, the apex cuspidate, the base obtuse or acute, marginally undulate, dark green above with a velvety lustre, the primary lateral veins ca. 9 pairs arising at an angle of ca. 65–75°; petiole (6.5–)10–22(–28) cm long, often alate nearly to the geniculum, vaginate below or the wings expanded and free; geniculum 0.5–1.3 cm long. Peduncle (16–)20–37 cm long; spathe white, reflexed, lanceolate to oblong-elliptic, 4–8(–9.8) cm long and 1.2–3 cm wide, the apex attenuate to cuspidate, the base acute to subtruncate and clasping the peduncle; spadix 2.5–5.5 cm long, on a stipe 0.3–0.8 cm long; perianth green, the segments separate or sometimes

¹¹Not considered a good diagnostic feature.

conglutinate in age; pistil white, obpyramidal, apically truncate, the stigma elevated and shortly exceeding the perianth; ovary 3-locular, the ovules affixed at or near the base of the locules, varying from (3-)2 to 1 in each of the 3 locules, totaling (7-)6-4 ovules per ovary; fruiting spadix smooth; fruit spheroid, the apex truncate; seeds 1 or 2 per locule, the surface vertically furrowed and foveolate between the verrucose ridges.

Type: *pl. 159*, L'Illustration Horticole **21**: 24. 1874. This color plate adequately defines *S. floribundum*, and agrees with the original description which it accompanies. This species was described from a plant growing in cultivation, and no type material appears to have been prepared. A fine representative specimen of *S. floribundum* is *Lehmann 7758* (F, GH, US), which is more or less identical to the material cultivated today under this name.

Distribution: Banks of streams in the central Magdalena Valley of Colombia.

COLOMBIA: Boyaca: high forested fronts, El Humbo, 130 mi n of Bogotá, Mar 1933, *Lawrence 696* (MO). Cundinamarca: Paime, *Bro. Ariste-Joseph 4924* (US). Sur de Santander: camp on Taza Creek, vicinity of Barranca Bermeja, Magdalena Valley between Sogamoso R. & Colorado R., Feb 1934, *Haught 1271* (US); camp on Margarita Creek, vicinity of Barranca Bermeja, Magdalena Valley between Sogamoso R. & Colorado R., Oct 1934, *Haught 1386* (F, US); brookside, Dosquebrados, Jan 1880, *Kalbreyer 1354* (K). Antioquia: Rostrojas, Feb 1880, *Kalbreyer 1414* (K); Sabaleta, *Lehmann 7757* (F); Río Nuz, 600-1000 m, *Lehmann 7758* (F, GH, US); "alt. 1200," *Triana 696* (BM).

CULT.: Hort. Williams, Aug 1876, and Hort. Kew, Mai 1876, *N. E. Brown s.n.* (K); Hort. Kew ex Hort. Williams, Apr 1878, and Hort. Veitch, Apr 1879, *N. E. Brown s.n.* (K); *Engler 82* (B, BM, C, G-BOIS, G-DEL, GH, L, M, P, US); Hort. Cantonspaark no. 3393, Dec 1953 (U); etc.

Perhaps the most handsome member of the genus, this species has been a popular conservatory subject for nearly a century. Though not described until 1874, *S. floribundum* was first collected by Gustav Wallis before 1864. The original description gave no data on its arrival in Europe, but stated only that it was prepared from a plant growing in the garden of M. Linden for the previous two years, and that its publication had been delayed by lack of sufficient flowers to determine in which genus it should be placed (they erroneously selected *Anthurium!*). In 1875 (*Hamb. Gart. Blum. 31*: 63), Wallis listed *A. floribundum* among his collections near San Carlos (Aguas Claras), New Granada, mentioning that many of these same species were collected previously. It is likely that *S. floribundum* was first collected in that locality.

S. floribundum appears to be endemic to the Magdalena Valley of Colombia. Various authors have referred to this species collections from Panama, but I cannot corroborate their identifications. Vegetatively *Bailey 209* resembles this species, but a cursory inspection of the spadix clearly demonstrates the conic pistils; it is referred to *S. phrynifolium*. Standley (*Ann. Missouri Bot. Gard. 31*: 34. 1944) cited this collection as *S. floribundum*, then illustrated the species with a drawing of *Seibert 507*, which I identify as *S. quindiuense*.

There seems little cause to maintain var. *cuneatum* of this species. It was based upon *Lehmann 2592*, collected in Tolima, Colombia. That specimen was deposited at Berlin, and was probably burned.

S. floribundum is outstanding for its dark green leaves with a velvety lustre. As a dried specimen, however, it differs in its broad leaves. It is most closely related to *S. fulvovirens* and *S. juninense*, both of which are species of much greater size than this species.

Some cultivated material of *S. floribundum* has the spathe cuspidate at the

apex, in contrast to the long-attenuate apex of the spathe in all collections from the wild. This difference of the cultivated form may have resulted from selection by horticulturists.

15. *S. fulvovirens* Schott, Oesterr. Bot. Zeitschr. **8**: 179. 1858. Figure 7.

Leaf-blade oblique, typically ovate to ovate-elliptic, (25-)35-44 cm long and (10-)17-20 cm wide, the apex terminated by a cusp 1.5-3.5 cm long, the base obtuse to subrotund, the many primary lateral veins arising at an angle of 60-70° and very prominent beneath; petiole to 74 cm long, alate in the basal two-thirds; geniculum (1-)1.5-3 cm long. Peduncle to 49 cm or more long; spathe \pm oblong and clasping at the base; spadix 6.8-11.5 cm long, smooth, on a short stipe 0.3-0.8 cm long; perianth of separate segments; pistil obpyramidal, apically truncate, the nipple-like stigma scarcely exceeding the perianth; ovary 3-locular, the ovules affixed near the base of the locules, 2 or 1 in each of the 3 locules, totaling 6-5 ovules per ovary; fruit unknown.

Type collection: *H. von Wedel 2198*, "shrub 3 ft., inflorescence gray, Fish Creek, vicinity of Chiriqui Lagoon," Prov. Bocas del Toro, Panama, 9 Apr 1941 (neotype GH, duplicates F, MO). The designation of a neotype is appropriate since neither the holotype (*Wendland 939*, "Pedregal, C. Rica, 1857") nor any duplicate of it has been located. A photograph of the holotype (Field Mus. no. 29838) clearly indicates that the type was deposited at Vienna, and therefore we must assume that it was burned along with the other Araceae.

Distribution: [Pedregal(?), Costa Rica], along Chiriqui Lagoon in northern Panama, in the central Magdalena Valley and Pacific coast of Colombia (Buenaventura).

COLOMBIA: Río Magdalena, *Weir 55* (BM). Santander: Amarilla Creek, vicinity of Barranca Bermaja, Magdalena Valley, between Sogamoso R. & Carare R., Jul 1936, *Haught 1895* (F, US); Valle del Cauca: Río Dagua, Buenaventura, *Lehmann 5361a* (F, K).

CULT.: "coll. Fl. Claes, Colombia, Juin 1927," *V. Lambert s. n.* (BR).

A good photograph of the holotype in conjunction with the original description of *S. fulvovirens* serves to define this species very well. It is further clarified by an original Schott drawing (W).

The exact collection locality of *Wendland 939* is uncertain. Standley (Field Mus. Publ. Bot. **18**: 48. 1937) noted that Wendland entered Costa Rica "by the Sarapiquí Valley, and explored especially the mountain chain from Barba to Turrialba," which would limit his localities to the provinces of Heredia and Cartago, on the Atlantic slope of the Cordillera.

The Colombian collections referred to this species have a somewhat narrower leaf-blade than is typical, but they are essentially similar in other features.

S. fulvovirens finds its nearest relative in *S. juninense*, a Peruvian species with a wider spathe. These two might well be considered as infraspecific categories of a single species, but are maintained here as separate species because of the great distance between their areas of collection and the natural barrier to continuity of distribution created by the Cordillera Oriental of the Andes in Colombia.

16. *S. juninense* Krause, Notizbl. Bot. Gard. Berl. **11**: 615. 1932. Figure 6.

Leaf-blade oblique, ovate-elliptic, 28-32 cm long and 12-15.5 cm wide, the apex cuspidate (probably; lost from type specimen), the base rotund-obtuse, with many primary lateral veins arising at an angle of ca. 55-60°; petiole 40-57 cm long, alate throughout much of its length; geniculum 1.6-2 cm long. Peduncle to 70 cm long; spathe oblong, to 19 cm long and 5.7 cm wide, the apex long-cuspidate, the base apparently obtuse; spadix to 12.3 cm long, on a stipe ca. 1.5 cm long; perianth of separate segments; pistil obpyramidal, the apex subtruncate,

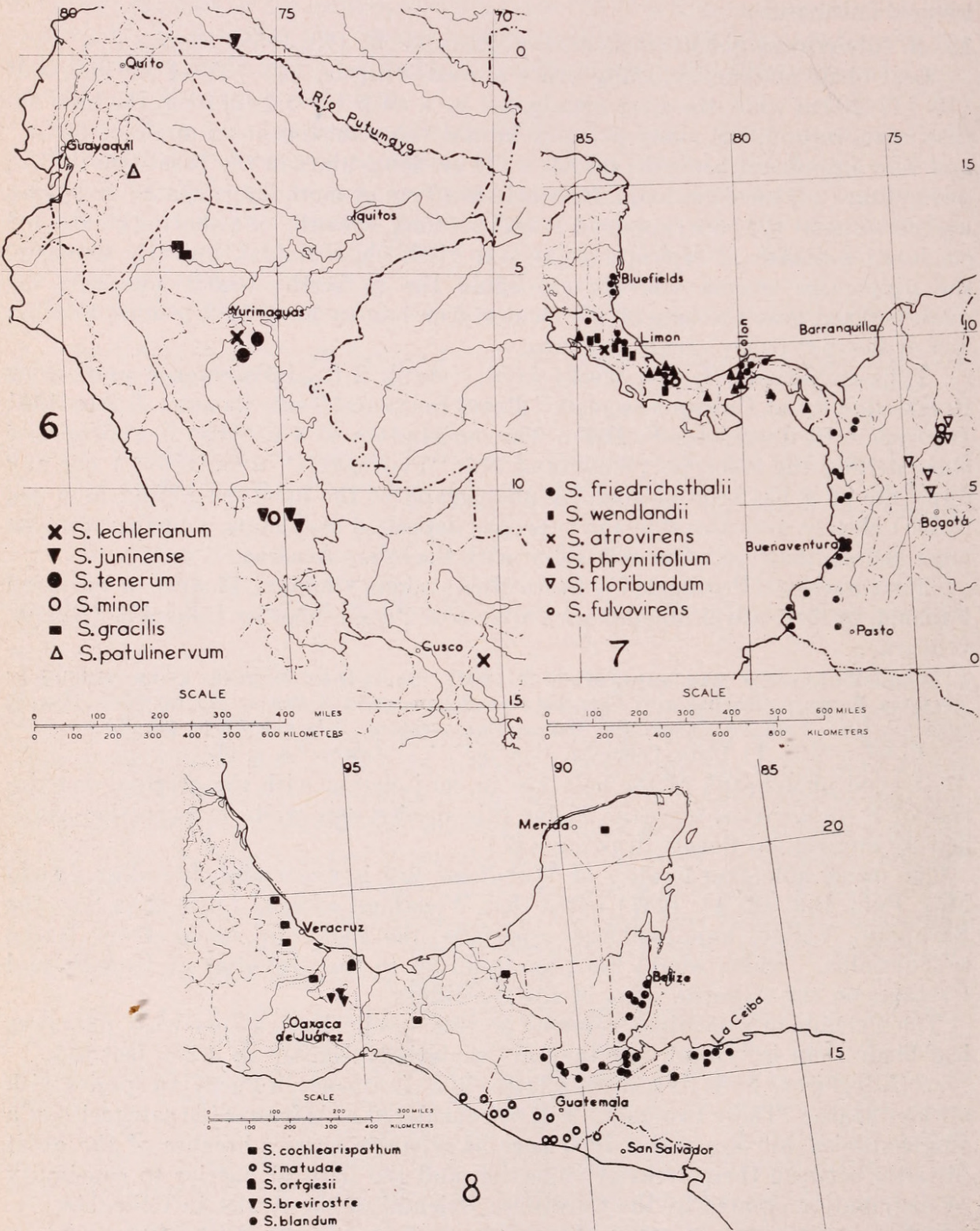


FIG. 6. Geographic distribution of several species of *Spathiphyllum* sect. *Amomophyllum* of western South America. FIG. 7. Geographic distribution of two species of sect. *Amomophyllum* and four species of sect. *Spathiphyllum* of the Isthmus region and adjacent Colombia. FIG. 8. Geographic distribution of several species of sect. *Spathiphyllum* of Mexico and northern Central America.

crowned by the nipple-like stigma; ovary (2-)3-locular, the ovules affixed near the base of the locules, 2 or 1 in each of the 3 locules, totaling 5-3 ovules per ovary; fruit unknown.

Type collection: *E. P. Killip & A. C. Smith 26157*, "spathe white or green; Pichis Trail, Santa Rosa, alt. 625-900 meters, dense forest." Junín, Peru; 6, 7 Jul 1929 (holotype US, isotype B).

Distribution: Wet forests of Junín, Peru and along Río Putumayo, Colombia.

PERU: Junín: Puerto Bermudez, Jul 1929, *Killip & Smith 26565* (NY, US); Cahuapanas, on Río Pichis, Jul 1929, *Killip & Smith 26752* (NY, US).

COLOMBIA: Comisario del Putumayo: selva higrófila del Río Putumayo, Pto. Porvenir, arriba de Pto. Ospina hacia la Loma, Nov 1940, *Cuatrecasas 10665* (COL).

Though very similar to *S. fulvovirens*, it seems prudent to continue to recognize *S. juninense* as a distinct species until more adequate collections have accrued. The type collection is most distinctive (in this section of the genus) for its exceptionally wide spathe, and its stout spadix borne on an elongate stipe. Other Peruvian collections cited are somewhat anomalous, and were annotated "*S. juninense* vel aff." *Cuatrecasas 10665* was similarly annotated; its elliptic leaf-blade is acute at the base, and its spathe is narrower than that of the typical form. The small amount of material available precludes a knowledge of the natural variation of this species, yet these collections may represent a single taxon.

The Cordillera Oriental forms a geographic barrier in Colombia between *S. fulvovirens* and *S. juninense*. These two species are very similar, but the spathe is somewhat wider and there is a small reduction in the number of ovules per ovary in *S. juninense*. It is easily separated from *S. floribundum* by its much greater size.

17. *S. patinii* (Hogg) N. E. Brown, Gard. Chron. II. 10: 783. 1878.

Anthurium patinii Hogg, Gard. Year-book 123. 1875.

Anthurium patini Mast. Gard. Chron. II. 3: 524, 525. f. 109. 1875.

Anthurium candidum Bull, in Catalogue 3. pl. iii. 1875.

Amomophyllum patini (Mast.) Engl. Gard. Chron. II. 7: 139. 1877.

Massowia gardneri C. Koch, Gard. Chron. II. 10: 622. 1878; non Schott, Aroid 1: 2. pl. 3. 1853.

Spathiphyllum candidum N. E. Br. Gard. Chron. II. 10: 783. 1878.

Leaf-blade oblique, lanceolate-elliptic or oblong-elliptic, 12-21 cm long and 2.8-5 cm wide, the apex acuminate, the base acute-cuneate, marginally undulate, with ca. 4-6 pairs of primary lateral veins arising at an angle of ca. 45°; petiole slender, subequaling the blade, 10-22 cm long and alate in the lower two-thirds or more, vaginate below or the wings free and spreading; geniculum ca. 0.5-1(-1.5) cm long. Peduncle (10-)19-41 cm long; spathe reflexed, lanceolate to oblong, 4-8 cm long and 1-2.5 cm wide, the apex attenuate-acuminate, the base obtuse and clasping, white above, creamy-white beneath with the midrib green; spadix 1.3-3.6 cm long; on a stipe ca. 0.5(-1) cm long; perianth segments green, separate or sometimes conglutinate in age; pistil white, obpyramidal, apically truncate, only the nipple-like stigma exceeding the perianth; ovary 3-locular, the ovules affixed near the base of the locules, 2 in each of the 3 locules, totaling 6 ovules per ovary; fruiting spadix smooth; fruit angular-spheroid, apically truncate; seeds 1 or 2 per locule, ovoid, the surface verruculose, ridged and furrowed.

Type: the original description in Hogg's Gard. Yearbook [Int. Code Bot. Nomencl. (1956) Art. 10, note]. (The species is more adequately described and illustrated in Gard. Chron. II. 3: 524–525. f. 109. 1875.) Known only in cultivation.

CULT.: Hort. Bull, 21 Nov 1878, *N. E. Brown* (holotype of *S. candidum* N. E. Br.), and Hort. W. Bull, 20 Apr 1879 (K); Hort. Kew, ex Hort. Williams, 16 Aug 1878 teste N. E. Brown (K); Hort. W. Bull, 7 Mai 1881, *N. E. Brown* with Engler 229 (K); Engler 229 (BM, G-DEL, US); "ex herb. J. Bauman" (S); 29-3-1939 (L); "In pots Bot. Gard. Singapore," Sep 1918, *C. X. Furtado* (BO, NY); etc.

Though unable to verify its priority, I have accepted the description in Hogg's *Year-book* as the first valid publication of the epithet *patinii*, thus following Engler's treatment (*Pflanzenreich* 4^{23b}: 130, 131. 1908) and others since. Masters, in the same year, published a good illustration and description of this species, and stated that it had been introduced to Mr William's nursery from Colombia. Neither Hogg nor Masters made any mention of the other's publication.

The same species was described as new under the name *Anthurium candidum* by Mr W. Bull also in 1875. He attributed its introduction from Colombia to his own collector, Mr. Shuttleworth. Unfortunately, no specimen collected in Colombia by either Patin or Shuttleworth appears to have been preserved, and research has not revealed the exact locality where they first collected the species. André (Ill. Hortie. 27: 135, 136. 1880) wrote that *S. patinii* was discovered in the province of Antioquia (New Granada) and was sent to Europe through the efforts of M. Patin in 1874.

A specimen preserved at Kew was taken "from the type plant" (fide N. E. Brown) at Hort. Williams. This specimen agrees perfectly with a much cultivated plant in American collections today. However, I have been unable to refer to this species any specimens collected from the wild, and thus the application of the name is here restricted to the material in cultivation which closely matches the initial description. Though suggestive of other Andean species, *S. patinii* is a distinct taxon. That this is a naturally occurring species is corroborated by a note accompanying Bull's description of *Anthurium candidum*. Bull's *Catalogue* (3. 1875), states that the plant was introduced to Mr. Bull by one "Mr. Shuttleworth, from the United States of Colombia" who described "the difficulties under which this remarkable plant was obtained, the climbing of a steep rock, owing to the rarified atmosphere being almost beyond his physical powers." One may conclude that *S. patinii* is a species of rugged, mountainous terrain. If so, the absence of collections from the wild is not surprising, in view of the near-total lack of modern collections of *Spathiphyllum* from Andean Colombia.

In 1878, N. E. Brown (Gard. Chron. II. 10: 783) took up the name *S. candidum* for a plant which varied but slightly from the typical *S. patinii*. I have followed Engler and others in reducing *S. candidum* to synonymy under this species.

The leaf-blade of *S. patinii* is wider and has more spreading primary lateral veins than *S. quindiense*. The close relationship of *S. patinii* to *S. tenerum* is clear, but the latter has wide-spreading primary lateral veins, its leaf-blade is proportionally broader, and the base of the blade is less acute or even obtuse.

18. *S. sipapoanum* Bunting, sp. nov. Figure 5.

Foliorum lamina anguste elliptico-oblonga, 16–17.5 cm longa et 2–2.3 cm lata, ad apicem acuminata, ad basim acuta, venis primariis 4–5-jugatis angulo ca. 25°; petiolus 10.5–12 cm longus, ad $\frac{2}{3}$ vaginatus; geniculum 0.9–1.5 cm

longum. Pedunculus quam petiolus ca. 2-plo longior, 21 cm longus; spatha lanceolata, 6.8–7.2 cm longa et ca. 1.8 cm lata, apice attenuato, basi acuto; spadix ca. 2 cm longus, stipite ca. 1.2 cm longo; flores 2-meri; perianthii segmenta separata; pistillum cylindrico-obpyramidale, quadrangulare, apice subtruncato, stigmatelato perianthium superanti, poro stigmatico oblongo; ovarium 2-loculare, loculis 2-ovulatis, 4 in toto ovario; spadix fructiferus levis; fructus cuboideus, breviter rostellatus; semina 4, ovoidea ad commaticiformia in faciei obliqua, superficie foveolato.

Type collection: *B. Maguire & L. Politi 28751b*, "streamside, mixed montane forest at 600 m alt., Intermediate Camp, Cerro Sipapo (Paraque)"; Terr. Amazonas, Venezuela. 2 Feb 1949 (holotype NY). Ulicate. Known only from the type collection.

The original collection consists of two plants found mixed among specimens of *S. cannaefolium* (*Maguire 28751*) collected on the slopes of Cerro Sipapo, Venezuela. *S. sipapoanum* shows a close relationship to *S. schomburgkii*, but differs in its proportionally narrower, oblong leaf-blade, long-attenuate spathe, longer stipe, and bilocular ovary with two ovules per locule. The greater number of ovules per locule in *S. neblinae* separates it from *S. sipapoanum*.

19. *S. tenerum* Engl. Bot. Jahrb. **37**: 120. 1905. Figure 6.

Leaf-blade somewhat oblique, oblong-lanceolate, 16–18 cm long and 4–5 cm wide, the apex acuminate-cuspidate, the base commonly obtuse, with ca. 7 or 8 pairs of primary lateral veins arising at an angle of 60–65°; petiole slender, 20–26 cm long, prominently alate in the lower three-fourths; geniculum 0.4–0.6 cm long. Peduncle slender, 31–39 cm long; spathe oblong to oblong-lanceolate, 5.3–8.3 cm long and 1.5–2 cm wide, the apex attenuate to subcaudate, the base obtuse, greenish-white (fide Ule); spadix 2.6–5 cm long, on a stipe 0.3–0.8 cm long; perianth of separate segments; pistil obpyramidal, very angular, apically truncate, the nipple-like stigma shortly exceeding the perianth; ovary 3-locular, the ovules affixed near the base of each locule, 2(–1) in each of the 3 locules, totaling 6–4 ovules per ovary; fruiting spadix smooth; fruit broadly obovoid, apically truncate; seeds 5–3, broadly comma-shaped in profile, the surface vertically furrowed and foveolate between the verruculose ridges.

Type collection: *E. Ule 6851*, "Bodenpfl., Bl. grünlich weiss, Cerro de Ponasa, 1200 m," Loreto, Peru, Feb 1903 (holotype B, isotypes G-DEL, MG).

Distribution: Along streams in Loreto, Peru.

PERU: Loreto: Pongo de Cainarachi, Sep 1902, *Ule 6851b* (L).

The leaf-blade of *S. tenerum* is proportionally rather wide as compared to that of closely related species, and the primary lateral veins are quite wide-spreading, surpassed only by those of *S. patulinervum*. The exceptionally long and slender peduncles of *S. tenerum* are very characteristic. Close relationship exists between *S. tenerum* and *S. patinii*, but the base of the leaf-blade is broader in this species than in *S. patinii*.

20. *S. minor* Bunting, sp. nov. Figure 6.

Foliorum lamina obliqua, elliptico-lanceolata, 11–13.5 cm longa et 3 cm lata, ad apicem acuminata, ad basim cuneata vel acuta, veins primariis ca. 6-jugatis angulo ca. 45° divergentibus; petiolus ad 9.5 cm longus, alatus prope ad geniculum; geniculum 0.3–0.5 cm longum. Pedunculus quam petiolus 2-plo longior, ad 18 cm longus; spatha oblonga, 4–4.7 cm longa et 0.9–1 cm lata, apice acuminato, basi acuto et plus minusve complexa; spadix 1.7–2.5 cm longus, stipite

ca. 0.8 cm longo; perianthii segmenta separata; pistillum obpyramidale, apice truncato, stigmatе papilliformi perianthium superanti; ovarium 3-loculare, loculis uniovulatis ovulo solitari prope basim loculi cuique affixo; fructus ignotus.

Type collection: *E. P. Killip & A. C. Smith 26153*, "Dept. Junín, Pichis Trail, Santa Rosa, alt. 625-900 meters; dense forest," Peru; 6, 7 Jul 1929 (holotype US, isotype NY). Known only from the type collection, which was originally referred to the genus *Stenospermantium* by Krause; it is clearly a *Spathiphyllum*.

While represented by a single collection of two plants, *S. minor* is distinctive and is described as new without reservation. It is low in stature, and has proportionally rather broad leaves as compared to the other species whose locules are uniovulate (*S. gracilis* and *S. patulinervum*). *S. minor* shows a strong relationship to the species of the sandstone areas of Guayana, especially to *S. neblinae*, but differs in the uniovulate condition of its locules.

21. *S. gracilis* Bunting, sp. nov. Figure 6

Foliorum lamina obliqua, anguste oblongo-elliptica, 18–21 cm longa et 2.8–3.3 cm lata, ad apicem attenuata, ad basim acuta, ad marginem leviter undulata, venis primariis ca. 7–8-jugatis angulo ca. 30–40° divergentibus; petiolus gracilis, 26–32 cm longus, ad dimidium vaginatus; geniculum 0.6–0.8 cm longum. Pedunculus 29–34 cm longus; spatha ± lanceolata, 8–11 cm longa et 1.3–1.6 cm lata, apice attenuato, basi acuto vel attenuato et breviter ansato; spadix ad 2.7 cm longus, stipite ca. 1 cm longo, latitudine duos flores aequans; flores bimeri, perianthii segmenta separata; pistillum cylindrico-obpyramidale, apice subtruncato vel obtuso-subconico, stigmatе elato; ovarium 2-loculare, loculis uniovulatis, ovula solitaria oblonga in septo centrali prope basim locularem affixis; fructus ignotus.

Type collection: *G. Tessmann 4837*, "Ost-Peru: Stromgebiet des Marañon am Pongo de Manseriche, ca. 77°30' West." 1924 (holotype G-DEL, isotype NY). Known only from the type collection. The typewritten label on the isotype sheet states "Puerto Melendez, below Pongo de Manseriche" as the collection locality.

S. gracilis is closely allied to *S. patulinervum*, but differs in (1) the narrower angle at which the primary lateral veins arise, and (2) the acute-cuneate base of the leaf-blade. The base of the blade of *S. patulinervum* is nearly obtuse and the margins are curved.

22. *S. patulinervum* Bunting, sp. nov. Figure 6.

Foliorum lamina obliqua, anguste oblongo-lanceolata, supra laete viridis, infra pallidior, 16.5–18.5 cm longa et 2.4–3.2 cm lata, ad apicem attenuato-acuminata, ad basim acuta, venis primariis 8–9-jugatis angulo 75–80° divergentibus; petiolus gracilis, 24–29 cm longus, ad $\frac{2}{3}$ vaginatus; geniculum 0.6–0.8 cm longum. Pedunculus 31–33 cm longus; spatha lanceolata, 6.5–6.8 cm longa et 1.6 cm lata, apice longe-acuminato ad subcaudatum [1.5–2.5 cm longo], basi obliquo-acuto, albo, in aetate viridescenti; spadix laete viridis, 2.1 cm longus, stipite 4 mm longo; flores 2-meri, perianthii segmenta separata; pistillum plus minusve obpyramidale, apice truncato, stigmatе papilliformi perianthium superanti; ovarium 2-loculare, loculis uniovulatis, ovula solitaria in septo centrali prope basim locularem affixis; spadix fructiferus ± tuberculatus; fructus obovoideo-sphaeroideus, ca. 3.5 mm longus, apice subtruncato, breviter rostellatus; semina 1 vel 2, reniformi-orbicularia in faciei obliqua, superficie plus minusve levi.

Type collection: *W. H. Camp E-1069*, "common on banks; lvs. bright green above, paler below; spadix bright green, spathe clear white, sometimes with green in center or along margins, and tip green, becoming pale green with age;

benches and slopes western side of Cutucu; 2000–2500 ft; Prov. Santiago-Zamora (“Oriente”); Cordillera Cutucu. ca. 2°40’S, 78°W,” Ecuador; 17 Nov–5 Dec 1944 (holotype NY). Uuncate. Known only from the type collection.

The narrow leaf-blade of *S. patulinervum*, with its primary lateral veins arising nearly perpendicularly to the midrib, is so characteristic that this species is described on the basis of the single unicate collection. The bimerous flowers and uniovulate locules of the ovary represent the ultimate reduction in this genus. It is closely allied to *S. gracilis*, which has the primary lateral veins arising at a strict angle to the midrib. Except the widespread *S. cannaefolium*, *S. patulinervum* is the only species of *Spathiphyllum* known from Ecuador.

Section 3. *Spathiphyllum* sect. *Dysspathiphyllum* Engl. Pflanzenreich. 4^{23B}: 120. 1908. Figure 2K

Spathe flattened and reflexed, non-decurrent upon the peduncle; perianth membranous, of separate segments; pistil elongate, \pm oblong in profile and conspicuously exceeding the perianth, the apex short-conic or blunt, terminated by a brush-like stigma. Plants 4 dm or more tall.

Type species: *Spathiphyllum huberi* Engl. Bot. Jahrb. 37: 120. 1905. (*S. humboldtii* Schott.)

Distribution: Amazonian Peru, Venezuela, and Brazil; coastal French Guiana and Suriname.

23. *S. humboldtii* Schott, Aroid. 1: 2. 1853. Figures 2K, 4.

Spathiphyllum candolleanum Schott, Prodr. Syst. Aroid. 429. 1860.

Spathiphyllum glaziovii Engl. Vid. Meddel. 756. 1879–1880.

Spathiphyllum huberi Engl. Bot. Jahrb. 37: 120. 1905.

Leaf-blade oblique, lanceolate to oblong-lanceolate or elliptic, 20–44 cm long and 5.5–14.5 cm wide, 2.5–4 times as long as wide, the apex acute-acuminate, the base obtuse or acute, sometimes subrotund, the primary lateral veins many, arising at an angle of ca. 45–60°; petiole (20–)32–68 cm long, 1–1.5 times as long as the blade, alate in the basal half or more; geniculum 1–2.5(–3) cm long. Peduncle 36–77(–96) cm long, often twice as long as the blade or longer; spathe lanceolate or oblong-lanceolate (4.6–)8–19(–26) cm long and 2–5.5(–6.6) cm wide, the apex attenuate or acuminate, the base obtuse and slightly clasping or narrowed to a short handle; spadix (1.5–)4–11 cm long, on a stipe (0.5–)1–3.5 cm long; perianth of 4 or 5 segments, free at the apex, connate in the basal one-third; pistil elongate, \pm oblong in profile, the style prominently exceeding the perianth, the apex blunt or subconic, ending in an elevated brush-like stigma; ovary 2–3-locular, the ovules affixed near the base in each locule, varying from (5–)4 to 2(–1) in each of the locules and totaling 9–4 ovules per ovary; fruiting spadix rough; fruit elongate obovoid, blunt toward the apex and abruptly rostellate; seeds fewer than the ovules, comma-shaped in profile or irregularly compressed, the surface very verruculose and foveolate.

Type collection: *F. W. Hostmann 1154*, “Surinam” (lectotype K, isotypes BM, G-DEL, U). The holotype was deposited at Vienna, and probably burned. The Geneva sheet is labeled (perhaps erroneously) “Guyane Anglaise, 1843.” Hostman is not known to have collected in British Guiana (Index Herb. 2²: 287. 1957).

Distribution: Wet forests along the coast of Dutch and French Guiana, along the Amazon River in Pará, Brazil, and Loreto, Peru, and in southernmost Venezuela.

BRAZIL: woods south of I.A.N., Belém, Pará, Jan 1943, *Archer 8204* (US); *Glaziou 10126* (C, P) (type collection of *S. glaziovii* Engl.); Tepeirinha pr. Santarém, Iguapé, Dec 1938, *Markgraf 3865* (RB).

FRENCH GUIANA: Cayenne, *Leprieur 1839* (G-DEL); sur la Montagne en Mahuri dans l'île de Cayenne, *Poiteau s.n.* (L); Jul 1824, *Poiteau s.n.* (K); Maroni, île Portal 1858, *Sagot 769* (BM); Maroni-en-fort, Aug 1910, *Santini 7773* (L); "Cayenne, No. 12" (L) (type collection of *S. candolleanum* Schott); "Guyane, herbier de M. Berbier" (P).

PERU: Canchahuaya, Río Ucayali, Loreto, Oct 1898, *Huber 1403* (MG) (type collection of *S. huberi* Engl.).

SURINAM: fluv. Saramacca sup., Feb 1922, *Gonggrijp & Stahel* (Herb. Surin.) 5 (U); Coppename R., Onobissi Kreek, Mar 1915, Sur. For. Bur. (B.W.) 1133a (U).

VENEZUELA: iguarapé forest of upper Río Yaciba, Terr. Amazonas, Dec 1953, *Maguire, Wurdack, & Bunting 36689* (NY, US).

There is considerable variability in this species but the lack of discernible pattern makes such variation of no taxonomic significance. Some specimens referred to *S. humboldtii* have bimerous flowers mixed with trimerous ones on the same spadix. Engler apparently overlooked this feature in all specimens except *Huber 1403*, which he described as type of *S. huberi*. The flowers of *Hostmann 1154* are either bi- or trimerous in the same spadix, with four or five perianth segments and a bi- or trilocular ovary. Notable variation also occurs in the form of the base of the leaf-blade, which may be obtuse, rounded, or even acute.

Engler and Krause (*Pflanzenreich* 4^{23B}: 120. 1908) separated *S. candolleanum* from *S. humboldtii* by its smaller size, ovary shape, and number of ovules per locule. *S. glaziovii* was set apart in that publication by the slightly different shape of its leaf-blade and spathe, shorter petiole, and fewer ovules per locule. There are few differences other than size and mery between Engler's descriptions of *S. huberi* and *S. humboldtii*. I cannot find justification for maintaining these as separate species, since their differences seem to fall within the expected natural variation of a widespread species, in this case exemplified by the differences between specimens of the type collection of *S. humboldtii*.

Jonker and Jonker (*Fl. Suriname* 1: 28–30. 1953) recognized both *S. humboldtii* and *S. huberi*, separating them by the number of locules per ovary, and ovules per locule, as Engler had done. I cannot maintain *S. huberi* on these grounds. Though Jonker and Jonker incorrectly considered the locality of *Huber 1403* to be in Pará rather than Peru, their treatment¹² lends credence to the possible conspecificity of the material collected in Peru and Suriname, and suggests that *S. humboldtii* might be widespread in the Amazon basin.

The single Venezuelan collection identified as *S. humboldtii* varies most from the other material referred here, but it may simply represent a point in the constant variance of this widespread species. Subsequent collections from the Amazon drainage may prove it to represent an unknown species.

S. humboldtii can be separated from all other species by its non-decurrent spathe, long-stiped spadix, and elongate pistil with the style very prominently exerted beyond the perianth.

Section 4. *Spathiphyllum* sect. *Spathiphyllum*.

Massowia subg. *Samowia* K. Koch, *Bonplandia* 4: 11. 1856.

Spathiphyllum sect. *Euspathiphyllum* Engl. in DC. *Monogr. Phan.* 3: 220. 1879.

¹²Jonker and Jonker considered two Suriname collections to be conspecific with *Huber 1403* (type of *S. huberi*).

Spathe erect, cucullate, conspicuously decurrent on the peduncle; segments of the perianth membranous, separate, or conglutinate or connate toward the base; pistil typically much exceeding the perianth, apically conic to attenuate. Plants mostly 5 dm or more tall.

Type species: *Spathiphyllum lanceaefolium* (Jacq.) Schott, Melet. Bot. 22. 1832 (which is also the generic type).

Distribution: Mexico, Central America, coastal Venezuela and Colombia.

24. *S. friedrichsthali* Schott, Aroid. 1: 2. pl. 4. 1853. Figure 7.

Spathiphyllum fendleri Schott, Oesterr. Bot. Wochenbl. 7: 159. 1857.

Spathiphyllum friedrichsthali var. *brevifolium* Engl. Bot. Jahrb. 6: 280. 1885.

Leaf-blade oblique, typically narrowly elliptic to oblanceolate, varying to broadly elliptic, widest at or just above the middle, 25–48(–70) cm long and 8–17(–22) cm wide, the apex acuminate-cuspidate, the base cuneate or acute, the primary lateral veins many, arising at an angle of 60–75°; petiole equaling or to 1.5 times as long as the blade, 24–50(–87) cm long, prominently winged nearly or quite to the geniculum; geniculum (1.2–)1.7–2.7 cm long. Peduncle mostly 2–3 times as long as the blade, 50–90(–127) cm long; spathe strongly naviculate, broadly oblanceolate to elliptic, 12–14(–33) cm long and (3.5–)4.5–8(–9.2) cm wide, typically broadest above the middle, the apex long-acuminate-cuspidate [1.5–4 cm long], the base cuneate and decurrent on the peduncle 2.5–4.5(–6) cm; spadix 3–7(–9.8) cm long, stout, densely flowered, sessile or on a stipe to 0.5(–1.0) cm long; perianth of separate segments; pistil greatly exceeding the perianth, the style subcylindric, fluted, apically blunt, the stigmatic area prominent; ovary (2–)3-locular, the ovules superposed, varying from 8 to 5(–3) in each of the 3 locules, totaling 24–15(–12) ovules per ovary; fruiting spadix roughened by the persistent styles; fruit obovoid, rostrate; seeds as many as the ovules or fewer, oblique-reniform to oblong in profile, the surface commonly smooth or occasionally verruculose between the vertical rows of foveola.

Type collection: C. W. Dodge & V. F. Goerger 9414, "in Gynaerium sagittatum thickets along Río Reventazón below farmhouse, Finca Castilla," 30 m, prov. Limón, Costa Rica, 27 Jul 1936 (neotype F, duplicate MO). The holotype, *Friedrichsthal s.n.*, deposited at Vienna, was probably burned. No duplicates of this collection have been found.

Distribution: Caribbean coastal forests of Nicaragua, Costa Rica, and Panama, along the shores of Barro Colorado Island in Gatún Lake, along the coast of the Gulf of Urabá, Colombia, and southward along the Pacific slope of Colombia to the Patía Valley (Nariño).

COSTA RICA: Hacienda de Boston, United Fruit Co. 291 (US). Alajuela: vic. of Los Chiles, along Río Frio (11°02' N, 84°44' W), Aug 1949, *Holm & Iltis* 795 (F, G-DEL, NY, U). Limón: near farmhouse at Finca Castilla, along Río Reventazón, Jul 1936, *Dodge & Goerger* 9499 (MO); Sigüirres, Feb 1932, *Kupper* 581 (M); bosque de Suerre y Dos Bocas, drenajes de los Ríos Parismina y Reventazón, Oct 1951, *Shank & Molina R.* 4173 (US); Hamburg Finca, on the Río Reventazón below Cairo, Feb 1926, *Standley & Valerio* 48861 (US); Finca Monte-risto, on the Río Reventazón below Cairo, Feb 1926, *Standley & Valerio* 49023 (US).

NICARAGUA: vic. of El Recreo, dept. Bluefields, Apr 1947, *Long* 47 (F); area de la Bahía de Bluefields, Río Escondido, dept. Zelaya, breñas a lo largo del Río Yanten, Apr 1949, *Molina R.* 2083 (F); guamil de la región de Toumarin a lo largo del Río Grande, Apr 1949, *Molina R.* 2412 (F); Castillo El Viejo, *Shimek & Smith* 420 (NY); am Strands bei Laguna in Bluefields, Mosquito, Mai 1855, *Wullschlaegel* 1766 (BR).

PANAMA: *Moore* 13 (F, US); *Seeman s.n.* (BM). Bocas del Toro: Water Valley, Sep 1940, *von Wedel* 820 (MO); vic. of Chiriquí Lagoon, Water Valley, Oct 1940, *von Wedel* 1360 (F, G, MO); vic. of Chiriquí Lagoon, Water Valley, Nov 1940, *von Wedel* 1506 (F, G, MO); vic. of Chiriquí Lagoon, Big Bight, Isla Colón, Nov 1941, *von Wedel* 2979 (F, MO);

Río Cricamola, between Finca St. Louis and Konkintoe, Aug 1938, *Woodson, Allen, & Seibert 1912* (F, G, MO).

CANAL ZONE: Mojinga Swamp near mouth of Río Chagres, Mar 1935, *Allen 855* (F), *861* (B, G-DEL, MO, NY, S, U, US); between Mt. Hope and Santa Rita Trail, Feb 1905, *Cowell 54* (NY); "Chagres," mouth of Río Chagres, Mar 1850, *Fendler 426* (K, MO) (type collection of *S. fendleri* Schott); Oct 1859, *Hayes 82* (G); Gatún Station, Panama R.R., Oct 1859, *Hayes 96* (NY); swampy places along Panama R.R., Gatún, Feb 1860, *Hayes 533* (NY); in swamps along the Panama R.R., Nov 1859, *Hayes 539* (NY); along edge of Río Indio de Gatún, Feb 1911, *Maxon 4821* (F, US); Gatún, Jan 1858, Fasc. 1, *Wagner 591* (#275 on tag on petiole) (M). Barro Colorado Island, C.Z.: 1931, *Aviles 48* (F); Jun 1931, *Bailey & Bailey 271* (BH); shore, P.N. 11, end of island, Sep 1929, *Bangham 567* (F, G); Aug 1928, *Chickering 35* (MICH); lake shore, Aug 1927, *Kenoyer 195* (US); along shore of Gatún Lake, e of laboratories, Nov 1948, *Killip 40037* (UC, US); Miller rear light, Dec 1931, *Shattuck 581* (F); shore near lighthouses, Feb 1932, *Woodworth & Vestal 656* (F, G); Nov 1938, *Zetek Z-4320* (F). Colón: vic. of Palenque, Aug 1911, *Pittier 4122* (US).

COLOMBIA: vic. of Villa Arteaga, Aug 1948, *Brahe, Araque M., & Barkley 18C701* (COL, UC, US). Antioquia: Estación "Camilo e. Restrepo," Apr 1955, *Daniel 4947* (NY); near Guapá, 53 km s of Turbo, Apr 1945, *Haught 4598* (COL, US); Urabá, entre Mutatá y Pavarandocito, Jan 1950, *Uribe U. 2038* (COL). Cauca: Noanamito, Río Micay, Feb 1943, *Cuatrecasas 14217* (US). Chocó: cerca al Río Atrato, en los alrededores de Quibdó, Jan 1949, *Araque M. & Barkley 19Ch049* (COL, US); Quibdó, Río Atrato, Apr-Mai 1931, *Archer 1796* (US); trocha de Utría al Valle, Jun 1950, *Fernandez 273* (COL, US); Andagoya, Apr 1939, *Killip 35076* (COL, S, US); Corcovada region, upper Río San Juan, ridge along Yeraquí Valley, Apr 1939, *Killip 35275* (COL, F, US); Río Truandó, 1858, *Schott 3* (NY); *Triana s.n.* (label partially burned) (BM). Nariño: Isla de Gallos, Pacifico, Feb 1942, *Dryander 2589* (US); Rives du Río Mira, Oct 1899, *Langlassé 2* (G, K, US); Patía Valley, *Lehmann K.375* (F, K); Pasto, *Lehmann R.1* (K). El Valle (Valle del Cauca): Río Yurumanguí, Jan-Feb 1944, *Cuatrecasas 15969* (US); Río Calima, La Trojita, Feb-Mar 1944, *Cuatrecasas 16366* (US); Córdoba, Dagua Valley, Mai 1922, *Killip 5034* (G, NY, US); Córdoba, Feb 1939, *Killip & Garcia 33397* (COL, F, G, MO, S, US); Sabaletas, km 29 of highway from Buenaventura to Cali, stream bed, Río Sabaletas, Jun 1944, *Killip & Cuatrecasas 38859* (COL, F, US); Río Dagua, Buenaventura litoral, Jan-Mai, *Lehmann 5361* (F, K, L, NY).

Vernacular names: Colombia: "niño en la cuna" (Choco); "cansitta garza" (Isla de Gallos).

This species is well marked by the large number of ovules per locule, and the large spathe and proportionally short, stout spadix. It is widely distributed and is often collected.

With the original description of *S. friedrichsthali* was the note: "Habit. Guatemala. (Friedrichsthal. Herb. Caes. Vindob.)." It appears that some error occurred in labeling the collections of Friedrichsthal, for detailed studies indicate that this species does not extend as far north as Guatemala, but reaches its northern limit in southern Nicaragua. This error of labeling is corroborated by Ørsted (Jour. Bot. Hooker. **5**: 46. 1853): "The Austrian botanist Friedrichsthal performed journeys through a great part of Nicaragua and Costa Rica in 1839, and appears to have made great collections of plants." Some years later, Hemsley (in Godman & Salvin, Biol. Centr. Am. **4**: 128. 1887) wrote: "In 1839 Emanuel Friedrichsthal 'performed journeys through a great part of Nicaragua and Costa Rica'; yet all the plants of his collecting in the Kew Herbarium are labeled Guatemala. We believe the first set of his collections is at Vienna."

S. friedrichsthali has been confused by many authors. Standley (Ann. Missouri Bot. Gard. **31**: 35. 1944) treated this species, but I do not agree with his remarks (discussed here under *S. phryniifolium*). Matuda (Anal. Inst. Biol. México **25**: 126. 1954) attributed it to the flora of Chiapas (Mexico); specimens cited by him represent *S. matudae*. As an example of *S. friedrichsthali*, Matuda presented a photograph of *Standley 5007*. It is a specimen collected near Lance-

tilla, Honduras, which I refer to *S. blandum*, though indeed it is aberrant for that species.

In synonymy under this species Engler listed *S. lanceolatum* C. Koch and *Massowia lanceolata* C. Koch. The present study indicates that these names are synonyms of *S. cochlearispathum* (which see).

Engler described var. *brevifolium* of *S. friedrichsthali* based upon a collection from southwestern Colombia (*Lehmann 2751*, deposited at Berlin, and presumably destroyed). Study of the relatively small amount of material available from this large region, while more than Engler had for examination, offers little justification for a named variety.

25. *S. cochlearispathum* (Liebm.) Engl. in DC. Monogr. Phan. 2: 221. 1879. Figure 8.

Hydnostachyon cochlearispathum Liebm. Vid. Meddel. 1-2: 24. 1849-50.

Hydnostachyon longirostre Liebm. Vid. Meddel. 1-2: 24. 1849-50.

Spathiphyllum liebmanni Schott, Aroid. 1: 2. 1853.

Spathiphyllum heliconiaefolium Schott, Aroid. 1: 2. pl. 5, 6. 1853.

Spathiphyllum longirostre (Liebm.) Schott, Aroid. 1: 2. 1853.

Massowia lanceolata C. Koch, Bonplandia 4: 12. 1856.

Spathiphyllum lanceolatum C. Koch, Berl. Allg. Gart. 25: 174. 1857.

Spathiphyllum cochlearispathum (Liebm.) Engl. var. *longirostre* (Liebm.) Engl. in DC. Monogr. Phan. 2: 221. 1879.

Spathiphyllum lacustre Lund. Contr. Univ. Mich. Herb. 6: 4. 1941.

Leaf-blade oblong or oblong-lanceolate to narrowly elliptic, widest at or just below the middle, 45-65(-80) cm long and 15-23(-28) cm wide, the apex acuminate or cuspidate, the base subrotund or rarely obtuse or subcordate; primary lateral veins many, arising at an angle of 60-75°; petiole 40-80(-104) cm long, prominently alate nearly or quite to the geniculum, the wings finely mottled with white and often crinkled-cripsed along the margins (as are the cataphylls); the geniculum 3-5 cm long. Peduncle 50-90(-139) cm long; spathe cucullate, oblanceolate or elliptic, 18-33 cm long and 6-10 cm wide, the apex acuminate, the base subcuneate or attenuate and decurrent on the peduncle 3.5-7(-9.5) cm; spadix 5.5-11.5 cm long, sessile or on a stipe to 1(-1.8) cm long; perianth of separate segments; pistil attenuate-conic, ca. twice as long as the perianth (in flower); ovary 3-locular, the ovules superposed, varying from (6-)5-2 in each of the 3 locules, totaling 16-6 ovules per ovary; fruit obovoid, rostrate, ca. 1 cm long [the beaked portion ca. 3-4 mm]; seeds ca. as many as the ovules, irregularly oblique-ovoid to oblong in profile, ca. 4 mm long, the surface smooth and shiny between the vertical rows of foveola.

Type collection: *F. M. Liebmann s.n.* (here designated by me *M41A*), "in sylvis umbrosis circa Mirador," Veracruz, Mexico, Nov 1841 (lectotype C, isotype [designated by me *M41B*] C). I cannot accept as duplicates of the lectotype the two sheets of *Leibmann s.n.* (designated by me *M41C* and *M41D*).

Distribution: Rainforests of the Caribbean coast of Mexico, in Veracruz, eastern Oaxaca and Chiapas, Tabasco, and at cenotes in Yucatán.

MEXICO: Veracruz: Chiquihuite prés Potrero, Mar 1866, *Bourgeau 2215* (K); Vallée de Córdoba, Omealco, Oct 1866, *Bourgeau 3261* (G-BOIS, P); *Karwinski s.n.* (specimens tagged no. "273" & "274") (M); Atoyac, Dec 1882, *Kerber 7B* (US); circa Colipa, *Liebmann s.n.*, designated *C41E* (C) (type collection of *Hydnostachyon longirostre* Liebm.); circa Mirador, Nov 1841, *Liebmann s.n.*, designated *M41C* & *M41D* (C); "Zacuapam" (probably intended as Axocuapam), Jul 1926, *Purpus 10781* (US); El Mirador, Apr 1935, *Purpus 16445* (F). Oaxaca: Tepinapa to Jocotepec, Mar 1919, *Reko 4092* (US). Chiapas: Ocozocoantla, 5 hrs. horseback trip n from El Refugio to Rancho Aguajito, Mai 1949, *Carlson 2126* (F).

Tabasco: lakeside at Ojo de Agua near Balancán, Mai 1939, *Matuda 3136* (F, GH, MICH) (type collection of *Spathiphyllum lacustre* Lund.). Yucatán: cenote at San José, Chichén Itzá, Jun 1932, *Steere 1592* (MICH).

CULT.: In large pot, Hotel Francia, Oaxaca de Juárez, Mexico, Mar 1940, *Bailey 552* (BH); Hort. M. Devansaye, Jan 1879 (K); *Engler 17* (B, C, G-BOIS, G-DEL, GH, L, P, US); Fragment and outline of type specimen of *S. lanceolatum* C. Koch, *Brown s.n.* (K); etc.

Vernacular names: Veracruz: "chil de gatos"; Oaxaca: "hoja de piedra."

This is the northernmost species of the genus, extending nearly to 20° N. latitude in Veracruz, Mexico. Some of the material referred here is more or less anomalous, but the species is poorly collected and imperfectly understood.

S. cochlearispathum was initially described in *Hydnostachyon*. That genus was differentiated from *Spathiphyllum* by a unilocular ovary. The ovary, however, is clearly trilocular in all specimens originally assigned to *Hydnostachyon*, and Schott correctly referred them to his earlier-described genus *Spathiphyllum* in 1853.

Engler (Monogr. Phan. 2: 221. 1879) placed *S. longirostre* as a variety of *S. cochlearispathum*, which treatment he retained in 1908 (Pflanzenreich 4^{23B}: 122). I cannot justify the recognition of var. *longirostre*. The type specimen of *S. cochlearispathum* and of *S. longirostre* are so similar that they are here treated as conspecific.

Matuda (Anal. Inst. Biol. México 25: 124. 1954) accepted *S. lacustre* Lund., based upon a single collection (*Matuda 3136*) from Tabasco. To maintain it apart from *S. cochlearispathum* seems unwarranted, since the type specimen of *S. cochlearispathum* and of *S. longirostre* possess the characteristics stated by Matuda for separating them from *S. lacustre*. All have five to three ovules per locule and the geniculum varies from three to five centimeters in length.

A Karwinski specimen (M) from Mexico (locality unknown) is annotated "Spathiphyllum longirostre Schott, ipse." It is very different from the holotype of *S. longirostre*. If conspecific, these elements must represent the extremes of variation in the species. Though cited here, the Karwinski collection was not considered in preparation of the description of *S. cochlearispathum*. It resembles most nearly *Matuda 3136* from Tabasco, and is similar to two Liebmann specimens [s.n., designated by me *M41C* and *M41D* (C)] from Mirador, Veracruz.

The most interesting, and perhaps most nearly distinct form referred here is a collection from a "cenote" at Chichén Itzá, Yucatán (*Steere 1592*), with a proportionally wider leaf-blade, a longer petiole and shorter peduncle, and a spathe more shortly decurrent on the peduncle than is typical. When material is available from other "cenotes" in that region, a clearly defined taxon may become apparent and deserve recognition.

It appears that *S. lanceolatum* C. Koch is synonymous with *S. cochlearispathum* rather than with *S. friedrichsthalii* as treated by Engler. This may never be satisfactorily resolved because the holotype of *S. lanceolatum* was probably burned at Berlin. However, a Kew sheet prepared by N. E. Brown (12 Jul 1878) consists of a drawing (an "outline of the type specimen! in Herb. C. Koch!") and a fragment ("a few ovaries from C. Koch's type!"). The "ovaries" contain fifteen or sixteen ovules, and the dimensions of the outline of the leaf-blade and spathe agree with those of this species rather than of *S. friedrichsthalii*.

Material of *Engler 173*, distributed under the incorrect identification of *S. lanceolatum* C. Koch, does not belong here (see under *S. kochii*).

26. *S. matudae* Bunting, sp. nov. Figure 8.

Foliorum lamina obliqua, e lanceolata ad elliptico-lanceolatam vel aliquando

subovatam, sicca supra valde fusca, infra pallidior, 36–48(–60) cm longa et 13–23 cm lata, ad marginem undulata, ad apicem e acuto-acuminata ad deltoideam (foliorum latiorum), ad basim obtuso-subrotundata, venis primariis multis angulo 60–70° divergentibus; petiolus laminam longitudine subaequans, 35–50(–60) cm longus, ad $\frac{2}{3}$ vaginatus, vagina ad apicem conspicue auriculata; geniculum 2.5–4.5(–5.5) cm longum. Pedunculus quam lamina 1.5–2-plo longior, 50–70(–105) cm longus; spatha cucullata, elliptica vel oblongo-elliptica, 15–27 cm longa et 5–8(–10) cm lata, apice attenuato-acuminato [acumine ad 5 cm longum], basi acuto et in pedunculo 2.5–5.5(–9) cm decurrenti; spadix 4.5–9.5(–11.5) cm longus, stipite 0.6–2(–2.5) cm longo; perianthii segmenta separata; pistillum leviter constrictum inter ovarium et (plus minusve inflatum) stylum, apicem versus attenuatum et exsertum; ovarium (2–)3-loculare, loculis 5–2-ovulatis, ovulis plerumque superpositis, 13–7 in toto ovario; spadix fructiferus tuberculatus; fructus obovoideus vel ellipsoideus, breviter ad longe rostratus; semina ovula numero aequantia, ex obliquo-ovoidea ad plus minusve oblonga in faciei obliqua, inter foveolarum ordines verticales superficie levi.

Type collection: *E. Matuda 17645*, “Cacaluta, Escuintla,” Chiapas, Mexico, 29 Mar 1948 (holotype NY, isotype F).

Distribution: Pacific slope of southernmost Mexico, Guatemala and adjacent El Salvador.

MEXICO: Chiapas: Esperanza, Escuintla, Mai 1947, *Matuda 16561* (F); Esperanza, Escuintla, Sep 1947, *Matuda 17013* (F, NY); Islamapa, Huehuetán, Jun 1948, *Matuda 18022* (F); Escuintla, Mai 1938, *Matuda 2742* (MICH).

GUATEMALA: Amatitlán: Barranca de Eminencia, Feb 1892, *J. D. Smith 2790* (US). Escuintla: Escuintla, Mar 1890, *J. D. Smith 2241* (US); plain near Río Sinacapa, se of Escuintla, Mar 1941, *Standley 89241* (F); along Río Guacalate, nw of Escuintla, Mar 1941, *Standley 89292* (F); barranco of Río Burrión, ne of Escuintla, Mar 1941, *Standley 89602*. Quezaltenango: Finca San José Buena Vista, Colomba, *Lewis s.n.* (F); Las Nubes, Volcán de Zunil, Feb 1874, *Salvin s.n.* (K); Finca Pirineos, below Sta. María de Jesús, Mar 1939, *Standley 68204* (F), *68231* (F); along old road between Finca Pirineos and Patzulín, Feb 1941, *Standley 86896* (F), *86905* (F); *86966* (F); Finca Pirineos, lower S-facing slopes of Volcán Sta. María, between Sta. María de Jesús and Calahuachi, Dec 1939, *Steyermark 33202* (F). San Marcos: above Finca El Porvenir, up Loma Bandera Shac, lower S-facing slopes of Volcán Tajumulco, Mar 1940, *Steyermark 37352* (F). Santa Rosa: Río La Plata, Jan 1893, *Heyde & Lux 4655* (US); hills e of Cuilapa along stream supplying the city water, Nov 1940, *Standley 78162* (F); region of Platanares, between Taxisco and Guazacapán, Dec 1940, *Standley 79067* (F), *79070* (F). Suchitépéquez: near Santiago farm, vicinity of Tiquisate, Jun 1942, *Standley 47636* (F); near Pueblo Nuevo, Mar 1939, *Standley 66857* (F).

EL SALVADOR: Ahuachapán: Sierra de Apaneca, in the region of Finca Colima, Jan 1922, *Standley 20166* (GH, US).

Vernacular names: Mexico: “bushna.” Guatemala: “gusnay,” “bushnay,” “huisnay,” “güisnay.” El Salvador: “huisnay.”

The previously unrecognized species *S. matudae* is distributed along the Pacific slope from southernmost Mexico to El Salvador. The long-attenuate pistil of the Chiapas and westernmost Guatemalan material is similar to that in the El Salvador collections. In Guatemala, however, the style exhibits various forms from attenuate to rostellate, and certain specimens (e.g., *J. D. Smith 2241*, *2790*) show a relation to *S. brevirostre*, especially in the form of the style.

The type collection of *S. matudae* was selected from the Chiapas material, and the species was named to honor its collector, Eizi Matuda.

Distinctive features of *S. matudae* are the broadly obtuse base of the leaf-blade, the relatively long geniculum, and the constriction of the pistil between the ovary and the style. The leaf-blade is widest below the middle, and is typically

twice to three times as long as wide, thus differing from those of *S. cochlearispathum*, which are more or less oblong, widest at the middle, and proportionally narrower than the blades of *S. matudae*.

This species has the common name "huisnay" (or some variation of it) throughout its range. Collectors report that the natives eat the spadices either cooked with eggs, or cooked and pickled in vinegar. In the narrative of his travels, Preuss (Exped. Zentr. Süd. 123: 1901) noted this practice. Preuss' specimen, cited by Engler as *S. ortgiesii*, appears to be no longer extant. It was collected at San Andres-Osuna, northwest of the city of Escuintla, Guatemala. Undoubtedly, his specimen was conspecific with *S. matudae* rather than with *S. ortgiesii*. Engler and Krause (Pflanzenreich 4^{23B}: 122. 1908) cited *J. D. Smith 4625* (Santa Rosa, Guatemala) as *S. friedrichsthali*. I have not seen it, but its locality suggests that it also may represent *S. matudae*.

27. *S. grandifolium* Engl. Bot. Jahrb. **37**: 119. 1905. Figure 5.

Leaf-blade oblique, ovate-oblong, 47 cm long and 24 cm wide, the apex acuminate-cuspidate, the base obtuse-rotund, the many pairs of primary lateral veins arising at an angle of 60–70° (–80°); petiole 54 cm long, alate below, the geniculum 2 cm long. Peduncle* equaling the petiole; spathe elliptic-oblong, 20 cm long and 5 cm wide, the apex attenuate, the base cuneate and decurrent on the peduncle 3.2 cm; spadix* 15 cm long, on a stipe 1 cm long; perianth* of separate segments; pistil* rostellate but scarcely exserted above the perianth, locules* of the ovary 4-ovulate; fruit unknown.

Type collection: *F. C. Lehmann 563*, "auf dem Boden in dichten Regenwäldern bei Altaquer an den Westabhängen des Cordilleren von Pasto, 1000 m.," Nariño, Colombia, Mar 1881 (holotype B). Unicate, presumably. Known only from the type collection.

S. grandifolium is closely related to *S. atrovirens* of Costa Rica, but its spathe is more shortly decurrent than in the latter species.

28. *S. wallisii* Regel, Gartenflora **26**: 323. pl. 920. 1877.

Leaf-blade lanceolate- to oblong-elliptic (14–)24–36 cm long and (3–)5–10 cm wide, marginally undulate, the apex long-acuminate, recurved at the tip, the base acute, the midrib nude in the lowermost 2 cm above the geniculum, the primary lateral veins ca. 8–10 pairs arising at an angle of 45–50°; petiole subequaling the blade or a little longer, to 45 cm long, commonly alate in the lower part or nearly to the geniculum; geniculum 1.4–2.3 cm long. Peduncle longer than the petiole, ca. 20–64 cm long; spathe cucullate, ovate to oblong-elliptic, 7–17 cm long and 2.5–7.5 cm wide, the apex long-acuminate [to 2.5 cm], the base commonly obtuse or subrotund, sometimes acute, decurrent on the peduncle 1.5–4 cm or more, white, becoming green in age; spadix fragrant, 1.5–8 cm long, on a stipe 0.5–1.2 cm long; perianth white, of separate segments; pistil ± elliptic in outline, the style conic, white, prominently exserted beyond the perianth; ovary 3-locular, with 4–3(–2) ovules ± fascicled in each of the 3 locules, totaling 12–6 ovules per ovary; fruit unknown.

Type: the original description. *S. wallisii* was described from a plant growing in cultivation (in Europe); apparently no type specimen was preserved [Int. Code Bot. Nomencl. (1956) Art. 10, note]. Known only in cultivation.

CULT.: in big pot, Hotel Francis, Oaxaca de Juárez, Mexico, Mar 1940, *Bailey 550* (BH); *F. Sander & Co.*, 22 Feb 1898, *Brown s.n.* (K); Kew Gardens, 17 Oct 1912, *Harvey 608/1911*, *Brown s.n.* (K); 6 Apr 1914, *Thompson 10* (MO); Garfield Park Cons., 3 Aug 1939 (F); etc.

S. wallisii was reportedly introduced from Colombia, but this has not been

*fide Engler (1908): parts lost from the type specimen.

corroborated. It was originally described from a young plant growing in a garden and flowering for the first time. If a type specimen was preserved by Regel, it is probably in the herbarium at Leningrad. No specimens deposited at Leningrad have been available for this study.

No material other than from cultivated plants has been referred to this species since its publication. Despite the lack of a type specimen, the available data and the illustration which accompanies the original description characterize a species very similar to the well-known plant of our conservatories and of plantsmen known as *S. "clevelandii."*

Certain small discrepancies may be noted between Regel's description and illustration of *S. wallisii* and the currently cultivated *S. "clevelandii,"* especially in the spathe, which was described originally as oblong-elliptic. *S. "clevelandii"* has a spoon-shaped spathe which is commonly ovate in outline, varying to elliptic. The shape of the base and apex of its spathe agrees with the original description of *S. wallisii*, and other characteristics are similar enough that I feel entirely justified in regarding *S. "clevelandii"* as conspecific with *S. wallisii*.

Except for a few dried specimens borrowed from European herbaria, I have no knowledge of what plant is currently offered in Europe under the name *S. wallisii*. The treatment presented here is in agreement with N. E. Brown (Kew specimens), and T. H. Everett and E. J. Alexander (Gard. Chron. Am. II. 48: 209. 1944).

According to the records of the Bailey Hortorium (fide G. H. M. Lawrence, in personal correspondence), "*S. clevelandii* originated in the American trade with Julius Roehrs & Co., who offered it for the first time in 1935." The Hortorium has "no record of its appearance in European lists prior to 1938," though its records are incomplete for Germany. "*Spathiphyllum wallisii* appears to have first come into cultivation in Europe about 1936."

Birdsey (Cult. Aroids 118. 1951) noted that Mr. R. G. Wilson of Miami had grown from seed many plants of *S. "clevelandii"* which were quite uniform in appearance. This statement lends support to the idea that it is a self-perpetuating taxon, and probably a natural species. Yet Birdsey wrote that it is a putative "hybrid produced by W. A. Manda in the time of President Cleveland." He presented (op. cit. 119) an excellent photograph of *S. "clevelandii"* under the name *S. kochii*, rejecting the name *S. wallisii* because of the small dimensions given by Regel in the original description. *S. kochii* differs from *S. wallisii* in its greater size and its proportionally broader leaf-blade which is obtuse at the base.

The narrow leaf-blade on a slender petiole together with the conic style of the pistil easily differentiates *S. wallisii* from other species of this section.

29. *S. wendlandii* Schott, Oesterr. Bot. Zeitschr. 8: 177. 1858. Figure 7.

Leaf-blade oblanceolate to elliptic, 22–50 cm long and 9–17(–21) cm wide, the apex cuspidate, the base attenuate and decurrent onto the geniculum, the primary lateral veins many, arising at an angle of 45–60°; petiole 18–45(–60) cm long, vaginate below and often prominently alate throughout its length, the wing continuous with the decurrent base of the leaf-blade; geniculum 1.2–2 cm long, alate, to 3 cm or more wide and marginally involute and crisped, or deeply sulcate but not alate and the petiole nude in the upper 5–17 cm. Peduncle (35–)45–82 cm long; spathe elliptic to oblong-oblanceolate, the apex attenuate-acuminate, the base attenuate, decurrent on the peduncle 3–6(–9) cm; spadix 2.5–

7.5(–8.7) cm long, sessile or on a stipe to 1 cm long; perianth segments separate at the apex, partially conglutinate at the base (at least in age), the apex fimbriate or erose and often deeply notched in the center; pistil narrowly elongate, shortly exserted beyond the perianth; ovary (2–)3-locular, the ovules affixed near the top of the locules, superposed, varying from 4–2(–1) in each of the 3 locules, totaling 11–6(–3) ovules per ovary; fruit unknown.

Type collection: *M. C. Pachero 93*, “Lago Bruille (?), Cartago,” Costa Rica; 1 Jan 1946 (neotype F). Ulicate. This specimen most nearly agrees with the original description and with Schott’s drawing of *S. wendlandii* (W). The holotype (*Wendland 722*, Cuesta de Congo, pr. San Miguel, Costa Rica, 1875) is doubtfully extant; it was probably deposited at Vienna, and burned with the other Araceae. A fine photograph of the type specimen (Field Mus. no. 29839) further exemplifies this species.

Distribution: Wet forests of the Caribbean slope of central Costa Rica, and in adjacent Chiriquí, Panama.

COSTA RICA: Alajuela; San Luis de Zarco, Feb 1938, *A. Smith H337* (F); San Luis de Zarco, canton Alfaro Ruiz, Jul 1938, *A. Smith 857* (F, NY); hills above Zapote, canton San Carlos, Jul 1938, *A. Smith 927* (F, NY). San José or Cartago: Santiago de San Ramón, Jul 1937, *Brenes 22626* (F); vicinity of El General, Dec 1936, *Skutch 3033* (US); Río Verde, Llanuras de Sta. Clara, Mai 1896, *J. D. Smith 6817* (GH, US); vicinity of Sta. María de Dota, Dec 1925–Jan 1926, *Standley & Valerio 44088* (US). Limón: in forest near Banana R., Port Limón, Mai 1903, *Cook & Doyle 425* (US); vicinity of Guápiles, Mar 1924, *Standley 37350* (US); colline de Sikurbeta, Talamanca, Feb 1895, *Tonduz 9398* (BR, US), *Tonduz 9399* (BR).

PANAMA: Chiriquí: Chiquero, Boquete Distr., Apr 1938, *Davidson 565* (F, MO, US).

S. wendlandii is outstanding for its fringed and/or notched perianth segments, its pistil which is very narrowly elongate but only shortly exserted beyond the perianth, and its winged geniculum (in the typical form). Despite the narrow range of this species, two forms may be distinguished. The geniculum may be alate by the continuation of the petiolar wing to the blade, or the geniculum may not be alate. All specimens without an alate geniculum are from higher altitudes (*Brenes 22626*, *Skutch 3033*, *A. Smith H337*, *857*, *927*, *Standley & Valerio 44088*, *Davidson 565*). Specimens with an alate geniculum are from adjacent areas of lower elevation down to the coast. The specimens from higher altitudes are smaller and the leaf-shape somewhat different. With the accumulation of more specimens, these forms may deserve naming.

Previous descriptions of *S. wendlandii* characterized the locules of the ovary as six-ovulate. Among the material referred to this group, the locules typically contain four or fewer ovules. The description is accordingly emended, and this species is placed next to *S. ortgiesii* rather than *S. cochlearispathum*.

Standley (Field Mus. Publ. Bot. **18**: 143. 1937) merged *S. wendlandii* with *S. friedrichsthalii*, under the latter name. These two species are totally distinct. *S. wendlandii* differs by the smaller number of ovules per locule and notched and/or fringed perianth segments.

30. *S. ortgiesii* Regel, *Gartenflora* **21**: 292, 293. *pl.* 738 (facing p. 322). 1872. Figure 8.

Leaf-blade elliptic-oblongate to broadly elliptic, very oblique, 37–59 cm long and 15–26 cm wide, the apex cuspidate, the base cuneate and finally decurrent onto the geniculum forming a crinkled wing continuous with the wing of the petiole; primary lateral veins arising at an angle of 45–60°, passing without interruption into the wing of the petiole; petiole ca. 20–48 cm long, alate through-

out its entire length; geniculum alate, 1.5–3 cm long and 1–2.4 cm wide. Peduncle to 55 cm long; spathe oblanceolate or oblong-elliptic, 12–31 cm long and 5–9 cm wide, the apex short-acuminate, the base cuneate and decurrent on the peduncle (3–)5–8 cm; spadix 5–10 cm long, on a stipe 0.5–1.8 cm long; segments of the perianth separate, entire at the apex, the apical portion erect and forming a collar around the pistil; pistil often constricted between the style and ovary, the style elongate-conical, scarcely exerted beyond the perianth; ovary 3-locular, with 3–2 ovules affixed very near the base of each of the 3 locules, totaling 8–6 ovules per ovary; fruit unknown.

Type: the original description [Int. Code Bot. Nomencl. (1956) Art. 10, note]. *S. ortgiesii* is further defined by an illustration of this species in the same volume as the original description. At Kew there is a representative specimen of *S. ortgiesii* labeled only "Hort. Kew., 12 Jul 1878, N. E. Brown." The specimen was taken from a plant in cultivation; it was prepared by a competent botanist at a time contemporary with the publication of *S. ortgiesii*, and possibly represents material from the original introduction (by Roezl?).

Distribution: Wet slopes near Santiago Tuxtla in southern Veracruz, Mexico.

MEXICO: Veracruz: steep wet ravine slopes 1.5 miles below Santiago Tuxtla, Apr 1952, Moore 6270 (BH, NY).

CULT.: Hort. Kew, 12 Jul 1878, N. E. Brown s.n. (K); Engler 79 (B, G, K, L, P, US); etc.

Regel (Gartenflora 19: 39. 1870) stated that this species was probably introduced (into cultivation) by Roezl from Mexico. The initial description was undoubtedly drawn from a living plant (from the botanical garden in Zürich). *S. ortgiesii* continued to be known only in cultivation until the present.

No type specimen of this species appears to have been preserved; if there is one, it must be deposited at Leningrad where Regel worked, and was unavailable for this study. Older specimens examined were of garden origin (mostly Engler 79), and possibly arose from the original introduction. On the basis of the original description and figure of this species, a recent collection from the Gulf coast of southern Mexico (H. E. Moore 6270) has been identified as *S. ortgiesii*. There are differences between specimens of Engler 79 and the Moore collection, especially in leaf-shape, which is elliptic-oblanceolate in the latter, broadly elliptic in Engler 79. All the Engler specimens, however, are without inflorescences, and prevent floral comparison. The Brown collection discussed above correlates these various elements, and is florally similar to the Moore collection.

Engler and Krause (Pflanzenreich 4^{23B}: 124. 1908) cited Preuss 1444 (Escuintla, Guatemala) as representing this species. I have not examined that specimen; its locality suggests that it may possibly represent *S. matudae*. No specimen collected in Guatemala along the Pacific slope has been seen that may be referred to *S. ortgiesii*.

The species seems nearly related to *S. wendlandii*. It is much larger than *S. wendlandii*, and its perianth segments are entire apically. From all others these two species are differentiated by a winged geniculum.

31. *S. atrovirens* Schott, Oesterr. Bot. Zeitschr. 8: 179. 1858. Figure 7.

Leaf-blade lanceolate or oblong-lanceolate, 40–61 cm long and 15–22 cm wide, the apex acuminate, the base obtuse, the primary lateral veins many, arising at an angle of 60–70°; petiole to 42 cm or more long, alate in the lower two-thirds; geniculum 1.5 cm long. Peduncle to 50 cm or more; spathe cucullate, elongate-elliptic, 21–26 cm long and 6.7–7.5 cm wide, the apex attenuate-acuminate, the base acute and decurrent on the peduncle 5.5–10 cm; spadix 3.5–5 cm long, on a

stipe 0.5–1 cm long; perianth of separate segments; pistil obpyramidal, slightly constricted between the annular style and the ovary, apically subtruncate, only the elevated stigma exceeding the perianth; ovary 3-locular, the ovules superposed, varying from 4 to 3(–2) in each of the 3 locules, totaling 12–9(–8) ovules per ovary; fruit unknown.

Type collection: *H. Pittier* 9053, “bord d’un ruisseau à San Francisco de Guadalupe, alt. 1170 cm,” Costa Rica, Oct 1894 (neotype US, duplicate BR). The holotype, *Wendland* 1264, deposited at Berlin or Vienna, appears to be no longer extant, probably having been burned.

Distribution: Restricted to the Atlantic slope of the Cordillera in east central Costa Rica.

COSTA RICA: près San Francisco de Guadalupe, Mai 1893, *Pittier* 7995 (BR).

This species is one of three *Spathiphyllum* species based upon *Wendland* collections from Costa Rica. Until the present study, *S. atrovirens* was known only from the (original) type collection. Though the type specimen appears to be no longer extant, I refer to this species two subsequent collections which agree well with the original description and with *Schott*’s drawing (W). One of these collections is designated neotype of *S. atrovirens*.

The exact locality where *Wendland* collected his specimen is unknown, having been noted simply “bei Pedregal.” *Standley* (*Field Mus. Publ. Bot.* 18: 48. 1937) stated that *Wendland* “entered the country by the Sarapiquí Valley, and explored especially the mountain chain from Barba to Turrialba,” which restricts his localities mostly to the provinces of Heredia and Cartago, on the Atlantic side of the cordillera. *Standley* (op. cit. 143) further stated that *S. atrovirens* was found in “Guápiles and undoubtedly in other parts of the Atlantic coast; region of San Ramón at 950 meters.” Guápiles is in Limón, adjacent to the earlier-named provinces. The *Pittier* collections came from this same region.

S. atrovirens is closely related to *S. brevirostre*, but the spathe is longer-decurrent upon the peduncle, and the primary lateral veins of the leaf-blade arise at a wider angle than in *S. brevirostre*.

32. *S. brevirostre* (Liebm.) *Schott*, *Aroid.* 1: 2. 1853. Figure 8.

Hydnostachyon brevirostre Liebm. *Vid. Meddel.* 1–2: 25. 1849–1850.

Leaf-blade oblique, lanceolate to oblong, 35–41 cm long and 12–14 cm wide, commonly widest below the middle, the apex cuspidate-acuminate, the base obtuse, the primary lateral veins arising at an angle of 45–55°; petiole shorter than blade (fide *Liebm.*: incomplete in specimens), sometimes alate up to the geniculum; geniculum 2.3–4.5 cm long. Peduncle 1.5 or more times as long as the blade, to 66 cm long; spathe elliptic, (13–)17–23 cm long and 5–8 cm wide, the apex acuminate or subcaudate and 1.5–4 cm long, the base acute and decurrent on the peduncle 2.5–4.5 cm; spadix 3.2–7 cm long, on a stipe 0.6–1.4 cm long; perianth of separate segments; pistil shortly exceeding the perianth, constricted between the ovary and the inflated, ± annular style, crowned by the stigma; ovary 3-locular, the ovules superposed or collateral, varying from 5–3 in each of the 3 locules, totaling 12–9 ovules per ovary; fruit obovoid, rostellate; 10–9 ovules maturing (apparently); mature seeds unknown.

Type collection: *F. M. Liebm.* *s.n.*, “in sylvis umbrosis montanis, Cuesta de Teotelingo, alt. 4–5000’,” Oaxaca, Mexico. Jun 1842 (lectotype C.) Three collections were cited with the original description, all from the same region of Oaxaca. The lectotype most adequately represents the species.

Distribution: Limited to rainforests of eastern Oaxaca, Mexico.

MEXICO: Oaxaca: Trapiche de la Concepción, Jul 1842, *Liebmann s.n.* (C); pr. Tona-guía, Aug 1842, *Liebmann s.n.* (C); vicinity of Choápam, Jul 1894, *Nelson 906* (US).

S. brevirostre finds its closest ally in *S. atrovirens* of Costa Rica. Found at high elevations in the state of Oaxaca, it is known only from the original collections and a single subsequent one, all made in the previous century.

S. brevirostre differs from *S. atrovirens* by its more shortly decurrent spathe and the narrower angle at which the primary lateral veins arise. It appears to be allied to *S. matudae* of adjacent Chiapas and Guatemala, but the longer style of the pistil in this latter species serves to distinguish it from *S. brevirostre*.

33. *S. blandum* Schott, Oesterr. Bot. Wochenbl. 7: 159. 1857. Figure 8.

Leaf-blade elliptic to oblong- or lanceolate-elliptic, 30–45(–65) cm long and (8–)11–19(–25) cm wide, commonly widest at the middle and narrowed equally toward either end, the apex and base acute-acuminate; petiole shorter than the blade, 27–37(–45) cm long, often alate up to the geniculum, the wing apically auriculate and 5–8 mm wide; geniculum 1.5–2.8(–3.2) cm long. Peduncle commonly 1½–2 times as long as the petiole, 45–70(–90) cm long; spathe typically elliptic, 12–22(–27) cm long and (3.6–)4.5–8(–9.8) cm wide, acuminate at each end, or varying to oblong and sometimes oblanceolate with the apex cuspidate and 1.5–3 cm long, the base acute or obtuse and finally attenuate, decurrent on the peduncle (often obliquely) 2–5.5(–8.5) cm; spadix (3–)4.5–11(–14) cm long, sessile or on a stipe 1(–2) cm long; perianth of separate segments; pistil elongate-conic, the exerted portion equaling or longer than the perianth; ovary (2–)3-locular, the ovules collateral, varying from 3 to 1 in each of the 3 locules, totaling 8–4 ovules per ovary; fruiting spadix tuberculate, the fruit to 10.5 mm long, obovoid, rostrate; seeds 7–3, oblique-reniform-ovoid to oblong in profile, their inner faces flat and smooth, the outer face rounded, smooth to slightly verruculose between the vertical rows of foveola.

Type: the original description [Int. Code Bot. Nomencl. (1956) Art. 10, note]. Schott described this species from a living plant in cultivation. Apparently no type specimen was preserved. An excellent representative specimen of *S. blandum* is *J. D. Smith 1534* (G, GH, US).

Distribution: Widespread in wet situations along coast of the Gulf of Honduras in British Honduras, Guatemala, and Honduras, extending deep into the interior of Guatemala.

BRITISH HONDURAS: Belize District: Manatee, B. H. Bot. Station, *Campbell 67* (K); Gracie Rock, Sibun R., Mar 1935, *Gentle 1600* (MICH, NY); Gracie Rock, Sibun R., Jul 1935, *Gentle 1698* (MICH). El Cayo Dist.: San Antonio, Mai 1931, *Bartlett 13022* (MICH); Water Hole near Vaca, Apr 1938, *Gentle 2464* (GH, MICH); Roaring Creek, Aug 1929, *Lundell 452* (F); Valetin, Jun–Jul 1936, *Lundell 6195* (MICH), *7020* (MICH). Stann Creek Dist.: Big Creek, Mai 1929, *Schipp 252* (BM, F, G-DEL, GH, NY, S, US); Middlesex, *Schipp 252* (MICH, MO). Toledo Dist.: Jan 1907, *Peck 626* (GH, K).

GUATEMALA: Sutzabal, *Owen 10* (US). Alta Verapaz: near Finca Sepacuité, Mar 1902, *Cook & Griggs 65* (US); Chamá, Aug 1920, *Johnson 470* (US); vicinity of Secanquim, Apr 1905, *Pittier 186* (US); near Chirriacté on Petén highway, Apr 1941, *Standley 91640* (F); along Río Polochic below Tamahú, Apr 1941, *Standley 91991* (F); Cerro de Agua Tortuga (Sahacoc), vic. of Gubilguitz, Mar 1942, *Steyermark 44597* (F); between Samanzana and Candelaria, via Seboquil, Mar 1942, *Steyermark 45102* (F); Gubilguitz, Mar 1902, *von Tuerckheim 8331* (US); Gubilguitz, Jul 1903, *von Tuerckheim 8471* (GH, US); Gubilguitz, Aug 1907, *von Tuerckheim 355* (US); Cobán, Aug 1907, *von Tuerckheim 356* (US); eastern portions of Vera Paz & Chiquimula, 1885, *Watson 179* (GH). Huehuetenango: vicinity of Maxbal,

ca. 17 miles n of Barillas, Sierra de los Cuchumatanes, Jul 1942, *Steyermark* 48734 (F, NY). Izabal: Los Amates, Feb 1905, *Deam* 105 (GH, MICH, NY, US); Quiriguá, Jul 1938, *Johnston* 1262 (F); Río Dulce, Mar 1889, *J. D. Smith* 1534 (G-DEL, GH, US); vicinity of Quiriguá, Mai 1922, *Standley* 23773 (US), 24110 (US); Manicaria swamp near Pto. Barrios, Apr-May 1939, *Standley* 72801 (F), 72808 (F); Escoba, across the bay (west) from Pto. Barrios, Mai 1939, *Standley* 73004 (F); between Bananera and "La Presa" in Montaña del Mico, Mar 1940, *Steyermark* 38278 (F); Dec 1941, *Steyermark* 41906 (F).

HONDURAS: Puerto Sierra, Feb 1903, *Wilson* 581 (NY). Atlántida: Coyol, Aug 1923, *Carleton* 507 (US); Lancetilla Valley near Tela, Jun-Jul 1929, *Chickering* 166 (MICH), 193a (MICH), 210 (MICH); vicinity s of San Alejo, near Río San Alejo, *Standley* 7730 (F); Lancetilla Valley near Tela, Dec 1927-Mar 1928, *Standley* 52995 (F, US), 53099 (US), 53108 (F, US), 55781 (F, US); vicinity of Tela, Dec 1927-Mar 1928, *Standley* 54520 (F, US); hills above Lancetilla, Jul 1934, *Yuncker* 4631 (F, MICH, MO), 4729 (F, MICH, MO); near Lancetilla, Aug 1934, *Yuncker* 5007 (F, MICH, MO); foothills back of La Ceiba, Jul 1938, *Yuncker, Koepfer, & Wagner* 8225 (F, GH, NY). Santa Bárbara: San Pedro Sula, Apr 1888, *Thieme* 306 (U.S. 5528) (US). Yoro: Quebrada Seca, Dec 1927, *Standley* 53902 (F, US).

CULT.: *Engler* 65 (B, C, G-DEL, GH, L, P, US); "Serre du Rivage, 1853" (G); "Aug 1858," annotated by Schott, Herb. Hook. (K); [spec. in Herb. Hook., without data, annotated by Schott apparently (K)].

It is not known by what means *S. blandum* found its way into European gardens, and its country of origin remained unknown before this investigation. Engler (DC. Monogr. Phan. 2: 224. 1879) incorrectly referred to *S. blandum* *Wulfschlaegal* 1766 (Bluefields, Mosquito), which he considered to have been collected in Suriname. Jonker and Jonker (Fl. Suriname 1: 28. 1953) first recognized that that locality is not in Suriname. They were wrong, however, to suggest that it might be in Jamaica, since no species of *Spathiphyllum* is indigenous to the Antilles. Along the Caribbean coast of southern Nicaragua is the locality "Bluefields, Mosquito;" *S. friedrichsthali* is native in that region. Though *Wulfschlaegal* is not listed as having visited Nicaragua, it is possible that the ship on which he traveled to Europe in 1855 made a stop on the Mosquito coast before leaving the hemisphere, or possibly the specimen reached him from some other source.

There appears to be a progressive increase in the size of plants of *S. blandum* from British Honduras southeastward to the Lancetilla Valley of Honduras, where the species reaches its maximum stature. It shows little variation, however, other than in size.

S. blandum typically has the leaf-blade widest at the middle and narrowed nearly equally toward either end, while in *S. phryniifolium* the leaf-blade tends to be widest below the middle and the base of the blade is obtuse. The absence of a wing upon the geniculum separates *S. blandum* from *S. ortgiesii* and *S. wendlandii*.

34. *S. lanceaefolium* (Jacq.) Schott, Melet. Bot. 22. 1832. Figure 5.

Dracontium lanceaefolium Jacq. Collectanea 4: 118. 1790.

Massowia lanceaefolia C. Koch, Bonplandia 4: 12. 1856.

Leaf-blade oblong- or elliptic-lanceolate, more than 30 cm long and ca. 10 cm wide, the apex acuminate, the base (apparently) acute, the many primary lateral veins arising at an angle of 45-55°; petiole shorter than or equaling the blade, alate nearly to the base of the geniculum; geniculum ca. 1.5 cm long. Peduncle somewhat longer than the petiole; spathe oblong-lanceolate, ca. 15 cm long and 5 cm wide, the apex acuminate-cuspidate, the base (apparently) acute, decurrent on the peduncle ca. 2 cm; spadix 3-4 cm long, on a stipe ca. 1 cm long; perianth segments separate or possibly conglutinate, green at the apex; pistil elongate-conic, exceeding the perianth, the locules of the ovary 2-ovulate.

Type : Jacquin, Ic. Pl. Rar. **3**: pl. 612 (1786–1793). This is an excellent color plate, with enlargements of a single flower. The original description states that the flowers have five perianth segments, although the plate suggests that they have only four. Since all the segments are not of the same size, it is possible that two more segments would be hidden behind the pistil in that illustration. The holotype, *Bredemeyer s.n.*, collected near Caracas, was probably burned at Vienna or Berlin.

The description presented above was drawn from the Jacquin plate and from the descriptions of various writers who probably examined the Bredemeyer specimens.

S. lanceaefolium has remained an unfamiliar species, known only from the type collection. Now the type specimen has been destroyed. No specimens have been identified as *S. lanceaefolium* during this investigation. *Sagot 769* was referred to this species by other workers, but its non-decurrent spathe and the characteristics of its pistil lead me to identify that specimen unquestionably as *S. humboldtii*.

Despite the lack of representative specimens, Jacquin’s description and fine illustration of *S. lanceaefolium* serve adequately to define the genus *Spathiphyllum*, and consequently to save the generic name. It is noteworthy that an illustration of this species presented by Schott (Aroid. **1**: 2. pl. 3B. 1853) is not in complete agreement with that of Jacquin, lending more uncertainty to the exact character of *S. lanceaefolium*. The differences between the illustrations are compared below.

Jacquin	Schott
Specimen flowering	Specimen fruiting
Stipe ca. 1 cm long	Stipe longer
Spathe oblong-lanceolate	Spathe elliptic-lanceolate
Style blunt-rounded	Style attenuate

This species appears to be closely related to three other species. The acute base of the leaf-blade distinguishes *S. lanceaefolium* from both *S. kochii* and *S. phryniifolium*, in which the leaf-blade is obtuse at the base. Differences between *S. lanceaefolium* and *S. blandum* are uncertain. In the absence of definitive material of *S. lanceaefolium*, and considering their different geography, I have continued to recognize each as a species.

35. *S. kochii* Engl. & Krause, Pflanzenreich 4^{23B}: 123. 1908. Figure 5.

Leaf-blade elliptic-lanceolate to elliptic, 2–3 times as long as wide, 30–49 cm long and 10–20 cm wide, the apex acuminate-cuspidate, the base obtuse to subrotund, the many pairs of primary lateral veins arising at an angle of ca. 45°; petiole 18–50 cm long, alate in the lower half or more; geniculum 1.5–2.6 cm long. Peduncle to 60(–70) cm long; spathe elliptic-lanceolate or elliptic, 14–30 cm long and 5–10 cm wide, the apex long-attenuate, the base acute and decurrent on the peduncle 1.5–6 cm; spadix 3–6.8(–9) cm long, on a slender stipe 1.5–3(–4) cm long; perianth of separate segments, drying very light-colored; pistil slender-conic, the style long-exserted above the perianth, drying dark-colored, ending in the blunt stigma; ovary 3-locular, the ovules affixed near the base of the locules, 2–1 in each of the 3 locules, totaling 6–3 ovules per ovary; fruiting spadix rough; fruit obovoid, rostrate; seeds 3 or less, oblique-ovoid, the surface smooth between the ± vertical rows of foveola.

Type collection: *Engler 173* (Herb. No. 38) (lectotype P, isotypes B, G-BOIS, G-DEL, GH, K, L, M, P, US). The type collection was made from plants cultivated at the botanical garden of the University of Kiel.

Distribution: Rainforests of the Caribbean coast west of Caracas, Venezuela, and possibly in central Colombia.

COLOMBIA: Caparrapí, Cundinamarca, Jun 1939, *Garcia B. 7676* (COL), 7689 (COL, US); (?) La Balsa, Quindío Mts., ese of Cartago, El Valle, 1844, *Goudot s.n.* (P).

VENEZUELA: above Guamitas, Parque Nacional, Aragua, Dec 1938, *Alston 5812* (NY); en selva pluvial a Barburata, Carabobo, Feb 1942, *Famayo 2211* (VEN); El Hacha, Falcón, 1906, *Brown s.n.* (K); Maracay, Aragua, 1928, *Vogl 822, 823* (M).

S. kochii was poorly understood until the present study. The name is nowhere found in floras, and scarcely at all in the literature of cultivated plants. The epithet was applied by Birdsey (Cult. Aroids 118. 1951) to the cultivated plant (often known as *S. "clevelandii"*) that I identify as *S. wallisii*.

Engler and Krause described *S. kochii* to accomodate a plant growing in the botanical garden at Berlin, under the name "*S. lanceolatum* C. Koch," specimens¹³ (*Engler 173*) of which had earlier been distributed to other herbaria under that name. Comparison of those specimens with the type of *S. lanceolatum* revealed that they were not conspecific. Specimens of *Engler 173* then became the type of *S. kochii*.

Engler keyed out *S. kochii* on the basis of its 4-2-ovulate locules, and its crisped-undulate leaf-margins. This ovary characteristic is misleading, since there exists but a single, aberrant specimen [*Engler 173* (B)] with four ovules per locule, and the flowers of that specimen were either two- or four-locular! All other specimens of *Engler 173* have one or two ovules in each of the three locules. The Berlin sheet is the only specimen of *S. kochii* that bears its authors' annotation label. It appears, however, that the plate of *S. kochii* distributed by Engler was prepared from the Paris sheet of *Engler 173*. This latter specimen best represents the species, and is designated lectotype of *S. kochii*.

The original description names only tropical America as the native area of this species. Until the present study, no collections from the wild had been identified as *S. kochii*. Among the material examined is a distinct species from coastal Venezuela that agrees well with the type of *S. kochii*. Two anomalous collections from Columbia are tentatively referred here, and though they are geographically disjunct from the Venezuelan representatives, they vary little more than the specimens of *Engler 173* that were presumably taken from plants of identical origin. Related to this taxon is *Goudot 1844*,¹⁴ but this doubtfully represents *S. kochii*, and may prove to be an undescribed species. This latter specimen was never before annotated or cited.

S. kochii is closely allied to *S. lanceaefolium*, and there is some basis for joining these under a single specific epithet. In the absence of definitive material of *S. lanceaefolium*, it seems wise to recognize *S. kochii* as an independent species. It shows a tendency toward a broader leaf-blade; the base of the blade is

¹³These specimens were later amplified by the addition of a plate illustrating *S. kochii*.

¹⁴Not considered in preparation of the description of this species.

obtuse rather than acute, and the stipe of the spadix is much longer than that of *S. lanceaefolium*.¹⁵

36. *S. phryniifolium* Schott, Oesterr. Bot. Wochenbl. **7**: 159. 1857. Figure 7.

Spathiphyllum zetekianum Standl. Ann. Missouri Bot. Gard. **27**: 267. 1940.

Leaf-blade oblique, typically lanceolate, 2.5–4 times as long as wide, varying to oblong-elliptic, 25–50(–67) cm long and (5–)8–16(–20) cm wide, the apex acuminate-cuspidate, the base obtuse to subtruncate, the primary lateral veins many, arising at an angle of ca. 60°; petiole subequaling the blade, conspicuously alate nearly or quite to the geniculum; geniculum 1–3 cm long. Peduncle 1.5 times to twice as long as the blade, 35–65(–103) cm long; spathe cucullate, typically lanceolate, varying to oblong-elliptic, 10–26(–33) cm long and 3–9(–11) cm wide, the apex attenuate, the base oblique, subtruncate to cuneate and decurrent on the peduncle 2–4.5(–7) cm; spadix 2.5–8(–11.5) cm long, on a stipe 0.4–1.3(–2) cm long; perianth of separate segments; pistil elongate-conic, the exerted portion shorter than the perianth; ovary (2–)3-locular, the ovules affixed near the base of the locules, 2–1 in each of the 3 locules, totaling 6–3(–2) ovules per ovary; fruiting spadix rough; fruit obovoid, rostellate; seeds as many as the ovules, oblique-ovoid or reniform to oblong in profile, the surface smooth or somewhat foveolate.

Type collection: *A. Fendler 425*, “Chagres, Isthmus of Panama,” mouth of the Río Chagres, Canal Zone, Panama, Jan 1850 (holotype K). Uniculate, presumably.

Distribution: Widespread in Panama including the Perlas Archipelago, extending northward to Chiriquí Lagoon on the Caribbean coast and reaching the western Costa Rican province of Guanacaste.

COSTA RICA: Guanacaste: La Tejona, n of Tilarán, *Standley & Valerio 46032* (US).

PANAMA: Bocas del Toro: Water Valley, Sep 1940, *von Wedel 933* (F); Old Bank Island, vic. of Chiriquí Lagoon, Feb 1941, *von Wedel 2068* (MO); Shiphead Island, vic. of Chiriquí Lagoon, Sep 1941, *von Wedel 2688* (F, MO), *2690* (MO). CANAL ZONE: Agua Clara Reservoir, Sep 1924, *Stevens 556* (US); Barro Colorado Island: Jun 1931, *Bailey & Bailey 122* (BH), *209* (BH); Snyder-Molino Trail, Jul 1931, *Starry 4* (F); Zetek Trail, Jul 1931, *Starry 27* (F) (type collection of *S. zetekianum* Standl.); Aug 1940, *Woodson & Schery 968* (MO); back of second cone e of Peña Blanca, Feb 1932, *Woodworth & Vestal 681* (F). Chiriquí: El Boquete, Mar 1918, *Killip 3639* (US). Coeló: n rim of El Valle, June 1939, *Alston & Allen 1850* (MO). Darién: Cana-Causi Trail, Chepigana Dist., Mar 1940, *Terry & Terry 1525* (F). Panamá: Cerro Campana, Dec 1939, *Allen 2090* (MO); Cerro Campana, trail from Campana to Chica, Aug 1941, *Allen 2655* (F). PERLAS ARCH.: “Perl-oarne,” 1852, *Andersson s.n.* (S). San José Island: coastal bluffs at Naval Station, Jun 1945, *Erlanson 353* (GH, US); Camp Valley, Oct 1944, *Johnston 265* (GH); center of Area 11D (trail from Loop), Jan 1946, *Johnston 1164* (GH); north of Navy Station, at pump, Jan 1946, *Johnston 1264* (GH). Veraguas: trail between Cañazas and foot of Cordillera Central, headwaters of Río Cañazas, Feb 1937, *Allen 203* (MO, UC).

S. phryniifolium is restricted to Costa Rica and Panama, but various authors have included it in the floras of countries from Mexico to Peru! It is often confused with *S. friedrichsthali*, which occurs in the same region as *S. phryniifolium*. The most positive difference between these two species is the number of ovules per locule—two or one in *S. phryniifolium*, and commonly 8–5 in the other. *S. friedrichsthali* is further differentiated by its very stout, densely flowered spadix and the long-exserted styles.

¹⁵According to the original description and illustration of *S. lanceaefolium* by Jacquin.

Standley (Field Mus. Publ. Bot. **18**: 143. 1937) apparently followed Engler (Pflanzenreich **4**^{23B}: 125. 1908) in citing the range of this species to include Guatemala, and in 1944 (Ann. Missouri Bot. Gard. **31**: 36) wrote: "The writer strongly suspects that *S. phryniifolium* is a synonym of *S. friedrichsthali*, and certainly the differences suggested for separating the two species are not convincing." This opinion is contrary to my observations. Standley then illustrated *S. friedrichsthali* from Allen 203, a collection with biovulate locules which, although slightly aberrant in appearance, possibly represents *S. phryniifolium*. He did not cite this collection under either species! Despite the alleged lack of difference between the two species, Standley continued to accept his earlier-described *S. zetekianum*, which I consider to be only a very young plant, possibly of *S. phryniifolium*.

The specimens that agree most closely with the type collection are from isolated areas—the off-shore Perlas Archipelago in the Gulf of Panama, and the distant Costa Rican province of Guanacaste, some 200 miles to the west of the type locality. The collections from the Canal Zone and from intermediate points show some variation from the typical form, with leaves proportionally a little wider. There are indications that a smaller form may occur in some intermediate localities. Nonetheless, there seems little doubt that the specimens referred to *S. phryniifolium* represent one fairly uniform species.

The type specimen of *S. zetekianum* (Starry 27) is obviously a juvenile plant. Its oldest leaf and the flowers approach the form found in this species. Killip 3639, with its narrow leaves, may be non-representative of this taxon, and Terry 1525 is questionably referred here; yet the uniovulate locules of their ovaries furnish a sound basis for referring them to *S. phryniifolium*.

The possible conspecificity of this species and *S. lanceaefolium* has been considered. Since the latter species is incompletely known, each is recognized as a separate taxon.

EXCLUDED OR DUBIOUS NAMES

- Leucochlamys callacea** Poepp. ex Engl. in DC. Monogr. Phan. **2**: 230. 1879, nomen, as synonym of *Spathiphyllum cannaefolium*.
- Massowia marginata** C. Koch ex Ender, Index Aroid. 53. 1864, nomen; = *Spathiphyllum cochlearispathum*?
- Pothos odorata** Anderson ex Dryand. Bot. Mag. **17**: pl. 603. 1803, nomen, as synonym of *Spathiphyllum cannaefolium*.
- Spathiphyllum beccari** Engl. Bul. Soc. Tosc. Ort. **4**: 268. 1879; = *Holochlamys beccarii* Engl. Becc. Malesia **1**: 265. 1883.
- S. caudatum** Poepp. & Endl. Nova Gen. Sp. Pl. **3**: 85. pl. 296. 1845; = *Urospatha caudatum* (Poepp. & Engl.) Schott, Aroid. **1**: 3. pl. 8. 1853.
- S. × hybridum** N. E. Br. (*S. cannaefolium* × *S. patinii*) Ill. Hort. **29**: 75, 76. 1882. Originated in cultivation; its persistence today is unknown.
- S. marginatum** C. Koch, Bonplandia **4**: 12. 1856, nomen; = *S. cochlearispathum*?
- S. pictum** Bull, Catalogue 13, with pl. 1874; = ?
- S. pictum** Nichols, Diet. Gard. **3**: 467. 1887; = *Rhodospatha picta* Nichols?
- S. sagittifolium** Schott, Melet. Bot. **1**: 22. 1832; = *Urospatha sagittaeifolium* Schott, Aroid. **1**: 4. 1853.
- S. sagittaeifolium** Spruce ex Engl. in DC. Monogr. Phan. **3**: 279. 1879, nomen, as synonym of *Urospatha spruceanum* Schott, Bonplandia **5**: 128. 1857.
- S. wallisii** Hort. Veitch. Gard. Chron. II. **3**: 558. 1875; = *Stenospermaticum popayenense* Schott var. *wallisii* (Mast.) Engl. in Pflanzenreich **4**^{23B}: 88. 1908.

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