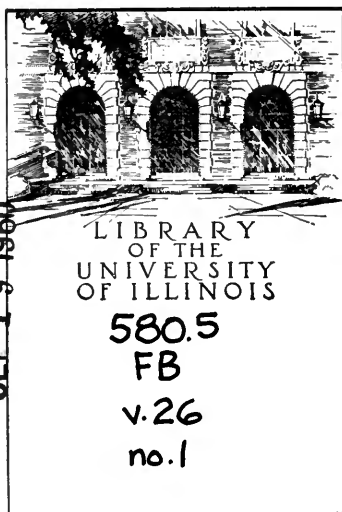


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ORCHIDS OF GUATEMALA

OAKES AMES

AND

DONOVAN STEWART CORRELL

✓ FIELDIANA: BOTANY

VOLUME 26, NUMBER 1

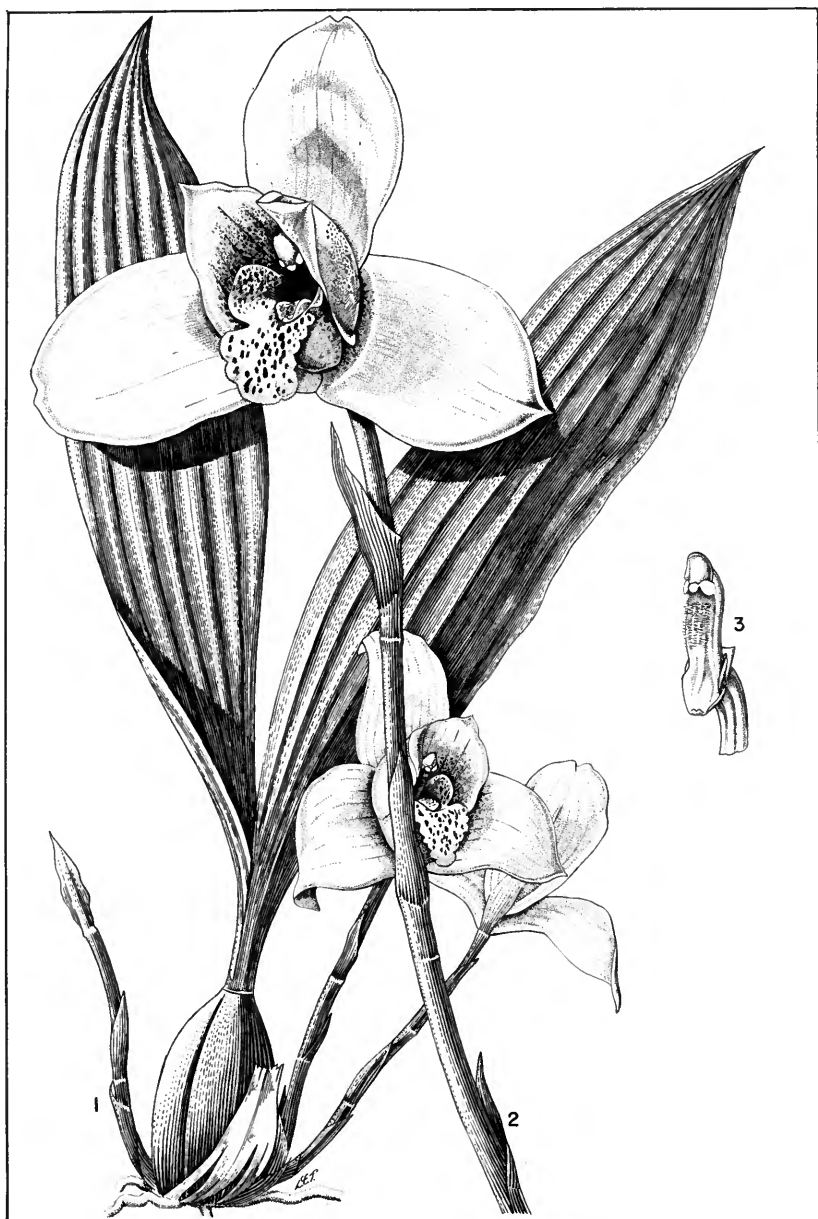
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ORCHIDS OF GUATEMALA



Lycaste virginalis (L. Skinneri). 1, flowering plant ($\times \frac{1}{3}$); 2, flower and peduncle ($\times \frac{1}{2}$); 3, column, front-side view ($\times \frac{2}{3}$). Drawn by D. E. Tibbitts.

ORCHIDS OF GUATEMALA

OAKES AMES

Director, Botanical Museum of Harvard University, 1935-1950

AND

DONOVAN STEWART CORRELL

United States Department of Agriculture

Formerly Research Associate, Botanical Museum of Harvard University

FIELDIANA: BOTANY

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Biology

PREFACE

The present work brings together for the first time information concerning all the known orchids of Guatemala (and British Honduras), a total of 527 species and 25 varieties in 89 genera. This more than doubles the 238 species given by Hemsley, in 1886-88, as occurring in Guatemala. All of the genera are illustrated, as well as more than one hundred additional species. In view of the extreme richness of the flora of Guatemala, further botanical collecting will unquestionably result in the finding of additional genera and species now not known to occur there.

Without the unselfish assistance of many individuals and institutions this work would have been impossible. To all those individuals, especially the botanical collectors and those concerned with the various herbaria, we wish to express our sincere appreciation for their valuable contributions and co-operation, and for the many courtesies extended us during the course of this work.

The late Professor Oakes Ames was the guiding spirit and constructive critic of this research. He also supported the work and made available most of the illustrations used herein. The junior author did the active research and is personally responsible for all specimen determinations and the text matter. This project was carried on in the excellent Oakes Ames Herbarium and Library in the Botanical Museum of Harvard University.

Our profound appreciation is extended to the artists, Blanche Ames (Mrs. Oakes Ames); Gordon Winston Dillon, of the Botanical Museum of Harvard University and the American Orchid Society; Dorothy O. Allen (Mrs. Paul H. Allen), United Fruit Company, Costa Rica; D. E. Tibbitts, Chicago Natural History Museum; Elsie H. Froeschner, and Eleonar B. Phillips, for the privilege of including their fine drawings.

We are indebted to Margaret Ward Lewis (Mrs. B. B. Lewis), not only for her botanical collections but also for the use of her diagnostic photographs of many Guatemalan orchids. The courtesy of Dr. J. R. Johnston in placing at our disposal his botanical collections and watercolors of Guatemala orchids is also gratefully acknowledged.

To our colleagues, Mr. Charles Schweinfurth, of the Botanical Museum of Harvard University, and Dr. Louis O. Williams, now with the Escuela Agricola Panamericana, Tegucigalpa, Honduras, we are especially indebted. Without Mr. Schweinfurth's valuable and never failing generous help throughout the course of this work and up to the last item of assembling materials for publication this task would have been nearly insurmountable. The stimulating discussions with Dr. Williams, who was simultaneously preparing his present publication on the orchids of Mexico (*Ceiba*, No. 1: 1-98. June 20, 1951, Part I), aided greatly in clarifying many controversial points of nomenclature.

To the late Mr. Alfred C. Weatherby we are indebted for friendly advice and valuable assistance, especially in the application of rules of nomenclature.

We wish to acknowledge the co-operation of Professor Paul C. Mangelsdorf, Director of the Botanical Museum of Harvard University, who greatly facilitated the final assembling of material comprising this work, and Dr. Robert E. Woodson, Missouri Botanical Garden, for the loan of certain of the orchid cuts.

To Mr. Louis C. Bierweiler, of the Botanical Museum of Harvard University, we are grateful for considerate and unselfish co-operation at all times, and to the junior author's wife, Dr. Helen Butts Correll, we are indebted for assistance in the preparation of the manuscript.

Finally, we wish to thank Dr. Frans Verdoorn for his permission to adopt, in part, the Introduction used herein from the junior author's book, *Native orchids of North America, north of Mexico*, published by *Chronica Botanica*, 1950.

The specimens that provide the basis for this work are those in the Oakes Ames Orchid Herbarium and Gray Herbarium of Harvard University, the Herbarium of Chicago Natural History Museum, the National Herbarium, Washington, and the University of Michigan Herbarium.

In the text, the treatment of the genera follows the recent phylogenetic system of classification of the Orchidaceae proposed by Rudolf Schlechter in 1926 (*Notizblatt des Botanischen Gartens und Museums Berlin-Dahlem*, Bd. 9, no. 88, pp. 563-591). In this system the simple and primitive genera are followed by the more complex and advanced. The arrangement of the species, which have been treated rather broadly, is alphabetical within a genus. The keys are basically artificial; that is, they have been constructed primarily for utility and not for the purpose of showing relationship.

The scientific names are in accord with the definite regulations prescribed by the *International Rules of Botanical Nomenclature* (1935) for the publication and treatment of botanical names.

We would be remiss if we did not give special mention to some of the collectors who have provided the bulk of the material upon which this work rests. Besides Mrs. Lewis and Dr. Johnston, mentioned above, more than 75 individuals have made collections of Guatemalan orchids that are cited in this work. Although it is not possible to enumerate here each of these it would seem to be worth while to mention those who have contributed most to this publication.

Among the early collectors who visited Guatemala are George Ure Skinner, Theodor Hartweg, Osbert Salvin, Frederick DuCane Godman, Julius von Warscewicz, Hermann Wendland, and Gustav Bernoulli.

Skinner first came to Guatemala in 1831 from England. Because of his keen interest in living orchid plants, which resulted in his introducing nearly 100 species into horticulture, he gave great impetus to the cultivation of orchids in England. Many of these introductions were new to science. It is of interest that he was the first to introduce a living plant of *Odontoglossum* into England. Many of Skinner's discoveries adorn Bateman's massive book on the orchids of Mexico and Guatemala. It is unfortunate that the Guatemala national flower, *Lycaste virginialis* (*L. Skinneri*), named in honor of Skinner, had to be renamed because of the rules of priority in botanical nomenclature.

Hartweg, in 1839, explored mainly Volcán de Agua. Warscewicz first came to Guatemala in 1846. During his stay in Central America he discovered many new orchids, some of which were of outstanding ornamental value. Wendland collected primarily on Volcán de Fuego in 1857, and later, in 1873, Godman and Salvin explored both Volcán de Fuego and Volcán de Agua. Bernoulli was in Guatemala between 1864 and 1878, during which time he collected alone, or with Rich. Cario, primarily in the departments on the Pacific slope.

Unquestionably, no department in Guatemala is so thoroughly known in regard to orchids as Alta Verapaz, primarily because of the large collections made by Hans von Türekheim, dating from 1877 to 1908, and later by Harry Johnson, in 1920. These two collectors found a rather large number of species new to science.

Their work demonstrates what can be accomplished when collecting is concentrated and confined to a specific region.

Between 1889 and 1892 E. T. Heyde and Ernesto Lux collected in several departments in central Guatemala and on the Pacific slope. It is largely through their efforts that we have a fairly good record of the orchids of Quiché and Santa Rosa.

During 1905-06 William A. Kellerman made some collections in several central and southern departments. In 1933-34, Alexander F. Skutch obtained a small but excellently prepared collection from several departments, mainly in Huehuetenango and Quiché. Similarly, in recent years, Francis W. Hunnewell has made a small but discriminating collection, primarily in five of the Pacific coast departments.

Cyrus L. Lundell's collections from Petén, which, along with those of H. H. Bartlett, formed part of the basis for his work, *The vegetation of Petén* (1937), provided us with most of our knowledge of the orchids of that department.

During the period from 1938 to 1942, Paul C. Standley and Julian A. Steyermark made large collections in Guatemala in their studies of the flora of that country. Between them they collected in every department in Guatemala. Because of their work we realize that any future intensive exploration for orchids in Guatemala should appreciably augment the species, if not the genera, now known to occur there, for, in this four-year period, during which time the orchids formed only a part of a large general collection, Standley and Steyermark collected specimens of 323 species and 19 varieties of orchids in 68 genera, of which 3 genera, 38 species, and 4 varieties were new to Guatemala and 8 species were new to science.

DONOVAN S. CORRELL

August, 1951

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Orchids of Guatemala

INTRODUCTION

The Orchidaceae, a cosmopolitan family attaining its highest development in the tropics and warm temperate regions of both hemispheres, is one of the largest families of flowering plants in the world, consisting of several hundred genera and fifteen thousand or more species and varieties. It is probably exceeded in number of species only by the Compositae. In Guatemala, it may well prove to be the largest family of phanerogamic plants.

The orchid family, which is considered to have originated from the Liliaceae, is perhaps the most advanced in the Monocotyledoneae. Some other closely allied families, besides the Liliaceae, are the Burmanniaceae, Iridaceae, Amaryllidaceae and Hypoxidaceae. Although the family is thought to be rather ancient in respect to geologic time, no fossil remains have been found. While there is enormous variation in the form and structure of the various genera and species, all orchids have a distinctive feature in common which, for our convenience, superficially separates them from other plants in our flora. This feature is the column, an elongation of the floral axis that bears the sexual organs. According to Pfitzer's observations (1889), the technical and only real difference that separates the orchids from all other plants is the absence of an embryonic root.

Besides its wide distribution and its large number of species, the orchid family is unusual among the higher plants for several reasons, namely, the extreme variations of its complex and highly specialized flowers; its great variety of habit and diversity of habitat; the enormous number of seeds produced in a single capsule. Very few, if any, plant families possess the floral and vegetative variations found in the Orchidaceae. Because of this extreme variability and the consequent singularity of the flowers, orchids have acquired numerous descriptive common names. It is also quite possible that the physiological adaptations of the genera have no equal in any other family. Parasitism on higher plants and carnivorousness are perhaps the only physiological functions not definitely known to occur in the Orchidaceae.

The number of seeds produced in an orchid capsule is in many cases phenomenal. The astronomers at the Greenwich Observatory, England, made an accurate count of the seeds in a capsule of *Cycnoches chlorochilon* and found that it contained 3,770,000 seeds. For a species of *Maxillaria*, Darwin (1877) accepted Fritz Mueller's computation that a single capsule yields 1,756,440 seeds, and Darwin himself estimated that the European *Orchis maculata* produces approximately 6,200 seeds in a single capsule. Many of our orchids produce large numbers of seeds, and it may be noted here that in many instances the seeds exhibit distinct features for a given species. In spite of this prolific seed production, however, orchids remain a comparatively inconspicuous feature of most floras. Although a number of theories have been advanced, no completely satisfactory explanation has ever been arrived at in regard to the general rarity of orchids. Perhaps a fundamental reason is the fact that for the most part they depend upon external aid for pollination, and chiefly because of faulty pollination and economy of vitality on the part of the plant very few seed-pods are formed. Also, the period of time elapsing between pollination and fecundation is often of long duration, sometimes as much as several weeks. In the meantime, the orchid is apt to lose its inflorescence through injury (with consequent loss of fruit production) or succumb to some one of its many natural enemies. Even so, considering the huge production of seeds in a single capsule, it stands to reason that only a few fruits are necessary for the survival of a particular species. Hence, this delicate biological balance in the Orchidaceae remains in the realm of speculation.

The microscopic seeds apparently contain no endosperm or stored food and thus they are thought to be entirely dependent upon external aid for germination and the growth of the seedling. In nature, fungi are considered to furnish this assistance and, if the seed is not destroyed, a compatible relationship is established between the fungus and the orchid. The delicate balance between the orchid seedling and the fungus, which may easily be upset to the detriment of the seedling, is another reason for the rarity of orchids. Perhaps in nature most, if not all, species of orchids contain within their roots and rootstocks an endotrophic fungus that occupies the cellular structure and remains in harmony with the orchid.

A most interesting natural phenomenon in the Orchidaceae is insect pollination. Although many plants are wind-pollinated, with few exceptions orchids are pollinated by insects. Each individual

species seems to have its own peculiar mechanism to insure its receiving pollen from another plant of the same species. In most species the column is so formed and placed in the flower that, in order to reach the nectary, the visiting insect must touch the stigmas and deposit there any pollen that it may be carrying. Upon leaving, the insect must first come in contact with the anther and thus become burdened with another load of pollen or an entire pollinium that it carries to the stigmas of the next flower visited. In this manner cross-pollination is effected and self-pollination of the species is prevented or made unnecessary.

It is believed that many orchids can be pollinated only by a single specific insect, such as a bumble bee. The pollinating agents in the Orchidaceae include bees, wasps, various flies and ants as well as butterflies, moths, beetles, snails and humming birds.

There is always the possibility that irregular flowers, such as those found in orchids, may revert to a regular structure, the ancestral and more primitive condition. This reversion of irregular to regular floral parts is known as "peloria." This condition may also result from an increase in the number of the modified segments. Peloria is often hereditary.

Through the ages man has sought orchids, not only for their satisfying beauty, but also for their once fancied value in alleviating suffering and for their supposed restorative and procreative powers. At first their supposed medicinal properties were of primary concern; the Greeks, Theophrastus and Dioscorides, more than two thousand years ago advanced the belief that most plants, including a species of *Orchis*, could be used for curative purposes. Throughout Europe, especially during the Renaissance, these ancient Greek concepts were adhered to and consequently interest centered in those plants thought to be of medicinal value. Even today in some parts of the world primitive peoples use some orchids in their therapeutic practices. However, the singular beauty of the flowers and the bizarre forms that many of them assume are the primary reasons for most of the present-day interest in orchids.

From an artistic and esthetic point of view orchids are universally accorded first place in nature. Their extraordinary beauty makes them the basis of a multimillion dollar floral industry in the United States and England. However, aside from their ornamental value, the family is otherwise of little economic importance. Vanilla, the extract from the cured unripened pods of various species of the genus *Vanilla*, especially *V. planifolia* in the western hemisphere, is the

most important commercial product of this large family. A few Asiatic species have tubers and tuberoids that contain a nutritive starch associated with a peculiar gum. These tubers are collected and dried and are placed on the market where they are sold as salep. This drug is extensively used in oriental countries as a demulcent nerve tonic, for paralysis, and as a food similar to tapioca. The leaves of *Angraecum fragrans* (*Jumellea fragrans*), of the Seychelles Islands, are used for making faham tea. Although for centuries some orchids were considered efficacious in the healing of the sick, they have fallen into disrepute, and not a single species has been retained in modern medicine as an indispensable source of any drug. A few species have miscellaneous household uses as a source of glue and resin.

Surprisingly, in recent years orchids have received political recognition. Minnesota has adopted the queenly *Cypripedium reginae* as its state flower. Brazil, Colombia, Costa Rica, Guatemala and Honduras have all issued postage stamps commemorating outstanding species prevalent in their respective geographical regions. Guatemala has designated the white form of the exceptionally beautiful *Lycaste virginalis* (Frontispiece), commonly known as "Monja Blanca," as its national flower. Likewise, Costa Rica has adopted *Cattleya Skinneri*, commonly known as "Guaria morada" or "Flor de San Sebastian," as its national flower.

DISTRIBUTION OF GUATEMALA ORCHIDS

In 1945, Paul C. Standley and Julian A. Steyermark, whose collections are of inestimable value to floristic studies of Latin America and who have traveled and collected widely in Guatemala, published an informative account of the vegetation of that country ("The Vegetation of Guatemala, a Brief Review," in *Plants and Plant Science in Latin America*, edited by Frans Verdoorn, 1945). This section, devoted to the distribution of Guatemalan orchids, draws heavily upon their article for basic information, and the following quotations are taken direct from them.

"The exceedingly varied types of soil and topography and diverse geological history of the country, ranging from ancient mountain masses connected with North America to relatively youthful volcanic areas, combined with marked altitudinal and climatic variations—hot desert to cold alpine regions—have given Guatemala the richest flora in all Central America with an estimated total of 8,000 species

of vascular plants. Of this number, many are endemics confined to particular canyons and volcanoes. Many genera and species of the United States and Mexico reach their southern limits of distribution in Guatemala, while a large number of South American genera and species either reach their northern limits of dispersal here or are unknown elsewhere from other parts of Central America. Orchidaceae, Leguminosae, and Compositae are especially prominent, and include hundreds of species, many of which are not found outside of Guatemala.

"The great diversity of the country is responsible for the following large number of floristic regions: (1) the limestone plains of Petén; (2) the mangrove swamps along both coasts; (3) the rain forest of the Atlantic coast; (4) the low savannas of Izabal and Petén; (5) the mixed forest of the Pacific plains; (6) the arid desert plains—chaparral of the plateaus of the Oriente and valleys of the Río Motagua and Río Blanco (also called Río Negro); (7) the wet mountain forest of Alta Verapaz; (8) the mixed mountain forest of the Pacific bocacosta; (9) the upland mixed forest of temperate and cold regions; (10) the coniferous forests; and (11) the alpine regions. . . ."

Although orchids are found in every one of the phytogeographic regions noted above, several are especially rich in orchids while others have very few. Those regions where orchids occur most abundantly are discussed below.

The greatest concentration of orchid genera and species is in Alta Verapaz, where 242 species, representing 60 genera, have been found. As Standley and Steyermark have pointed out, the wet forests of Alta Verapaz, with abundant rainfall the year round, possess an extremely large and diversified flora, the richest in all Guatemala. It is especially rich in its abundance and variety of Orchidaceae and Bromeliaceae.

The low rain forests of the Atlantic coast, covering most of Izabal, have a luxuriant tropical flora, which, though largely derived from that of South America and Atlantic Central America, is distinctive in having a number of endemic species. Izabal, which includes most of this vegetational area, has 111 species of orchids in 43 genera. Standley and Steyermark write of this country: "The entire area is included in the humid tropical zone. . . . Bromeliaceae, Orchidaceae, *Peperomias*, and many kinds of mosses and hepatics cover the branches of trees in dense masses. Many species of this region are not found elsewhere in Guatemala, although some are also found in the Pacific bocacosta."

According to Standley and Steyermark, "A large portion of Guatemala above 5,000 feet [1,525 meters] possesses upland mixed forests of broad-leaved species. It is a forest which comprises xerophytic as well as moisture-loving (including cloud forest) types of plants. Most of the cloud forests in Guatemala occur at an elevation between 4,500–7,000 feet [1,370–2,135 meters] and have a rich development of tree ferns, orchids, begonias, bromeliads, aroids, and bryophytes. Many endemic species are found in these cloud forests."

The Departments of Chimaltenango, Chiquimula, Guatemala, and Zacapa lie, in part, in the upland mixed forests. Between 30 and 40 genera of orchids, comprising more than 75 species, are found in each of these four Departments, with 116 occurring in the Department of Guatemala.

The Guatemalan highlands (at 1,525 to 3,810 meters [5,000–12,500 feet]) consist primarily of coniferous forests of various types, each with a characteristic flora, and the alpine regions, usually confined to open places on tops of the volcanoes above 3,050 meters (10,000 feet). Huehuetenango, lying entirely in this region, has a surprisingly large orchid flora, there being 110 species in 41 genera. The orchids of this region are predominantly terrestrial. The species here show affinity with both the Andes of South America and the higher peaks of North and Central America, and endemism is pronounced.

The vast limestone plains and low savannahs of Petén contain 57 species of orchids in 25 genera. Many of these also occur in adjacent British Honduras. This region, comprising about one-third of the total area of Guatemala and averaging about 185 meters (600 feet) elevation, has a wet and a dry season with both the humid and arid tropical flora developed.

With the exception of several Departments lying athwart the Pacific bocacosta, the remaining Departments each have fewer than 25 genera comprising less than 40 species. Standley and Steyermark write, regarding the Pacific bocacosta: "The mixed forests of the lower and middle humid slopes (bocacosta) of the mountains (up to 3,000 feet) [915 meters] bordering the Pacific coast possess a rich diversified flora similar to that of the low rain forest of the north coast of the Atlantic. . . . Rain is plentiful much of the year and there is a great variety of palms, ferns, vines, and epiphytes."

The Departments lying partly in the Pacific bocacosta and the number of orchid genera and species in each are Quezaltenango, 32 genera and 72 species; San Marcos, 24 genera and 59 species; Santa Rosa, 27 genera and 58 species; Sololá, 28 genera and 47 species; Suchitepequez, 27 genera and 53 species. It is of interest that many of the species of ornamental value, such as those of *Cattleya* and *Lycaste*, are found in this region.

Since British Honduras is phytogeographically similar to Petén, an effort has been made to include in this work all the orchids that are known to occur in that country. There are 91 species of orchids in 40 genera in British Honduras, all but four of which have also been found in Guatemala. These four are *Epidendrum Boothianum*, *Galeandra Baueri*, *Laelia Digbyana*, and *Spiranthes adnata*.

Of the approximately 1,800 species in about 175 genera of Orchidaceae found in North and Central America, Guatemala has 527 species and 25 varieties in 89 genera. This number is exceeded only by Costa Rica (half the size of Guatemala) with some 900 species in about 115 genera and Mexico (about seventeen times the size of Guatemala) with a little more than 600 species in about 80 genera.

Although a surprisingly large number of species in Mexico (more than 200) have not been collected in Guatemala, there are only five small genera, comprising only six species, that are found in Mexico and not in Guatemala. These are *Epipactis gigantea*, *Acineta Barkeri*, *Erycina diaphana*, *E. echinata*, *Papperitzia Leiboldii*, and *Hintonella mexicana*. On the other hand, there are in Guatemala 14 genera that are not represented in Mexico.

Some of the largest genera in Guatemala are *Epidendrum* (87 species), *Pleurothallis* (55 species), *Spiranthes* (35 species), *Oncidium* (33 species), *Maxillaria* (21 species), and *Cranichis* and *Stelis* (each with 17 species). Since in tropical and warm temperate regions the greatest number of orchids occur as epiphytes, it is not surprising to find that of this number only *Spiranthes* and *Cranichis* are terrestrial genera. Besides being the largest genus, *Epidendrum* is the most widespread, for it is the only one represented in every Department.

Although endemism is rather pronounced in some plant families in Guatemala, most of the genera and species in the Orchidaceae seem to be generally distributed. There are only 57 species of orchids, representing 23 genera, apparently confined to Guatemala. Of these, 9 species are in *Epidendrum* and 8 in *Pleurothallis*. Only

one monotypic orchid genus, *Palumbina*, is known to be endemic to Guatemala.

A number of genera in Guatemala have species that are of ornamental interest and, in the past, were of great commercial value to the florist industry. Some of these are *Brassia*, *Cattleya*, *Laelia*, *Lycaste*, *Odontoglossum*, and *Oncidium*. Of these, the largest and most widespread is *Oncidium*. It is of interest that the above genera are more or less concentrated on the Pacific slopes of Guatemala, primarily in the bocacosta region.

Although soil and topography have a definite influence upon terrestrial species, there is little doubt that temperature and moisture are the essential factors that control the distribution and survival of orchids, both terrestrial and epiphytic. In tropical and warm temperate regions, such as Guatemala, the greatest number of orchids occur as epiphytes in rain forests on moderately cool mountain slopes mainly between 1,000 and 2,300 meters (3,000–7,500 feet) elevation. Very few species are found in arid regions, and, of these, most are epiphytic or lithophytic with specially adapted tissues for storing water.

As noted above, orchids are found in all regions in Guatemala, from near sea level up to at least 4,000 meters (13,100 feet) altitude. They thus approach the extreme altitudinal limits of phanerogamic plants in the country. Although many species have a wide altitudinal range, the species in some genera are usually found at very low elevations, such as those in *Cattleya* and *Scaphyglottis*. Some species in other genera, though also usually occurring at lower elevations, are found at high altitudes. There are 29 species in 16 genera that are found up to at least 3,050 meters (10,000 feet), while 26 species in 14 genera extend above 3,100 meters (10,100 feet), and one of these, *Leochilus pygmaeus*, occurs up to 4,000 meters (13,100 feet).

Those species found at high elevations in Central America are often either endemic to the region or show affinity with the flora of the Andes of South America or that of the high mountains of North America. For this reason it is of interest to enumerate these high montane orchids of Guatemala. Those found as high as 3,100 to 3,300 meters (10,100–10,900 feet) are *Arpophyllum alpinum*, *Corallorhiza macrantha*, *Cypripedium irapeanum*, *Epidendrum Chloe*, *E. polybulbon*, *Habenaria entomantha*, *Malaxis lepanthiflora*, *Odontoglossum bictoniense*, *Spiranthes hyemalis*, *S. parasitica*, and *S. vernalis*. Those occurring as high as 3,300 to 3,500 meters (10,900–11,500 feet) are *Epidendrum Lindleyanum*, *E. ochraceum*, *Lepanthes oreo-*

charis, *Physosiphon tubatus*, and *Spiranthes stolonifera*. Those species that occur at 3,500 meters (11,500 feet) or higher are *Govenia mutica* var. *Purpusii*, *Habenaria limosa*, *Isochilus linearis*, *I. major* var. *alatus*, *Leochilus pygmaeus*, *Malaxis Ehrenbergii*, *M. Soulei*, *Ponthieva pulchella*, *Spiranthes minutiflora*, and *Stelis ovatilabia*.

GENERAL CHARACTERISTICS OF ORCHIDS

Orchids are perennials and are either terrestrial, epiphytic, lithophytic, semiaquatic or, very rarely, subterranean. Most of the species found in the temperate zone are terrestrial, while the greater number of tropical and subtropical orchids are epiphytic or lithophytic. The subterranean genera, of which there are two (*Rhizanthella* and *Cryptanthemis*), are confined to Australia.

Two distinctive types of vegetative growth are found in the Orchidaceae, sympodial and monopodial. All terrestrial and many epiphytic orchids have a sympodial main axis, in which growth of the original main axis ceases at the end of the flowering season, to be resumed the next year by the development of a different axis, resulting in a series of successive annual axes. In this type of growth the inflorescence may be either terminal on the shoot or borne on the side of the shoot on a short leafless branch. The other form of growth, monopodial, occurs when the main axis grows steadily onward year after year, producing new leaves at the apex (rarely leafless) and bearing flowers on lateral shoots that arise in the axils of the older leaves.

In respect to the flowers, orchid plants may be hermaphroditic, dioecious or monoecious, depending upon the genus.

In general, terrestrial orchids have an erect or ascending stout or slender stem bearing one or more radical or cauline leaves or both and terminated by one or more flowers. The leaves are either present at flowering time or appear separately at a different season. When present, the leaf is entire and varies from a bract-like sheathing leaf to a slender or broad lamina that is filiform to orbicular, membranaceous to coriaceous or fleshy and often plicate or duplicate. The roots are fibrous, fleshy or tuberous. Many species have prominent rhizomes upon which adventitious roots are borne; others produce corms or tubers.

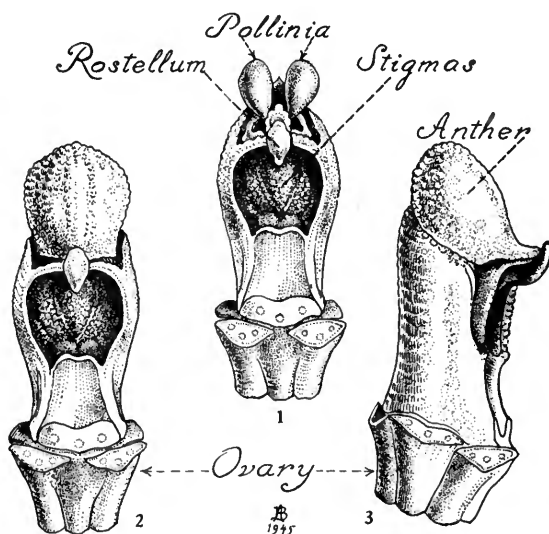
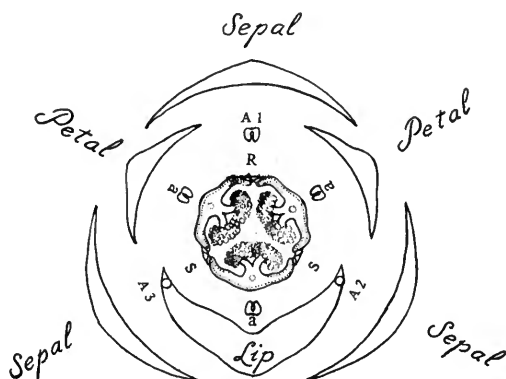
A few of the terrestrial species are saprophytic; that is, they grow in and derive their nourishment from humus. These plants are commonly small and inconspicuous. They usually develop a

coralloid rhizome, are more or less lacking or apparently lacking in chlorophyll, and have an essentially naked or bracteate greenish, yellowish or reddish purple stem terminated by a raceme of flowers.

Epiphytic and most lithophytic orchids have no permanent main roots. Instead, there are adventitious roots that arise mainly from the nodes of the stem and sometimes form a mat over the substratum, penetrating into the surrounding medium or hanging free from the substratum for a considerable length. The aerial roots of epiphytic orchids have a special development of the epidermis, called the velamen, which consists of several layers of cells that form a spongy tissue that rapidly absorbs moisture from the atmosphere. When these roots are moist they are usually green, but when dry they are whitish, brownish or ash-colored. When present, the leaves are similar to those of terrestrial orchids.

Many epiphytic sympodial forms have pseudobulbs. These are thickened secondary stems, composed of one to several internodes, which serve as reservoirs of water and food. They are variously shaped, being mostly globose, pyriform or fusiform, and bear leaves either throughout their entire length or only at the apex. The leaves are one or more, simple and entire, and are often thick and fleshy, being usually well adapted for storing water because of a thick cuticle.

The inflorescence of the Orchidaceae consists of one or more flowers and is a spike, simple raceme, or panicle. The zygomorphic flowers (diagram, p. 11) are either unisexual or bisexual and have an inferior 1- or 3-celled ovary. They may be small and inconspicuous or large and showy. Occasionally polymorphic, cleistogamous, peloric or teratologic flowers are produced. The three sepals as well as the petals are generally colored instead of being green, as in most flowers. They may be free from one another or more or less united, sometimes forming a tube. The symmetrical dorsal sepal usually differs somewhat in shape from the lateral sepals, which are more or less oblique. The lateral sepals are either free from each other or somewhat coherent and are often united at the base, occasionally forming a mentum, or chin, with the foot of the column. Of the inner segments, the petals, two are regular and identical, and the third, called the lip, or labellum, is more or less modified. The lip is properly the uppermost petal of the flower, but in most species it assumes the lower position in the perianth as a result of the twisting of the pedicel or pedicel and ovary. It usually differs markedly in shape, size and coloration from the other two petals



The upper drawing represents a cross section of an orchid flower at a time in its age-long evolution when all of the organs were distinct. A1-A3, three stamens of outer whorl; a, a, a, stamens of inner whorl; S, S, position (indicated) of fertile stigmas; R, sterile stigma that has become the rostellum. The central figure shows the fruit in cross section, with its three rows of dust-like seeds.

Below the upper drawing a typical column is shown. 1-3, stamens and stigmas and the central axis of the flower have combined to form the column, the diagnostic structure of the vast orchid family. The pollinia represent A1 of the diagram. Drawn by Blanche Ames.

and is commonly by far the most conspicuous feature of the flower. The lip is either simple or variously lobed; flat or more or less saccate; entire, fringed or variously toothed and notched; and its disk, or upper surface, is frequently adorned with calli, papillae or lamellae. It may be only slightly or greatly extended at the base to form a spur, or nectary.

The column (see diagram), which represents a union of carpels and is, in part, an elongation of the floral axis, bears at or near the summit, or laterally, one to rarely three mobile or rigidly attached anthers and in front on the ventral surface the more or less confluent stigmas or stigma. In many species a modified stigma, called the rostellum, projects out over the stigmatic surface and serves to affix the pollinia to insects. The anther, or anthers, situated behind the rostellum and often lying upon it, rest in a shallow cavity called the clinandrium. It is more or less distinctly 2-celled and contains a mass of pollen or two, four, six or eight distinct pollen masses, or pollinia, the number present sometimes being used in the differentiation of genera. The pollen is either powdery, granular-mealy (sometimes composed of groups of grains), waxy or cartilaginous. The columns of the various genera and species exhibit a wide range of variation and are of basic importance in classification. The column is often produced into a more or less distinct foot.

A detailed discussion of the various parts of the column and their morphological origin would doubtless be of interest, especially in relation to their dramatic significance to insect-pollination. However, in a primarily taxonomic work such as this, space will not permit too lengthy a discussion of this subject. If detailed information concerning this subject is desired, an excellent account may be found in Darwin's *Various Contrivances by which Orchids are Fertilized by Insects* (1877). Briefly, in many genera, as *Listera*, *Orchis*, *Oncidium*, etc., part of the rostellum forms a disk to which the pollinia are attached by a caudicle or stalk. On its under surface this disk secretes, or there collects, a sticky fast-setting cement. When an insect enters the flower in search of nectar, the rostellum is ruptured. The viscid disk is exposed and is so situated that it comes in contact with the proboscis, head, thorax or abdomen of the insect and thus becomes attached to the little pollinator.

The fruits of orchids, with few exceptions, are dry capsules and are variously shaped, being commonly ovoid, ellipsoid or cylindrical. They are frequently strongly 3-angled, and the angles may be winged. *Vanilla*, however, has a more or less cylindrical fleshy pod or "bean."

In many species the withered flower persists at the apex of the fruit. When ripe, the dry capsule dehisces along one, two, three or six longitudinal sutures, with the valves usually, but not always, remaining united above and below. The minute seeds, composed of undifferentiated cells, are produced in enormous quantities and are well adapted for dispersal by wind.

ORCHIDACEAE

Perennial herbs, vines or shrub-like plants of various habits and habitats, terrestrial, epiphytic, lithophytic, semiaquatic or (very rarely) subterranean, autophytic or saprophytic, hermaphroditic, dioecious or monoecious, produced from a short or elongated or (rarely) coralloid rhizome, corm or tuber. Roots subterranean or aerial, fibrous, fleshy or tuberous, solitary, fasciculate or adventitious and scattered on the rhizome or stem. Stems terete to ancipitous, sometimes angular, much abbreviated to elongated, slender to very stout, often modified as thickened pseudobulbs, naked, bracteate or leafy. Pseudobulbs variously shaped, usually globose, pyriform or fusiform, one- or more-leaved, subtended by leaves, sheaths or cataphylls. Leaves simple, radical or cauline or both, persistent, deciduous or marcescent, occasionally altogether lacking, varying from foliaceous sheathing bracts to a broad or narrow lamina; lamina filiform to orbicular, membranaceous to fleshy or coriaceous, often duplicate or plicate. Inflorescence terminal or lateral, supported by an abbreviated to greatly elongated peduncle, consisting of one or more flowers, commonly a spike, simple raceme or panicle. Flowers small and inconspicuous to large and showy, zygomorphic, unisexual or bisexual, sometimes polymorphic; perianth composed of three outer segments (sepals) and three inner segments (petals), the segments free or more or less united, adnate to the 1- or 3-celled inferior ovary, one petal (the lip or labellum) usually complex in structure and differing only slightly to greatly in form, size and coloration from the other segments; lip often extended at the base and forming a spur or nectary. Stamens and pistils (including the filaments and styles) united to form, in part, an organ called the column in the center of the flower. Column various, formed by an elongation of the floral axis, bearing at or near its summit or laterally one, two or (very rarely) three mobile or rigidly attached anthers, producing in front on the ventral surface the somewhat confluent stigmas, with one stigma usually modified to form the rostellum, often produced below into a foot; anther situated behind the rostellum, resting in a bed or clinandrium, perfectly or imperfectly 2-celled, containing a mass of pollen or two to eight distinct pollen-masses or pollinia; pollen powdery, granular-mealy, waxy or cartilaginous. Fruit a dry capsule or fleshy pod, commonly ovoid, ellipsoid or cylindric, dehiscing along one, two, three or six longitudinal sutures; seeds numerous, scobicular (except in *Vanilla* and *Selenipedium*).

KEY TO SUBFAMILIES, TRIBES AND GENERA

- A. Stamens 2, a third one transformed into a large staminode; pollen granular, not united into masses or bodies.....Subfamily DIANDRAE.

I. Tribe CYPRIPEILOIDEAE

- A. Stamen 1, the two lateral ones abortive or forming small staminodes; pollen consolidated into masses or solid bodies (pollinia)...Subfamily MONANDRAE.

- B. Caudicle and viscid disk (gland) arising from the base of the pollinia; anther erect or more or less resupinate, the broad base very closely adnate to the column, never deciduous after flowering; pollinia always granular.
Division BASITONAE.

II. Tribe OPHRYDOIDEAE

- B. Caudicle and viscid disk (gland) arising from the apex of the pollinia; anther erect or incumbent, the filament short and slender, generally very narrowly joined to the column, usually deciduous but if persisting soon withering.....Division ACROTONAE.

- C. Pollinia granular, soft; anther commonly persistent but withering; inflorescence (normally) always terminal.

III. Tribe POLYCHONDREAE

- C. Pollinia waxy or cartilaginous; anther commonly soon deciduous; inflorescence terminal or lateral.

IV. Tribe KEROSPHEREAE

-
- I. Tribe CYPRIPEILOIDEAE (Subtribe CYPRIPEILEAE. Two genera in Guatemala).

1. Petals oblong-elliptic, up to 6.5 cm. long; ovary 1-celled...1. *Cypripedium*.

1. Petals narrowly lanceolate, falcate, up to 75 cm. long; ovary 3-celled.
2. *Phragmipedium*.

- II. Tribe OPHRYDOIDEAE (Subtribe HABENARIEAE. One genus in Guatemala).
3. *Habenaria*.

- III. Tribe POLYCHONDREAE (Seven subtribes and fifteen genera in Guatemala).

1. Anther more or less prone, incumbent.

2. Stems not pseudobulbous, usually elongate.

3. Leaves not articulated, persistent; stems not cane-like (Subtribe VANILLEAE).

4. Low erect terrestrial herbs; flowers 2 cm. or less long.

5. Leaves clasping the stem; plant with stolons and bearing fleshy tuberoids.....4. *Triphora*.

5. Leaves with lax vaginate petioles; plant with a creeping rhizome.
5. *Psilochilus*.

4. Tall scandent herbs, usually epiphytic or trailing in trees or shrubs, without tuberous roots; flowers rather large, more than 2 cm. long.
6. *Vanilla*.

3. Leaves articulated, early deciduous; stems cane-like (Subtribe SOBRELIEAE).

6. Base of the lip strongly gibbous or subsaccate, ornamented with two prominent calli; flowers relatively small.....7. *Elleanthus*.
 6. Base of the lip neither strongly gibbous nor subsaccate, without prominent calli; flowers relatively large.....8. *Sobralia*.
 2. Stems pseudobulbous (at least at the base), very short (Subtribe BLETTILAEAE).....9. *Crybe*.
 1. Anther more or less erect; rostellum erect or suberect.
 7. Leaves not plicate-nerved, usually delicate; plant rarely not producing leaves.
 8. Roots fasciculate.
 9. Lip uppermost in the flower, i.e. non-resupinate (Subtribe CRANICHIDEAE).
 10. Plant leafless, saprophytic, adorned with bifurcate hairs.
 10. *Wulfschlaegelia*.
 10. Plant producing leaves, not saprophytic, hairs not bifurcate.
 11. Petals and lip not inserted on the column.
 12. Sepals connate at the base to form a cup.....11. *Prescottia*.
 12. Sepals free at the base, not forming a cup.....12. *Cranichis*.
 11. Petals and occasionally the lip inserted on the column.
 13. *Ponthieva*.
 9. Lip lowermost in the flower, i.e. resupinate (Subtribe SPIRANTHEAE).
 14. *Spiranthes*.
 8. Roots not fasciculate, arising singly from the nodes on the lower part of the stem or rhizome (Subtribe PHYSUREAE).
 13. Lip flat or subsaccate, neither produced into a prominent free sac nor spur at the base.....15. *Goodyera*.
 13. Lip produced into a prominent free sac or spur at the base.
 16. *Erythroides*.
 7. Leaves plicate-nerved, chartaceous or subcoriaceous (Subtribe TROPIDIEAE).
 14. Lip broad at the base, concave, saccate or short-spurred; lateral sepals forming a short mentum at the base; column short.
 17. *Tropidia*.
 14. Lip narrow at the base; sepals and petals narrow, more or less adherent to form a tube; column elongate.....18. *Corymborchis*.
- IV. Tribe KEROPHAREAE (Twenty-six subtribes and seventy-one genera in Guatemala).
- A. Series a.—ACRANTHAE. Inflorescence normally terminal or by abortion of the terminal inflorescence axillary in the upper leaves, very rarely axillary.
 1. Viscid disk (when present) arising from the apex of the pollinia, commonly irregular, sometimes rudimentary or none.
 2. Ovary manifestly articulated with the pedicel; pedicel always persistent; stem slender, rigid, sometimes very abbreviated, usually unifoliate (Subtribe PLEUROTHALLIDEAE).
 3. Sepals all distinctly connate.
 4. Sepals more or less rotate, not forming a narrow tube; petals and lip commonly similar.....19. *Stelis*.
 4. Sepals forming a narrow tube at the base or campanulate; petals and lip very dissimilar.
 5. Inflorescence a raceme (in Guatemalan species); sepals with relatively short free lobes.....20. *Physosiphon*.
 5. Inflorescence a single flower or rarely two flowers; sepals with long free continuations.....21. *Masdevallia*.

3. Sepals not distinctly connate, at least the dorsal sepal free or nearly so.
6. Inflorescence lateral, originating about the middle of the secondary stem; lateral sepals with retrorse callosities above the middle.
22. *Scaphosepalum*.
6. Inflorescence terminal or rarely lateral at the base of the secondary stem; lateral sepals without conspicuous retrorse calli.
7. Blade of the petals transverse, i.e. strongly bilobed, rarely simple (or essentially so), from a very oblique base. 23. *Lepanthes*.
7. Blade of the petals not transverse or strongly bilobed.
24. *Pleurothallis*.
2. Ovary not articulated with the pedicel; pedicel caducous with the flower; stems slender or fleshy-thickened, 1- to several-flowered.
8. Pollinia always without appendages, i.e. no viscid disk or caudicles present (Subtribe LIPARIDAE).
9. Column very short; anther erect. 25. *Malaxis*.
9. Column more or less elongate; anther incumbent. 26. *Liparis*.
8. Pollinia appendaged, i.e. sometimes with a rudimentary viscid disk, sometimes with a caudicle having a viscid apex.
10. Column entirely without a foot, more or less adnate to the base of the lip (Subtribe LAELIDAE).
11. Pollinia two or four, with two in each cell of the anther when four are present.
12. Lip gibbous or saccate at the base; flowers with an evident mentum. 28. *Nageliella*.
12. Lip neither gibbous nor saccate at the base.
13. Lip geniculate at its junction with the column. 27. *Hexisea*.
13. Lip not geniculate at its junction with the column.
14. Flowers usually not large and showy; stems either pseudobulbous or epseudobulbous.
15. Lip without hollow horn-like processes, commonly adnate to the column at base but not always so.
29. *Epidendrum*.
15. Lip with two large hollow horn-like processes, free or nearly so. 30. *Diacrium*.
14. Flowers large and showy; stems always pseudobulbous.
31. *Cattleya*.¹
11. Pollinia eight, four in each cell of the anther.
16. Pollinia in four pairs, each pair joined by parallel caudicles; anther operculate.
17. Lip from base gradually passing into the lamina; pollinia nearly of one size, subequal. 32. *Laelia*.
17. Lip abruptly broadened into the lamina; pollinia of two sizes, unequal.
18. Lip very different from the sepals. 33. *Brassavola*.
18. Lip similar to the sepals. 35. *Homalopetalum*.
16. Pollinia a fascicle of eight, not paired, in one series; anther not operculate. 34. *Meiracyllium*.
10. Column produced into a distinct foot (though sometimes abbreviated); lip not adnate to the column or at most with margins adnate to the base of the column-foot (Subtribe PONERIDAE).
19. Pollinia four or six.

¹ *Cattleya* and *Epidendrum* are technically indistinguishable and are scarcely more than genera of convenience.

- 20. Leaves not distichous on an elongate stem, terminal and usually paired on pseudobulbs or short thickened stems; pollinia four or six.....36. *Scaphyglottis*.
- 20. Leaves distichous and scattered along an elongate stem; pollinia four.
 - 21. Inflorescences 1-flowered, fasciculate.
 - 22. Inflorescences lateral on the stem in the axils of leaves; leaves not fleshy.....37. *Ponera*.
 - 22. Inflorescences terminal on the stem; leaves more or less fleshy.....38. *Jacquinilla*.
 - 21. Inflorescences racemose.
 - 23. Lip S-shaped at the base; inflorescence terminal only. 39. *Isochilus*.
 - 23. Lip not S-shaped at the base; inflorescences terminal and sometimes also lateral.....37. *Ponera*.
- 19. Pollinia eight.
 - 24. Leaf solitary, from the apex of a stout stem; inflorescences subtended by a single large spathe.....40. *Arpophyllum*.
 - 24. Leaves two or more, from the apex of a pseudobulb; inflorescences not subtended by a single large spathe.
 - 25. Column-foot much shorter than the column proper, very inconspicuous; mentum obsolescent.....41. *Coelia*.
 - 25. Column-foot subequal in length to the column proper; mentum conspicuous.....42. *Bothriochilus*.
- 1. Viscid disk distinct, regular, with the margins well defined, arising from the apex of the rostellum.
 - 26. Column with a foot; plants with pseudobulbs or with swollen bases to the stems; pollinia four or four joined into two pairs (Subtribe POLYSTACHYAE).
 - 27. Lip without a spur.....43. *Polystachya*.
 - 27. Lip with a spur.....44. *Galeandra*.
 - 26. Column without a foot; plants without pseudobulbs; pollinia two (Subtribe EPIDANTHEAE).....45. *Epidanthus*.
- A. Series b.—PLEURANTHAE. Inflorescence lateral, arising near the base of the pseudobulbs or in the axils of the leaves or of the sheaths of the lower stems.
- B. Subseries a.—SYMPODIALES. Plants forming a sympodium, i.e. with the stems approximate or superimposed and manifestly terminated by commonly smaller apical leaves.
 - 28. Pollinia without a stipe; viscid disk (if present) commonly rudimentary or the apex of the caudicle glutinous.
 - 29. Rhizome shortened or coralloid, bulbous, annulate, with short internodes; pseudobulbs usually none; leaves plicate or entirely lacking (in the saprophytic genera); plants terrestrial.
 - 30. Plants saprophytic, without true leaves; rhizome coralloid; stems elongate (Subtribe CORALLORHIZEAE).
 - 31. Lip with 5 to 7 longitudinal lamellae on the disk; pollinia eight.....46. *Hexalectris*.
 - 31. Lip with 2 lamellae at most; pollinia four...47. *Corallorrhiza*.
 - 30. Plants not saprophytic, with green leaves; roots not coralloid; stems shortened or pseudobulbous (Subtribe PHAJAEAE).
 - 32. Lip with a spur.....48. *Calanthe*.
 - 32. Lip without a spur.....49. *Bletia*.
 - 29. Rhizome more or less elongate; stems pseudobulbous, 1- or several-leaved; leaves flat or plicate; plants epiphytic.

- 33. Pseudobulbs homoblastic (i.e. of several nodes, only the terminal one of which bears well-developed leaves), fusiform, several-leaved; leaves plicate, rather thin; flowers relatively large (Subtribe CHYSIEAE).....50. *Chysis*.
- 33. Pseudobulbs heteroblastic (i.e. of a single node with one or two terminal leaves), usually small; leaves coriaceous or fleshy, not plicate; flowers relatively small (Subtribe BULBOPHYLLEAE).
51. *Bulbophyllum*.
- 28. Pollinia with a prominent stipe (though sometimes short); viscid disk distinct.
- 34. Pollinia of a waxy texture, easily compressed or crushed (Subtribe CYRTOPODIEAE).
- 35. Lip spurred or with a strongly saccate base.....52. *Eulophia*.
- 35. Lip neither spurred nor with a saccate base.
- 36. Lip prominently 3-lobed.....53. *Cyrtopodium*.
- 36. Lip simple or at most crenulate.....54. *Govenia*.
- 34. Pollinia of a cartilaginous texture, i.e. neither easily compressed nor crushed.
- 37. Leaves convolutive in vernation.
- 38. Pseudobulbs large, fusiform, homoblastic, several-leaved (Subtribe CATASETEAE).
- 39. Column twisted; flowers perfect (monomorphic or polymorphic).....55. *Mormodes*.
- 39. Column not twisted; flowers rarely perfect (dimorphic or trimorphic).
- 40. Column thick, straight, usually with two retrorse antennae in male flowers.....56. *Catasetum*.
- 40. Column slender, curved or arcuate, without retrorse antennae.....57. *Cynoches*.
- 38. Pseudobulbs short, heteroblastic, 1- to few-leaved.
- 41. Lip continuous with the base of the column or solidly attached to the short column-foot, not articulated, more or less prominently divided into a hypochile and epichile (Subtribe GONGOREAE).
- 42. Petals conspicuously narrower than the sepals, usually inserted near or on the very base of the column.
- 43. Epichile not saccate.....62. *Gongora*.
- 43. Epichile deeply saccate.....63. *Coryanthes*.
- 42. Petals not conspicuously narrower than the sepals.
- 44. Epichile saccate.....63. *Coryanthes*.
- 44. Epichile not saccate.
- 45. Lateral sepals strongly reflexed in anthesis.
61. *Stanhopea*.
- 45. Lateral sepals not strongly reflexed in anthesis.
- 46. Pseudobulb with a solitary leaf.....59. *Houlletia*.
- 46. Pseudobulb with two or more leaves.
- 47. Lip with a slender claw; lateral lobes of lip oblong-falcate, acute.....60. *Paphinia*.
- 47. Lip without a slender claw; lateral lobes of lip subquadrate, truncate.....58. *Lacaena*.
- 41. Lip articulated with the apex of the column-foot.
- 48. Inflorescence basal, i.e. arising at the base of the pseudobulb; lip usually provided with a depressed longitudinal callus (Subtribe LYCASTEAE).

49. Inflorescence a few- to many-flowered raceme.
64. *Xylobium*.
49. Inflorescence consisting of a single flower . . . 65. *Lycaste*.
48. Inflorescence suprabasal, i.e. in the axils of the lower (sometimes leaf-bearing) sheaths; lip usually provided with a transverse callus or a transverse flabellate crest (Subtribe ZYGOPETALEAE) . . . 66. *Zygopetalum*.
37. Leaves duplicative in veneration.
50. Column commonly produced into a foot and forming a mentum with the lateral sepals; rostellum not produced, emarginate.
51. Callus of the lip transverse, commonly flabellate; inflorescence suprabasal, i.e. in the axils of the lower (often leaf-bearing) sheaths; pseudobulbs reduced or rudimentary (Subtribe HUNTLEYAE) . . . 67. *Chondrorhynchus*.
51. Callus of the lip longitudinal, often depressed or rarely none; inflorescence borne at the base of the pseudobulb; pseudobulbs usually well developed and often with elongate stems (Subtribe MAXILLARIEAE).
52. Sepals forming a short tube at the base . . . 70. *Trigonidium*.
52. Sepals not forming a tube at the base.
53. Viscid disk lunate; column almost footless; peduncle commonly as long as or longer than the leaves.
69. *Mormolyca*.
53. Viscid disk rounded; column with a distinct foot; peduncle usually much shorter than the leaves.
68. *Maxillaria*.
50. Column always without a foot; rostellum produced, commonly bifid, sometimes subulate and acute.
54. Anther incumbent; rostellum porrect or deflexed, sometimes with the apex ascending.
55. Base of the lip deeply saccate or spurred, or the lateral sepals connate and saccate or spurred at the base.
56. Lateral sepals free; base of the lip deeply saccate or forming a single spur; inflorescence 1- or 2-flowered (Subtribe TRICHOCENTREAE) . . . 71. *Trichocentrum*.
56. Lateral sepals connate, saccate or spurred at the base; base of the lip neither deeply saccate nor forming a single spur; inflorescence racemose or paniculate (Subtribe COMPARETTIEAE).
57. Lip with a pair of flattened porrect lamellate calli near the apex . . . 73. *Scelochilus*.
57. Lip without lamellate calli near the apex.
58. Lip with two filiform appendages at the base.
74. *Comparettia*.
58. Lip without filiform appendages at the base.
72. *Ionopsis*.
55. Base of the lip neither saccate nor spurred; lateral sepals free or connate, if connate neither spurred nor saccate at the base (Subtribe ONCIDIEAE).
59. Pollinia two.
60. Leaves articulated, i.e. deciduous with age; plants with pseudobulbs; inflorescence from the base of the pseudobulb.
61. Base of the lip enfolding the column and shortly adnate to it at its base (Subtribe TRICHOPILEEAE).
75. *Trichopilia*.

61. Base of the lip not enfolding the column.
62. Sepals and petals long-caudate; column not winged at the apex.....78. *Brassia*.
62. Sepals and petals not long-caudate (or if so the column is winged or auriculate); column winged or wingless at apex.
63. Lip inserted on the column near the middle.
77. *Aspasia*.
63. Lip not inserted on the column near the middle.
64. Lateral sepals entirely united.79. *Palumbina*.
64. Lateral sepals not entirely united, at most only partly united.
65. Anther produced in front into a membranaceous appendage longer than (rarely equaling) the locule.....81. *Leochilus*.
65. Anther not produced in front into a membranaceous appendage longer than the locule.
66. Lip long-unguiculate..82. *Sigmatostalix*.
66. Lip not long-unguiculate.
67. Basal part of lip erect and more or less parallel to the column; calli of the lip usually two, parallel and not joined; column usually not winged.
76. *Odontoglossum*.
67. Basal part of lip spreading (at almost a right angle) from the column; calli on the lip various; column usually winged at the apex.....80. *Oncidium*.
60. Leaves not articulated, i.e. marcescent, equitant, closely approximate; stems elongate and pseudobulbose (Subtribe LOCKHARTIEAE).....83. *Lockhartia*.
59. Pollinia four (Subtribe ORNITHOCEPHALEAE).
84. *Ornithocephalus*.
54. Anther erect on the back of the column or on the apex of the column under the clinandrium; rostellum erect (Subtribe NOTYLIEAE).
68. Lip simple, not lobed.....85. *Notylia*.
68. Lip 3- or 4-lobed.
69. Lip 4-lobed, the lateral lobes linear to narrowly lanceolate.....86. *Cryptarrhena*.
69. Lip 3-lobed, the lateral lobes suborbicular-ovate to semiorbicular.....87. *Macradenia*.
- B. Subseries b.—MONOPODIALES. Plants forming a monopodium, i.e. the stems with unlimited growth.
70. Inflorescence 1-flowered; lip without a spur; column often with an infrastigmatic ligule (Subtribe DICHAEAEAE).....88. *Dichaea*.
70. Inflorescence racemose, several- to many-flowered; lip with a basal spur; column always without an infrastigmatic ligule (Subtribe SARCANTHEAE).....89. *Campylocentrum*.

1. CYPRIPIEDUM L.

Terrestrial herbs with fibrous roots rising from a short rootstock. Leaves cauline, plicate. Flowers showy, subtended by foliaceous bracts. Sepals spread-



FIG. 1. *Cypripedium irapeanum*. Flowering plant ($\times \frac{2}{6}$). Drawn by D. E. Tibbitts.

ing, free or with the lateral pair partially or wholly united. Petals spreading, free, usually smaller than the sepals. Lip sessile, strongly inflated, pouch-shaped. Column declined, with two laterally placed fertile stamens each bearing a 2-celled anther and a dorsally placed sterile petaloid thick staminode; pollen granular. Ovary 1-celled.

This genus consists of about fifty species that are widespread in boreal, temperate and tropical regions of Europe, Asia and America. They are considered to be the most primitive orchids extant and represent what appears to be a section isolated from the rest of the family, without any intermediate or connecting genera surviving today.

Cypripedium irapeanum Llave & Lex. Nov. Veg. Descr. (Orch. Opusc.) 2: 10. 1825. Figure 1.

On open grassy hillsides or in loamy soil in pine-oak forests on mountain slopes, up to 3,200 meters alt. Mexico and Guatemala. Often common locally.

Plant stout, densely pilose throughout, 3.5–10.5 dm. tall; stem leafy. Leaves suborbicular-ovate to narrowly lanceolate, acute to acuminate, 3–13 cm. long, 2–8.5 cm. wide. Inflorescence a solitary flower or few-flowered raceme (as many as six flowers). Floral bracts similar to but somewhat smaller than the leaves. Flowers bright yellow, with strongly arcuate pedicellate ovaries that are 3–5 cm. long and densely covered with brownish glandular pubescence. Perianth parts more or less pubescent. Sepals often suffused or striped with pale green; dorsal sepal broadly elliptic, acute or submucronate, 3–6 cm. long, 1.8–3.5 cm. wide; lateral sepals connate; lamina oblong-elliptic, emarginate or subacute, 3–5 cm. long, 2–3 cm. wide. Petals oblong-elliptic, antrorsely curved, 3–6.5 cm. long, 2.7–3 cm. wide. Lip obovoid, strongly saccate, interior surface at base densely tomentose and with bright red spots, exterior surface glabrous, 4–6 cm. long, 3–3.5 cm. wide at the widest point. Column about 2 cm. long; staminode ovate, acuminate, subtrilobed, about 1.2 cm. long.

Although *C. irapeanum* is not common in collections, collectors' notes often state that it occurs abundantly where it grows naturally. It is a showy species and rivals in beauty the North American *C. reginae* Walt., which it resembles. It is one of the two species of diandrous orchids found in Guatemala, and here represents the southernmost extension of the genus in the western hemisphere.

Guatemala: Near San Rafael, about 10 miles from Guatemala, *Margaret Ward Lewis* 151.—Huehuetenango: Along Río Selegua, opposite San Sebastián H., *Steyermark* 50491. Above La Libertad, on Cerro Pueblo Viejo, "common here by the thousands of plants," *Steyermark* 50973.—Sacatepéquez: Volcán de Agua, *Hartweg* (fide Hemsley). San Luis Pastores, *Johnston* 1645.—Sololá: Volcán San

Pedro, north-facing slopes toward Lago de Atitlán, above village of San Pedro, *Steyermark* 47181. "Guatemala," *Skinner*.

2. PHRAGMIPEDIUM Rolfe

Terrestrial or epiphytic herbs with fibrous roots. Leaves coriaceous, ligulate, conduplicate, sulcate. Flowers large, showy in few- to many-flowered racemes or panicles. Sepals spreading, with the dorsal one free and the lateral ones entirely united. Petals free, spreading, similar to the sepals or long-caudate (in our species). Lip sessile, inflated, calceolate. Column short, stout, with two laterally placed fertile stamens each bearing a 2-celled anther and a dorsally placed sterile, petaloid staminode; pollen granular. Ovary 3-celled.

There are in this genus in tropical America about a dozen species, which are mainly confined to South America. The elongated petals are characteristic.

Phragmipedium caudatum (Lindl.) Rolfe, *Orch. Rev.* 4: 332. 1896. *Cypripedium caudatum* Lindl. *Gen. & Sp. Orch. Pl.* 531. 1840. Figure 2.

Epiphytic on trees or in humus on open or shaded rocks, up to 2,000 meters alt. Rare in Guatemala and Panama; widespread in northern South America.

Plant rather stout, erect or ascending, 4-5 dm. tall. Stem scapose, densely and finely pilose, supporting 2-4 flowers, provided about the middle with a conduplicate foliaceous bract that is about 8 cm. long and 3 cm. wide. Leaves radical, spreading, distichous, ligulate, obtuse to subacute, dorsally sulcate, leathery and glossy, glabrous, 10-35 cm. long, 2-4 cm. wide. Floral bracts conduplicate, elliptic, obtuse to broadly rounded at the apex, 4-9.5 cm. long, 3-4.5 cm. wide when spread out. Flowers variously colored, usually yellow-green flushed with reddish brown or purple, with stout arcuate pedicellate ovaries that are 12-19 cm. long and finely pilose. Sepals pubescent on the outer surface, conspicuously nerved, undulate-wavy along the margins; dorsal sepal lanceolate, long-acuminate with an obtuse tip, arched over the lip, 9-16 cm. long, 2-3 cm. wide near the base; lateral sepals united into a broadly lanceolate or ovate-lanceolate lamina that is long-acuminate at the apex and concave below the middle, 8-13 cm. long, 3-4.5 cm. wide. Petals narrowly lanceolate and falcate at the base, extended into extremely long pendent caudae which are up to 75 cm. long (rarely only a few cm. in length), about 1 cm. wide near the base, pubescent especially near the tip with brown articulated hairs, with a dense tuft of hairs on the inner surface at the base. Lip calceolate, inflated, ellipsoid, open above with the anterior margins of the orifice induplicate and pubescent within, puberulent on the outer surface, usually greenish with a reddish brown reticulation, purple-spotted on the interior surface, 5-6.5 cm. long. Staminode flat, transversely triangular with the angles obtuse, purplish, more or less pubescent along the margins, about 1 cm. long, 1.2-1.6 cm. wide. Capsule cylindrical, about 10 cm. long and 8 mm. in diameter.

This species is characterized by having extremely long petals. When the flower-buds first open the petals are about the length of the sepals. However, after the flower is completely opened, the petals continue growth until they attain a length of from 30 to 75 cm.

Alta Verapaz: Rare on trees in Pansamalá, May, 1887, *Türckheim* 1248. Xuchaneb (cultivated in garden of Don Mariano Pacheco H. in Guatemala City), *Steiermark* 46392.—Huehuetenango: Vicinity of Maxbal, about 17 miles north of Barillas, Sierra de los Cuchumatanes, *Steiermark* 48522.—Guatemala: "The plant was purchased in Guatemala City by Mrs. [W. P.] Cockerell. . . . It was presumably collected in the mts. of Guatemala by an Indian. T. D. A. Cockerell, June 1918." Somewhere between San Agustín A. and Salamá, specimen purchased in Cobán, *Margaret Ward Lewis* 127.

3. HABENARIA Willd.

Terrestrial or semiaquatic herbs with fleshy or tuberous roots; tubercles ovoid or fusiform-elongate. Plants erect, simple; stem with cauline or basal leaves or both, rarely with the leaves reduced to bracts. Flowers in showy or inconspicuous racemes, rarely solitary. Sepals free or somewhat coherent at the base, subequal; lateral sepals spreading or deflexed; dorsal sepal erect or forming a hood over the column. Petals free, usually connivent with the dorsal sepal, entire or bifid, polymorphic. Lip usually slightly adnate to the column, entire, toothed, or tripartite, at the base produced into a spur. Column short; stigmas with or without papillose processes; anther one, two-celled, persistent; pollen granular.

This is a polymorphic genus of approximately five hundred species that are natives mainly of the warmer regions of the world. They are found chiefly in woodlands, savannas, meadows and swamps, where they usually occur in moderately to strongly acid soils.

1. Petals entire or merely toothed at the base; lip entire, toothed on each side at the base or three-lobed.
2. Lip deeply three-lobed; leaves basal. *H. distans* var. *jamaicensis*.
2. Lip not deeply three-lobed; leaves cauline.
3. Stigmatic processes wanting; lip entire. *H. limosa*.
3. Stigmatic processes well developed, conspicuous; lip entire, toothed or sharply angled on each side at the base.
4. Ovary conspicuously winged, with the wings minutely papillose on the edges. *H. alata*.
4. Ovary not conspicuously winged.
5. Lip rounded or reduced to a narrow claw at the base; spur less than 1.5 cm. long. *H. eustachya*.
5. Lip toothed or sharply angled on each side at the base; spur more than 1.5 cm. long.
6. Petals rotundate-quadrate to suborbicular, obtuse. . . *H. strictissima*.
6. Petals subquadrate to oblong-quadrate, usually with the apex more or less trilobulate. *H. strictissima* var. *odontopetala*.



FIG. 2. *Phragmipedium caudatum*. Flowering plant ($\times \frac{1}{3}$). Drawn by D. E. Tibbitts.

1. Petals bifid; lip always three-lobed.
7. Flowers one to three.....*H. pauciflora*.
7. Flowers more than three.
 8. Leaves basal.....*H. distans*.
 8. Leaves not essentially basal.
 9. Spur more than 3.5 cm. long.
 10. Leaves mainly linear, coarse and thick when dry, more or less equitant; semiaquatic.....*H. bractescens*.
 10. Leaves ovate to oblong-lanceolate, thin and papery when dry, not equitant; non-aquatic.....*H. quinqueseta*.
 9. Spur less than 3.5 cm. long.
 11. Leaf-sheaths maculate; leaf-margins undulate-scarious.
H. monorrhiza.
 11. Leaf-sheaths not maculate; leaf-margins not undulate-scarious.
 12. Mid-nerve of the sepals, lobes of the lip, and anterior lobes of the petals papillose.....*H. crassicornis*.
 12. Sepals, lip and petals smooth.
 13. Flowers white; mid-lobe of lip conspicuously wider than the lateral lobes, subequal in length.....*H. clypeata*.
 13. Flowers green or yellowish green; mid-lobe of lip not conspicuously wider than the lateral lobes, subequal or unequal in length.
 14. Lobes of the lip subequal, pendent; semiaquatic...*H. repens*.
 14. Lobes of the lip unequal (rarely subequal) in length; lateral lobes mostly spreading and recurved; not aquatic.
 15. Leaves small, scattered along the stem; spur less than 2 cm. long.....*H. entomantha*.
 15. Leaves comparatively large, mostly near the middle of the stem; spur more than 2 cm. long.....*H. novemfida*.

Habenaria alata Hook. Exot. Fl. 3: t. 169. 1826. Figure 3.

Rather common on grassy hillsides and brushy slopes, in open meadows and pastures, and moist soil in open pine-oak forests, up to 1,900 meters alt. Widespread in the West Indies and Mexico, through Central America to South America.

Plant slender, glabrous, 1.7-7 dm. tall; stem leafy. Leaves narrowly lanceolate, acuminate, 6-14 cm. long, up to 2 cm. wide. Raceme 6-20 cm. long, 2.5-4.5 cm. in diameter. Floral bracts ovate-lanceolate to lanceolate, acuminate, 2-3.5 cm. long, about 6 mm. wide near the base. Flowers pale green, with broadly winged pedicellate ovaries that are about 1.5 cm. long. Sepals connivent at first, then spreading, with minutely papillose margins. Dorsal sepal broadly ovate to suborbicular, concave, rarely apiculate, the median nerve dorsally carinate, 6-10 mm. long, 5-7 mm. wide. Lateral sepals somewhat obliquely elliptic-lanceolate, apiculate and recurved at the apex, 7-10.5 mm. long, 3.5-4.5 mm. wide. Petals thick, opaque, lanceolate, obtuse to subacute, with a small lobe at the base on the anterior margin, 5.5-11 mm. long, 2-2.5 mm. wide. Lip thick, linear-lanceolate, with a tooth on each side near the base (occasionally with the basal triangular teeth inconspicuous or obsolete), directed forward, 5.5-8 mm. long, about 2 mm. wide. Spur recurved, clavate, 9-13 mm. long. Column about 2.5 mm. long. Capsule obliquely ellipsoid, prominently winged, about 1.5 cm. long.



FIG. 3. *Habenaria alata*. 1, flower, side view (about $\times 2$); 2, flower, with lateral sepals spread apart, front-side view (about $\times 2$); 3, lip, spur, and column, front-side view (about $\times 4$); 4, section from margin of sepal, showing papillose character (much enlarged); 5, petal (about $\times 4$). Drawn by Blanche Ames.

This is a polymorphic species. The lip commonly has a triangular protuberance on each side near the base. Sometimes these protuberances are so strongly developed that they give to the lip a three-lobed appearance, but frequently they are so much reduced that they become inconspicuous and obsolete.

Alta Verapaz: Cobán, *Türkheim* II 1501.—Chimaltenango: Between Chimaltenango and San Martín Jilotepeque, *Standley* 80868.

Near Finca La Alameda, near Chimaltenango, *Standley* 59143; 79764. Near Río Pixcayá, between Chimaltenango and San Martín Jilotepeque, *Standley* 64482.—Guatemala: Guatemala, *Jesús Morales* 1137.—Jutiapa: Between Agua Blanca and Amatillo, *Steyermark* 30388.—Sacatepéquez: Near Antigua, *Standley* 58547.—Santa Rosa: San Juan Utopa, *Heyde & Lux* 6247. Cerro Redondo, *Steyermark* 52213.—Zacapa: Lower slopes of Sierra de las Minas, above Río Hondo, *Steyermark* 29538. Along Río Lima, Sierra de las Minas, between Río Hondo and summit of mountain at Finca Alejandría, *Steyermark* 29631. From Doña Edna Sarg de Rodriguez, Finca San José Buena Vista, *Margaret Ward Lewis* 211.

Habenaria bractescens Lindl. Gen. & Sp. Orch. Pl. 308. 1835. *H. Pringlei* Robinson, Proc. Am. Acad. 27: 184. 1892. Figure 4.

Uncommon in bogs, marshes and on the border of lakes, semi-aquatic, up to 1,000 meters alt. Widespread and rather common, generally, from Mexico through Central and South America to Argentina.

Plant large, stout, glabrous, 4.5–12 dm. tall; stem leafy. Roots long, slender, fibrous, with the central one tuberous. Leaves linear to narrowly lanceolate, acuminate, conduplicate and keeled, 9–26 cm. long, 1.5–3 cm. wide. Raceme laxly few-flowered, 8–23 cm. long, 6–9 cm. in diameter. Floral bracts ovate-lanceolate, acuminate, 3.5–6 cm. long, up to 1.7 cm. wide near the base. Flowers large, white and pale green, with slender pedicellate ovaries that are 4–6.5 cm. long. Dorsal sepal elliptic, acute or apiculate and recurved at the apex, scarcely concave, 1.3–2.1 cm. long, 8–14 mm. wide. Lateral sepals obliquely ovate-elliptic, acute to acuminate, 1.4–2.4 cm. long, 6.5–10 mm. wide. Petals bipartite; posterior lobe linear-lanceolate, falcate, 1.2–2.2 cm. long, about 2 mm. wide; anterior lobe filiform, 1.2–2.5 cm. long, about 1.5 mm. wide. Lip tripartite to within 3–4 mm. of the base; mid-lobe narrowly linear, subacute, 1.5–2.2 cm. long, about 2 mm. wide; lateral lobes filiform, 1.6–2 cm. long. Spur slender, 5–15 cm. long. Capsule obliquely cylindrical, prominently ribbed, about 2.5 cm. long.

The extraordinarily large flowers, being white, make this species one of the most showy in the genus. It is easily distinguished from the closely related *H. quinqueseta* by its narrower leaves.

Escuintla: 2 km. north of San José, *Stork & Horton* 8832.—Izabal: Boca del Río Polochic, *Smith* 1583.—Petén: Lake Zotz, *Lundell* 3324.—Sololá: Around lake at Finca Mocá, slopes of Volcán Atitlán, *Steyermark* 47881. Jocoló, marshy edge of lake, *Johnson* 1001.

Habenaria clypeata Lindl. Gen. & Sp. Orch. Pl. 311. 1835. *H. lactiflora* A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 28. 1845. *H.*

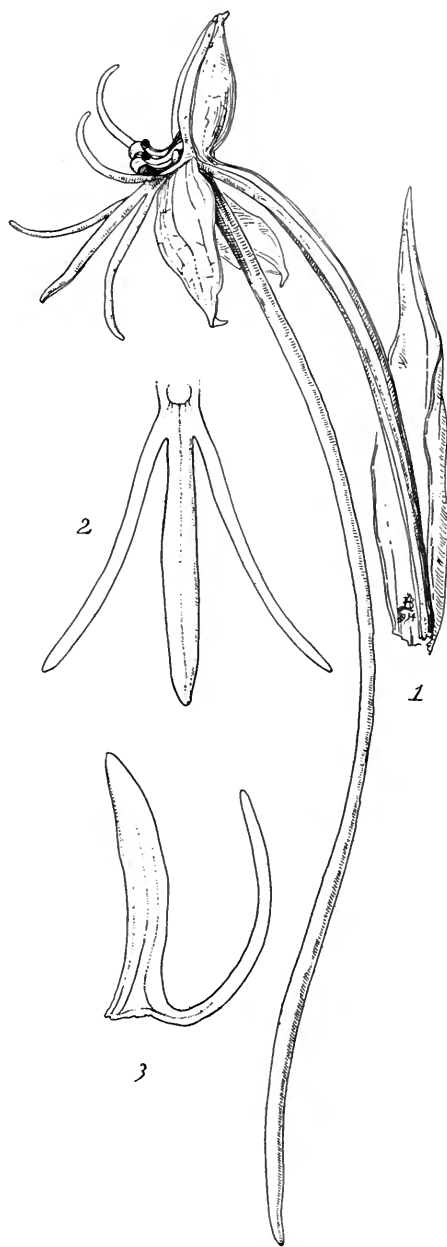


FIG. 4. *Habenaria bractescens* (*H. Pringlei*). 1, flower, side view ($\times 1$); 2, lip (about $\times 2$); 3, petal (about $\times 2$). Drawn by Blanche Ames.

spithamaea Schltr. Repert. Sp. Nov. 15: 195. 1918 (type: Guatemala, in pinetis inter Casillas et Laguna de Ayarza, July, 1870, Bernoulli & Cario 551). Figure 5.

In dry rocky pine-oak scrub forests, also in boggy ground, on grassy slopes, pastures, loamy soil of ridges and sandy, limy soil, up to 2,500 meters alt. Rather rare in Mexico, Guatemala, Honduras, Costa Rica and Panama.

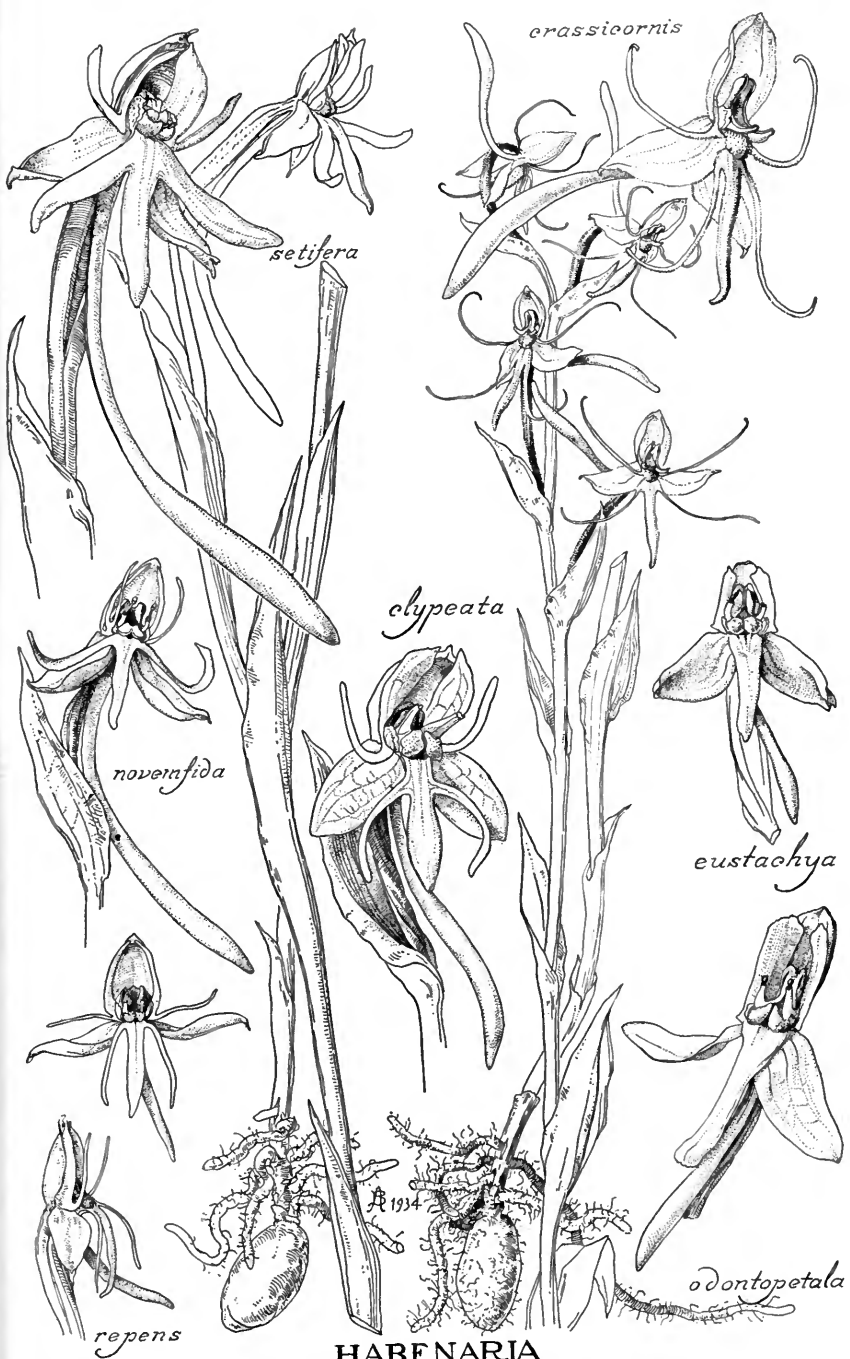
Plant small, slender, glabrous, with a globose tuber attached to the base of the stem, 1.1–5.3 dm. tall; stem leafy. Leaves small, oblong-elliptic to narrowly lanceolate, acute, acuminate or cuspidate, equitant, mostly strongly conduplicate, ensiform, 3.5–7 cm. long, 0.8–3 cm. wide. Inflorescence a few- to many-flowered raceme, 4–10 cm. long, 3–4 cm. in diameter. Bracts large, ovate-lanceolate, acuminate, cucullate and clasping the pedicellate ovary, 1.5–3 cm. long. Flowers white, fragrant of hyacinth, with slender pedicellate ovaries that are 1.5–2 cm. long. Dorsal sepal elliptic, strongly concave-galeate, 9–10 mm. long, 6–7 mm. wide. Lateral sepals obliquely oblong-elliptic, obtuse or subacute, 8–9 mm. long, 3–4.5 mm. wide. Petals bipartite; posterior lobe linear-oblong, falcate, connivent with the dorsal sepal, 6–10 mm. long, 1.8–3 mm. wide; anterior lobe filiform, recurved, 11–12.5 mm. long. Lip tripartite to the base or to within 2.5–3 mm. from the base; mid-lobe linear, obtuse, 6.5–12 mm. long, 1–2.5 mm. wide; lateral lobes filiform, 8–15 mm. long. Spur stout, clavate, somewhat recurved, 1.5–2.5 cm. long. Column about 3 mm. long.

The lateral segments of the lip are basal or sometimes, together with the mid-lobe, separated from the base of the lip by a well-developed claw and are either shorter than or about equal to the mid-lobe.

Huehuetenango: Between Chanquejelvé and Ixcacao, Sierra de los Cuchumatanes, *Steiermark* 51804.—Jalapa: Between Miramundo and summit of Montaña Miramundo, between Jalapa and Mataquescuintla, *Steiermark* 32697.—Santa Rosa: Cerro Gordo, 1,100 meters, *Heyde & Lux* 3858. Between Casillas and Laguna de Ayarza, *Bernoulli* 706 (fide W. B. Hemsley).—Zacapa: Sierra de las Minas, between Río Hondo and summit of mountain at Finca Alejandría, *Steiermark* 29639.

Habenaria crassicornis Lindl. Gen. & Sp. Orch. Pl. 311. 1835. Figure 5.

FIG. 5. *Habenaria clypeata*: Flower (about $\times 2$). *H. crassicornis*: Flowering plant ($\times 1$); individual flower (about $\times 2$). *H. eustachya*: Flower (about $\times 2$). *H. novemfida*: Flower (about $\times 2$). *H. strictissima* var. *odontopetala* (*H. odontopetala*): Flower (about $\times 2$). *H. repens*: Two flowers (front and side views; about $\times 2$). *H. setifera*: Plant ($\times 1$); individual flower (about $\times 1\frac{1}{3}$); not found in Guatemala. Drawn by Blanche Ames.



HABENARIA

Uncommon in pine-oak woods, moist ravines, open grassy fields, and mountain woods, up to 2,700 meters alt. Mexico, Guatemala and Honduras.

Plant slender, glandular-puberulent above, with a small globose tuber attached to the base of the stem, 1.2–3.8 dm. tall; stem leafy. Leaves small, ovate to lanceolate, acute or acuminate, equitant, keeled, 2–5 cm. long, 0.7–2.2 cm. wide. Inflorescence a very loose few-flowered raceme, 5–11 cm. long, 3–4.5 cm. in diameter. Bracts broadly ovate, acuminate, clasping, 1.2–2.2 cm. long. Flowers yellowish green and white, with slender, pedicellate ovaries that are 2–2.5 cm. long. Sepals carinate along the mid-vein. Dorsal sepal ovate-elliptic, apiculate, concave, 7–8.5 mm. long, 4–5 mm. wide. Lateral sepals obliquely ovate-lanceolate, acute or acuminate (often apiculate, recurved at the apex), 8–11 mm. long, 4–4.5 mm. wide. Petals bipartite; posterior lobe narrowly linear, falcate, 8.5–10 mm. long; anterior lobe filiform, setaceous, divergent and recurved, 13–17 mm. long. Lip tripartite to within 2–3 mm. of the base; mid-lobe filiform, 10–13.5 mm. long; lateral lobes filiform, setaceous, 13–16 mm. long. Spur thick, semi-oblong at the apex, ascending from a very slender basal portion, 1.5–2.1 (rarely as much as 2.8) cm. long. Column 2.5–3.5 mm. long. Capsule obliquely cylindrical, ribbed, about 1.5 cm. long.

This species is distinguished from a nearly related species, namely *H. entomantha*, by the minutely glandular puberulence of the various parts of the flower and often of the entire inflorescence. The ovary is also glandular along the ribs.

Chimaltenango: Finca Alameda, *J. R. Johnston* 155.—Huehuetenango: Terrestrial in dry scrubby woods of oak, pine and arbutus, *Skutch* 1635.—Jalapa: Cerro Alcoba, just east of Jalapa, *Steyermark* 32510.—Santa Rosa: Cerro Gordo, *Heyde & Lux* 3858b.

Habenaria distans Griseb. Cat. Pl. Cub. 270. 1866. *H. Tuerckheimii* Schltr. Repert. Sp. Nov. 2: 129. 1906 (type: Guatemala, in Felsspalten bei Cubilgüitz, August, 1903, *H. von Türrckheim* 766). Figure 6.

Uncommon in shady damp forests, on moist grassy slopes, up to 1,800 meters alt. Ranging widely from Florida and Mexico to Guatemala and Costa Rica, and throughout the West Indies.

Plant slender, glabrous, 1.4–3.3 dm. tall; stem clothed with bracteal leaves. Leaves 2–6, essentially basal, oblong-elliptic (rarely ovate or obovate), acute, abruptly diminishing into bracts above, 6–15 cm. long, 2–5 cm. wide. Inflorescence a loose raceme composed of 5–21 scattered flowers, 4–13 cm. long. Floral bracts

FIG. 6. *Habenaria distans*. 1, plant ($\times 1$); 2, flower, front view ($\times 2\frac{1}{2}$); 3, petal ($\times 3$); 4, pollen mass (highly magnified). Original drawing by Blanche Ames; redrawn by G. W. Dillon.



narrowly lanceolate, acuminate, 1-2 cm. long. Flowers greenish, with slender pedicellate ovaries that are 1-1.5 cm. long. Dorsal sepal oblong-elliptic, concave, 5-8 mm. long, 4-5 mm. wide. Lateral sepals somewhat deflexed, curved upward toward the apex, obliquely oval to ovate-oblong, acute, 5-8 mm. long, 2-3 mm. wide. Petals bipartite, the two lobes about equal in length, 6-8 mm. long; posterior lobe suberect, narrowly linear, falcate, about 1 mm. wide; anterior lobe filiform, usually slightly longer than the posterior lobe. Lip tripartite; mid-lobe narrowly linear, pendent, 7-10 mm. long; lateral lobes filiform, spreading, curved upward, 8-11 mm. long. Spur gradually clavate at the apex, 1.2-1.5 cm. long. Capsule ellipsoid, strongly ribbed, about 1.2 cm. long.

Habenaria distans is distinctive in that its leaves are essentially basal or in a basal rosette. This species is the only Guatemalan *Habenaria* that has this character.

Alta Verapaz: Cubilgüitz, *Türckheim* 8308; 8588 (isotype of *H. Tuerckheimii* Schltr.).—Chiquimula: Along Río Tacó, between Chiquimula and Montaña Barriol, 3-15 miles northwest of Chiquimula, *Steyermark* 30633 (probably).—Huehuetenango: Trail between Santa Ana Huista and Nentón, via hamaca over Río Azul and "La Laguna," Sierra de los Cuchumatanes, *Steyermark* 51379.

Habenaria distans Griseb. var. *jamaicensis* (Fawc. & Rendle) Cogn. in Urban Symb. Antill. 6: 300. 1909. *Habenaria jamaicensis* Fawc. & Rendle in Journ. Bot. 47: 126. 1909.

Among mosses on rocky or clayey banks in shade, in cloud forests, up to 1,800 meters alt. Widespread but rare in Mexico, Guatemala, Costa Rica, Jamaica, Haiti and Santo Domingo.

Variety *jamaicensis* is identical in habit with the typical form. However, the flowers are usually fewer and smaller and the petals are entire or develop only a short anterior lobe. As originally described, the petals of *H. jamaicensis* possessed short, inconspicuous anterior lobes. However, in the Guatemalan and Mexican material seen the petals are entire. It seems best, nevertheless, to treat all of these plants as var. *jamaicensis*.

Chiquimula: Upper slopes of Montaña Tajurán, in vicinity of El Barriol, *Steyermark* 30799.

Habenaria entomantha (Llave & Lex.) Lindl. Gen. & Sp. Orch. Pl. 311. 1835. *Orchis entomantha* Llave & Lex. Nov. Veg. Descr. (Orch. Opusc.) 2: 8. 1825. *Habenaria tetranema* Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 373. 1918 (type: Guatemala, Camino de Sapote, locis herbidis, July, 1866, *G. Bernoulli* 325).

Rather common in moist soil of mixed pine-hardwood forests, damp soil of grassy hillsides, fields, in earth pockets of lava flow, edges of lakes and sedge bogs, up to 3,300 meters alt. Widespread

in Mexico, Guatemala, British Honduras, and Honduras; reported from Venezuela.

Plant slender, with a small ovoid tuber attached to the base of the stem, 1.3–4.5 dm. tall; stem leafy. Leaves small, ovate, linear-oblong to ovate-lanceolate, subacute to acuminate, equitant, often reduced to tubular-clasping bracteal leaves, silvery beneath, 1.5–5 cm. long, 0.8–2.5 cm. wide. Inflorescence a loose or dense cylindrical raceme of many or few flowers, 3.5–16 cm. long, 1.5–4 cm. in diameter. Bracts lanceolate, acuminate, 1.3–2.5 cm. long. Flowers green or greenish yellow, with slender pedicellate ovaries that are 0.8–1.7 cm. long. Sepals carinate along the mid-vein. Dorsal sepal suborbicular-ovate to broadly elliptic, obtuse to acute, occasionally apiculate and recurved at the apex, 6–7 mm. long, 3.5–5 mm. wide. Lateral sepals obliquely oblong-lanceolate to lanceolate, acute and strongly recurved at the apex, 6–7 mm. long, 2–3 mm. wide. Petals bipartite; posterior lobe narrowly linear, falcate, 5.5–6 mm. long, 1–1.5 mm. wide; anterior lobe filiform, recurved, 7–10.5 mm. long. Lip tripartite to the base; mid-lobe linear-filiform, 5.5–12 mm. long, about 1 mm. wide; lateral lobes filiform, 9–13 mm. long. Spur fusiform-clavate, recurved, 0.9–1.7 cm. long. Column about 2 mm. long. Capsule obliquely ellipsoid, about 1.3 cm. long.

Habenaria entomantha is a highly variable and polymorphic species. The small flowers and diminished equitant leaves of this plant are more delicate and graceful than the robust appearance and spreading leaves of *H. novemfida*, with which it is sometimes confused. This orchid is commonly called "jasmin de monte."

Alta Verapaz: Santa Cruz, *Türkheim* 1393.—Chimaltenango: Finca Alameda, *J. R. Johnston* 920. Near Tecpam, *Skutch* 519.—El Progreso: Between Calera and summit of Volcán Siglo, *Steyermark* 43054(?).—Huehuetenango: Cerro Pixpí, above San Ildefonso Ixtahuacán, *Steyermark* 50619a. Cerro Negro, 2 miles east of Las Palmas, Sierra de los Cuchumatanes, *Steyermark* 51727. Above Democracia on trail towards Jutal, *Steyermark* 51059. About Laguna de Ocubila, east of Huehuetenango, *Standley* 82624. Cerro Victoria, Sierra de los Cuchumatanes, near Barillas, *Steyermark* 49759. Between San Mateo Ixtatán and Santa Eulalia, Sierra de los Cuchumatanes, *Steyermark* 49901.—Quiché: *José Ignacio Aguilar* 1534.—Sololá: Volcán Santa Clara, *Steyermark* 46985.

Habenaria eustachya Reichb. f. Ber. Deutsch. Bot. Gesell. 3: 274. 1885. Figure 5.

Uncommon in rich hillside woods, soggy or wet ground in dense forests and open woods, up to 800 meters alt. West Indies, Mexico, Guatemala and Honduras.

Plant rather stout, 2–10.5 dm. tall; stem leafy. Leaves narrowly elliptic to lanceolate, obtuse, acute to acuminate, 5–20 cm. long, 2–4 cm. wide. Inflorescence a loosely or densely flowered, cylindrical raceme, 6–42 cm. long, 3–3.5 cm. in diam-

eter. Bracts lanceolate, acuminate, 1.3–2.5 cm. long. Flowers green or yellowish green, with stout pedicellate ovaries that are 1.1–1.8 cm. long. Dorsal sepal suborbicular, deeply concave-galeate, 4–5 mm. long, about 4 mm. wide. Lateral sepals obliquely oblong-elliptic, obtuse to broadly rounded, strongly deflexed, spreading, 6–7 mm. long, about 3.5 mm. wide. Petals somewhat obliquely oblong-quadrate, with obtuse angles, rounded or sinuately 2–3 toothed at the apex, with a protuberance at the base on the anterior margin, 4–5 mm. long, 1.5–2 mm. wide. Lip entire, linear-oblong, subacute, deflexed, rounded or reduced to a narrow claw at the base, 5–8 mm. long, 1.5–2 mm. wide. Spur slender, slightly thickened toward the apex, 10–12 mm. long. Capsule obliquely cylindrical-fusiform, 11–13 mm. long, about 4.5 mm. in diameter.

This species approaches *H. strictissima* very closely. It differs from *H. strictissima* in that the lip is not lobed or toothed at the base and the spur is much shorter, being constantly between 10 and 12 mm. in length.

Alta Verapaz: Cubilgüitz, *Türckheim* 8298.

Habenaria limosa (Lindl.) Hemsl. in Godm. & Salvin, Biol. Centr.-Am. 3: 305. 1884. *Platanthera limosa* Lindl. Ann. Nat. Hist. 4: 381. 1840. *P. guatemalensis* Schltr. Repert. Sp. Nov. 15: 193. 1918 (type: Guatemala, locis graminosis, Volcán de Sta. María, September, 1876, *Bernoulli & Cario*). Figure 7.

Rather frequent in mossy ground in open woods, along cold brooks and in open sedge marshes at high elevations, up to 3,700 meters alt. Nevada, Arizona and New Mexico, south through Mexico to Guatemala.

Plant slender or stout, glabrous throughout, 3–16.5 dm. tall; stem leafy, provided at the base with tubular sheaths. Leaves lanceolate, acuminate, silvery green, suberect, 9–28 cm. long, 1.2–3.5 cm. wide. Raceme cylindrical, laxly or densely flowered, with the flowers approximate or sometimes compact or distant, elongated, 6–45 cm. long, 1–2.5 cm. in diameter. Floral bracts narrowly lanceolate, the lowermost up to 4 cm. long and greatly exceeding the flowers. Flowers small, green, fragrant. Dorsal sepal ovate-oblong to elliptic, obtuse, concave, connivent with the petals to form a hood over the column, 3-nerved, 3–6 mm. long, 2–3 mm. wide below the middle. Lateral sepals strongly deflexed, ovate-lanceolate to linear-elliptic, oblique, obtuse to subacute, 3-nerved, 4–8 mm. long, 1.8–2.5 mm. wide. Petals ovate-oblong to lanceolate, more or less falcate, obtuse to subacute, obliquely dilated at the base, connivent with the dorsal sepal, 3.2–6.5 mm. long, 1.5–3 mm. wide at the base. Lip linear-elliptic to elliptic-lanceolate, obtuse, tapering or rounded at the base, strongly arcuate-decurved in natural position, with a thick cushion or tubercle on the median face near the base, often with lightly

FIG. 7. *Habenaria limosa*. 1, plant ($\times \frac{1}{2}$); 2, flower, side view ($\times 4$); 3, dorsal sepal ($\times 4$); 4, petal ($\times 4$); 5, lateral sepal ($\times 4$); 6, lip ($\times 4$). Drawn by G. W. Dillon.



revolute margins, 4–8.5 mm. long, 1.5–2.5 mm. wide below the middle. Spur cylindrical, filiform, tapering at the apex, usually about twice as long as the lip, 1–2.5 cm. long, rarely shorter. Column stout, short, 1–2 mm. long.

Chimaltenango: Sierra Santa Elena, near Tecpam, *Caec. & Ed. Seler* 2294. Near Tecpam, *Skutch* 492.—Huehuetenango: 2½ miles east of San Mateo Ixtatán, Sierra de los Cuchumatanes, *Steyermark* 49879. Between Tojquiá and Caxín bluff, summit of Sierra de los Cuchumatanes, *Steyermark* 50168. Alpine areas in vicinity of Tunimá, Sierra de los Cuchumatanes, *Steyermark* 48342. Sierra de los Cuchumatanes, *Skutch* 1093.—Quezaltenango: Volcán Santo Tomás, *Steyermark* 34818.

Habenaria monorrhiza (Sw.) Reichb. f. Ber. Deutsch. Bot. Gesell. 3: 274. 1885. *Orchis monorrhiza* Sw. Prodr. 118. 1788, in part. *Habenaria maculosa* Lindl. Gen. & Sp. Orch. Pl. 308. 1835.

Rather common in low weedy ground, wet meadows and thickets, on wooded hillsides and open slopes, rarely on the base of trees, up to 1,500 meters alt. Widespread throughout the West Indies, Jamaica, Guatemala and northern South America.

Plant rather stout, glabrous, 1.8–12 dm. tall; stem leafy. Leaves ovate to lanceolate, acute or acuminate, with the margins undulate-scarious, 4–12 cm. long, 2–4 cm. wide; leaf-sheaths maculate. Raceme 5–22 cm. long, 2.5–4 cm. in diameter. Bracts ovate to oblong-lanceolate, acuminate, with the margins scarious, 1.2–2 cm. long. Flowers white, with stout pedicellate ovaries that are about 2 cm. long. Dorsal sepal oval to suborbicular, concave, the median nerve carinate, 6.5–7.5 mm. long, 4.5–5 mm. wide. Lateral sepals obliquely ovate or elliptic, somewhat carinate along the median nerve, 6–8 mm. long, 3.5–4 mm. wide. Petals bipartite; posterior lobe narrowly oblong or elliptic, obtuse, 6–8 mm. long, 2–3 mm. wide; anterior lobe filiform, 5–7 mm. long. Lip tripartite to the base; mid-lobe narrowly lingulate, rising from a broad base, 6.5–10 mm. long, about 1 mm. wide; lateral lobes filiform, 7.5–11.5 mm. long. Spur slender, 1.8–2.3 cm. long. Column 2.5 cm. long.

Habenaria monorrhiza is distinguished by its undulate-scarious leaf-margins and maculate leaf-sheaths.

Alta Verapaz: Cubilgüitz, *Türkheim* 8299. Cobán, *Türkheim* 8459; II 1507. Finca Mocca, *Johnson* 58. Senahie, *Goll* 172. Between Cobán and Finca Chimoté, near Rubeltein, *Steyermark* 44165.—Quezaltenango: Finca Helvetia, *Skutch* 1377. Finca San José Buenavista, near Coatepeque, *Margaret Ward Lewis* 211.—Retalhuleu: Near Chivolandia (Dept. Quezaltenango), along road to San Felipe, *Standley* 87210.

Habenaria novemfida Lindl. in Benth. Pl. Hartw. 94. 1842. *H. diffusa* A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 28. 1845. *H.*

dipleura Schltr. Repert. Sp. Nov. 15: 194. 1918 (type: Guatemala, Dept. Quiché, inter Joyabaj et Chichicastenango, September, 1870, Bernoulli & Cario 560). *H. quinquefila* Schltr. Repert. Sp. Nov. 15: 195. 1918 (type: Guatemala, locis graminosis inter Cobán et Gualán, August, 1870, Bernoulli & Cario). Figure 5.

Rather common on grassy slopes of open woods and shrub forests, along streams and in meadows and on open rocky hills, up to 2,800 meters alt. Mexico, Guatemala, Honduras, Salvador and Costa Rica.

Plant rather slender, glabrous, 2.5–7.5 dm. tall; stem leafy at or above the middle. Leaves oblong-elliptic to linear-lanceolate, acute or acuminate, spreading, 3–14 cm. long, 1.5–4 cm. wide. Raceme loose or compact with few to many flowers, 6–20 cm. long, 3.5–5.5 cm. in diameter. Bracts lanceolate, acuminate, 8–23 mm. long. Flowers pale green or yellowish green, with slender pedicellate ovaries that are 1.5–2.5 cm. long. Sepals carinate along the three central veins. Dorsal sepal ovate-elliptic to suborbicular, subacute, concave, 4.5–7 mm. long, 4–5 mm. wide. Lateral sepals obliquely ovate-elliptic to oblong, obtuse to subacute, 7–10 mm. long, 3–3.5 mm. wide. Petals bipartite; posterior lobe linear, falcate, 4.2–6 mm. long, 1–1.5 mm. wide; anterior lobe filiform, 7–10.5 mm. long. Lip tripartite to the base; mid-lobe narrowly linear, 6–11 mm. long, about 1 mm. wide; lateral lobes filiform or narrowly linear, spreading at right angles to the mid-lobe, strongly curved upwards (in some specimens irregularly denticulate on the concave margin), 11–15 mm. long. Spur slender, recurved, somewhat thickened at the apex, 2–3.2 cm. long. Column 2.5–3 cm. long.

Habenaria novemfida is an extremely variable species. The flowers resemble those of *H. entomantha* but are much larger. The plants of *H. novemfida* are larger and more robust than those of *H. entomantha* and the leaves are mostly near the middle of the stem and spreading, whereas the leaves of *H. entomantha* are scattered along the stem and are equitant.

Alta Verapaz: Cobán, *Türkheim* II 1991.—Guatemala: Road to Lake Amatitlán, about 3 miles from Guatemala, *Margaret Ward Lewis* 147.—Huehuetenango: Cerro Pixpí, above San Ildefonso Ixtahuacán, *Steyermark* 50619.—Quiché: Between Joyabaj and Chichicastenango, *Bernoulli & Cario* 1134.—Zacapa: Sierra de las Minas, between Río Hondo and summit of mountain at Finca Alejandría, *Steyermark* 29686.

Habenaria pauciflora (Lindl.) Reichb. f. Bonpl. 2: 10. 1854. *Bonatia pauciflora* Lindl. Gen. & Sp. Orch. Pl. 329. 1835.

Rare in boggy or upland grasslands, savannas, thickets, and open forests, on rocky grassy slopes, up to 1,350 meters alt. Mexico, Guatemala, Honduras, Panama and South America.

Plant rigidly erect, slender, from a small solitary tuber, 2.5–6 dm. tall. Stem nearly concealed by the leaves, provided at the base with several reddish brown sheaths. Leaves small, spathaceous, acuminate, suberect to erect-spreading, clasping the stem, 5–20 cm. long. Inflorescence composed of one to three flowers. Floral bracts similar to the leaves but smaller. Flowers white to light green or cream-colored, with long conspicuously arcuate pedicellate ovaries that are up to 12 cm. long. Dorsal sepal erect, cymbiform, oval in outline, obtuse and mucronate at the apex, 9–15 mm. long, 6–9 mm. wide. Lateral sepals strongly deflexed, ovate-lanceolate to elliptic-lanceolate, oblique, acute and with a slender recurved mucro at the apex, deeply concave, 1.2–1.6 cm. long, about 5 mm. wide below the middle. Petals bipartite, erect; posterior lobe fleshy, linear-oblong to elliptic-oblong, subacute, falcate, somewhat contorted, 9–13 mm. long, 2.5–3 mm. wide; anterior lobe fleshy-coriaceous, linear, falcate, subacute, 8–10 mm. long, about 1 mm. wide. Lip tripartite to near the base, fleshy-coriaceous, pendent, with the lateral lobes somewhat spreading, 1.3–1.7 cm. long, about 4 mm. wide below the divisions; lobes subequal, linear, obtuse to acute, 9–14 mm. long, about 2 mm. wide. Spur elongated, arcuate, slender below, somewhat clavate above, 4–8 cm. long. Column short, stout.

The one- to three-flowered inflorescence distinguishes this species from all other *Habenarias* found in Guatemala. It is known as “chochol” in Guatemala.

Huehuetenango: Between Democracia and Santa Ana Huista, Sierra de los Cuchumatanes, *Steyermark* 51291. Between Nentón and Las Palmas, via Yalisjao, Rincón, Chiquite, Chiaquial, Guaxacaná, in Sierra de los Cuchumatanes, *Steyermark* 51589.—Petén: La Libertad and vicinity, *M. Aguilar* H. 208.

Habenaria quinqueseta (Michx.) Sw. Adnot. Bot. 46. 1829. *Orchis quinqueseta* Michx. Fl. Bor.-Am. 2: 155. 1803. *Habenaria macroceratitis* Willd. Sp. Pl. 4: 44. 1805. *H. macroceratitis* var. *brevicalcarata* Ames, Orch., Fasc. IV: 224. 1910 (type: Guatemala, Dept. Sololá, San Lucas Tolimán, alt. 1,800 meters, February, 1894, *Heyde & Lux* 6383). Figure 8.

Uncommon in sandy pine woods, along wooded streams, and in open or shady places on dry hills, up to 2,000 meters alt. Widespread from South Carolina and Florida through Alabama to Louisiana and Texas, Mexico and Central America to northern South America, and the West Indies.

Plant slender or stout, glabrous, 2–9 dm. tall; stem leafy. Leaves oblong-lanceolate to oblong-obovate, broadly rounded to acuminate at the apex, 6–25 cm.

FIG. 8. *Habenaria quinqueseta*. 1, plant ($\times \frac{2}{3}$); 2, lip and column, front view ($\times 2$); 3, petal ($\times 2$); 4, lateral sepal ($\times 2$); 5, dorsal sepal ($\times 2$). Drawn by Blanche Ames.



long, 2.5–6 cm. wide. Raceme few- to many-flowered, lax, 7–25 cm. long, 5–6 cm. in diameter. Floral bracts ovate-lanceolate, acuminate, 1.5–2.8 cm. long, 7–15 mm. wide. Flowers greenish white, with slender pedicellate ovaries that are 2–3 cm. long. Dorsal sepal oblong-elliptic to suborbicular, obtuse, concave, 6–13 mm. long, 5–10 mm. wide. Lateral sepals obliquely ovate-oblong to oblong-lanceolate, obtuse to acute, 8–16 mm. long, 4–7 mm. wide. Petals bipartite; posterior lobe oblong-linear, falcate, obtuse to acute, 6–15 mm. long, about 2 mm. wide; anterior lobe filiform, recurved, 13–25 mm. long. Lip tripartite; mid-lobe linear, with revolute margins, 8–20 mm. long, 2–3 mm. wide; lateral lobes filiform, recurved at the apex, 15–30 mm. long. Spur varying from slender to strongly clavate, recurved, 4–18 cm. long.

The flowers of *H. quinqueseta* are very variable, particularly in respect to the spur. A number of segregates have been made, based mainly upon the relative length of the spur and the various shapes of the leaves.

Guatemala: *Aguilar* 39. Guatemala market, *Johnston* 1564.—Huehuetenango: Along Río Cuilco, between Cuilco and aldea of San Juan, 2½ miles west of Cuilco, *Steyermark* 50857.—Retalhuleu: Near Río Xabe, Finca San José Nil, *W. R. Hatch & C. L. Wilson* 391B. San Sebastian near Retalhuleu, *Bernoulli & Cario* 679.

***Habenaria repens* Nutt.** Gen. N. Am. Pl. 2: 190. 1818. Figures 5, 9.

In ditches, streams, swamps, ponds, and along lake shores, often on floating mats, also in wet soil of meadows, fresh-water marshes and bogs; usually in the lowlands, rarely above 1,800 meters alt. This is one of the most common and widely ranging species of *Habenaria*. It occurs in the United States from North Carolina to Florida, along the Gulf Coast of Louisiana and Texas, from Guatemala through Central and South America, and throughout the West Indies.

Plant semi-aquatic, stout or slender, glabrous, 1–9 dm. tall; stem leafy. Leaves linear-oblong to linear-lanceolate, acute to acuminate, chartaceous, 5–24 cm. long, 3.5–20 mm. wide. Raceme densely flowered (rarely consisting of a few scattered flowers), 6–28 cm. long, 2.5–3 cm. in diameter. Bracts lanceolate, acute, 1.5–9 cm. long, about 1 cm. wide at the base. Flowers small, greenish, with slender pedicellate ovaries that are 9–14 mm. long. Dorsal sepal oval to orbicular-ovate, mucronate, concave, 3–7 mm. long, about 3 mm. wide. Lateral sepals ovate to ovate-oblong, mucronate, 4–7 mm. long, about 3 mm. wide. Petals bipartite; posterior lobe lanceolate, falcate, acute, 3–7 mm. long; anterior lobe filiform, falcate, 4–7.5 mm. long. Lip tripartite to within 2 mm. of the base; mid-lobe linear, 4–7 mm. long; lateral lobes filiform, 5–11 mm. long. Spur slender, 9–14 mm. long.

A striking peculiarity of this species is its adaptation to life in wet places. Again and again it is reported as being associated with



FIG. 9. *Habenaria repens*. 1, plant ($\times 1$); 2, flower, front view ($\times 2$); 3, petal ($\times 3$). Original drawing by Blanche Ames; redrawn by G. W. Dillon.

aquatic plants. It is occasionally found floating on deep lakes and quiet waters with water hyacinth and other floating plants.

Alta Verapaz: Near Cobán, *Türckheim* II2189. East of Tactic, *Standley* 92377. Near San Juan Chamelco, *Standley* 92448; 92242. East of Tactic, *Steyermark* 43982.—Chimaltenango: Lago de los Pinos, *J. R. Johnston* 1400. Dueñas, *Salvin* 183 (fide Hemsley).—Guatemala: Near Finca La Aurora, *Ignacio Aguilar* 311.—Izabal: Shores of Lago Izabal, on side opposite San Felipe, between Punta Dos Reales and Punta de Lechuga, *Steyermark* 39594.—Jalapa: Los Amates, *Kellerman* 8091. South and east of Jalapa, *Steyermark* 32064. Chichoy, *Johnston* 1576.—Jutiapa: Lago Retana, between Ovejero and Progreso, *Steyermark* 32020.—Sacatepéquez: Along Río Guacalate, northwest of Antigua, *Standley* 64700.—Santa Rosa: Pueblo Viejo, *Heyde & Lux* 6244. Lago de los Pinos, near Sabanetas, *Standley* 60434.—Sololá: Finca Mocá, *J. Bequaert* 50.—Jocolá, *Johnson* 1006.

Habenaria strictissima Reichb. f. *Linnaea* 18: 407. 1844. *H. latipetala* Schltr. Repert. Sp. Nov. 15: 194. 1918 (type: Guatemala, Dept. Petén, Sacluc, in dumetis apricis, September, 1877, *Bernoulli & Cario*).

Rather rare in rich soil of woods, on rocky brushy hills and grassy plains, up to 2,000 meters alt. Apparently restricted to Mexico, Guatemala, and Nicaragua.

Plant slender, glabrous, 2–9 dm. tall; stem leafy. Leaves ovate-lanceolate to oblong-elliptic, acute to subacuminate, occasionally much reduced, 4–14 cm. long, 1.5–5 cm. wide. Raceme lax, with approximate flowers, 8–30 cm. long, 2.5–4 cm. in diameter. Bracts ovate-lanceolate to linear-lanceolate, 1–2.5 cm. long. Flowers yellowish green, with slender pedicellate ovaries that are about 1.5 cm. long. Dorsal sepal broadly ovate, obtuse, cucullate, 5–7.5 mm. long, 4–5.5 mm. wide. Lateral sepals obliquely ovate or elliptic, semilunate, 5–9 mm. long, 3.5–4.5 mm. wide. Petals rotundate-square to suborbicular, obtuse or broadly rounded at the apex, often auriculate at the base on the anterior margin, 2.5–4 mm. long, 2.5–3.5 mm. wide. Lip linear-oblong, obtuse, with an angular tooth on each side at the base, 6.5–10 mm. long, 2–2.5 mm. wide. Spur slender, slightly thickened at the apex, 1.8–2.8 cm. long.

Chiquimula: Above El Rincón, *Standley* 74731.—Escuintla: 4 km. north of San José, *Worth* 8627.—Jutiapa: Vicinity of Jutiapa,

FIG. 10. *Habenaria strictissima* var. *odontopetala*. Plant ($\times \frac{2}{3}$); 1, lateral sepal ($\times 5$); 2, lip and column, front view ($\times 5$); 3 and 4, two types of petals ($\times 5$). Drawn by Blanche Ames.



Standley 74899.—Petén: La Libertad and vicinity, *Mercedes Aguilar* *H.* 156.

***Habenaria strictissima* var. *odontopetala* (Reichb. f.) L. O.** Wms. Bot. Mus. Leaf. Harv. Univ. 7: 184. 1939. *H. odontopetala* Reichb. f. *Linnaea* 18: 407. 1844. *H. Selerorum* Schltr. Bull. Herb. Boiss. 7: 539. 1899 (type: Guatemala, Dept. Alta Verapaz, ad margins silvarum prope Cobán, December, *Seler* 2492). Figures 5, 10.

Rather common in moist rich soil of woods and swamps, up to 1,500 meters alt. Widespread in Florida, Mexico, Guatemala, Honduras, Costa Rica, Panama and the West Indies.

Variety *odontopetala* is very similar to *H. strictissima*. It is on the average a much larger plant than the species. Although the shape of the lip is the same in both, that of var. *odontopetala* is usually much slenderer and longer than that of *H. strictissima*. The petals are the most dissimilar character of the two segregates. The petals of var. *odontopetala* are essentially oblong-quadrate, 3-lobulate at the blunt apex and have a protuberant anterior basal angle; whereas, the petals of the species are essentially suborbicular, obtuse or broadly rounded at the apex and usually lack the basal protuberance.

Alta Verapaz: Cobán, *Türckheim* II 1425.—Chiquimula: Cerro Tixixí (Tishishí), 3–5 miles north of Jocotán, *Steyermark* 31571.—Izabal: Between Puerto Barrios and Santo Tomás, *Steyermark* 42031.

DOUBTFUL AND EXCLUDED SPECIES

Habenaria laetiana Schltr. Repert. Sp. Nov. 21: 330. 1925 (type: Guatemala, Praderas de Guatemala, 1,400 meters, July, 1921, *A. Tonduz* 741). Possibly referable to *H. entomantha*.

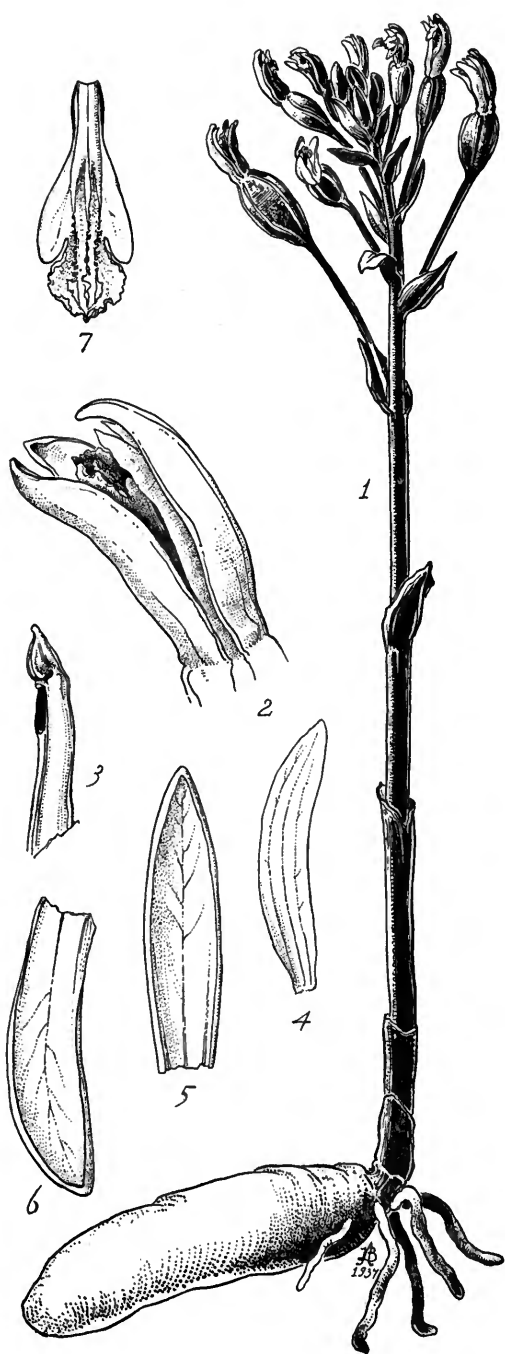
Habenaria maxillaris Lindl. Dueñas, *Wendland* (fide Hemsley).

Habenaria sparsiflora Wats. Chimaltenango: Near Tecpam in Sierra S. Elena, *Seler* 2294 (fide Schlechter). Quezaltenango: Mountain woods between Totonicapán and Los Encuentros, *Seler* 2295 (fide Schlechter). Apparently misidentified, because it is too far out of the range of this species.

4. *TRIPHORA* Nutt.

Inconspicuous terrestrial herbs, stoloniferous and bearing fleshy tuberoids; stem slender, with several small clasping alternate leaves. Inflorescence composed

FIG. 11. *Triphora cubensis*. 1, plant ($\times 1$); 2, flower, side view ($\times 4$); 3, column, side view ($\times 4$); 4, petal ($\times 4$); 5, dorsal sepal ($\times 4$); 6, lateral sepal ($\times 4$); 7, lip, front view, spread open ($\times 4$). Drawn by Blanche Ames.



of small nodding flowers borne in the axils of the upper leaves, racemose or corymbose. Perianth parts distinct. Lip three-crested, obscurely or deeply three-lobed. Column free, slender, straight, entire or simply lobed at the apex; anther erect or subincumbent, rigidly attached to the top of the column. Pollen granular, extine pitted or reticulate. Capsule nodding, ellipsoid.

This is a small genus of about ten species, which are widely distributed in temperate and tropical America.

1. Lip obscurely or shallowly 3-lobed, crested with 2 parallel keels... *T. debilis*.
1. Lip prominently and deeply 3-lobed, crested with 3 longitudinal keels.
 2. Column 9 mm. or more long; lip 5 mm. or more wide across the lateral lobes..... *T. trianthophora*.
 2. Column about 7 mm. long; lip 4 mm. or less wide across the lateral lobes. *T. cubensis*.

Triphora cubensis (Reichb. f.) Ames in Sched. Orch. 7: 35. 1924. *Pogonia cubensis* Reichb. f. in Ned. Kruidk. Arch. 4: 322. 1858 (by typographical error as *rubensis*). Figure 11.

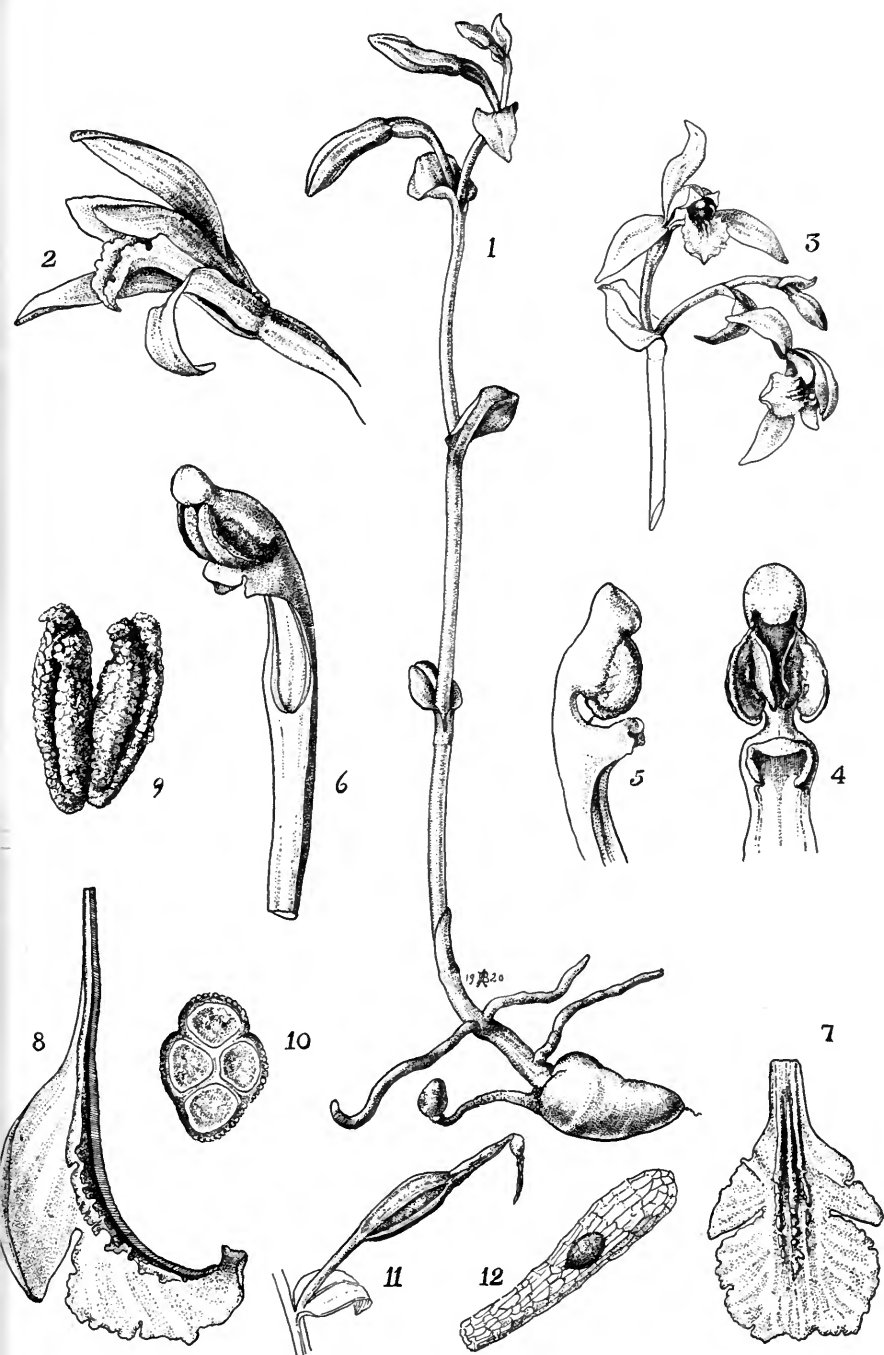
In pinelands and clearings, up to 1,500 meters alt. Rare in southern Florida, Mexico, Guatemala, Panama and the West Indies.

Plant glabrous, slender or stout, 6-26 cm. tall, produced from an elongated cylindrical tuber that is up to 6 cm. long. Leaves abbreviated, ovate, spathaceous, acute or apiculate, sheathing or appressed to the stem, scattered alternately along the stem, 7-15 mm. long. Inflorescence corymbose, rarely one or two flowers, composed of as many as ten (rarely more) flowers that are borne in the axils of the upper leaves on slender pedicels (the pedicels of the lower flowers are elongated to form a corymb). Flowers magenta, somewhat arcuate, small, with the segments connivent. Sepals subequal, linear-lanceolate to narrowly elliptic-lanceolate, obtuse to subacute, 6-11 mm. long, 1-2 mm. wide; lateral sepals oblique. Petals linear to filiform, 6-10 mm. long, about 1 mm. wide. Lip obovate-oblancheolate to subspatulate, 3-lobed, 7-10 mm. long, 3-4 mm. wide across the lateral lobes; lateral lobes obliquely triangular, obtuse, incurved, projecting 1-1.5 mm.; mid-lobe suborbicular to suborbicular-rhombic, acute to apiculate, 2-3 mm. long and wide. Column about 7 mm. long, slender. Capsule ellipsoid-ovoid, usually erect, 1.2-1.5 cm. long.

This species is distinguished by its typically corymbose inflorescence and abbreviated leaves.

Zacapa: Sierra de las Minas, along trail between Río Hondo and summit of mountain at Finca Alejandria, *Steyermark* 29653.

FIG. 12. *Triphora trianthophora*. 1, plant, in bud ($\times 1$); 2, flower, side view ($\times 2$); 3, flowers ($\times 1$); 4, upper part of column, with pollinia removed ($\times 8\frac{1}{2}$); 5, upper part of column, side view ($\times 8\frac{1}{2}$); 6, column, side-front view ($\times 6\frac{1}{2}$); 7, lip, spread out ($\times 3$); 8, longitudinal section through center of lip ($\times 5$); 9, pollinia ($\times 14$); 10, pollen tetrad, median section to show pitted extine (highly magnified); 11, capsule ($\times 1$); 12, seed (highly magnified). Drawn by Blanche Ames.



Triphora debilis Schltr. Repert. Sp. Nov. 15: 196. 1918 (type: Guatemala, Chilion, shady places, August, 1867, *Bernoulli & Cario* 520).

Found only in Guatemala.

Plant erect or ascending, glabrous, about 10 cm. tall; stem weak, about 1.5 mm. in diameter. Leaves usually 4, spreading, broadly ovate or suborbicular, subacute or shortly acuminate, clasping the stem at the base, 1–1.7 cm. long, 8–14 mm. wide below the middle. Inflorescence a solitary, suberect flower terminating the stem, subtended by a foliaceous bract, with a subclavate pedicellate ovary that is about 9 mm. long. Bract ovate, acuminate, about 4.5 mm. long. Sepals lanceolate or liguliform, subacute, becoming narrow at the base, about 1.8 cm. long; lateral sepals oblique. Petals obliquely elliptic-lanceolate, obtuse, somewhat narrowed at the base, about 1.6 cm. long, wider than the sepals. Lip rhomboid-spatulate, obscurely or shallowly 3-lobed, 1.6 cm. long, about 6 mm. wide above the middle, crested with two parallel obtuse keels from the base to about the middle of the lip; apical lobe quadrate and adorned with small subulate tubercles that are scattered over the disk. Column slender, 1.3 cm. long.

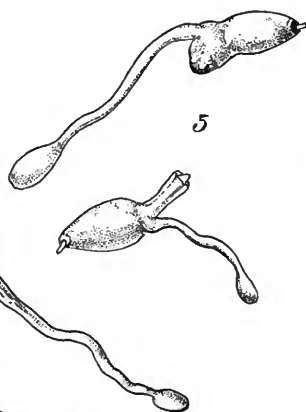
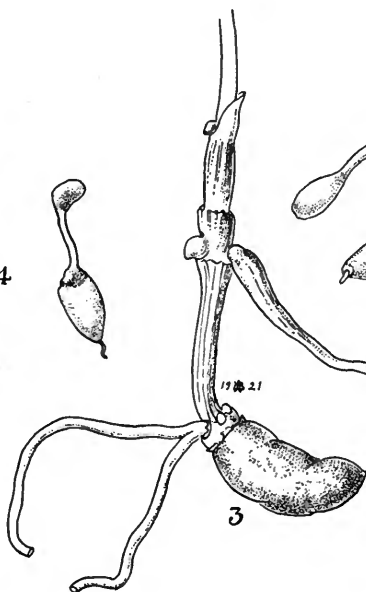
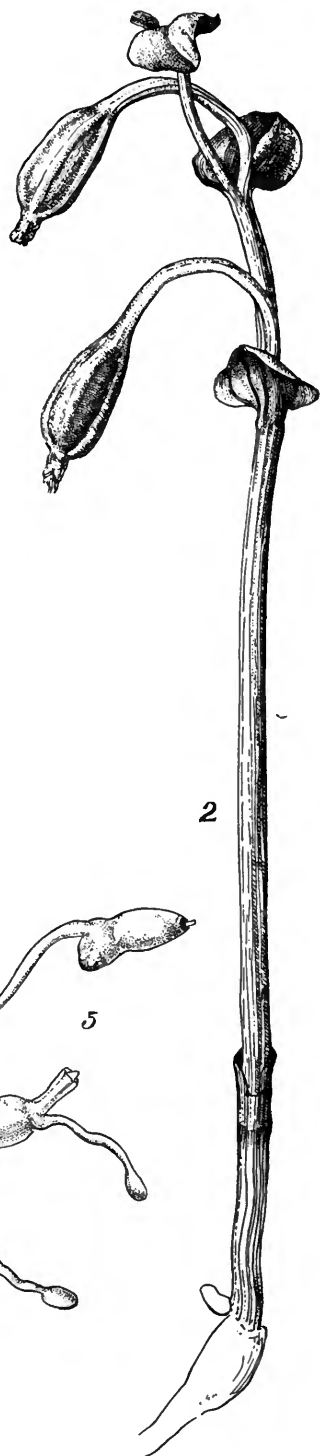
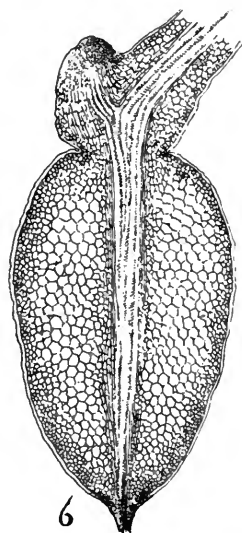
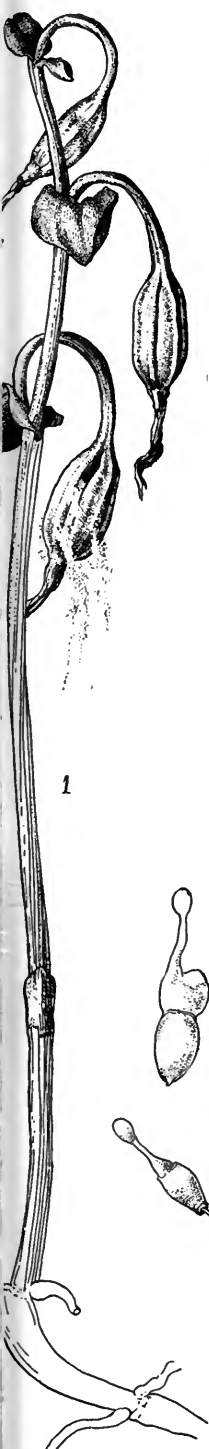
This species is closely related to *T. trianthophora*. It is very probable that when more collections are available for study from Central America this segregate will be relegated to *T. trianthophora* or considered as a variety of that species. Represented from Guatemala only by the type collection.

Triphora trianthophora (Sw.) Rydb. in Britton, Man. Fl. Northern States and Canada, ed. 1: 298. 1901. *Arethusa trianthophoros* Sw. Kongl. Sven. Vet. Acad. Nya Handl. 21: 230. 1800. *Triphora mexicana* (S. Wats.) Schltr. Repert. Sp. Nov. 17: 139. 1921. Figures 12, 13.

In leaf mold of pine and oak forests, occasionally on rotten limbs of trees, up to 3,000 meters alt. Widespread but not common in the eastern and middle United States; uncommon in Mexico, Guatemala and Panama.

Plant slender, weak, glabrous, 6.5–27 cm. tall, somewhat stoloniferous; stem 1–3 mm. in diameter, tinged with maroon, translucent in drying. Leaves small, sessile, ovate-elliptic to cordate-ovate or cordate-reniform, obtuse to acute, usually

FIG. 13. *Triphora trianthophora*. 1 and 2, fruiting plants ($\times 1$); 3, tuber and stolons ($\times 1$); 4, young tubers, showing original point of attachment to stolon, at basal end (lower right), and illustrating development of stolon and minute tuber (lower left), and formation of bud from which a stem is about to arise (upper center) ($\times 2$); 5, tubers (later stage of development than shown in figure 4) with stolon elongated and tuber enlarged ($\times 2$); 6, longitudinal section through middle uppermost tuber shown in figure 5 (semidiagrammatic). Drawn by Blanche Ames.



tinged with purple, clasping the stem, 8–25 mm. long, 5–25 mm. wide. Inflorescence composed of 1–3 (rarely more) flowers borne in the axils of the upper leaves. Flowers pale pink, rose-magenta or almost white, marked with white, green and purple, nodding, ringent, with pedicellate ovaries that are 1–1.3 cm. long. Dorsal sepal linear to linear-oblong, obtuse or acute, somewhat concave, 10–17 mm. long, about 2 mm. wide. Lateral sepals lanceolate, somewhat falcate, subacute or acute, 10–17 mm. long, about 2.5 mm. wide. Petals linear-oblong to linear-spatulate, falcate, obtuse or acute, 9.5–18 mm. long, about 2.5 mm. wide. Lip prominently 3-lobed, obovate or cuneate in outline, narrowed to a short slender claw, 10–16 mm. long, 5–9 mm. wide across the lateral lobes; lateral lobes ovate-triangular, obtuse; mid-lobe suborbicular to subdeltoid, with undulate-crenate margins; disk with 3 green keels on the median line which disintegrate at the free ends and vanish toward the lower part of the mid-lobe into tiny teeth that are traceable as minute papillae nearly to the apex of the mid-lobe. Column semiterete at the base, laterally dilated near the middle, 9–12 mm. long. Capsule pendent, 1.5–2 cm. long.

Because of its color and small size this species is easily overlooked in its native habitat.

Chimaltenango: Chichavac, *Skutch* 494.—Huehuetenango: Between Santa Ana Huista and Nentón, via hamaca over Río Azul and “La Laguna,” Sierra de los Cuchumatanes, *Steyermark* 51397. Paso del Boquerón, along Río Trapichillo, below La Libertad, *Steyermark* 51198.

5. *PSILOCHILUS* Barb. Rodr.

Terrestrial herbs with creeping rhizomes. Roots adventitious, fleshy. Leaves membranaceous with lax vaginate petioles. Flowers few, in a short, terminal, spicate raceme. Sepals free, dorsally carinate along the mid-vein. Petals free, not carinate. Lip free, three-lobed, crested with three longitudinal calli on the central face of the disk, spurless. Column elongate, clavate, marginate, entire or simply lobed at the apex. Anther terminal, stipitate, mobile, 2-celled. Pollinia 4; pollen grains compound with the extine pitted or reticulate.

This is a monotypic genus of tropical America.

Psilochilus macrophyllus (Lindl.) Ames, Orch., Fasc. VII: 45. 1922. *Pogonia macrophylla* Lindl. Ann. & Mag. Nat. Hist. ser. 3, 1: 335. 1858. Figure 14.

Rare in rich moist humus in mountain forests, up to 1,600 meters alt. Throughout the West Indies, Guatemala and northern South America.

Plant coarse, glabrous, purplish, from a creeping rhizome, 1–3.6 dm. tall; stem leafy. Leaves ovate-cordate to ovate-oblong, acute or acuminate, 2–11 cm. long, 1.2–4 cm. wide; petiole arising from a lax vaginate base. Raceme short, occasionally branching, composed of 2 to 8 flowers, 2.5–7 cm. long. Bracts am-



FIG. 14. *Psilochilus macrophyllus*. Plant ($\times 1$); 1, flower, side view ($\times 2$); 2, column, front view (note supplementary anthers; $\times 4$); 3, lip, spread out ($\times 4$); 4, supplementary anthers ($\times 7$); 5, pollen tetrad, showing pitted extine. Drawn by Blanche Ames.

plexicaul, broadly ovate, acute, 1–2 cm. long, 7–15 mm. wide at the base. Flowers ringent, on slender pedicels that are 4–7 mm. long. Sepals dark greenish purple, carinate along the mid-vein, with the margins involute; dorsal sepal linear to narrowly oblanceolate, acute, incurved, 1.8–2 cm. long, about 3 mm. wide; lateral sepals linear, acute, somewhat falcate, 1.7–1.8 cm. long, 3–3.5 mm. wide. Petals greenish white, narrowly linear, obtuse or subacute, 1.5–1.7 cm. long, 2–3.5 mm. wide. Lip broadly spatulate, with a narrow channeled claw, 3-lobed, with three inconspicuous longitudinal calli on the median face of the disk, greenish yellow or white, with a purple tip, 1.2–1.5 cm. long; mid-lobe subrotund, recurved, with the margin crisped, extending 5–6 mm. beyond the lateral lobes; lateral lobes short, obtuse, about 2 mm. long. Column incurved, subclavate, slightly winged, 1.2–1.4 cm. long.

Alta Verapaz: Near Cobán, *Türckheim* II 1998. Between Tactic and the divide on road to Tamahú, *Standley* 91359.—Huehuetenango: Vicinity of Maxbal, about seventeen miles north of Barillas, Sierra de los Cuchumatanes, *Steyermark* 48897. Cerro Victoria, Sierra de los Cuchumatanes, near Barillas, *Steyermark* 49721.—San Marcos: Above Finca El Porvenir, up Loma Bandera Shac, lower south-facing slopes of Volcán Tajumulco, *Steyermark* 37344.

6. VANILLA Swartz

Stout scandent terrestrial herbs, branching; stems with leaves or sometimes aphyllous, emitting adventitious roots. Leaves leathery, chartaceous or membranous. Raceme or spikes lateral or subterminal, short. Flowers large. Sepals subequal, free, spreading. Petals similar to the sepals. Lip adnate to the column and often enclosing the base of the column, simple or three-lobed. Column long, without a foot. Anther one, attached to the margin of the clinandrium, incumbent. Pollen powdery or granular. Capsule long, fleshy.

This is a complex genus of fifty or more species found in the tropics throughout the world. Several of the species are cultivated for their aromatic properties. Unfortunately our knowledge of the genus is still very imperfect. The flowers are ephemeral and very difficult to press, so that the specimens brought in by collectors are usually sterile or so poorly preserved that the floral characters are difficult to interpret. Throughout the literature devoted to the genus, this situation has been emphasized. With the increasing interest now being taken in the vegetation of the American tropics, it is hoped that efforts will be made to preserve flowers of vanilla in alcohol, so that the difficulties of identification of old species and the proper characterization of new ones will be simplified.

1. Floral bracts foliaceous, similar to the leaves but usually much smaller; lip without a retrorse tuft of scales or hairs on the disk; capsule not fragrant.
2. Lip 3-keeled, more than 3.5 cm. long..... *V. inodora*.

2. Lip with a large fleshy callus on the mid-lobe, less than 3.5 cm. long.
V. Pfaviana.
1. Floral bracts not foliaceous, dissimilar to the leaves; lip with a retrorse tuft of scales or hairs on the disk; capsule fragrant.
3. Lip less than 7 cm. long, conspicuously verrucose along the center near the apex.....*V. planifolia.*
3. Lip more than 7.5 cm. long, not conspicuously verrucose along the center.
V. pompona.

Vanilla inodora Schiede, Linnaea 4: 574. 1829.

On trees in rocky woodlands and in coffee plantations, up to about 1,200 meters alt. Widespread from Mexico through Central America to northern South America and the West Indies.

Stem thick, somewhat flexuose, leafy, about 8 mm. thick. Leaves subsessile, ovate-elliptic to oblong-elliptic, shortly acuminate, much longer than the internodes, membranaceous to subcoriaceous, nervose, up to 28 cm. long and 11 cm. wide. Raceme axillary or subterminal, flexuose, with about six flowers, up to 15 cm. long. Floral bracts in two ranks, foliaceous, membranaceous, similar to the leaves but much smaller and variable in size, ovate-oblong to ovate-lanceolate, subacute, up to 3 cm. long, occasionally much longer. Flowers greenish, with the lip white and yellowish at the base, with pedicellate ovaries that are about 3.8 cm. long. Sepals lanceolate to oblong-lanceolate, subobtuse, 4.5–5 cm. long, 1–1.5 cm. wide. Petals oblong-lanceolate, subobtuse, 4.5–5 cm. long, 1–1.4 cm. wide. Lip deeply 3-lobed, about equal to the sepals and petals but broader, shortly adnate to the base of the column, 3.8–4.5 cm. long, about 3 cm. wide when spread out; lateral lobes oblong, obtuse; mid-lobe spreading and then erect, broadly ovate-oblong, subacute; disk 3-keeled, without a tuft of hairs. Column clavate, 2–3 cm. long. Capsule linear-elongate, slightly tapering at the apex, slender, up to 25 cm. long, not fragrant.

No specimens from Guatemala have been seen. The description has been drawn from the original description and supplemented by that in Fawcett and Rendle in their *Flora of Jamaica*. It is suspiciously similar to *V. Pfaviana* and with further research that species may prove to be referable to *V. inodora*. The following collections are sterile, but vegetatively match the above description. They are cited here with some reservation as to their true identity.

Izabal: Near Entre Ríos, *Standley* 72709.—Huehuetenango: Cerro Chiblac, between Finca San Rafael and Ixcán, Sierra de los Cuchumatanes, *Steyermark* 49171.—Suchitepequez: Southern lower slopes of Volcán Zunil, vicinity of Finca Las Nubes, along Quebrada Chita, east of Pueblo Nuevo, *Steyermark* 35412.

Vanilla Pfaviana Reichb. f. Gard. Chron. n. s. 20: 230. 1883. *Vanilla Preussii* Kränzl. Notizbl. Bot. Gart. Mus. Berlin 7: 320. 1919 (type: Guatemala, in shrub-forest near El Baul plantation, torrid zone, *Preuss* 1445). Figure 15.

VANILLA *Pfavianana* Reichb. f.



FIG. 15. *Vanilla Pfavianana*. Plant, flowering portion ($\times 1$); 1, lip, front view, spread out ($\times 1\frac{1}{4}$); 2, column, front view ($\times 1\frac{1}{2}$). Drawn by Blanche Ames.

Climbing on trees in oak-pine forest, up to 1,500 meters alt. Mexico, British Honduras, Guatemala and Costa Rica.

Stem slender, flexuose, leafy, about 3 mm. thick. Leaves suborbicular-ovate to oblong-elliptic, abruptly acute or acuminate, longer than the internodes, fleshy-coriaceous, up to 21 cm. long and 8 cm. wide. Raceme terminal or lateral. Floral bracts foliaceous, similar to the leaves but usually smaller, occasionally as large as the leaves. Flowers rather close or distant, green with a white lip and orange-yellow in the throat. Sepals and petals conspicuously contorted throughout and revolute at the apex. Sepals elliptic-lanceolate, broadly obtuse to acute, about 4 cm. long and 1.1–1.3 cm. wide. Petals elliptic-lanceolate, narrowly obtuse to acute, about 4.2 cm. long and 8 mm. wide. Lip deeply 3-lobed, adnate to the column for about 5 mm., arcuate in natural position with the sides involute and the apex reflexed, about 3 cm. long and 2.7 cm. wide across the lateral lobes when spread out; lateral lobes semiobcordate, broadly rounded above; mid-lobe obcordate to subquadrate, emarginate, with the margins crenate, 1.5–2 cm. wide; disk with a pair of short keels just in front of the column and with a large elliptic thickened callus extending along the center to the sinus of the mid-lobe, without a tuft of hairs. Column slender, arcuate, thickened at the apex, about 2 cm. long. Capsule very slender, curved, tapering at the apex, not fragrant, up to 18 cm. long and about 1 cm. in diameter.

Except for some differences in the size of the floral segments, the concept *V. Preussii* agrees very well with that of *V. Pfaviana*. The following material is sterile but it has the slender stem and leaves of this species and probably belongs here.

Baja Verapaz: *Türkheim* 1764.—Escuintla: El Zapote, *Muenschner* 12480.—San Marcos: Above Finca El Porvenir on "Todos Santos Chiquitos," lower south-facing slopes of Volcán Tajumulco, *Steyermark* 37076.

Vanilla planifolia Andrews, Bot. Repos. 8: t. 538. 1808. *Vanilla fragrans* (Salisb.) Ames, Sched. Orch. 7: 36. 1924. Figure 16.

Rooted in soil and climbing on trees in swamps, wet thickets, savannas and mixed forests, up to 600 meters alt. Rather common in the lowlands from southern Florida and Mexico through Central America to northern South America and the West Indies. Cultivated throughout the tropics of both hemispheres.

Plant scandent, branching, leafy. Stem terete, about 1 cm. in diameter. Leaves subsessile, oblong-elliptic to narrowly lanceolate, acute to shortly acuminate, fleshy-succulent, up to 23 cm. long and 8 cm. wide, usually smaller. Racemes axillary, with as many as twenty or more flowers, up to 8 cm. long. Floral bracts ovate-oblong, obtuse to subacute, 5–10 mm. long, unlike the leaves. Flowers greenish yellow, with pedicellate ovaries that are about 2.5 cm. long. Sepals and petals sublinear to oblong-oblancoate, obtuse to subacute. Sepals 4–5.5 (rarely 7) cm. long, 1–1.5 cm. wide above the middle. Petals somewhat shorter and narrower than the sepals. Lip attached to the column almost to its apex to

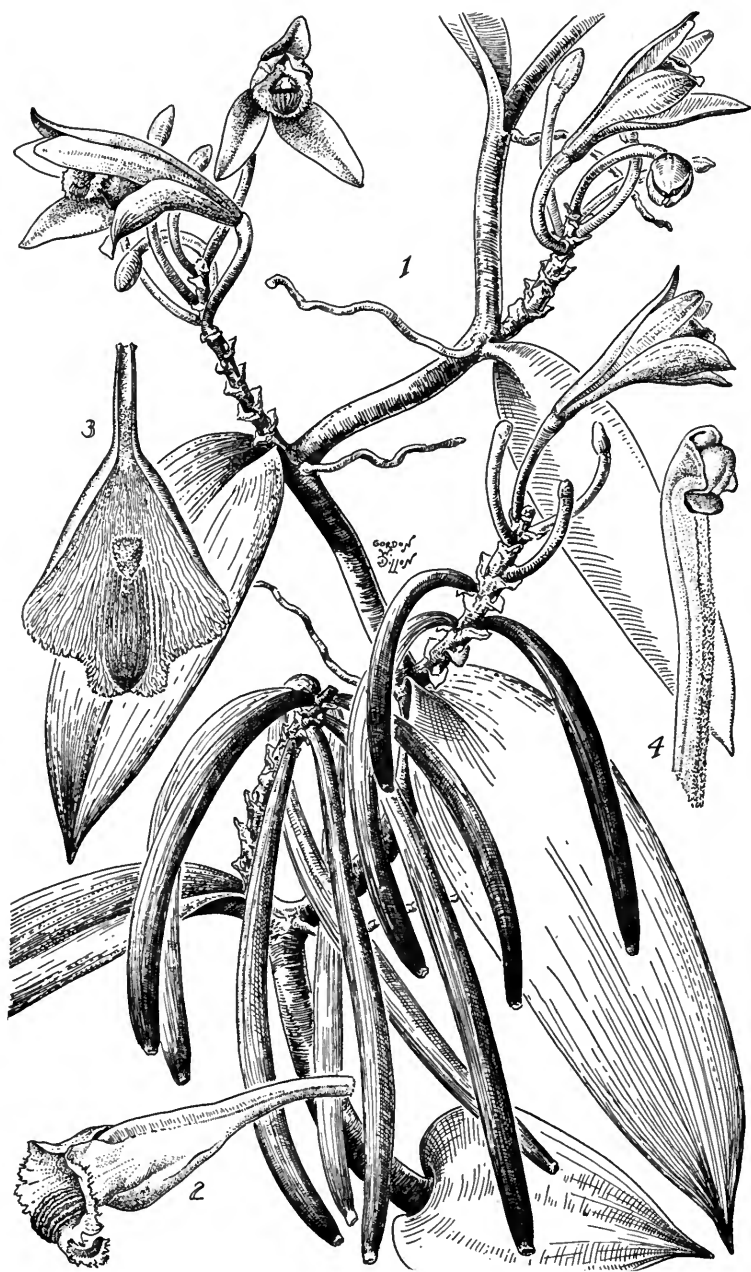


FIG. 16. *Vanilla planifolia*. 1, plant ($\times \frac{1}{2}$); 2, lip, front-side view, in natural position ($\times 1$); 3, lip, spread open ($\times 1$); 4, column, front-side view ($\times 2$). Drawn by G. W. Dillon.

form a tube, dilated and reflexed at the apex, when spread out 4–5 cm. long and 1.5–3 cm. wide at the widest point; lamina obscurely 3-lobed, cuneate-obovate in outline, retuse and irregularly fringed on the revolute margins; disk with a retrorse tuft of hairs near the center and several verrucose lines extended from the tuft to the thickened apex of the lip. Column arcuate, bearded on the ventral surface, about 3 cm. long. Capsule narrowly cylindrical, fragrant, up to 25 cm. long and 8 mm. in diameter.

This species is the common vanilla of commerce and is grown for commercial purpose in many parts of the tropics. It has been known ever since the discovery of America. Pollination for commercial purposes is artificial. For information concerning the history, cultivation and importance of this species see Correll (*Lloydia* 7: 236–264. 1944).

Alta Verapaz: Jocoló, *Johnson* 1178. Vicinity of Finca Yalpemech, near Alta Verapaz–Petén boundary line, *Steyermark* 45286. North of Concepción, 3–5 miles southeast of Finca Yalpemech, near Alta Verapaz–Petén boundary line, *Steyermark* 45233.—Izabal: Vicinity of Puerto Barrios, *Standley* 25064. Between Milla 49.5 and ridge 6 miles from Izabal, Montaña del Mico, *Steyermark* 38539. Swamps of Salomón Creek, one-half to one mile south of Bananera, *Steyermark* 38944.—Petén: La Libertad and vicinity, *Lundell* 164.

***Vanilla pompona* Schiede, *Linnaea* 4: 573. 1829.**

On trees and shrubs in forests, up to 1,000 meters alt. Widespread from Mexico through Central America to northern South America.

Stem large, up to 1.5 cm. thick, leafy. Leaves ovate-oblong to broadly lanceolate, obtuse to subacute, coriaceous, up to 30 cm. long and 8 cm. wide, much exceeding the internodes. Raceme axillary, composed of about 8 flowers (sometimes more or less), up to 15 cm. long. Floral bracts broadly elliptic-oblong to suborbicular, rounded to obtuse at the apex, unlike the leaves, up to 2.5 cm. long and 2.5 cm. wide. Flowers large, fleshy, greenish yellow or creamy yellow, fragrant. Sepals narrowly oblanceolate, obtuse, up to 9 cm. long and 1.8 cm. wide. Petals narrowly oblanceolate, obtuse, dorsally keeled, up to 8.8 cm. long and 1.5 cm. wide. Lip orange-yellow, attached to the column almost to its apex to form a tube, upcurved in natural position with the apex flared, up to 9.5 cm. long, about 4.5 cm. wide near the apex when spread out; lamina obscurely 3-lobed, obovate in outline, retuse and broadly rounded and undulate-crenulate at the apex, with an apicule in the sinus, somewhat keeled on the back; disk prominently veined with the veins somewhat thickened, thin, adorned with a retrorse tuft of fimbriate scales about the middle and sometimes with several obscure lines of excrescences from the tuft of hair to near the apex. Column arcuate, bearded on the ventral surface, up to 7 cm. long. Capsule thick, fragrant, linear-elliptic, obtuse, trigonous, up to 18 cm. long and 2.5 cm. thick.

This species is cultivated for its aromatic properties. Although not now an important source of commercial vanilla, its fruits were at one time, under the name of "vanillons," a well-known tropical product, and may have furnished the "vanilloes" referred to by James Petiver in 1693 as an imperfectly known and "most earnestly desired" article of commerce. The flowers, which last but a day, are large and showy, creamy yellow in color, with a delightful fragrance. Under cultivation it is said that the plants will yield two crops a year, six months being required from flower to "bean." Pollination is artificial. The specimen cited below is sterile but probably represents this species.

Izabal: Between Virginia and Lago Izabal, Montaña del Mico, *Steyermark* 38703.

7. ELLEANTHUS Presl

Terrestrial or epiphytic herbs with coarse, fleshy, matted roots; stem simple or branched, leafy. Leaves sessile above a sheath, strongly nerved. Flowers in dense heads or spicate racemes. Sepals subequal, free, erect. Petals as long as the sepals, narrower. Lip attached to the base of the column and usually enclosing it, erect, concave-saccate at the base with two prominent calli in the cavity, usually slightly constricted above the cavity. Column erect, semiterete or winged, without a foot. Anther 2-celled, operculate. Pollinia 8 (4 in each anther cell); pollen waxy. Capsule ellipsoid or shortly cylindrical, erect or spreading.

In this genus there are approximately fifty species that are native to tropical America from Mexico, Central America and the West Indies to Brazil and Peru. The genus attains its highest development in the Andean region of South America.

1. Flowers in a dense head; leaves lanceolate or broader. *E. capitatus*.
1. Flowers in a short raceme, distichous; leaves linear, grass-like.
 2. Flowers congested; floral bracts imbricated; rachis straight. . . *E. linifolius*.
 2. Flowers distant, about 3 mm. apart; floral bracts not imbricated; rachis fractiflex. *E. poiformis*.

Elleanthus capitatus (R. Br.) Reichb. f. Walp. Ann. 6: 475. 1862. *Bletia capitata* R. Br. in Ait. Hort. Kew. ed. 2, 5: 206. 1813. Figure 17.

Common in wet forests, open wet banks, terrestrial and epiphytic or on rocks, up to 2,400 meters alt. Widespread in the West Indies, Mexico, through Central America south to Peru and southern Brazil.

Plant tall, stout, simple or branching above, in sparse clumps, 6–30 dm. tall; stem leafy, 3–5 mm. in diameter, covered with leaf sheaths. Leaves chartaceous, elliptic-lanceolate to narrowly lanceolate, long acuminate, conspicuously

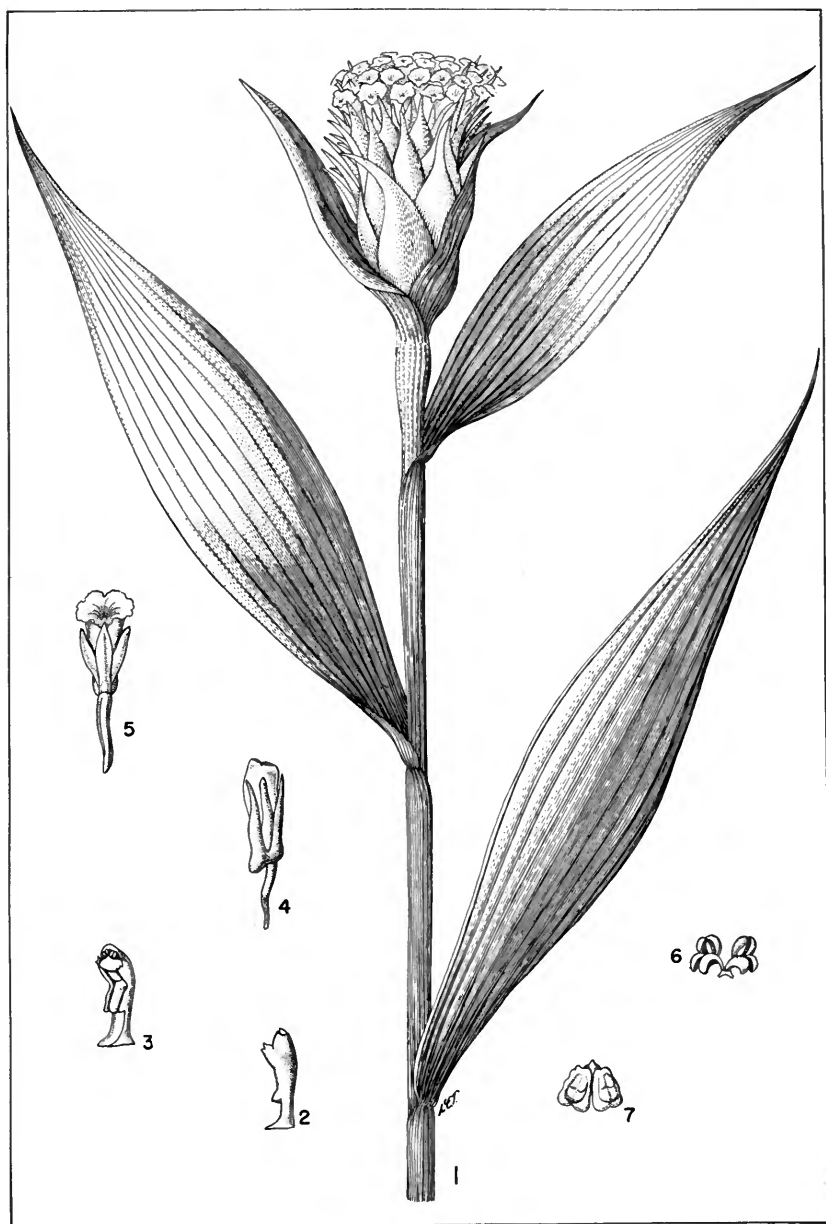


FIG. 17. *Elleanthus capitatus*. 1, upper part of plant with head of flowers ($\times \frac{1}{2}$); 2, column, side view (about $\times 1$); 3, column, front-side view (about $\times 1$); 4, flower, side view ($\times 1$); 5, flower, from above ($\times 1$); 6, pollinia (much enlarged); 7, anther (much enlarged). Drawn by D. E. Tibbitts. Adapted in part from Fawcett and Rendle, *Flora of Jamaica* 1: pl. 20. 1910.

nerved, 10–23 cm. long, 2–7 cm. wide. Inflorescence a determinate hemispherical head of many flowers, entire head covered by a mucilaginous fluid, 3–8.5 cm. long, 2.5–6 cm. in diameter. Floral bracts imbricate, ovate-triangular to lanceolate, acuminate, membranous, the outer ones without flowers, 2.5–6 cm. long, 8–15 cm. wide. Flowers rose-purple, on pedicellate ovaries that are 1–1.5 cm. long. Sepals oblong-elliptic, 9–13 mm. long, 3–3.5 mm. wide; dorsal sepal obtuse to subacute; lateral sepals subacute to acute, apiculate. Petals linear to linear-oblong, obtuse, 9–12 mm. long, 1.5–2.2 mm. wide above the middle. Lip rotund-flabellate to orbicular-obcordate, involute and enclosing the column, apex broadly emarginate with the margin erose-ciliate, saccate and with 2 subglobose, white calli at the base, 10–14 mm. long, 8–12 mm. wide; calli about 2.5 mm. long and 1.5 mm. wide. Column slightly dilated above, with a projecting, obtuse process on the anterior side just below the stigma. Capsule ellipsoid, about 1.2 cm. long and 5 mm. in diameter.

This species is especially common throughout most of Central America and northern South America. It reaches its maximum development in the Andes of Colombia and Peru.

Alta Verapaz: Cobán, *Türkheim* 2289. Chamá to Cobán, *Harry Johnson* 558. Large swamp east of Tactic, *Standley* 92372. On tree, along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 90084; 89835. On tree, wet forest near Tactic, above the bridge across Río Frío, *Standley* 90481. On high mossy hump in swamp, just east of Tactic, *Steyermark* 43951.—Chimaltenango: Quisaché, *Standley* 62305.—Chiquimula: Volcán Ipala, near Amatillo, *Steyermark* 30494.—Huehuetenango: Around lake southeast of Maxbal, about 17 miles north of Barillas, Sierra de los Cuchumatanes, *Steyermark* 48823; 48704.—Sacatepéquez: Antigua, on mossy hummock, *Margaret Ward Lewis* 168.—Sololá: Volcán Atitlán, south-facing slopes, *Steyermark* 47395. Terrestrial, pine woods bordering Río Bravo, in vicinity of Finca Mocá, south-facing slopes of Volcán Atitlán, *Steyermark* 47945.—Suchitepequez: Epiphyte, Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46646.—Zacapa: Terrestrial, slopes of Monte Virgen, Sierra de las Minas, around summit of mountain, *Steyermark* 42634.—Guatemala: *Ignacio Aguilar* 426.

***Elleanthus linifolius* Presl, Rel. Haenk. 1: 97. 1827.**

Rather uncommon on trees and rocks in wet forests, up to 1,300 meters alt. Found in the West Indies, Mexico, through Central America to Peru.

Plant simple, grass-like, glabrous, growing in clumps from a mat of coarse, fleshy roots, 1–3.5 dm. tall; stem very leafy. Leaves obliquely erect, linear, unevenly tridentate at the apex, membranous, 3–15 cm. long, 1–3 mm. wide. Raceme spicate, short, 1–2.5 cm. long, 1.5–4 cm. wide. Bracts imbricate, broadly

ovate to ovate-oblong, subacute to acuminate, strongly carinate and concave, longer than and usually enclosing the flowers, the margins scarious, 5–13 mm. long, about 6 mm. wide (when spread out). Flowers small, distichous, white, on short pedicellate ovaries. Dorsal sepal linear-oblong, acute, concave, 3–3.5 mm. long, about 1 mm. wide. Lateral sepals obliquely ovate, tapering to an acuminate apex, subcordate at the base, often strongly carinate above the middle. Petals linear-spatulate, broadly rounded at the apex, about 4 mm. long, mostly less than 1 mm. wide. Lip subquadrate-flabellate to broadly obovate, involute, completely infolding the column, with the margins undulate and denticulate-ciliate, decurved, somewhat constricted at the middle, saccate and with 2 small ovoid calli at the base, 3.5–4.2 mm. long, about 4 mm. wide. Column short, subclavate, incurved, about 2 mm. long.

This species is often represented in herbaria by specimens having flowers in poor condition. It is rather distinct, however, in that its whole aspect resembles a grass and the apex of the leaves (in our material) is constantly unevenly tridentate.

Alta Verapaz: Chamá, *Harry Johnson* 829. Epiphyte on tree, lowland forest in valley, "pantano," 2½ miles west of Cubilgüitz, *Steyermark* 44330. Epiphyte on top of limestone ridge, Cerro Chinajá, between Finca Yalpemech and Chinajá, above source of Río San Diego, *Steyermark* 45673.—Izabal: Quiriguá, *Harry Johnson* 1309. Between Bananera and "La Presa" in Montaña del Mico, *Steyermark* 38238; 38288. Lower slopes of rocky ravine along tributary to Río Frío, *Steyermark* 41572. Epiphyte, trail between Río Frío and Cayo Piedra, *Steyermark* 41649. Uppermost ridges and summit, Cerro San Gil, *Steyermark* 41964.

Elleanthus poiformis Schltr. Repert. Sp. Nov., Beih. 19: 164. 1923.

On trees in pastures and forests, up to 1,700 meters alt. Guatemala and Costa Rica.

Plant small, densely caespitose, grass-like, 1–3 dm. tall; roots glabrous, rather fleshy and branched. Stem filiform, about 1 mm. in diameter, concealed by the leaf-sheaths, often drooping from the weight of the leaves. Leaves erect or spreading, sessile, linear-filiform, membranous, unequally tridentate at the apex, up to 7 cm. long, 1–1.5 mm. wide, grass-green. Raceme laxly few-flowered, conspicuously fractiflex, about 3 cm. long, with the flowers distichously arranged about 3 mm. apart; rachis covered with reddish brown hairs on the surface facing the flowers. Floral bracts as long as or usually exceeding the flowers, fibrous-chartaceous, broadly triangular-ovate, abruptly acuminate, conduplicate, 5–10 mm. long. Flowers small, white, with short pedicellate ovaries that are about 2 mm. long and with the ventral surface and sides densely covered with reddish brown hairs. Sepals 3–4 mm. long, 1–1.5 mm. wide, 1-nerved, with the outer surface partly covered with reddish brown hairs; dorsal sepal elliptic to narrowly lanceolate, acute to apiculate, cymbiform; lateral sepals triangular-lanceolate,

acute to acuminate, oblique, dorsally keeled at the apex. Petals linear-spatulate, obtuse, 3.2–4 mm. long, 1–1.5 mm. wide near the apex. Lip suborbicular-flabellate when spread out, with the apical margins denticulate, saccate at the base and with the sides upcurved in natural position, 3–5 mm. long, 3.5–4 mm. wide, with a pair of ellipsoid calli nestling in the saccate base; calli attached to base of lip by a thin thread. Column 2–2.5 mm. long.

This species is easily distinguished from the closely allied *E. linitifolia* by its laxly flowered fractiflex raceme.

Alta Verapaz: Dense wet limestone forest near Chirriacté, on the Petén highway, *Standley* 91976.—Izabal: Cerro San Gil, *Steyermark* 41963. La Vigia, between Bananera and Quiriguá, *Margaret Ward Lewis* 170. Salamá, *Johnston* 1828.

8. SOBRALIA Ruiz & Pav.

Reedy terrestrial or epiphytic herbs with strongly nerved cauline leaves. Leaves coriaceous, articulate with long sheaths. Flowers usually large, showy, in a terminal axillary raceme. Bracts several, carinate, rigid, somewhat imbricate. Sepals subequal, erect, connate at the base. Petals similar to but slightly broader than the sepals. Lip adnate to the base of the column, entire or two-lobed, with the basal half involute enclosing the column, the apex exerted, spreading, undulate or fimbriate; disk smooth or variously crested with calli. Column elongate, footless, sub-incurved, semiterete, acutely angled or narrowly winged, 3-lobed at the apex. Pollinia 8 (4 in each cell of the bilocular anther), granulose. Capsule oblong or elongate, rigid or fleshy.

This genus consists of about thirty-five species and is confined to the tropics of Mexico and Central and South America. Some of the species have very showy flowers.

1. Flowers solitary, large; lip more than 7 cm. long.
 2. Flowers lavender or rose-purple, with pedicellate ovaries that are about 2.5 cm. long. *S. macrantha*.
 2. Flowers yellow, subsessile. *S. xantholeuca*.
1. Flowers 1–2, small; lip less than 6 cm. long.
 3. Stem flattened, two-edged; lip deeply fimbriate. *S. fragrans*.
 3. Stem terete; lip undulate-crested, not deeply fringed.
 4. Stem, lower surface of leaves and leaf-sheaths black warty or hispidulous; flowers pale lavender and white; lip more than 3.8 cm. long. *S. decora*.
 4. Stem, leaves and leaf-sheaths glabrous; flowers pale green or yellowish white; lip less than 3.3 cm. long. *S. mucronata*.

Sobralia decora Bateman, Orch. Mex. & Guat., t. 26. 1841 (type: Guatemala, *Skinner*). Figures 18, 19.

In deep shaded ravine in leaf mold, on rocks in oak-pine forests, occasionally in the crotch of trees, up to 1,700 meters alt. Rather common from Mexico to Honduras.



FIG. 18. *Sobralia decora*. Plant ($\times \frac{2}{3}$). Drawn by Dorothy O. Allen.

Plant erect, reed-like, 3.5–7.5 dm. tall, with the stem, lower surface of leaves and leaf-sheaths more or less black warty or hispidulous; stem leafy above. Leaves oblong-lanceolate to narrowly lanceolate, long acuminate, 5.5–22 cm. long, 1.5–6.5 cm. wide. Flowers 1–2, terminal, sessile or subsessile, pale lavender and white, subtended by short, scarious sheaths. Sepals strongly apiculate and recurved at the apex; dorsal sepal linear-oblong, 4–5 cm. long, 1.2–1.7 cm. wide; lateral sepals linear-oblong, slightly falcate, 4–5 cm. long, 1–1.2 cm. wide. Petals oblong-elliptic, subacute to acute, 3.5–4 cm. long, 1–1.1 cm. wide. Lip tubular-involute in natural position, cucullate at the base, undulate-cripsed and flared on the anterior margin, retuse or apiculate at the broadly rounded apex, rose-purple or lavender streaked with yellow and brown on the disk, when spread out obovate-rhomboid, 4–4.5 cm. long, 3–3.5 cm. wide near the apex; disk covered with numerous sinuately anastomosing veins, provided with numerous minute lamellae that traverse it longitudinally. Column white, slender-clavate, 2–2.5 cm. long, trilobed at the apex; lateral lobes slender-falcate; mid-lobe galeate. Capsule cylindrical, blackish, prominently 6-ribbed, about 8 cm. long when mature.

This species is easily distinguished from other species of *Sobralia* found in Guatemala by the short blackish pubescence found on the stem, leaf-sheaths and lower surface of the leaves. All of the plants in any one locality usually flower on the same day and last only one day.

Alta Verapaz: Chamá, *Harry Johnson* 907. Cubilgüitz, *Türkheim* 8006; 8458.—Chiquimula: Montaña Castilla, vicinity of Montaña Cebollas, along Río Lucia Saso, three miles southeast of Quezaltepeque, *Steyermark* 31326.—Izabal: On tree along Río Tameja, Cerro San Gil, *Steyermark* 42004.—Petén: La Libertad, *Lundell* 2961.

The following collections are sterile but probably represent this species: Chiquimula: Rocky volcanic slopes, Río Grande (Río Concepción), on Socorro Mountain, above Finca San José, southeast of Concepción de las Minas, *Steyermark* 31106.—Petén: On tree trunk, low forest along Río Chinajá, north of Chinajá on trail towards Zacatal, *Steyermark* 45461.—Zacapa: On rocks, oak-pine woods along upper reaches of Río Sitio Nuevo, between Santa Rosalía and first waterfall, *Steyermark* 42235.

Sobralia fragrans Lindl. Gard. Chron. 598. 1853. *S. eublepharis* Reichb. f. ex Kränzl. Repert. Sp. Nov. 26: 255. t. 78. 1929 (type: Guatemala).

Rather common on trees in wet forests, in partial shade, where it usually occurs in large bunches, occasionally terrestrial. Somewhat limited in distribution from Guatemala to Panama.

Plant glabrous, short, 1.8–3.5 dm. tall; stem and peduncle flattened, 2-edged, weak, with 1–2 leaves. Leaves oblong-lanceolate to narrowly lanceolate, acute or acuminate, somewhat toothed at the apex, rather fleshy, chartaceous-coriaceous



FIG. 19. *Sobralia decora* var. *aerata*. Plant, upper part (about $\times \frac{1}{2}$); upper left, column ($\times 1$); bottom (left to right), lateral sepal, petal, dorsal sepal, lip ($\times 1$). A variety found in Panama. Drawn by G. W. Dillon.

when dry, 6.5–23.5 cm. long, 1.5–5 cm. wide. Flowers 1–2, small, terminating a long peduncle, yellowish white, tinged with pink, fragrant, with slender pedicellate ovaries that are 2–3 cm. long, subtended by 2–3 uneven bracts. Bracts elliptic-lanceolate, obtuse or subacute, carinate, with whitish scarious margins, 3–5 cm. long, 1–1.5 cm. wide. Sepals narrowly linear to oblong-lanceolate, acute or abruptly apiculate, 3–4 cm. long, 4–7 mm. wide; lateral sepals somewhat falcate. Petals lanceolate to linear-oblong, subobtusely to acute, occasionally apiculate, slightly falcate, 3–3.8 cm. long, about 5 mm. wide. Lip obovate-cuneate, with the lower margins entire and strongly involute, crisped and deeply fringed along the apical, spreading-decurved margin, when spread out 2.5–3.2 cm. long, 1.5–1.8 cm. wide; disk provided with about nine elevated lamellae that are finely fringed toward the apex of the lip. Column semiterete, clavate, 1.6–1.8 cm. long. Capsule cylindrical, very slender, about 6 cm. long at maturity, about 6 mm. in diameter.

Sobralia fragrans is distinctive in that its stem and peduncle are conspicuously flattened. It is thus easily distinguished from *S. mucronata*, which has a similar habit but a terete stem.

Alta Verapaz: Cubilgüitz, *Türkheim* 8301. Chamá, *Harry Johnson* 271.—Izabal: Between Milla 49.5 and ridge 6 miles from Izabal, *Montaña del Mico*, *Steyermark* 38570. Río Dulce, between Livingston and 6 miles up river, *Steyermark* 39390. Cerro San Gil, along Río Frío, *Steyermark* 39968. "Montufar Flats," *Margaret Ward Lewis* 230.

***Sobralia macrantha* Lindl. Sert. Orch., sub t. 29. 1836.**

Rather common in leaf mold on calcareous rocks in forests, in wet soil of ravine and in sandy soil along stream banks, occasionally epiphytic, up to 3,333 meters alt. Widespread from Mexico to Costa Rica.

Plant tall, glabrous or tuberculate on the leaf sheaths, 4.5–21 dm. tall; stem leafy, often growing in large clusters from the same root mass. Leaves narrowly to broadly lanceolate, long-acuminate, spreading, rigid, 13–30 cm. long, 2–7.5 cm. wide. Inflorescence consisting of a solitary flower that is subtended by a large foliaceous bract. Bract narrowly lanceolate, carinate, membranous, with scarious margins, up to 13 cm. long. Flower very large, rose-purple, showy, with stout arcuate pedicellate ovaries that are about 2.5 cm. long. Sepals linear-oblong, subacute or acute, minutely apiculate, recurved, 8–10.2 cm. long, 1.5–2.6 cm. wide. Petals oblong-obovate, broadly rounded and inconspicuously mucronate at the apex, with the margins undulate-crisped above the middle, 6.5–9 cm. long, 2.3–4 cm. wide near the apex. Lip very large, the lower half forming a laterally compressed tube around the column, rotundate and deeply bilobed at the apex, expanding and undulate-crisped along the margins above the middle, white on the inside of the tubular basal portion, tinged with yellow in the center; when spread out broadly oblong-obovate, 8–11 cm. long, about 7 cm. wide above the middle. Column 3–3.5 cm. long, slender-clavate. Capsule elongate-fusiform, recurved, 6-angled, about 11.5 cm. long and 2 cm. in diameter.

This species has the most attractive flowers of any of the sobralias occurring in Guatemala. Several horticultural varieties have been found in Guatemala; namely, "*S. macrantha pallida*," which has large, pale flowers about 18 cm. across; *S. macrantha* var. *albida*, with whitish flowers; and "*S. macrantha splendens*," which has smaller and darker flowers than those of the species. This species is commonly known as "Candelaria," "Cebollin," and "lirio."

Alta Verapaz: Cobán, *Türckheim* 2462.—Baja Verapaz: Patal, *Standley* 69559. Rocky hills near and above Santa Rosa, in pine-oak forest, *Standley* 91053.—Chimaltenango(?): Santa María de Jesús, *J. R. Johnston* 922.—El Progreso: Sierra de las Minas, hills north of Finca Piamonte, between Finca Piamonte and summit of Volcán Santa Luisa, *Steyermark* 43615.—Escuintla: Escuintla, *J. R. Johnston* 1316.—Guatemala: Guatemala, *S. Hayes*.—Huehuetenango: Paso del Boquerón, along Río Trapichillo, below La Libertad, *Steyermark* 51195.—Retalhuleu: Finca Helvetia, *W. C. Muenscher* 12442.—San Marcos: Above Finca El Porvenir, along Río Cabus to within 2 miles of Cueva de las Palomas, south-facing slopes of Volcán Tajumulco, *Steyermark* 37936.—Santa Rosa: Estanzuela, *Heyde & Lux* 3861.—Sololá: Trail between slopes of Volcán Santa Clara and town of San Pedro, *Steyermark* 47119.—Suchitepequez: Southwestern slopes of Volcán Zunil, between Finca Asturias and Finca Alto Mira, northeast of Pueblo Nuevo, *Steyermark* 35331.—Zacapa: Sierra de las Minas, along Rillito del Volcán de Monos, Volcán de Monos, *Steyermark* 42337.—Road from Santa María to Quezaltenango, *Margaret Ward Lewis* 162.

The following collections are sterile or in fruit but probably represent this species: Alta Verapaz: Terrestrial, Cerro Tortuga (Sahacoc), vicinity of Cubilgüitz, *Steyermark* 44611. On mossy hummock, large swamp east of Tactic, *Standley* 92658.—Chiquimula: On rocky slopes near summit, Cerro Tixixí (Tishishí), 3–5 miles north of Jacotán, *Steyermark* 31657.—Huehuetenango: Covering slopes of barranco and growing by the thousands of plants for several acres, associated with *Quercus-Pinus*, Cerro Victoria, across river from Finca San Rafael, Sierra de los Cuchumatanes, *Steyermark* 49618.

Sobralia mucronata Ames & C. Schweinf. Sched. Orch. 8: 54. 1925.

Epiphyte in dense forests, up to 600 meters alt. Very rare in Guatemala, Honduras and Costa Rica.

Plant glabrous, erect, 2.6-9 dm. tall; stem leafy, slender, mostly concealed by leaf sheaths. Leaves elliptic-lanceolate, acuminate, coriaceous, with 2 or more teeth at the apex, 4-18 cm. long, 1-3.5 cm. wide. Inflorescence comprising 1-2 flowers that arise in the axil of the uppermost leaf, subtended by several imbricating bracts. Bracts conduplicate, lanceolate, 2 or more toothed at the apex, up to 4.5 cm. long. Flowers small for the genus, pale green or yellowish-white, with slender pedicellate ovaries that are about 3 cm. long. Sepals and petals subacute or acute, mucronate. Dorsal sepal linear-oblong, 2.6-3.8 cm. long, 5-7 mm. wide. Lateral sepals slightly obliquely elliptic-oblong to narrowly oblong, 2.5-3.8 cm. long, 6.5-7.5 mm. wide. Petals linear-oblong to narrowly oblanceolate, slightly falcate, 2.3-3.5 cm. long, 5-6 mm. wide. Lip in natural position tubular-involute near the base, when spread out broadly oblong-elliptic or quadrate-oblong, 2.5-3 cm. long, 1.1-1.5 cm. wide above the middle, entire, retuse or apiculate at the broadly rounded apex, anterior margins strongly undulate-crested and somewhat crenulate; disk with 2 short calli at the base and several more or less conspicuous keels extending from the base nearly to the apex of the lip (these keels are supplemented above the middle of the disk by the central 5-7 nerves that become similarly carinate; all of the keels become conspicuously sinuate and raised above the middle of the lip). Column slender-clavate, with prominent lateral wings on the anterior surface, apex 3-lobed, with the lateral lobes erect, linear-falcate and incurved, the middle lobe suborbicular and strongly galeate. Capsule slender, elongate, up to 9 cm. long when mature.

Alta Verapaz: Cubilgüitz, *Türckheim* 8294.

Sobralia xantholeuca Hort. ex Williams, Orch. Grow. Man. ed. 6: 576. 1885.

Uncommon, epiphytic on trees and on rocks up to 1,550 meters alt. Thus far found only in Guatemala.

Plant up to 18 dm. tall, glabrous; stem rather stout, leafy, covered with leaf-sheaths that are pale green speckled with red-brown. Leaves articulate with the sheaths, oblong-lanceolate, long-acuminate, spreading and drooping, 15-28 cm. long, 3-7 cm. wide below the middle. Bracts narrowly lanceolate, carinate, with scarious margins, up to 14 cm. long. Flowers solitary, terminal, large and showy, yellow, subsessile. Sepals oblong-elliptic to linear-lanceolate, acute or acuminate, spreading and recurved, 8-11 cm. long, 1.7-2.3 cm. wide. Petals similar to the sepals but somewhat shorter. Lip large, 8-11 cm. long, the lower half forming a cylindrical tube around the column, rotundate and notched at the apex, expanding above with broad recurved, crisply waved crenate margins, the tubular throat golden streaked with dark yellow. Column slender-clavate, about 3.5 cm. long.

The large yellow flowers, which are about the size of those of *S. macrantha*, and the maculate leaf-sheaths easily distinguish this species from its allies.

Alta Verapaz: San Cristobal, *Türckheim* 131. Cobán, *Türckheim* 2477.—Huehuetenango: Epiphyte, dense rich wet woods between Yulhuitz and Maxbal, Sierra de los Cuchumatanes, *Steiermark* 48677.

The following specimen, in poor condition, probably represents this species: Huehuetenango: On rocky limestone jagged forested slopes northeast of Maxbal, about 17 miles north of Barillas, Sierra de los Cuchumatanes, *Steyermark* 48896.

9. CRYBE Lindl.

Terrestrial herbs with suborbicular, green corms on which the leafy stems and inflorescences are borne separately at the apex. Raceme 3-6-flowered. Flowers purplish red, nodding, with arcuate-decurved pedicellate ovaries, clavate-obovoid in appearance; perianth scarcely or not expanding. Sepals unequal, free. Petals similar to the lateral sepals, free. Lip adnate to the base of the column, obovate-cuneate, cucullate, retuse with an apicule in the sinus. Column long, erect, clavate; anther 2-celled; pollinia 4, mealy, 2 in each anther-cell. Capsule ellipsoidal.

This monotypic genus is confined to Middle America.

Crybe rosea Lindl. Nat. Syst. Bot. ed. 2: 446. 1836. *Arethusa rosea* (Lindl.) Benth. ex Hemsl. in Godm. & Salvin, Biol. Centr.-Am. 3: 304. 1884. Figure 20.

Uncommon in sandy soil and loam in pine-oak forests, also on lava rock and on the edge of deep ravines, up to 2,000 meters alt. Apparently confined to Mexico, Guatemala and Honduras.

Plant glabrous; stem short, 7-15 cm. tall, terminated by two leaves and another leaf sheathing below. Leaves oblong-elliptic to linear-lanceolate, acute or acuminate, prominently veined, the terminal leaf reduced at the base to a slender petiole, 8-42 cm. long, 1.5-6 cm. wide. Inflorescence a 3-6 flowered raceme terminating a slender peduncle, up to 15 cm. long; peduncle 1.1-4 dm. tall, provided with several distant scarious bracts. Bracts short, triangular or slender-acuminate, 5-15 mm. long. Flowers with pedicellate ovaries that are 1-3 cm. long. Sepals oblanceolate, acute or acuminate, recurved at the apex, tuberculate-maculate with purple on the dorsal surface above the middle, the central veins carinate at the apex on the ventral surface, 2.7-3.5 cm. long, 6-7 mm. wide; the lateral sepals obliquely falcate. Petals oblanceolate, obtuse to subacute, falcate, white tinged with purple, 2.9-3.3 cm. long, 6.5-7 mm. wide. Lip strongly involute enclosing the column, the lower half strongly cucullate, the dilated apical portion with the margins folded, undulate-crenate, 3.5-5 cm. long, 2-3 cm. wide above the middle; disk with the three central veins slightly carinate. Column somewhat recurved, with two lateral auricles on the anterior surface near the middle. Capsule ellipsoid-oblong, 2-4.5 cm. long, about 1 cm. in diameter.

Chimaltenango: *J. R. Johnston* 1983.—Huehuetenango: Oak-pine woods on steep rocky slopes above La Libertad, on Cerro Pueblo Viejo, *Steyermark* 50979; 51005. Cerro Pixpí, above San Ildefonso Ixtahuacán, *Steyermark* 50620.—Jalapa: Rocky scrub-oak forest on



FIG. 20. *Crybe rosea*. Flowering plant ($\times \frac{1}{2}$). Sketched by G. W. Dillon; completed by D. E. Tibbitts.

hills northeast of Jalapa, *Standley* 76846. Under rocks in quebrada, brushy oak slopes of Cerro Alcoba, east of Jalapa, *Standley* 77221.—Quezaltenango: San Martín, *J. R. Johnston* 1315.—Santa Rosa: *Heyde & Lux* 3862 (in part).—Sololá: Trail between village of San Pedro, via San Juan, San Cristóbal Buena Vista, and northwestern slopes of Volcán Santa Clara, *Steiermark* 47304.—On banks along Antigua to Guatemala City road, *John Porter* 35.—Near Incienso Aserradero de San Vicente, *Margaret W. Lewis* 205.—Au Felswanden au den "Südgehängen" des Vulcans Sta. Maria, häufig, *Lehmann* 1616.

10. WULLSCHLAEGELIA Reichb. f.

Terrestrial, leafless herbs. Stem erect, simple, slender, provided with several short scarious cuspidate scales. Roots fasciculate, fibrous, caudate, somewhat thickened. Flowers small, short-pedicelled, in a loose or dense raceme. Sepals thin, erect; lateral sepals connivent and produced at the base into a short mentum. Petals small, similar to the dorsal sepal. Lip on the upper side of the flower, sessile at the base of the column, erect, broadly cymbiform, entire, saccate at the base within the mentum formed by the sepals. Column short, thick; anther erect, sessile; pollinia powdery-granular. Capsule obovoid.

A small genus containing only three species, which are natives of the West Indies, Central and South America.

Wulschlaegelia aphylla (Sw.) Reichb. f. Bot. Zeit. 131. 1863.
Cranichis aphylla Sw. Prodr. 120. 1788. Figure 21.

Saprophytic, in humus and rotten leaves of dense, dark, wet forests, up to 600 meters alt. Rather rare in the West Indies, Guatemala, Honduras and northern South America.

Plant 1.5–3.5 dm. tall, whitish, aphyllous; stem more or less covered with bifurcate, articulated glandular-pubescent with a number of minute scales. Scales triangular-lanceolate, acuminate, 3.5–5 mm. long. Raceme slender, many-flowered, 3–13 cm. long. Bracts similar to the scales, scarious, 2–3 mm. long. Flowers small, pale white, erect-ascending. Pedicellate ovary short, pubescent, 2–3 mm. long. Sepals pubescent with bifurcate brownish hairs; dorsal sepal triangular-lanceolate to elliptic-oblong, obtuse, concave, 1.7–2 mm. long, 0.75–1 mm. wide; lateral sepals transversely and obliquely oblong, subobtuse to acute, connivent at the base to form a short mentum, about 3.5 mm. long to the base of the mentum, 1–1.5 mm. wide. Petals short, elliptic-obovate to oblong-quadrate, broadly rounded to obtuse, with bifurcate hairs along central vein on dorsal surface, 1.75–2 mm. long, about 1 mm. wide. Lip incumbent, oblong-quadrate, conduplicate-concave, truncate and erose at the apex, with bifurcate hairs along the central vein on the lower surface, 3–3.2 mm. long, about 1.5 mm. wide. Column short with a rather long foot. Capsule ellipsoid-pyriform, about 1 cm. long.

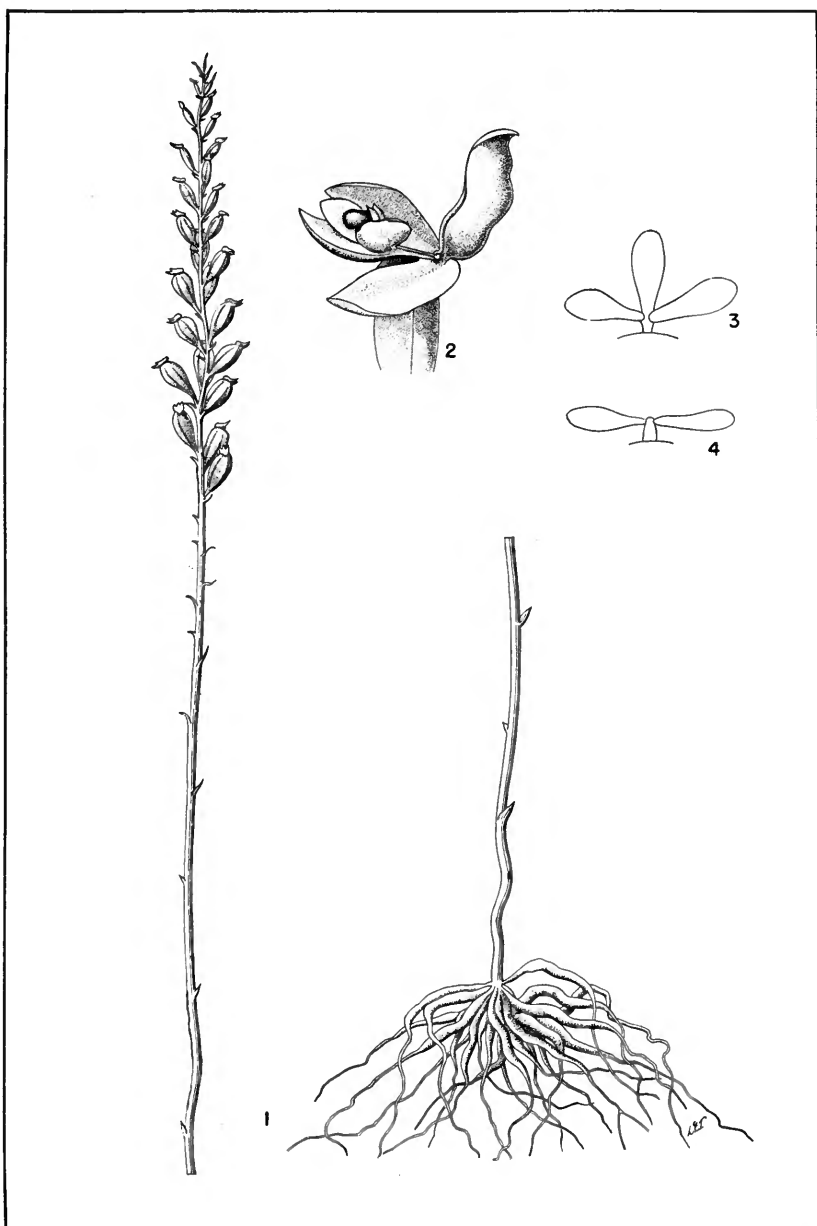


FIG. 21. *Wulfschlaegelia aphylla*. 1, flowering and fruiting plant (from Swartz's type; $\times \frac{3}{4}$); 2, flower, side view, with lateral sepal pulled down and a petal removed (about $\times 6$); 3 and 4, bifurcate hairs on the plant (greatly enlarged). Drawn by D. E. Tibbitts. Adapted from Fawcett and Rendle, *Flora of Jamaica* 1: pl. 3. 1910.

This species is distinctive in its saprophytism and its bifurcate hairs, which are composed of 3 to 5 cells, one of which is the stalk, the other 2 or 4 forming the two branches.

Izabal: Near Entre Ríos, *Standley* 72744. Punta Palma, across bay from Puerto Barrios, *Steiermark* 39861.

11. *PRESCOTTIA* Lindl.

Terrestrial herbs with clustered fibrous or fleshy roots from a short rhizome. Leaves basal or essentially so, sessile or with long petioles, membranous. Inflorescence a slender or thick spike of numerous small flowers. Sepals membranous, connate at the base to form a short cup or tube, spreading or revolute at the apex. Petals narrow, adnate to the sepaline cup. Lip on the upper side of the flower, with the claw adnate to the sepaline cup, entire, auriculate at the base, arched, deeply concave or galeate, often enclosing the column. Column very short, adnate to the sepaline cup. Pollinia 4, granular or powdery. Capsule small, suberect, ovoid or ellipsoid.

This genus consists of about thirty-five species, which are natives of tropical and subtropical America from Florida, Mexico and the West Indies to Brazil and Ecuador.

1. Floral segments less than 2.5 mm. long.....*P. oligantha*.
1. Floral segments usually more than 3 mm. long.
 2. Leaves with a distinct slender petiole about as long as the lamina; lip conspicuously galeate.....*P. stachyodes*.
 2. Leaves tapering into a short inconspicuous petiole; lip merely involute-concave below the middle.....*P. tubulosa*.

Prescottia oligantha (Sw.) Lindl. Gen. & Sp. Orch. Pl. 454. 1840. *Cranichis oligantha* Sw. Prodr. 120. 1788. Figure 22.

On mossy logs and limestone rocks on the edge of dense rain forests, on brushy rocky banks and in clayey soil, up to 1,500 meters alt. Widespread from southern Florida and Mexico, through Central America to Panama, the West Indies, Colombia and Venezuela.

Plant scapose, glabrous, 1.3–3.4 dm. tall. Roots short, thick, fleshy, fasciculate, partly covered by a thick tomentum, 4–6 mm. in diameter. Stem slender, purplish. Leaves radical, petioled, 1.5–7 cm. long including the petiole, reduced above to sheathing lanceolate bracts; blade ovate-oblong to obovate, suborbicular or elliptic, obtuse to acute, rarely apiculate, 3–4 cm. long, 1–3 cm. wide. Spike densely flowered, slender, 2.5–8 cm. long, 5–7 mm. in diameter. Floral bracts narrowly lanceolate, translucent, 3–5 mm. long. Flowers minute, white, green or pink, less than 2.5 mm. long; perianth parts adhering at the base. Dorsal sepal ovate, obtuse to rarely acute, 1–2 mm. long, about 1 mm. wide. Lateral sepals arising from a broad connate base, triangular or deltoid, somewhat concave near the apex, obtuse or subacute, 1–2.2 mm. long, a little more than 1 mm. wide at the base. Petals linear to narrowly obovate-spatulate, retuse, truncate to obtuse

at the apex, 1–1.5 mm. long, about 0.5 mm. wide. Lip erect, suborbicular, concave-saccate, apiculate, with lateral auricles at the base, 1–1.5 mm. long, about 2 mm. wide when spread out. Column laterally winged near the apex. Capsule ellipsoid, shallowly six-keeled, less than 5 mm. long.

This species has the smallest flowers of any *Prescottia* found in Guatemala.

Alta Verapaz: Between Cobán and Finca Chimote, near Rubeltein, *Steiermark* 44157.

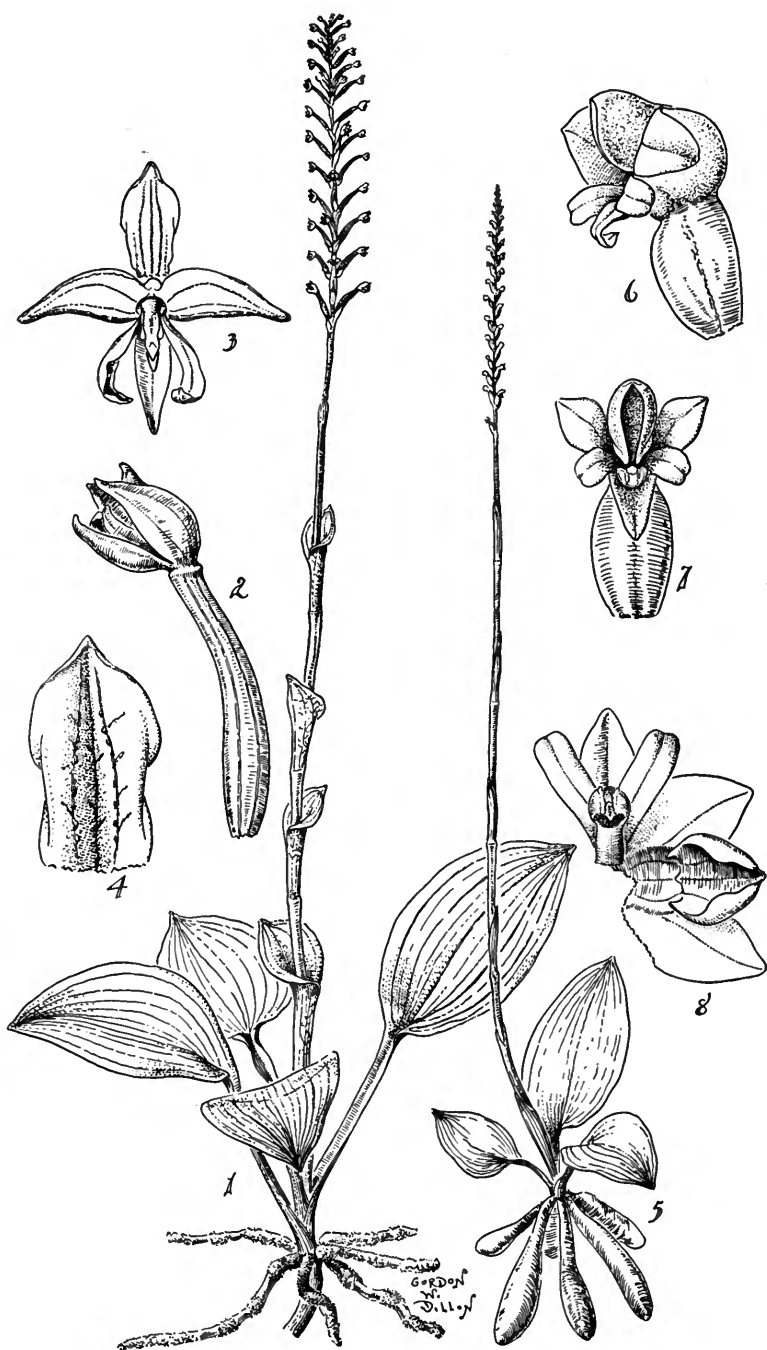
Prescottia stachyodes (Sw.) Lindl. Bot. Reg. 22: sub t. 1916. 1836. *Cranichis stachyodes* Sw. Fl. Ind. Occ. 3: 1427. 1799. *Prescottia colorans* Lindl. Bot. Reg. 22: t. 1916. 1836.

Terrestrial. Occasional on rocky banks and in dense shade of forests, up to 3,000 meters alt. Widespread in the West Indies, Mexico and Guatemala south to Brazil.

Plant slender or stout, glabrous, 4–9.5 dm. tall; stem purplish-brownish green, invested by numerous loose, membranous, tubular sheaths. Leaves basal, large, with long petioles; lamina orbicular-ovate to elliptic-oblong, abruptly acute or acuminate at the apex, slightly asymmetrical and broadly rounded to subcordate at the base, often with cartilaginous-serrate margins, 7–22 cm. long, 3.5–16 cm. wide; petiole slender, narrowly winged, 3–25 cm. long. Spike long, cylindrical, with numerous flowers, 9–31.5 cm. long, 1–2 cm. in diameter. Bracts ovate-lanceolate to narrowly lanceolate, acuminate, 7–20 mm. long. Flowers green, sepals and petals often marked with reddish brown, with short stout pedicellate ovaries. Sepals and petals strongly revolute. Dorsal sepal linear-oblong, tapering to the obtuse or subacute apex, 3–3.5 mm. long, about 1 mm. wide. Lateral sepals united at the base; free part oblong, tapering to the obtuse apex, 3–3.2 mm. long, about 1 mm. wide. Petals narrowly linear, obtuse, 3–3.5 mm. long, about 0.5 mm. wide. Lip suberect, with strongly involute margins forming a subglobose galea, laterally compressed, with an auricle on each side at the base, 4–5 mm. long, 3–4 mm. wide when spread out. Column short, subglobose, about 2 mm. long. Capsule ellipsoid, about 1 cm. long.

Alta Verapaz: Cubilgüitz, *Türkheim* 8589.—El Progreso: Sierra de las Minas, in cloud forest, hills north of Finca Piamonte, between Finca Piamonte and summit of Volcán Santa Luisa, *Steiermark* 43603.—Izabal: Along Río Frío, Cerro San Gil, *Steiermark* 41604. Damp forested slopes and barrancos, Cerro San Gil, *Steiermark* 41872.—Jutiapa: Volcán Suchitán, northwest of Asunción Mita,

FIG. 22. *Cranichis muscosa*. 1, plant ($\times \frac{1}{2}$); 2, flower, side view ($\times 5$); 3, flower, front view, partly spread open ($\times 5$); 4, lip ($\times 10$). *Prescottia oligantha*. 5, plant ($\times \frac{1}{2}$); 6, flower, side view, with lateral sepal and petal turned back ($\times 10$); 7, flower, front view ($\times 10$); 8, flower, spread open ($\times 10$). Drawn by G. W. Dillon.



Steyermark 31939.—Quezaltenango: Slopes of Volcán Santa María, between Finca Pirineos and Los Positos, between Santa María de Jesús and Calahuaché, *Steyermark* 33790.—Quiché: Nebaj, *Skutch* 1684.—Sololá: Volcán Atitlán, south-facing slopes, *Steyermark* 47396.—Suchitepequez: Finca Mocá, *Skutch* 1540.—Zacapa: Slopes of Monte Virgen, around summit of mountain, *Steyermark* 42643.—Volcán Zunil, *Skutch* 932.

The following specimens are sterile but probably represent this species: San Marcos: Slopes of barrancos tributary to and bordering Río Vega, between San Rafael at northeast portion of Volcán Tacaná and Guatemala-Mexico line, *Steyermark* 36364.—Zacapa: Cloud forest in ravine bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29848.

Prescottia tubulosa (Lindl.) L. O. Wms. Bot. Mus. Leaflet. Harv. Univ. 7: 137. 1939. *Cranichis tubulosa* Lindl. Gen. & Sp. Orch. Pl. 451. 1840.

Rare (in our range) in damp loam and leaf mold in shade of heavy woods, in oak-pine forests, up to 2,800 meters alt. Mexico and Guatemala.

Plant slender or stout, 1.3–5.5 dm. tall, invested by short, membranous, tubular sheaths. Leaves subsessile or tapering into a short, broadly winged petiole, linear-elliptic to broadly oblanceolate, abruptly acute, 7–25 cm. long, 2.5–6.5 cm. wide. Spike dense, cylindrical, with numerous flowers, 3–19 cm. long, 1–2.5 cm. in diameter. Bracts lanceolate, acuminate, about 1 cm. long. Flowers pale yellow, sepals and petals usually grayish white, with short stout pedicellate ovaries. Sepals and petals strongly recurved. Dorsal sepal lanceolate, subobtusely to acute, 6–7.5 mm. long, 1.5–2 mm. wide. Lateral sepals united at the base; free part lanceolate, obtuse or subacute, 4–6 mm. long, about 1.5 mm. wide. Petals linear-oblanceolate, subacute, 6–7 mm. long, about 1 mm. wide. Lip in natural position strongly involute and with an auricle on each side at the base, recurved at the broadly obtuse, apiculate apex, when spread out cuneate-obovate, 6.5–8 mm. long (including the short claw), about 4 mm. wide at widest point. Column cuneate, sinuately tridentate at the apex, 3–5 mm. long. Capsule ovoid, 6–8 mm. long.

Huehuetenango: Wet brushy bank near Chiantla, along the river south and east of the town, *Standley* 82469.—Quezaltenango: Cerro Quemado, *Kellerman* 5577; 6070.

12. CRANICHIS Sw.

Terrestrial (rarely epiphytic), scapose herbs with fasciculate, fleshy roots. Leaves basal or radical, rarely with reduced cauline leaves. Scape slender, simple, provided with tubular clasping sheaths. Flowers small, in a spicate raceme. Sepals free, subequal or with the lateral pair somewhat broader and more or less

connivent. Petals free or somewhat adnate to the base of the column, spreading, smaller than the sepals. Lip on the upper side of the flower, adnate to the middle or base of the column, sessile or with a short claw, concave or saccate, usually embracing the column. Column short; anther one, two-celled; pollinia four; pollen granular-powdery. Capsule suberect, ovoid or ellipsoid.

This genus consists of about thirty species that are natives of tropical and subtropical America. The vein-design of the lip in many of the species is a reliable diagnostic character.

1. Bracts of the scape broad and foliaceous, gradually reduced in size above.
C. muscosa.
1. Bracts of the scape narrow, abruptly reduced in size above.
2. Claw of the lip attached near the middle of the column, cordate-triangular.
C. Schaffneri.
2. Claw of the lip attached to the base of the column.
3. Claw of the lip S- or C-shaped.....*C. mexicana.*
3. Claw of the lip straight.
4. Lip with a conspicuous apicule at the apex.....*C. apiculata.*
4. Lip not apiculate.
5. Lip deeply cucullate-saccate at the base; lateral sepals prominently oblique.....*C. cucullata.*
5. Lip shallowly concave or cymbiform; lateral sepals only slightly oblique.
6. Petals ciliate.
7. Lip orbiculate; mid-stripe of disk extending beyond the lateral stripes and branching at the apex of the lip.....*C. ciliata.*
7. Lip narrowly ovate; mid-stripe of disk not as above.
8. Petals obtuse; lip obtuse, less than 2.7 mm. long.
C. hieroglyphica.
8. Petals acuminate; lip acute or acuminate, more than 2.7 mm. long.....*C. Wagereri.*
6. Petals not ciliate (or obscurely so in *C. diphylla*).
9. Lip cymbiform, subquadrate when spread out, the margins strongly revolute above the middle.....*C. sylvatica.*
9. Lip orbiculate, the margins not revolute.....*C. diphylla.*

***Cranichis apiculata* Lindl. in Benth. Pl. Hartw. 92. 1842** (type: Guatemala, in summo jugo inter Dueñas et Acatenango, ad pedem montis ignivomi, *T. Hartweg* 624). *C. cylindrica* Ames in J. D. Smith, Enum. Pl. Guatem. 7: 49. 1905, nomen.

Shady soil in oak forests, up to 2,700 meters alt. Uncommon in Mexico and Guatemala.

Plant glabrous throughout, with several scarious sheaths enclosing the leaves and scape at the base, 3.5-4.7 dm. tall. Leaves basal, with a slender, narrowly winged petiole; lamina oval-elliptic to suborbicular, abruptly acute or apiculate, broadly rounded or abruptly reduced into the petiole at the base, 8.5-13 cm. long, 4.5-6.5 cm. wide; petiole 8-11 cm. long. Raceme cylindrical, flowers close together, 7.5-15 cm. long, about 2.5 cm. in diameter. Bracts lanceolate, acuminate, 5-9 mm. long. Flowers white and green, marked with brown, with slender pedicel-

late ovaries that are 8–10 mm. long. Dorsal sepal elliptic, obtuse, 4–4.5 mm. long, 1.5–2 mm. wide. Lateral sepals broadly elliptic, obtuse to subapiculate, concave, 3.5–4 mm. long, 2–2.2 mm. wide. Petals narrowly oblanceolate-spatulate, subtruncate to obtuse, with the margins minutely undulate-crenulate, 3.5–4 mm. long, about 1 mm. wide near the apex. Lip in natural position cymbiform, constricted at the apex to form a broad apicule, the margins conspicuously revolute, when spread out 3.5–4 mm. long, 2.5–3 mm. wide; disk adorned with brown, branching cross lines. Column small, about 2 mm. long. Capsule ovoid, about 8 mm. long.

Cranichis apiculata is easily identified by the conspicuous apicule at the apex of the lip.

Chiquimula: Montaña Nonojá, 3–5 miles east of Camotán, *Steyermark* 31701.—Jalapa: Laguna de Ayarza, *Heyde & Lux* 3859.—Santa Rosa: La Viñas, *Heyde & Lux* 6246. Malpais, *Heyde & Lux* 6246.—Calderas, *J. R. Johnston* 1403; 1117; 1118; 1577 (in part).—Volcán Zunil, *Skutch* 923.

Cranichis ciliata (HBK.) Kunth, Syn. Pl. Aeq. 1: 324. 1822. *Ophrys ciliata* HBK. Nov. Gen. & Sp. Pl. 1: 334, t. 74. 1815.

In leaf mold and deep humus of heavily shaded woods, on moist open banks and in thickets, up to 2,400 meters alt. Uncommon in Mexico, Guatemala, Honduras and Costa Rica, south to Venezuela.

Plant glabrous below, glandular-pubescent above, slender; scape purplish. Leaves basal, with narrowly winged petioles; lamina somewhat variegated, ovate, ovate-lanceolate or elliptic, abruptly acute or acuminate, broadly rounded to subcordate at the base, oblique, 5–12 cm. long, 2.3–7 cm. wide; petiole 7.5–14 cm. long, purplish. Raceme narrow, cylindrical, with few or many flowers, 4–15 cm. long, about 2 cm. in diameter. Bracts lanceolate, acuminate, 5–8 mm. long. Flowers white, marked with green or purple-brown, with pedicellate ovaries that are about 9 mm. long. Dorsal sepal elliptic to elliptic-oblong, obtuse, the margins involute, 3.8–4.2 mm. long, 1.5–2 mm. wide. Lateral sepals somewhat obliquely ovate-elliptic or elliptic, obtuse and minutely cucullate at the apex, 3–4.2 mm. long, 2–2.2 mm. wide. Petals linear-oblanceolate, obtuse, the margins ciliate, slightly falcate, 3–4 mm. long, about 1 mm. wide above the middle. Lip sessile, in natural position concave, the margins turned upward, when spread out suborbicular-obovate or orbicular, broadly rounded at the apex, 2.5–4 mm. long, 2–3.5 mm. wide; disk with three parallel green or brownish stripes, the mid-stripe extending beyond the apex of the lateral stripes and breaking up into branching stripes near the apex of the lip. Column 1.5–2 mm. long. Capsule ovoid, 8–9 mm. long.

Cranichis ciliata is distinguished from closely allied species, particularly *C. sylvatica*, by its orbiculate lip and the mid-stripe of the disk, which extends beyond the lateral stripes and branches near the apex.

Alta Verapaz: Vicinity of Secanquim, *Maxon & Hay* 3208a.—Chimaltenango: Above Las Calderas, *Standley* 60076. Region of Los Positos, above Las Calderas, *Standley* 80233. Chimaltenango, *J. R. Johnston*.—Guatemala: Volcán de Pacaya, above Las Calderas, *Standley* 58493. Slopes of Volcán de Pacaya, between San Francisco Sales and the base of the active cone, *Standley* 80740; 80753. Pacaya, *J. R. Johnston*. Las Nubes, *Wendland* (fide Hemsley).

***Cranichis cucullata* Schltr. Repert. Sp. Nov. 14: 115. 1915.**

Moist, mossy banks in dry oak-pine forests, wooded valleys, up to 2,200 meters alt. Very rare in Mexico, Guatemala and Ecuador.

Plant slender, glabrous below, sparingly puberulent above, 2.1–3.2 dm. tall. Leaves basal, with slender, winged petioles; lamina ovate to narrowly elliptic, acute, slightly oblique, subtruncate or tapering into the petiole at the base, variegated, 3–6 cm. long, 1.4–3 cm. wide; petiole 0.7–3 cm. long. Raceme very lax, composed of 4–15 scattered flowers, 3.5–7.5 cm. long. Bracts elliptic-lanceolate, acuminate, 6–8 mm. long. Flowers white, marked with red-brown, with slender pedicellate ovaries that are about 10 mm. long. Dorsal sepal elliptic-oblong, obtuse to subacute, 4.2–5 mm. long, about 2.2 mm. wide. Lateral sepals conspicuously oblique, ovate-deltoid, broadly obtuse to subacute, concave, the posterior margin broadly subauriculate at the base, 4.5–5 mm. long, about 3.5 mm. wide at the base. Petals linear-elliptic to linear-oblancoelate, obtuse or broadly rounded at the apex, slightly falcate, 4–4.5 mm. long, about 1.5 mm. wide. Lip sessile, in natural position deeply cucullate at the base, slightly recurved and narrowed above the middle to the broadly obtuse or subacute apex, 4–5 mm. long; when spread out broadly ovate; disk with three prominent brownish-red veins in the center, the lateral veins giving rise to short spreading veins, the center vein disappearing near the center of the lip. Column 2–2.5 mm. long. Capsule obliquely cylindrical, about 1.3 cm. long.

Cranichis cucullata is distinguished by its deeply cucullate lip and conspicuously oblique lateral sepals.

Huehuetenango: Moss-covered bank of crumbling serpentine rock in dry oak-pine woods, *Skutch* 1642.

***Cranichis diphylla* Sw. Prodr. 120. 1788. *C. guatemalensis* Schltr. Repert. Sp. Nov. 2: 129. 1906 (type: Guatemala, auf Felsen bei Chiacam, *H. von Türckheim* 1379).**

On rocks, mossy stumps and logs in densely shaded forests, up to 3,000 meters alt. Uncommon but widespread in the West Indies, Mexico and Central America.

Plant slender, glabrous below, glandular-pubescent above, 1–3.8 dm. tall. Leaves basal, with slender petioles; lamina ovate, oblong-lanceolate or lanceolate, acute or acuminate at the apex, truncate or subcordate at the base, 2.5–9 cm.

long, 1.5–4.2 cm. wide; petiole 2–8.5 cm. long. Raceme slender, dense or lax with few or many flowers, 2–10 cm. long, 1.3–2 cm. in diameter. Bracts lanceolate, acuminate, 3–8 mm. long. Flowers small, white or greenish white, with slender pedicellate ovaries that are about 5 mm. long. Dorsal sepal elliptic, obtuse, concave, 2.5–3.8 mm. long, about 1.5 mm. wide. Lateral sepals slightly oblique, ovate, obtuse, 3–3.5 mm. long, 1.5–2 mm. wide. Petals elliptic-oblong to narrowly oblanceolate, obtuse, 3–3.2 mm. long, about 1 mm. wide. Lip sessile, in natural position concave; when spread out orbicular-ovate or suborbicular, broadly obtuse to subacute, 2.5–3 mm. long, 2–2.5 mm. wide; disk with several irregular green-dotted lines. Column short, 1–1.5 mm. long.

Cranichis diphylla is different from nearly allied species in that its petals are eciliate and the small lip is of an orbicular-ovate type.

This species is represented from Guatemala only by the type collection of *C. guatemalensis*.

Cranichis hieroglyphica Ames & Correll in Bot. Mus. Leaflet. Harv. Univ. 10, no. 4: 61. *pl.* 2. 1942 (type: Guatemala, Dept. Guatemala, terrestrial, near San Rafael, road to Antigua, about 6,000 feet alt., September 8, 1935, *Margaret Ward Lewis* 154). Figure 23.

Terrestrial in mountain forests, usually at high elevations, up to 2,400 meters alt. Apparently confined to Mexico and Guatemala.

Plant solitary, erect or geniculate at the base, 2.5–4.5 dm. tall. Stem slender, pubescent with whitish articulated hairs, provided with several short tubular acuminate bracts, 2–3 mm. in diameter. Leaves two, basal and subopposite, spreading on the ground, enclosed at the base by two or more scarious clasping sheaths; petiole winged, 2–4.5 cm. long; lamina oblique, elliptic to ovate-elliptic, acute to abruptly acuminate, 4.5–11.5 cm. long, 2.7–5.5 cm. wide, succulent, glabrous, silvery green and glossy beneath, dark-veined above with a reticulate pattern over a dull silvery green background. Raceme compact, composed of twenty to thirty small white flowers that blossom in close succession, cylindrical, 2.5–3.5 cm. long, about 2 cm. in diameter. Floral bracts white, lanceolate, acuminate, 5–6 mm. long. Flowers with stout puberulent pedicellate ovaries. Sepals ovate-elliptic, narrowly obtuse to subacuminate, 1- to 2-nerved, concave, 2.5–3.1 mm. long, 1.3–1.5 mm. wide; lateral sepals slightly oblique. Petals somewhat oblique, linear-lanceolate to narrowly elliptic, obtuse, 1-nerved, ciliate along the margins with long whitish hairs, finely hirsute through the center near the base, 2–2.5 mm. long, about 0.7 mm. wide. Lip sessile, subquadrate-ovate, narrowly obtuse, angled on each side at the base, concave, 2–2.5 mm. long, 1.3–1.5 mm. wide; disk adorned with somewhat thickened green stripes, with a short central stripe and two subhorizontal stripes, one on each side, which converge toward the middle, with a deeply U-shaped stripe on each side at the base. Column short, terete, about 1.5 mm. long.

Cranichis hieroglyphica is most closely related to *C. Wageri* Reichb. f. However, besides having smaller flowers, the floral segments of *C. hieroglyphica* are comparatively blunt as compared with

CRANICHIS

hieroglyphica

Ames & Correll

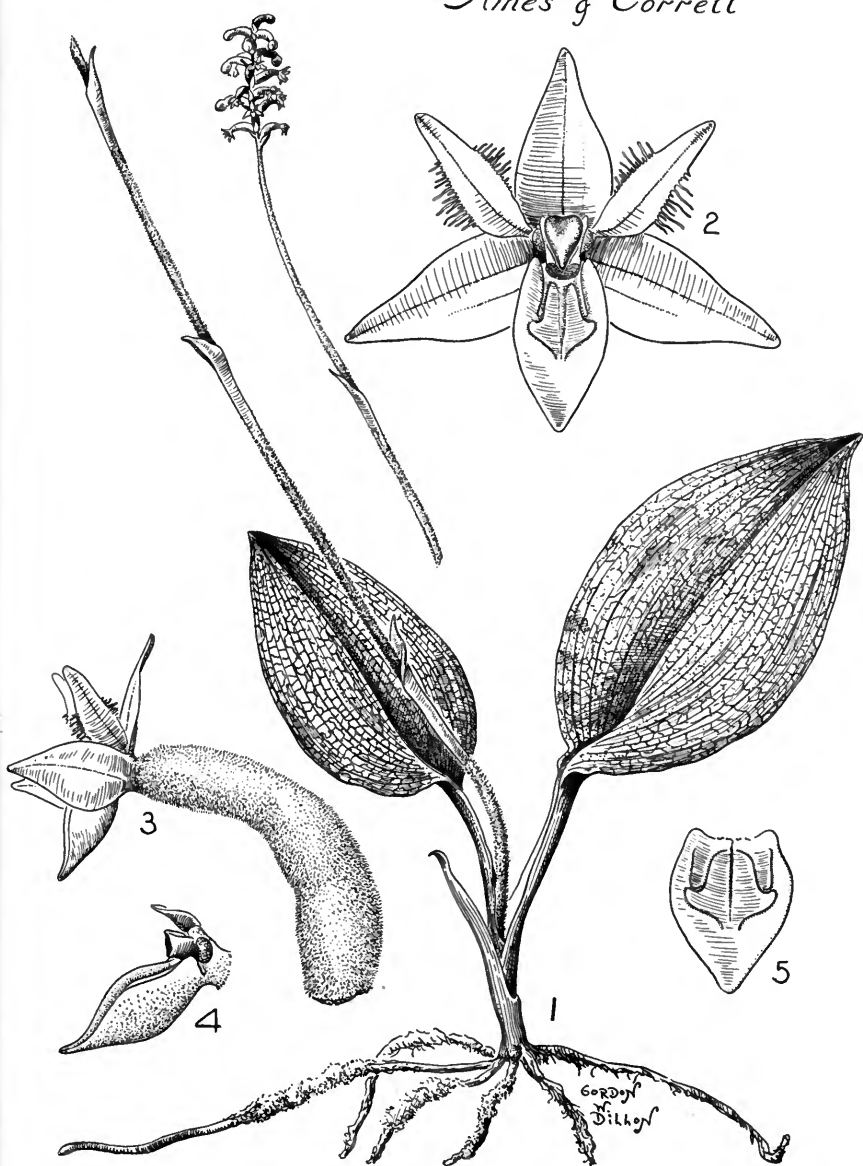


FIG. 23. *Cranichis hieroglyphica*. 1, plant ($\times \frac{1}{2}$); 2, flower, spread open ($\times 10$); 3, flower, side view ($\times 6$); 4, lip and column, side view ($\times 10$); 5, lip, spread out ($\times 10$). Drawn by G. W. Dillon.

the narrowly acuminate floral segments of *C. Wageri*. Although the petals of both species are ciliate, those of *C. hieroglyphica* are obtuse while those of *C. Wageri* are long-acuminate. The shape of the lip and the pattern of the venation are different in the species. The lip of *C. Wageri* is narrowly ovate to subcordate and acuminate. The stripe design is composed of three parallel green or brownish stripes with the lateral stripes producing retrorse secondary stripes. The lip of *C. hieroglyphica* is subquadrate-ovate and obtuse. The stripe design, from which the name is derived, is a peculiar pattern. The design of green stripes is composed of a short central stripe with additional subhorizontal stripes, one on each side, which converge toward the middle, and has a deeply U-shaped stripe on each side near the base. The stripes are somewhat thickened.

Chiquimula: Upper slopes of Montaña Tajurán, in vicinity of El Barriol, *Steyermark* 30816.—Guatemala: Volcán de Pacaya, above Las Calderas, *Standley* 58432.

Cranichis mexicana (A. Rich. & Gal.) Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 430. 1918. *Ocampoa mexicana* A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 31. 1845.

In loamy sands and calcareous soils on slopes of oak-pine forests, up to 2,150 meters alt. Uncommon in Mexico and Guatemala.

Plant rather stout, glabrous below, densely glandular-pubescent above, 2.9–7 dm. tall. Leaves basal, with one or more reduced leaves above the base, with broadly winged petioles; lamina oblong-elliptic to broadly oblanceolate, acute, tapering into the petiole at the base, 9–21 cm. long (including petiole), 2.5–5 cm. wide. Raceme densely flowered, compact, cylindrical, 7–19 cm. long, 2–2.5 cm. in diameter. Bracts ovate-lanceolate, acuminate, about 10 mm. long. Flowers white or pale green. Sepals glandular-pubescent on the outer surface. Dorsal sepal ovate-lanceolate, subobtuse, slightly concave, 5–6 mm. long, 2–3 mm. wide. Lateral sepals obliquely triangular-lanceolate, obtuse or subacute, extended at the base on the posterior margin into a semiorbicular auricle, 6–7.5 mm. long, 3–4 mm. wide at the base. Petals linear, broadly rounded or obtuse at the apex, about 5 mm. long and 1 mm. wide. Lip with an S- or C-shaped claw, in natural position deeply concave, constricted about the middle and arcuate-recurved above the middle, the margins upturned, when spread out ovate-oval or oval, broadly rounded and minutely cucullate at the apex, 5–6 mm. long, about 4 mm. wide; disk with several green lines. Column short, with 2 broad wings on the anterior margin, 3–4 mm. long.

Cranichis mexicana is easily distinguished from the other species of *Cranichis* found in Guatemala by the S- or C-shaped claw of the lip.

Chimaltenango: Tecpam, *Johnston* 1402. Barranco de La Sierra, southeast of Patzún, *Standley* 61590.

***Cranichis muscosa* Sw. Prodr. 120. 1788. Figure 22.**

Moist rocks in streams and on banks in wet mountain forests, up to 1,300 meters alt. Widespread in southern Florida, Mexico, Guatemala, Costa Rica, Panama, Bahama Islands, the West Indies, Trinidad and Venezuela.

Plant scapose, 9–44 cm. tall. Roots fleshy, coarsely fibrous, fasciculate. Scape slender, tinged with madder-purple. Leaves four to six, radical, petioled, reduced above to sheathing ovate to lanceolate leaf-like bracts; blade subcordate, broadly ovate, elliptic or oblong, obtuse to acute, 2.5–9.5 cm. long, 1.5–4 cm. wide; petiole winged, 1–4 cm. long. Raceme few- to many-flowered, 1.5–13 cm. long, 1.5–2.3 cm. in diameter. Floral bracts ovate-lanceolate, acute to acuminate, 3–5 mm. long. Flowers white. Sepals ovate to oblong-elliptic, abruptly acute to obtuse, 2–3 mm. long, 1–2 mm. wide. Petals linear-oblong to oblong-spatulate, obtuse, 2–3 mm. long, 0.5–1 mm. wide. Lip white, spotted with green, erect, sessile, suborbicular or oblong-quadrate, concave, rarely mucronate, with entire undulate margins, tuberculose or slightly crested along the three median veins of the disk, 2–3 mm. long, 1.5–2 mm. wide. Column slightly winged, about 1 mm. long. Capsule essentially sessile, 7–10 mm. long, ovoid.

The foliaceous bracts of the scape easily distinguish this species from all other species of *Cranichis* found in Guatemala.

Suchitepequez: Southwestern slopes of Volcán Zunil, in vicinity of Finca Montecristo, southeast of Santa María de Jesús, *Steyermark* 35224.

***Cranichis Schaffneri* Reichb. f. Bonpl. 3: 238. 1855.**

In oak-pine woods, in leaf mold and on trees in oak forests, on damp banks and in pockets of rocks in the open, up to 2,700 meters alt. Rare in Guatemala, widespread in Mexico.

Plant glabrous below, glandular-pubescent above, erect or suberect, 0.9–4 dm. tall. Leaves basal, sessile or on a very short petiole; lamina ovate to narrowly elliptic, broadly rounded to acute, 3–9.5 cm. long, 1.5–4 cm. wide; petiole up to 3 cm. long. Raceme lax, few-flowered, 3–14 cm. long, 1.5–2 cm. in diameter. Bracts ovate to lanceolate, acuminate, 3–5 mm. long. Flowers ascending, greenish white, with slender pedicellate ovaries that are about 8 mm. long. Sepals glandular-pubescent on the outer surface. Dorsal sepal elliptic to lanceolate, obtuse or acute, 3.5–6 mm. long, 1.5–2 mm. wide. Lateral sepals obliquely ovate-elliptic, concave, obtuse to subacute, occasionally somewhat united at the base, 3.2–5.5 mm. long, 2–3 mm. wide. Petals linear to linear-oblong, obtuse or broadly rounded at the apex, somewhat falcate, 3–6 mm. long, 0.5–1.2 mm. wide. Lip attached to about the middle of the column, cordate-triangular or obscurely 3-lobed, shallowly concave, obtuse or acute, with a stout, short claw, 2.3–4 mm. long, 1.5–3.5 mm. wide. Column short, 1.5–2 mm. long. Capsule ovoid, about 8 mm. long.

In Guatemala this species is the only *Cranichis* whose lip is attached near the middle of the column.

Huehuetenango: San Juan Atitlán, *Skutch* 1173.—Jalapa: Mountains about Chahuite, northwest of Jalapa, *Standley* 77483 (in part).

Cranichis sylvatica A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 30. 1845. *C. pseudociliata* Schltr. Repert. Sp. Nov. 12: 202. 1913 (type: Guatemala, Dept. Alta Verapaz, auf Felsen im Walde bei Secanquim, January, 1905, *W. R. Maxon & R. Hay* 3208; December, 1904, *G. P. Goll* 205).

In wet soil and on rocks in shady or open forests, up to 2,500 meters alt. Rare in Mexico, Guatemala and Honduras.

Plant slender, glabrous below, slightly pubescent above, 0.8–5 dm. tall. Leaves basal, with slender, winged petioles; lamina orbicular-ovate to oval-elliptic, abruptly acute or subapiculate, subtruncate or tapering at the base, somewhat oblique and variegated, 2–12 cm. long, 1.2–4.8 cm. wide; petiole 0.5–7 cm. long. Raceme of few or many flowers close together, 1.5–11 cm. long, 1.5–2.5 cm. in diameter. Bracts ovate-lanceolate to narrowly lanceolate, acuminate, 5–8 mm. long. Flowers white marked with green, with slender pedicellate ovaries that are 6–10 mm. long. Dorsal sepal elliptic, subobtuse to acute, 3.4–5 mm. long, about 1.5 mm. wide. Lateral sepals somewhat obliquely ovate, obtuse or subacute, 3–5 mm. long, 2–3.2 mm. wide. Petals elliptic-oblong to narrowly oblanceolate, broadly rounded to subacute at the apex, slightly falcate, occasionally obscurely ciliate on the margins, 3–4.5 mm. long, 1–1.5 mm. wide. Lip in natural position cymbiform or deeply concave, arched, spreading, with the margins revolute above the middle; when spread out subquadrate, broadest above the middle, subtruncate to subacute at the apex, 3–5 mm. long, about 3 mm. wide; disk with three parallel dotted green lines, with the center line disappearing near the center of the lip. Column white, thickened above and occasionally obscurely 3-lobed, 2–2.5 mm. long.

Cranichis sylvatica differs from nearly allied species by its cymbiform lip, which is subquadrate when spread out.

Alta Verapaz: Vicinity of Secanquim, *W. R. Maxon & R. Hay* 3208; 3119. Trail to Secanquim, *G. P. Goll* 205.—Chiquimula: Montaña Castilla, vicinity of Montaña Cebollas, along Río Lucia, 3 miles southeast of Quezaltepeque, *Steyermark* 31271. At base of trees, summit of cloud forest, Montaña Nonojá, 3–5 miles east of Camotán, *Steyermark* 31701.—Zacapa: Bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29849.

Cranichis Wageneri Reichb. f. *Linnaea* 41: 19. 1876. *C. subcordata* Schltr. Repert. Sp. Nov. 2: 130. 1906 (type: Guatemala, auf einem alten Baumstamme bei Pansamalá, January, 1887, *H. von Türckheim* 1113).

In wet woods in leaf mold or on rotten stumps, rarely upon trees, in moist thickets and on rocky banks, up to 1,650 meters alt. Uncommon in the West Indies, Mexico, through Central America to Colombia and Venezuela.

Plant glabrous below, sparingly pubescent above, 1.2–3 dm. tall. Leaves basal, subsessile or with a short petiole; lamina ovate to ovate-lanceolate, acute or acuminate, broadly rounded to subcordate at the base, somewhat oblique, 2.5–11.5 cm. long, 2–6.2 cm. wide; petiole 0.8–5.5 cm. long. Bracts lanceolate, acuminate, 5–6 mm. long. Flowers greenish white or reddish brown, with pedicellate ovaries that are 6–8 mm. long. Sepals ovate-lanceolate to elliptic-lanceolate, acuminate, 4–4.2 mm. long, 1.5–2 mm. wide. Petals linear-lanceolate, acuminate, ciliate along the margins, somewhat falcate, 3–4 mm. long, about 0.5 mm. wide. Lip in natural position arched, deeply concave-channeled, incurved at the apex, subsessile or with a short, broad claw, when spread out subcordate to narrowly ovate, acute or acuminate, rarely narrowly obtuse, 3–4 mm. long, 1.5–2.5 mm. wide near the base; disk with three parallel green or brownish stripes, the mid-stripe disappearing near the center of the lip, the lateral stripes producing several retrorse secondary stripes. Column about 1.5 mm. long.

Cranichis Wageneri is distinctive in that its floral segments are narrowly acuminate and the narrowly lanceolate petals are copiously ciliate. The stripe design on the disk of the lip is also helpful in determining the species.

Chiquimula: Volcán Ipala, near Amatillo, *Steiermark* 30497.

13. PONTHEIVA R. Br.

Terrestrial, scapose herbs with fleshy or somewhat fibrous roots and basal leaves that are subsessile or long-petioled, glabrous to pilose. Inflorescence a lax or subdense raceme of small flowers. Dorsal sepal and petals often adherent at the apex. Sepals free or the lateral ones slightly united at the base, spreading. Petals attached above the middle of the column, very oblique, spreading. Lip on the upper side of the flower, adnate to the column by its unguiculate base, abruptly dilated and ascending. Column short; anther one, two-celled; pollinia four, powdery-granular. Capsule suberect, ovoid or ellipsoid.

In this genus there are about twenty-five species that are found in the warmer regions of the Western Hemisphere from southeastern Virginia to Chile, including Mexico, Central America and the West Indies.

1. Entire plant (including leaves) densely glandular-villose. *P. maculata*.
1. Entire plant not as above; leaves glabrous or nearly so.
 2. Lip auriculate or auriculate-cordate at the base.
 3. Petals attached to the apex of the column, transversely falciform. *P. Tuerckheimii*.
 3. Petals attached below the middle of the column, obliquely ovate-triangular. *P. parvula*.

2. Lip not auriculate or cordate at the base.
4. Lip triangular or suborbicular, terminated by an obtuse or acute apicule.
 5. Lip more than 4 mm. long, ecallose at the base of the disk; petals mostly ciliate along the margins.....*P. racemosa*.
 5. Lip less than 3.8 mm. long, with a pair of small calli at the base of the disk; petals not ciliate along the margins.....*P. Ehippium*.
4. Lip elliptic or conspicuously 3-lobed above the middle.
 6. Lip about 6 mm. long.....*P. pulchella*.
 6. Lip 4 mm. or less long.....*P. triloba*.

Ponthieva Ehippium Reichb. f. *Linnaea* 28: 382. 1856.

In very damp and shaded soil and in grass under pine trees, up to 2,500 meters alt. Uncommon in Mexico, Guatemala, Honduras and Panama.

Plant slender, glabrous below, glandular-pubescent above, 1-3.7 dm. tall. Leaves basal, with short, winged petioles, ovate to oblong-obovate, acute, 3-12 cm. long (including petiole), 2-3.8 cm. wide. Raceme of few or many scattered flowers, 4-15 cm. long. Bracts elliptic, acute or apiculate, about 1 cm. long. Flowers white, with slender pedicellate ovaries that are 1-2 cm. long. Dorsal sepal elliptic-lanceolate to oblong-lanceolate, acute or acuminate, 6.5-7 mm. long, about 2 mm. wide. Lateral sepals broadly ovate to elliptic-lanceolate, obtuse, somewhat oblique, glandular-pubescent on the outer surface, 6.2-7 mm. long, 3.5-4 mm. wide. Petals semihastate-triangular, obtuse, with a short claw, sinuate along the outer margin, 4-6 mm. long (including the claw), about 2.5 mm. wide at the base. Lip with a short, laterally winged claw, triangular to suborbicular-quadrate, truncate or subtruncate and obtusely apiculate at the apex, maculate, entire lip 3-3.5 mm. long, 2.5-3 mm. wide; apicule about 1 mm. long; disk with 2 small calli at the base. Column short, about 2.5 mm. long. Capsule obliquely fusiform, about 12 mm. long.

Ponthieva Ehippium is closely allied to *P. triloba*, from which it is distinguished by its more orbiculate lip and by the prominently hastate base of the petals.

Santa Rosa: Cenaguilla, *Heyde & Lux* 3865.

Ponthieva maculata Lindl. *Ann. & Mag. Nat. Hist.* 15: 385. 1845.

Epiphytic on trees or occasionally terrestrial in damp forests, up to 2,500 meters alt. Widespread but not common in Mexico, Costa Rica, Venezuela, Colombia and Ecuador.

Plant glandular-villose throughout, up to 3 dm. tall; roots thick, fleshy, fasciculate. Leaves basal, sessile or petiolate, ovate-lanceolate to oblanceolate or elliptic-lanceolate, acute to shortly acuminate, 7-28 cm. long, 1.5-5 cm. wide. Raceme laxly flowered, up to 12 cm. long. Floral bracts elliptic-lanceolate, acuminate, concave, 1-2 cm. long. Flowers large for the genus, variously colored. Sepals and petals bronze-colored. Sepals glandular on the inner surface; dorsal

sepal elliptic to elliptic-lanceolate, acute, 9–13 mm. long, about 5 mm. wide; lateral sepals broadly elliptic to suborbicular, obtuse to broadly rounded at the apex, somewhat oblique, 9–12 mm. long, 5–8 mm. wide. Petals with a short claw, obliquely ovate-elliptic, obtuse, 7–9 mm. long, 2–3 mm. wide at base of lamina. Lip small, fleshy, subsessile, scoop-shaped, dark red or greenish red marked with white or cream-color, 2–4 mm. long, 2–3 mm. wide when spread open, when spread out subquadrate to obovate and apiculate, with a sulcate thickening at the base. Column clavate, about 4 mm. long. Capsule ellipsoid, 1.5–2 cm. long.

This species may be distinguished from other species of *Ponthieva* found in Guatemala by its densely glandular-pubescent leaves, stem and inflorescence. No specimen has been seen from Guatemala. However, since its area of distribution includes Guatemala, it is included here. There is no doubt that with further exploration it will be found to occur in our region.

Ponthieva parvula Schltr. Repert. Sp. Nov. 10: 394. 1912 (type: Guatemala, Dept. Alta Verapaz, in rupium fissuris prope Cobán, December, 1879, *H. von Türckheim* 484).

In rock crevices, up to 1,600 meters alt. Guatemala.

Plant small, erect, glabrous below, sparsely glandular-puberulent above, 7.5–9 cm. tall. Leaves several, basal, with a short petiole; lamina elliptic, obtuse to subacute, rounded at the base, 1.6–1.9 cm. long, 0.5–0.7 cm. wide; petiole about 7 mm. long. Raceme few-flowered. Bracts ovate, acuminate. Flowers small, erect-spreading or suberect. Sepals glabrous, about 2.75 mm. long; dorsal sepal oblong-elliptic, obtuse; lateral sepals obliquely ovate-triangular, obtuse. Petals with a short subduplicate claw, very oblique at the base, ovate-triangular, obtuse or broadly rounded at the apex, conspicuously dilated at the base on the outer margin, about 2.7 mm. long (including the claw). Lip with a short linear claw, suborbicular, with a small obtuse, recurved lobe at the apex, auriculate-cordate at the base, concave at the base of the disk, lateral margins upturned or involute, about as long as the petals, about 2.25 mm. wide at the middle. Column short. Capsule small, clavate, glandular-puberulent, about 4 mm. long.

This species is recognizable by its small flowers and the conspicuous auriculate-cordate base of the lip.

Ponthieva parvula is represented only by the type collection from Guatemala.

Ponthieva pulchella Schltr. Repert. Sp. Nov. 15: 196. 1918 (type: Guatemala, ad rupes, Sta. Eulalia, Sierra Madre, September, 1876, *Bernoulli & Cario* 667).

Terrestrial at high elevations, up to 3,700 meters alt. Apparently endemic to Guatemala.

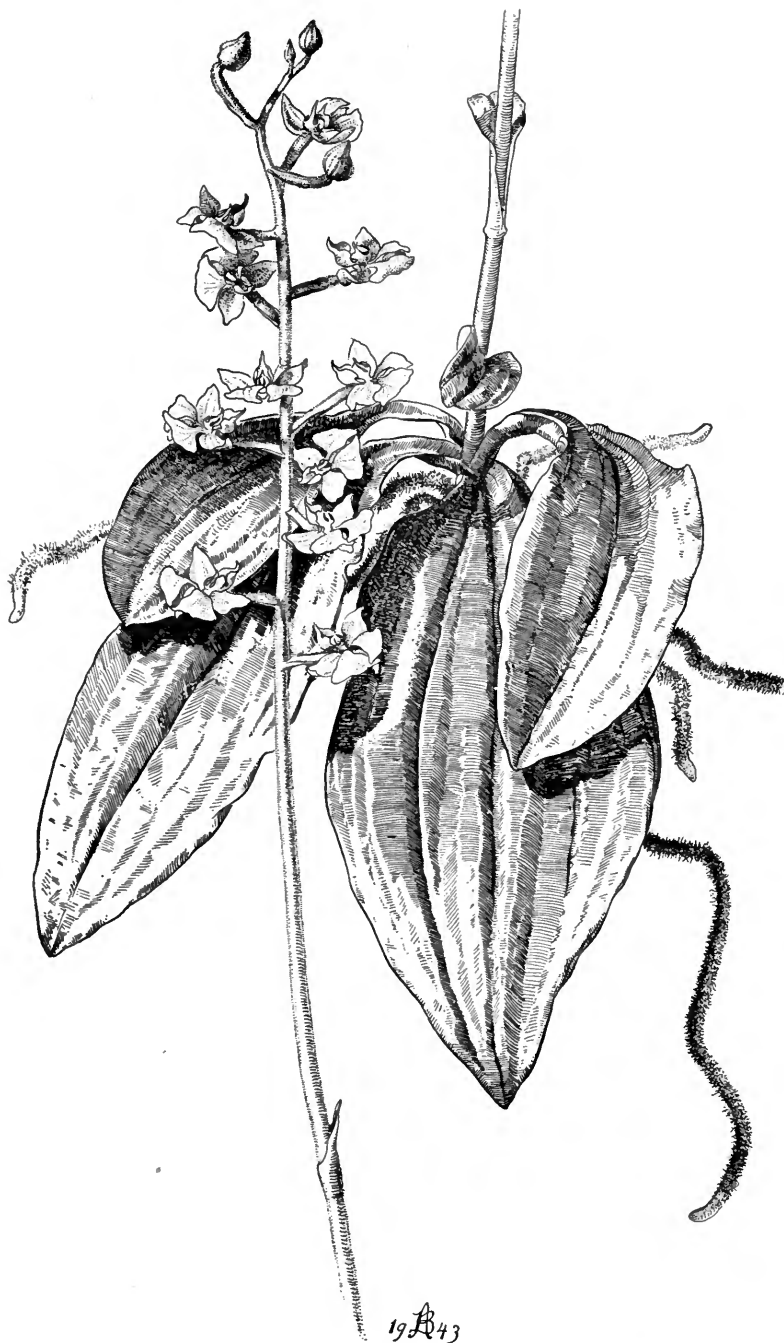


FIG. 24. *Ponthieva racemosa*. Plant ($\times 1$). Drawn by Blanche Ames.



FIG. 25. *Ponthieva racemosa*. Plant ($\times \frac{2}{3}$); 1, dorsal sepal ($\times 2$); 2, flower, partly spread out ($\times 2$); 3, lateral sepal ($\times 2$); 4, lip, spread open ($\times 2$); 5, column (a, anther; s, stigma), side view ($\times 8$). Drawn by Blanche Ames.

Plant erect, glabrous below, sparsely glandular-pilose above, 1.2–2.7 dm. tall. Leaves basal, spreading, ovate to elliptic, obtuse to shortly acuminate, tapering or rounded at the base, up to 10 cm. long and 2.5 cm. wide. Raceme lax, 6–10-flowered, up to 7 cm. long. Floral bracts elliptic, acute to acuminate, about 1 cm. long. Flowers white or yellowish green. Sepals 6–9 mm. long, up to 4.5 mm. wide, the outer surface glandular-pilose; dorsal sepal lanceolate-ligulate to elliptic, obtuse to subacute; lateral sepals obliquely rhomboid-ovate, obtuse. Petals with a narrow linear claw, obliquely triangular-ovate, obtuse, with the outer margin slightly undulate and conspicuously dilated at the base, 6–7 mm. long, 3 mm. wide at the widest point. Lip with a narrow linear claw, suberect, broadly elliptic, more or less 3-lobed at the apex, the lateral margins upcurved, concave at the base of the disk, 6 mm. long (including the claw), 2.75–4 mm. wide; mid-lobe about 1.5 mm. long and wide, obtuse, thick. Capsule glandular-pilose, about 1 cm. long.

Ponthieva pulchella is very closely allied to *P. Mandonii* Reichb. f., a South American species. It is probable that when additional material of this species is available for study this concept will be reduced to *P. Mandonii*.

Huehuetenango: Between Tojquiá and Caxin bluff, summit of Sierra de los Cuchumatanes, *Steyermark* 50191. Cerro Cananá, between Nucapuxlac and Cananá, Sierra de los Cuchumatanes, *Steyermark* 49069.

Ponthieva racemosa (Walt.) Mohr, Contr. U. S. Nat. Herb. 6: 460. 1901. *Arethusa racemosa* Walt. Fl. Carol. 222. 1788. *Ponthieva guatemalensis* Reichb. f. Beitr. Orch. Centr.-Am. 63. 1866 (type: Guatemala, in einer Barranca bei Guatemala, January 16, 1857, *Wendland* 243). Figures 24, 25.

In shady wet barrancas, loamy slopes in forests, on damp cliffs and along stream banks in woods, up to 2,000 meters alt. A widespread and common species from Virginia to Florida, west to Louisiana and Texas throughout the West Indies, Mexico and Central America to northern South America.

Plant erect, scapose, 1.3–6 dm. tall; scape and inflorescence glandular-pubescent, reddish brown, purplish or purplish-green. Leaves mostly in a basal rosette, oblong-elliptic, obovate or oblanceolate, obtuse or subacute, subsessile or long-petioled, glaucous on the lower surface, 2–17 cm. long (including the wide petiole), 1–5.5 cm. wide. Raceme lax, 5–24 cm. long, 1.5–5 cm. in diameter. Floral bracts ovate-lanceolate to narrowly lanceolate, acuminate, 5–9 mm. long. Flowers white-green, marked with green, with rather stout ascending pedicellate ovaries that are 1–2.2 cm. long. Dorsal sepal oblong-elliptic to elliptic-lanceolate, obtuse to subacute, 3.8–7.5 mm. long, 2–3 mm. wide. Lateral sepals broadly ovate to ovate-oblong, oblique, obtuse to acute, 4.3–8 mm. long, 2.5–4 mm. wide. Petals with a slender claw, obliquely triangular to semicordate, incurved, dilated on the outer margin at the base, constricted near the apex, obtuse to subacute, mostly ciliate, 4–8 mm. long, 1.5–5 mm. wide at the base. Lip with a short claw, suborbicular,

concave-saccate with the lateral margins upturned, terminated by a linear obtuse to acute apical lobe, with an obscure linear median crest on the disk, 4–7.5 mm. long, 2.5–6 mm. wide (when spread out); claw 1–2 mm. long. Column 2–4.5 cm. long, curved. Capsule ellipsoid, 8–13 mm. long, about 5 mm. in diameter.

Alta Verapaz: Cobán, *Türkheim* 1786, 14. On limestone rocks, between Cobán and Finca Chimote, near Rubeltein, *Steyermark* 44163.—Amatitlán: Frajanes, *Heyde & Lux* 6249. Pacaya, *J. R. Johnston* 1398; 1574.—Chimaltenango: Along road from Chimaltenango to San Martín Jilotepeque, *Standley* 57920.—Chiquimula: Río Grande (Río Concepción), on Socorro Mountain, above Finca San José, southeast of Concepción de las Minas, *Steyermark* 31131.—Guatemala: Along road between Guatemala and San Raimundo, *Standley* 63009. Barranca de las Vacas, near Guatemala, *Standley* 59546.—Jalapa: Mountains about Chahuite, northwest of Jalapa, *Standley* 77483 (in part).—Santa Rosa: *Heyde & Lux* 6255.

Ponthieva triloba Schltr. Repert. Sp. Nov. 9: 25. 1910 (type: Guatemala, Dept. Alta Verapaz, in rupium fissuris prope Xucanel, December, 1877, *H. von Türkheim* 14).

On wooded slopes and mossy rocks on brushy hillsides, up to 2,500 meters alt. This species has been found only in Guatemala, where it is rare.

Plant glabrous below, glandular-pubescent above, slender, ascending, 1.2–3.7 dm. tall. Leaves basal, sessile or essentially so, elliptic or elliptic-oblancoate, subobtusate or acute, 3–12 cm. long, 1.5–3.2 cm. wide. Raceme asymmetrical, few-flowered, 3.5–8 cm. long. Bracts tubular, oblong-lanceolate, acuminate, 5–8 cm. long. Flowers white, with slender pedicellate ovaries that are 1–1.5 cm. long. Sepals sparingly pilose on the outer surface and margins; dorsal sepal elliptic, narrowly obtuse or subacute, 4.5–6 mm. long, 2.2–2.5 mm. wide; lateral sepals obliquely ovate or broadly ovate-lanceolate, subobtusate or acute, 4.5–6.5 mm. long, 2.8–3.5 mm. wide. Petals with a short claw, semideltoide or obliquely triangular-lanceolate, asymmetrically obtuse or acute, 5–6.5 mm. long (including the claw), about 2.2 mm. wide across the base. Lip conspicuously 3-lobed above the middle, the entire lip 2.5–4 mm. long, 3.2–4 mm. wide across the lateral lobes; mid-lobe linear, obtuse or acute, 1–1.5 mm. long; lateral lobes spreading, subquadrate, with a truncate apex. Column about 3 mm. long. Capsule ovoid, prominently ribbed, about 12 mm. long.

Alta Verapaz: Felsspalten, bei Cobán, *Türkheim* 2070.—Huehuetenango: Between Canquintic and Subajasún, Sierra de los Cuchumatanes, *Steyermark* 51784. On bank, trail between Democracia and Santa Ana Huista, Sierra de los Cuchumatanes, *Steyermark* 51290.—Quiché: Nebaj, *A. F. Skutch* 1898. Near Chichicastenango, *F. W. Hunnewell* 14668. *José Ignacio Aguilar* 1512.

Ponthieva Tuerckheimii Schltr. Repert. Sp. Nov. 3: 47. 1906 (type: Guatemala, Dept. Alta Verapaz, near Pansamalá, July, 1886, *H. von Tuerckheim* 966). Figure 26.

In forests in leaf mold, up to 2,500 meters alt. Rather rare in Mexico, Guatemala and Costa Rica.

Plant slender or stout, 2.1–6 dm. tall; scape glandular-pilose. Leaves basal, glabrous, with slender scarious-winged petioles; lamina ovate to elliptic-lanceolate, acute or acuminate, oblique, subtruncate or rounded at the base, margins undulate, 3–11.3 cm. long, 1.3–4 cm. wide; petioles 1–10 cm. long. Raceme lax, elongate, many-flowered, 5–25 cm. long. Bracts tubular, elliptic-lanceolate, acute or acuminate, 7–10 mm. long. Flowers rather large, white and brown, with slender pedicellate ovaries that are 1.5–2 cm. long. Sepals sparingly glandular-pilose on the outer surface and margins; dorsal sepal elliptic-lanceolate, acuminate, 6–8.2 mm. long, 2–2.5 mm. wide; lateral sepals often united as much as 3 mm. at the base, very oblique, cymbiform or semiorbicular in outline, beak-like at the constricted apex, involute along the dorsal margins, 6–10 mm. long, about 6 mm. wide. Petals attached near the apex of the column, transversely falciform, obtuse at the two ends, about 3.5 mm. long (including the claw), 4–5.5 mm. wide. Lip small, with a short thick claw, S-shaped, liguliform, obtuse to subacute, with two lateral falcate-ensiform auricles at the base, concave at the base, conspicuously constricted and deflexed above the middle, 3.5–4 mm. long (including the deflexed apex). Column slender, arcuate, about 4 mm. long. Capsule slender, densely glandular-pilose, about 1.5 cm. long.

According to Harry Johnson, the Indians have the idea that the seeds of this species are carried up into trees where they become different plants with yellow flowers.

Alta Verapaz: Cobán, *Tuerckheim* 2338B. Road Chamá to Cobán, *Harry Johnson* 492.—Huehuetenango: Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, *Steyermark* 48600.

14. SPIRANTHES L. C. Rich.

Small or occasionally large terrestrial or epiphytic herbs with fleshy or tuberous roots that are usually fasciculate. Stem usually concealed by leaf-sheaths or bracts. Leaves basal, cauline or both, often absent at time of flowering. Sepals free; dorsal sepal usually erect and forming a galea with the petals; lateral sepals erect or spreading, affixed to the summit of the ovary, more or less decurrent on the ovary to form a free or usually adnate mentum. Petals narrow and usually adherent to the dorsal sepal. Lip sessile or clawed, plain, concave or gibbous, simple or lobed, adherent to the column in most of the species, ecallose or callose,

FIG. 26. *Ponthieva Tuerckheimii*. Plant ($\times 1$); 1, flower, front-side view ($\times 4$); 2, dorsal sepal ($\times 4$); 3, lip, front-side view (about $\times 10$); 4, lip, column, and petals (showing their attachment to the column; about $\times 7$). Drawn by Blanche Ames.



in some species bicaudate at the base. Column terete; clinandrium often membranaceous and conspicuous, often continued into the rostellum; rostellum various, inconspicuous to very pronounced, truncate to lobed or aristate; anther dorsal, erect, sessile or stipitate; pollinia two, powdery or granular, usually attenuated at one end.

Spiranthes is a highly technical genus comprising a complex and variable assemblage of plants. A large number of specific segregates have been proposed as well as a goodly number of generic segregates. Formerly, the *Spiranthinae* have been divided into four major genera—*Spiranthes*, *Pelexia*, *Sarcoglottis* and *Stenorrhynchus*. In this work, all have been brought together under the first genus. The primary reason for doing this was to avoid the arbitrary relegation of a number of the species to one genus or another. Also, in the making of the key to the species no attempt has been made to group the species under the above names (with a subgeneric status) since it was necessary to trace several species through more than one branch of the key. This was compulsory to avoid confusion and to facilitate the identification of the species.

Although *Spiranthes* is not the largest genus in Guatemala it is by far one of the most difficult to interpret. In its distribution it is world-wide, being circumboreal and represented from the Arctic to near the Antarctic regions. As considered here, there are approximately 150 species in the genus.

1. Lateral sepals free or essentially so, obliquely inserted or shortly decurrent on the ovary, at most forming a very shallow sac; column-foot short or indistinct; flowers usually small.
 2. Lip marked in the middle on the lower half with cinnabar-red.
 3. Flowers more than 1.5 cm. long.
 4. Sepals and petals obtuse to acute; plant aphyllous, from a solitary tuber, developing tuber-bearing stolons.....*S. stolonifera*.
 4. Sepals and petals long-acuminate; plant leafy below, from a cluster of fusiform-thickened roots, not developing tuber-bearing stolons.
S. hymenalis.
 3. Flowers less than 1 cm. long.
 5. Lip deeply constricted just above the middle to form a suborbicular lobule, 6 mm. or more long.....*S. parasitica*.
 5. Lip entire or obscurely constricted near the apex, less than 6 mm. long.
 6. Lip ovate to ovate-elliptic, with an inconspicuous auricle on each side at the base, 4-5 mm. long.....*S. rubrocalosa*.
 6. Lip oblong or oblong-elliptic, rounded at the base, 3.3-4 mm. long.
S. minutiflora.
 2. Lip not marked in the middle on the lower half with cinnabar-red.
 7. Lamina of lip not conspicuously lobed or constricted above, sometimes from a rather broad linear-sagittate base.
 8. Lip elliptic-lanceolate to narrowly lanceolate, mostly acuminate; sepals commonly very thin and tenuous.....*S. polyantha*.
 8. Lip not as above, at most subacute; sepals not noticeably thin and tenuous.

9. Lip from a broad base, ovate to triangular-ovate or ovate-lanceolate.
10. Stem concealed by whitish scarious tubular sheaths; spike densely flowered, pyramidal; floral bracts reddish brown. . . . *S. pyramidalis*.
10. Stem provided with greenish tubular sheaths; spike laxly or densely flowered, not pyramidal; floral bracts not reddish brown.
11. Basal callosities of lip slender, acuminate; leaves (when present) basal, with a slender petiole, elliptic. *S. costaricensis*.
11. Basal callosities of lip stout, fleshy; leaves (when present) basal or scattered on the stem, filiform to narrowly lanceolate.
12. Rachis and ovary densely pubescent with reddish hairs; leaves usually present at time of flowering, narrowly lanceolate. *S. vernalis*.
12. Rachis and ovary nearly glabrous; leaves rarely present at time of flowering, filiform. *S. tortilis*.
9. Lip oblong to oblanceolate or slightly constricted above or from a narrow base and dilated above into an ovate lamina.
13. Lip oblong to oblanceolate; leaves absent at time of flowering. *S. Llaveana*.
13. Lip ovate above; leaves present at time of flowering. . . *S. seminuda*.
7. Lamina of lip conspicuously constricted or dilated above, more or less panduriform.
14. Lip from a narrow base or broadest above the middle.
15. Lip linear-oblong below, abruptly dilated at the apex to form a suborbicular plate; petals filiform-spatulate. *S. amabilis*.
15. Lip constricted above or about the middle, oblanceolate in outline; petals linear-oblanceolate. *S. Llaveana* var. *violacea*.
14. Lip from a broad base, usually but not always broader at the base than above the middle.
16. Lamina of lip orbicular, constricted above to form a small lobule at the apex; flowers less than 3.5 mm. long. *S. guyanensis*.
16. Lamina of lip not orbicular; flowers more than 3.5 mm. long.
17. Basal callosities of lip rather prominent, directed backwards.
18. Petals linear; callosities of lip slender, acuminate; plants terrestrial. *S. costaricensis*.
18. Petals linear-oblanceolate; callosities of lip stout, more or less incurved; plants usually epiphytic.
19. Flowers not cleistogamous; inflorescence about as long as the leaves, not secund. *S. prasophylla*.
19. Flowers cleistogamous; inflorescence much exceeding the leaves, secund. *S. prasophylla* var. *cleistogama*.
17. Basal callosities of lip inconspicuous, mammillate, more or less submarginal and erect.
20. Lip with a conspicuously dilated lobule at the apex. . . *S. elata*.
20. Lip without a conspicuously dilated lobule at the apex. *S. cranichoides*.
1. Lateral sepals long-decurrent on the ovary; column-foot apparently elongate and subequal to the length of the column or longer; flowers usually but not always large.
21. Lateral sepals connate at the base to form a short distinct spur with a free acute mentum at the base, noticeably spreading and divergent from the other floral segments.
22. Lip less than 1.3 cm. long. *S. adnata*.
22. Lip more than 1.3 cm. long.
23. Sepals and petals obtuse to subacute; lateral sepals 2.5 mm. or more wide, conspicuously arcuate-recurved; lip with an oblong flat apiculate auricle on each side at the base. *S. Funckiana*.

23. Sepals and petals acuminate; lateral sepals less than 2.5 mm. wide, projecting downward and outward; lip with a thickened mammillate semiterete callus on each side at the base. . *S. Funckiana* var. *olivacea*.
21. Lateral sepals not connate into a distinct free spur, though sometimes with a blunt saccate base adnate to the ovary, not noticeably spreading and divergent from the other floral segments.
24. Lateral sepals free almost to the base, forming a distinct short mentum; rostellum a long awl-shaped rigid bristle-like point.
25. Flowers orange-colored to orange-red or orange-red and yellow; leaves more or less scattered on the stem, usually present at time of flowering.
26. Floral bracts broad, foliaceous, densely pubescent, more than 2.7 cm. long; sepals and lip obtuse to subacute; flowers orange-colored to orange-red. *S. aurantiaca*.
26. Floral bracts narrow, not foliaceous, sparingly pubescent, less than 2.7 cm. long; sepals and lip acute to acuminate; flowers orange-red and yellow. *S. cinnabarina*.
25. Flowers white to purple-red; leaves in a basal rosette, sometimes absent at time of flowering.
27. Flowers less than 8 mm. long. *S. Tonduzii*.
27. Flowers more than 8 mm. long.
28. Floral bracts scarious, conspicuously striate; inflorescence slender, less than 4 cm. in diameter.
29. Floral bracts brown-striate; petals more than 1 cm. long. *S. eriophora*.
29. Floral bracts purplish-striate; petals less than 1 cm. long. *S. oblecta*.
28. Floral bracts red or spotted with red; inflorescence stout, 4 cm. or more in diameter.
30. Lip acute to obtuse-apiculate; floral bracts exceeding the flowers. *S. speciosa*.
30. Lip acuminate; floral bracts much shorter than the flowers. *S. orchioides*.
24. Lateral sepals not forming a distinct mentum, at most produced at the base into a slight swelling; rostellum either bifid or extended into a blunt point.
31. Lip marked in the middle on the lower half with cinnabar-red; flowers small.
32. Lip deeply constricted just above the middle to form a suborbicular lobule, 6 mm. or more long. *S. parasitica*.
32. Lip entire or obscurely constricted near the apex, less than 6 mm. long.
33. Lip ovate to ovate-elliptic, with an inconspicuous auricle on each side at the base, 4-5 mm. long. *S. rubrocalosa*.
33. Lip oblong or oblong-elliptic, rounded at the base, 3.3-4 mm. long. *S. minutiflora*.
31. Lip not marked in the middle on the lower half with cinnabar-red; flowers usually large.
34. Sepals 1.5 cm. or more long; lip 2 cm. or more long.
35. Flowers fewer than ten or if more with orbiculate subsessile leaves at the base of the stem; apical lobe of lip triangular-ovate.
36. Lip mostly much exceeding 2.5 cm. in length; leaves absent at time of flowering, when present elliptic and petiolate from the base of the plant. *S. pauciflora*.
36. Lip mostly less than 2.5 cm. long; leaves usually present at time of flowering, orbiculate, subsessile, forming a rosette at base of stem. *S. rosulata*.

- 35. Flowers more than ten; leaves always elliptic and petiolate from base of stem; apical lobe of lip orbicular to broadly ovate or cordate.
- 37. Apical lobe of lip orbicular, more than 1.2 cm. wide. . . . *S. cerina*.
- 37. Apical lobe of lip broadly ovate to cordate, less than 1.2 cm. wide.
- 38. Lip below the constriction oblanceolate. *S. acaulis*.
- 38. Lip below the constriction lanceolate. *S. acaulis* var. *assurgens*.
- 34. Sepals less than 1.5 cm. long; lip less than 2 cm. long.
- 39. Leaves scattered on the stem, linear-lanceolate, present at time of flowering; lip suborbicular to broadly flabellate. . . *S. sarcoglossa*.
- 39. Leaves in a basal rosette, elliptic, often absent at time of flowering; lip not suborbicular or flabellate.
- 40. Plant small, rarely up to 15 cm. tall; flowers usually fewer than ten; petals narrowly linear, acute to subacuminate.
- 41. Lip scarcely if at all constricted near the apex. *S. trilineata*.
- 41. Lip conspicuously constricted near the apex to form a sub-orbicular lobule at the apex. *S. trilineata* var. *thelymitra*.
- 40. Plant large, rarely below 25 cm. tall when mature; flowers usually many more than ten; petals oblanceolate, obtuse to subacute.
- 42. Inflorescence densely flowered; stem concealed by imbricating scarious-brown spathaceous sheaths; floral bracts large, conspicuous. *S. hemichrea*.
- 42. Inflorescence laxly flowered; stem provided with reddish-tinged sheaths; floral bracts usually small and inconspicuous. *S. Schaffneri*.

Spiranthes acaulis (J. E. Sm.) Cogn. in Mart. Fl. Bras. 3, pt. 4: 221. 1895. *Neottia acaulis* J. E. Sm. Exot. Bot. 2: 91, t. 105. 1806. *Sarcoglottis picta* (Anders.) Klotz. Allgem. Gartenz. 10: 106. 1842.

In dense jungles, open pine forests or open places in moist soil, up to 950 meters alt. Widespread and rather common in the West Indies, Mexico and Central America; also Colombia and Trinidad.

Plant rather stout, glabrous below, pubescent above with articulated hairs, 1.8–5.7 dm. tall; stem reddish or yellowish brown. Leaves basal, rosulate, with short winged petioles, 5.5–37 cm. long (including the petiole); lamina elliptic-oblong to oblanceolate, obtuse or acute, tapering at the base into the petiole, usually silver-striped, 2.5–8 cm. wide. Spike loosely few- or many-flowered, 6–36 cm. long, 3–9 cm. in diameter. Bracts ovate-lanceolate to linear-lanceolate, acuminate, concave, 1.7–4 cm. long. Flowers arcuate-recurved, white striped with green. Sepals coarsely and sparingly pubescent on the outer surface; dorsal sepal oblong-lanceolate, obtuse or subacute and recurved at the apex, concave below, 1.8–2.8 cm. long, 4–5 mm. wide; lateral sepals (free portion) linear, obtuse or acute, strongly falcate and reflexed, 2–2.5 cm. long, 4–7 mm. wide. Petals linear-oblanceolate, obtuse to subacute, sigmoid, gradually narrowed below the middle, 2–2.7 cm. long, 3–4 mm. wide. Lip longitudinally channeled below, constricted near the apex and then expanded into an apical lobule and recurved at the apex, when spread out oblanceolate to oblanceolate-spatulate, 2.3–4 cm. long, 8–11 mm. wide at the widest point; lower portion below the constriction oblanceolate, sagittate, pubes-

cent below and with two slender-cuspidate incurved lateral callosities that are 2–4 mm. long; apical lobule cordate or broadly ovate, obtuse, broadly rounded or emarginate at the apex, with the margins undulate and deflexed. Column 1–1.3 cm. long; rostellum shallowly emarginate.

Spiranthes acaulis is variable in the size of the flowers and in the shape of the lip. This has resulted in numerous interpretations of the various collections. As a result the synonymy of this species comprises a formidable list.

Chiquimula: Upper slopes of Montaña Tajurán, in vicinity of El Barriol, *Steyermark* 30764.—El Progreso: Sierra de las Minas, between Tulumajillo and Finca Montañita in foothills, *Steyermark* 43361.—Petén: San Clemente, *Bartlett* 12119.—Retalhuleu: Río Coyote, along road 4 km. west of Retalhuleu, *Standley* 87453.—Santa Rosa: Hills east of Cuilapa, along the stream supplying the city water, *Standley* 78160.—Verapaz, *Klaboch*.

***Spiranthes acaulis* (J. E. Sm.) Cogn. var. *assurgens* (Reichb. f.) Correll, Lloydia 10: 209. 1947. *Spiranthes assurgens* Reichb. f. Beitr. Orch. Centr.-Am. 66. 1866 (type: Guatemala, Oratorio, Jan. 5, 1857, *Wendland*). *Spiranthes picta* (Anders.) Lindl. var. *assurgens* (Reichb. f.) Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10: 67. 1942.**

Variety *assurgens* is represented only by the type collection. The only distinctive difference separating it from the typical form is the shape of the lip, which is broad at the base and gradually narrowed above to the apical lobule. The portion below the constriction is thus lanceolate instead of being oblanceolate as in the typical form of the species. The apical lobule of the lip of variety *assurgens* is also sagittiform, while that of *S. acaulis* is cordate or broadly ovate.

***Spiranthes adnata* (Spreng.) Benth. ex Fawc. Flor. Pl. Jam. 40. 1893. *Satyrium adnatum* Sw. Prodr. 118. 1788.**

Terrestrial in damp forests, up to 1,000 meters alt. Mexico, British Honduras and the West Indies; also Venezuela.

Plant slender, up to 6.5 dm. tall; roots large, fleshy, fasciculate. Scape glabrous below, pubescent above, provided with several somewhat inflated tubular acuminate sheaths. Leaves several, basal, with a long slender petiole, broadly elliptic to elliptic-lanceolate, acute; lamina up to 12 cm. long and 5 cm. wide, slightly oblique; petiole sulcate, about as long as the lamina. Spike pubescent, laxly many-flowered, up to 20 cm. long. Floral bracts linear-lanceolate, long-acuminate, about as long as or longer than the pubescent pedicellate ovary. Flowers erect-spreading, about 1.5 cm. long from the apex of the dorsal sepal to the tip of the spur. Sepals greenish, the free part 6–8.5 mm. long; dorsal sepal broadly elliptic, obtuse, deeply concave, about 4 mm. wide; lateral sepals linear-oblanceolate, acute, spreading, oblique, united at the base and produced into a spur, about

2 mm. wide above the middle. Petals white, narrowly oblanceolate, acute, adherent to the dorsal sepal, 8–8.5 mm. long, about 1 mm. wide above the middle. Lip white, linear-spatulate in outline, sagittate at the base, constricted near the apex, up to 11.5 mm. long; below the constriction linear-spatulate, concave, pubescent on the inner surface on the linear portion; above the constriction semiorbicular to reniform, pleated on the margins, fleshy and strongly decurved in natural position, 2–3 mm. long, 3–4.5 mm. wide; basal callosities fleshy, flattened, about 2 mm. long. Spur adnate to the ovary almost to its apex, free for about 1 mm. Column clavate, about 6 mm. long. Capsule obliquely ellipsoid, 6-keeled, about 1.5 cm. long.

No specimen has been seen from Guatemala. However, on the basis of its occurrence in British Honduras and hence its probable occurrence in Guatemala it is included here.

Spiranthes amabilis Ames, Sched. Orch. 2: 8. 1923 (type: Guatemala, Dept. Alta Verapaz, Cobán, May, 1907, *H. von Türckheim* II 1787).

In moist soil of mountain forests, up to 1,350 meters alt. A very rare species that has been found only in Guatemala, Cuba, Jamaica and Puerto Rico.

Plant small, slender; scape with four or five sheath-like bracts, glabrous below, glandular-puberulent above, 6.5–21 cm. tall. Leaves basal, with slender petioles; lamina ovate, acute, subtruncate at the base, 1.5–3 cm. long, up to 1.7 cm. wide; petiole 1–2.5 cm. long. Raceme few-flowered (2–5). Bracts linear-lanceolate, acute or acuminate, scarious, erect, about 12 mm. long. Flowers yellowish white or greenish white. Dorsal sepal linear-oblong, obtuse or broadly rounded at the apex, concave at the base, adherent to the petals, 7–8 mm. long, 1–2 mm. wide. Lateral sepals narrowly linear from a slightly dilated base, obtuse to acute, translucent, spreading, 8–8.5 mm. long, 1–1.5 mm. wide. Petals filiform-spatulate, acute, rather coarsely crenate-dentate on the upper margin, 6.5–8.5 mm. long, about 1 mm. wide near the apex. Lip linear-oblong, 7–9 mm. long, 2–3 mm. wide at the middle, rounded at the base and abruptly contracted into the short claw, apical fourth expanded into a broadly reniform-suborbicular plate that is about 2 mm. long and 3–4 mm. wide; disk 5-nerved on the linear portion, the 3 central nerves extending into the apical plate, with an inconspicuous papilliform callus on each side at the base, the apical plate provided with minute papillae and a tuft of hair on the lower portion. Column slender below, abruptly dilated above the middle into an ovate-lanceolate acute plate, hispid on the anterior surface, 5–6 mm. long.

Spiranthes amabilis is closely allied to *S. elata*, but differs from it in the much smaller and fewer-flowered raceme and differently formed lip with obsolete calli.

Guatemala: Woods near San Rafael, *Margaret Ward Lewis* 164.

Spiranthes aurantiaca (Llave & Lex.) Hemsl. in Godm. & Salvin, Biol. Centr.-Am. 3: 300. 1885. *Neottia aurantiaca* Llave & Lex. Nov. Veg. Descr. 2: 2. 1825.

On grassy slopes, in wet ground among rocks, meadows and shady soil in barrancas and wooded slopes, up to 2,500 meters alt. Common in Mexico and Guatemala.

Plant stout, glabrous below, copiously pubescent above the uppermost leaf with brown articulated hairs, 3–10 cm. tall; stem leafy, bright green. Leaves strongly clasping and sheathing the stem, orbicular-ovate, elliptic-oblong or oblong-lanceolate, subobtuse to acute, the margins undulate, bright green, succulent, 7–25 cm. long, 4.5–8.5 mm. wide. Spike loosely flowered, 8–25 cm. long, 5–7 cm. in diameter; rachis and flowers densely pubescent. Bracts large, foliaceous-membranous, orange-yellow, elliptic-oblong, linear-oblong or oblong-lanceolate, acute, 3–6 cm. long, 1–1.5 cm. wide. Flowers large, tubular, spreading at the apex, orange or orange-red. Sepals broadly or narrowly oblong-lanceolate, obtuse to subacute, 2–2.5 cm. long, 5.5–7 mm. wide; lateral sepals involute above the middle. Petals obliquely linear-ligulate, obtuse, recurved at the apex, 2–2.5 cm. long, 3–4 mm. wide. Lip sessile, ovate-lanceolate, obtuse, saccate at the base, 1.9–2.5 cm. long, 6–9 mm. wide below the middle; disk puberulent below, adorned with two flat thickened submarginal calli on each side at the base. Column clavate, about 1 cm. long; rostellum bristle-like, terete below, becoming flat above, 7–8 mm. long.

This plant is used for adornment and is commonly known as “aján-wetch,” and “tzcho-kán.”

Chimaltenango: Between Chimaltenango and San Martín, *Porter* 13.—Huehuetenango: Cerro Pixpíx, above San Ildefonso Ixtahuacán, *Steyermark* 50628. Along Río Azul, below Jacaltenango, Sierra de los Cuchumatanes, *Steyermark* 51866. Between Chaculá and Canquitic, Sierra de los Cuchumatanes, *Steyermark* 51774.—Santa Rosa: Santa Rosa, *Heyde & Lux* 6241.—Sacatepéquez: San Juan, *Margaret Ward Lewis* 146.—Guatemala, plains, *Hayes*.

Spiranthes cerina (W. Baxt.) Lindl. Bot. Reg. 28: Misc. p. 20. 1842 (type: Guatemala, Mount of Salania, *Hartweg*). *Sarcoglottis cerina* W. Baxt. in Loud. Hort. Brit. Suppl. 3: 634. 1839.

On cliffs by waterfalls, up to 1,100 meters alt. Very rare in Mexico and Guatemala.

Plant rather stout, pubescent with white articulated hairs, the whole plant, including the flowers, flecked with silver spots, about 4.5 dm. tall; stem yellowish or olive brown. Leaves basal, appearing about 2 months after flowering, sessile, elliptic-oblong to broadly oblanceolate, abruptly acute, 15–30 cm. long, 4–7 cm. wide. Spike loosely few-flowered, about 15 cm. long and 6 cm. in diameter. Bracts lanceolate, acuminate, concave-incurved, 2–2.5 cm. long. Flowers arcuate-recurved, dull olive-brown on the outside, bright greenish yellow within, with the

lower part of the flowers and ovary glandular-pubescent. Dorsal sepal oblong-lanceolate, obtuse to subtruncate-retuse at the apex, longitudinally concave, 1.5–1.9 cm. long, 5.5–7 mm. wide. Lateral sepals (free part) elliptic-oblong, obtuse, strongly falcate and reflexed, 1.5–1.8 cm. long, 5.5–7 mm. wide. Petals elliptic-oblong, obtuse, tapering above and below, about 1.8 cm. long and 5 mm. wide. Lip broadly obovate to orbicular-spatulate, sagittate, obscurely 3-lobed above and retuse or broadly rounded at the apex, 2–2.5 cm. long, 1.3–1.5 cm. wide across the orbicular portion; basal portion linear, conduplicate, on each side at the base two linear-beaked callosities that are about 3 mm. long, abruptly expanded above into an orbicular obscurely 3-lobed plate; lateral lobules broadly rounded and erect, the apical lobule retuse with undulate-crenulate reflexed margins. Column about 1 cm. long; rostellum emarginate.

This species is very closely allied to *S. valida* Ames, a Costa Rican species, from which it may be distinguished by the apical portion of the lip, which is obscurely 3-lobed and orbicular, and broadly rounded at the base into the linear portion. The lip of *S. valida* is narrowly cuneate-ob lanceolate with three rather prominent subequal lobes at the apex. The sepals and petals of *S. cerina* are also much wider than those of *S. valida*.

Amatitlán: Near Amatitlán, *Margaret Ward Lewis* 108.

Spiranthes cinnabarina (Llave & Lex.) Hemsl. in Godm. & Salvin, Biol. Centr.-Am. 3: 300. 1885. *Neottia cinnabarina* Llave & Lex. Nov. Veg. Descr. 2: 3. 1825. *Stenorrhynchus montanus* Lindl. in Benth. Pl. Hartw. 95. 1842 (type: Guatemala, mountains of Dueñas, *Hartweg*). Figure 27.

On grassy hills, barren rocky mountain sides and in meadows, up to 2,400 meters alt. Rather common in western Texas, throughout Mexico and in northwestern Guatemala.

Plant stout, glabrous below, pubescent above with brown or whitish articulated hairs, 2–9.5 dm. tall. Leaves on the lower part of the stem conduplicate, oblanceolate to linear-lanceolate, subobtuse to shortly acuminate, 11–23 cm. long, 1.5–3.2 cm. wide. Spike usually short, congested, many-flowered, 4–17 cm. long, 3–6 cm. in diameter. Bracts narrowly ovate to lanceolate, acuminate, 1.2–2.5 cm. long, about 7 mm. wide. Flowers tubular, floral segments conspicuously recurved-flared at the apex, yellowish orange to yellow-scarlet. Sepals and petals minutely papillose, the sepals sparingly pubescent on the outer surface. Dorsal sepal lanceolate, acuminate, 1.2–2.2 cm. long, about 3 mm. wide. Lateral sepals somewhat obliquely lanceolate, acute or shortly acuminate, 1.2–2.5 cm. long, 2.2–3.2 mm. wide. Petals linear-lanceolate, acute, falcate, 1.2–2.2 cm. long, about 2.5 mm. wide. Lip sessile, obovate-lanceolate or elliptic-lanceolate, narrowly long-acuminate above the middle, 1.2–2.5 cm. long, 3–6 mm. wide at widest point, expanded and shallowly concave below the middle, thickened at the apex; disk puberulent on the lower part, with a marginal longitudinal flat callus on each side at the base. Column thick, papillose on the anterior surface, 6–10 mm. long; rostellum flat, slender, 2 mm. or more long.



FIG. 27. *Spiranthes cinnabarina*. 1, plant ($\times \frac{1}{2}$); 2, flower, spread open ($\times 2\frac{1}{2}$); 3, flower, side view ($\times 2\frac{1}{2}$). Drawn by G. W. Dillon.

SPIRANTHES

costaricensis Reichb. f.

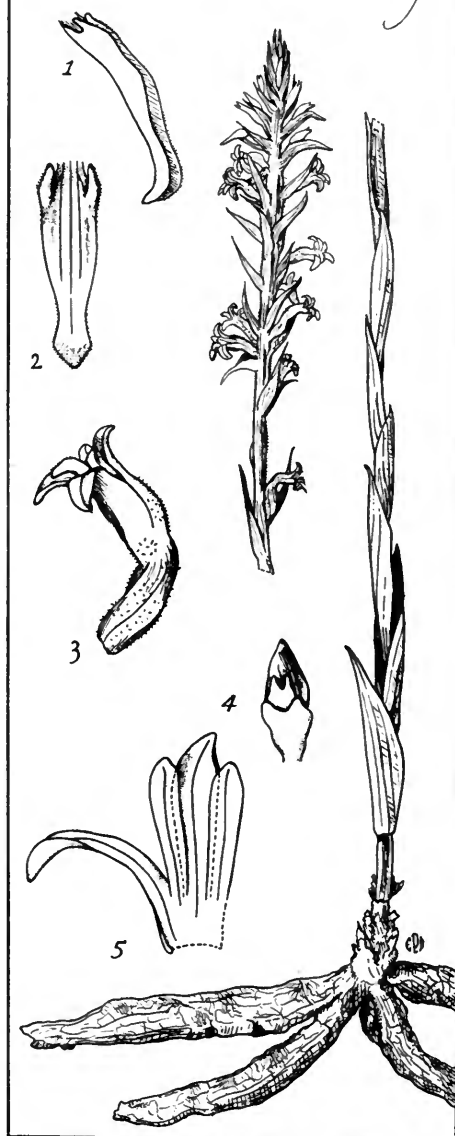


FIG. 28. *Spiranthes costaricensis*. Flowering plant ($\times \frac{3}{4}$); 1, lip, side view ($\times 5$); 2, lip, spread out ($\times 5$); 3, flower, side view ($\times 5$); 4, column ($\times 5$); 5, dorsal sepal, one lateral sepal, petals, spread out ($\times 5$). Drawn by Eleonar B. Phillips.

Huehuetenango: Naraccanal, *Seler* 2396; 2399. Chiantla, *Skutch* 1144. Aguacatán, *Johnston* 1383. Between Nentón and Las Palmas, via Yalisjao, Rincón Chiquito, Chiaquial, Guaxacaná, in Sierra de los Cuchumatanes, *Steyermark* 51574. Along Aguacatán road east of Huehuetenango, at about km. 15, *Standley* 81949.

Spiranthes costaricensis Reichb. f. Bonpl. 3: 214. 1855. *S. bicaudata* Ames, Orch., Fasc. VII: 126. 1922. Figure 28.

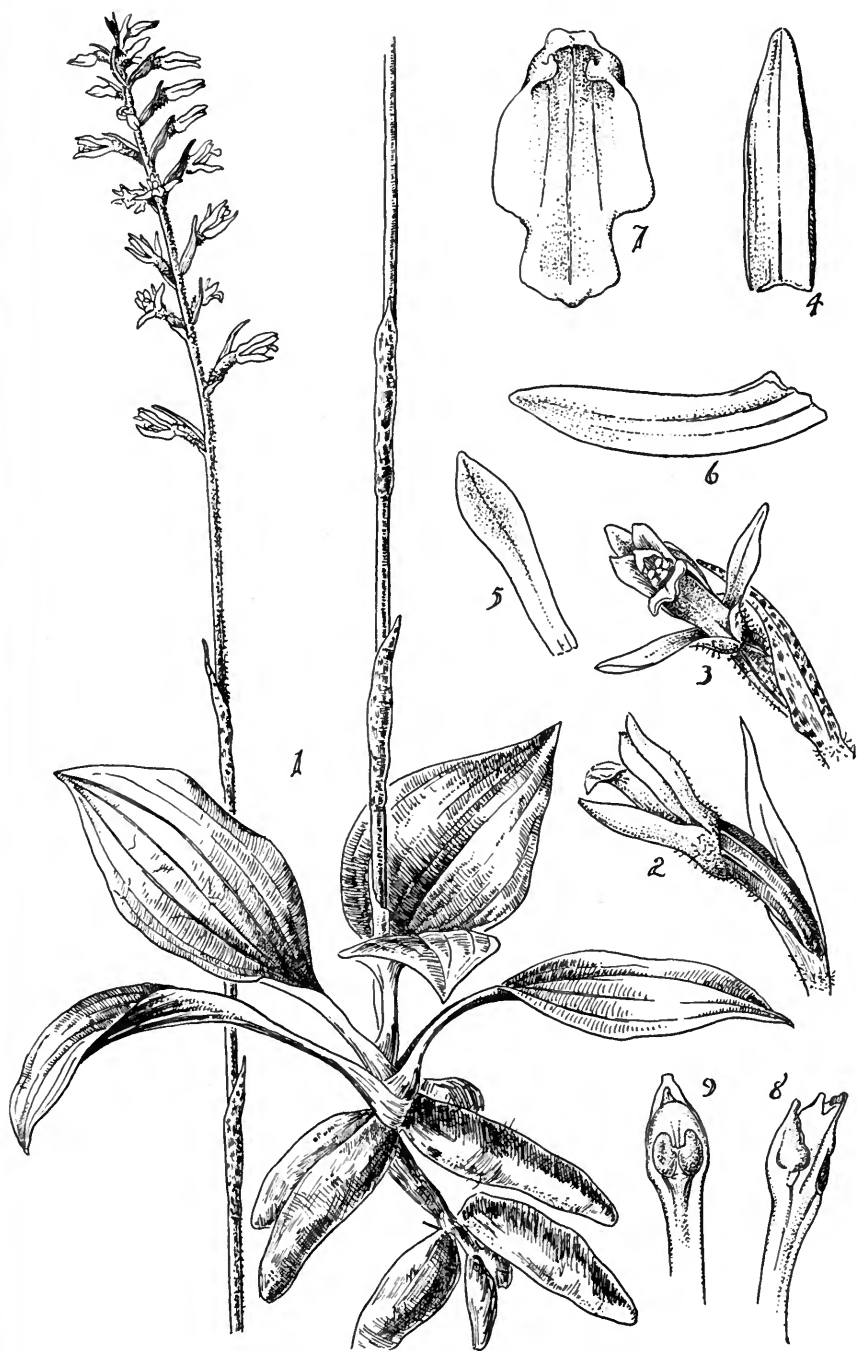
On tree trunks and in moist shady soil of mixed forests, on mossy stumps, bushy slopes and along roadsides, usually on the lower mountain slopes up to 1,160 meters alt. Widespread in the West Indies, Mexico and Central America.

Plant slender, 1.2–4.9 dm. tall; scape glabrous below, glandular-pubescent above, almost concealed by tubular-sheathing acuminate bracts. Leaves basal, with slender narrowly winged petioles; lamina obliquely elliptic-oblong or oblanceolate, acute or acuminate, tapering at the base, 4–19 cm. long, 1.8–6 cm. wide; petiole 2–6 cm. long. Spicate raceme lax or compact, 4–23 cm. long, 2–2.5 cm. in diameter. Bracts linear-lanceolate, acuminate-attenuate, 9–17 mm. long. Flowers green and white, tubular, flaring at the apex, strongly fragrant of violets. Sepals sparingly glandular-pubescent on the outer surface. Dorsal sepal linear-oblong, subobtusate or acute, concave at the base, 4.5–6.5 mm. long, about 1.5 mm. wide. Lateral sepals united for a short distance at the base to form a sac, often slightly constricted at the middle, free part linear-lanceolate, obtuse or subacute, 6–7 mm. long, about 1.2 mm. wide at the middle. Petals linear, obtuse, recurved at the apex, with a conspicuous green central vein, 4–6 mm. long, about 1 mm. wide. Lip with a short broad claw, triangular-ovate to ovate-lanceolate, obtuse to subacute and strongly decurved at the apex, abruptly narrowed above the middle, the apex with ciliate margins, with a slender acuminate callus (about 1 mm. long) on each side at the base, 4–6 mm. long (including the claw), 1–2 mm. wide below the middle, which is twice as wide as the upper half. Column short, about 3 mm. long, hispidulous on the anterior surface. Capsule ovoid, about 9 mm. long.

Alta Verapaz: Pela-pec, Finca Los Alpes, *Wilson* 330.—Petén: Uaxactun, jungle, *Bartlett* 12202.—Suchitepequez: Finca Mocá, *Skutch* 1571.

Spiranthes cranichoides (Griseb.) Cogn. in Urban, Symb. Antill. 6: 338. 1909. *Pelexia cranichoides* Griseb. Cat. Pl. Cub. 269. 1866. Figure 29.

FIG. 29. *Spiranthes cranichoides*. 1, plant ($\times 1$); 2, flower and floral bract, side view ($\times 4$); 3, flower and floral bract, front view ($\times 4$); 4, dorsal sepal ($\times 7$); 5, petal ($\times 7$); 6, lateral sepal ($\times 7$); 7, lip, from above, spread open ($\times 7$); 8, column, side view ($\times 10$); 9, column, front-ventral view ($\times 10$). Original drawing by Blanche Ames; redrawn by G. W. Dillon.



In leaf mold, humus and on rotten logs in dense forests at low altitude. Rather common in southern Florida. Uncommon in the West Indies, Guatemala and British Honduras.

Plant slender, glabrous below, pubescent above, 1.4–4.8 dm. tall; stem greenish, yellowish or purplish, provided with loose inflated white-spotted sheaths. Leaves in a basal rosette, with short petioles; lamina obliquely ovate to ovate-oblong, acute or acuminate, often variegated or purplish beneath, 2.5–7 cm. long, 1.5–4 cm. wide; petiole 1–4.5 cm. long. Spike loosely-flowered, 2–11 cm. long, 1.5–2.3 cm. in diameter. Floral bracts lanceolate, acuminate, maculate, semi-translucent, 8–13 mm. long. Flowers rather small. Sepals greenish, tinged with madder-purple, often flecked with white; dorsal sepal narrowly ovate-lanceolate to oblong-elliptic, obtuse or acute, 4–5 mm. long; lateral sepals lanceolate, acute, 5–5.5 mm. long, 1–2 mm. wide. Petals linear-spatulate, subobtuse to acute, greenish at the base and along the margins, otherwise white, 4–5 mm. long. Lip white, 3-lobed above the middle, 5–6 mm. long, 2–3 mm. wide near the middle; the broad lateral lobes erect, clasping the column, rounded at the apex, forming with the disk a cuneate-oblong lamina; apical lobe orbicular-quadrate, subtruncate, occasionally apiculate, narrower than the lower two-thirds of the lip, 1–2 mm. long; basal lateral callosities erect, glabrous, somewhat thickened. Column 3–4 mm. long. Capsule obliquely obovoid-ellipsoid, 6–9 mm. long.

Spiranthes cranichoides may be distinguished from nearly allied species, particularly *S. elata*, by the narrow subquadrate apical lobe of the lip, which is not expanded at the apex as in *S. elata*.

Petén: Tikal, *H. H. Bartlett* 12614. Yaloch-El Cayo road, *Bartlett* 12861.

***Spiranthes elata* (Sw.) L. C. Rich.** *Orch. Europ. Ann.* 37. 1817 (in *Mém. Mus. Hist. Nat. Par.* 4: 59. 1818). *Satyrium elatum* Sw. *Prodr.* 119. 1788. Figure 30.

In leaf mold and loamy soil in forests and dense thickets, rarely epiphytic, up to 3,000 meters alt. Widespread in Florida, Mexico and Central and South America.

Plant erect, stout or slender, glabrous below, pubescent above, 8.5–60 cm. tall; stem yellowish purple, purplish or greenish. Leaves basal, with rather long petioles; lamina oblong-elliptic, ovate-lanceolate to narrowly lanceolate, acute to acuminate, 3–15 cm. long, 1–6 cm. wide; petiole sulcate, 1–10 cm. long. Spike loosely flowered, often unilateral, 3–22 cm. long, 1–2.5 cm. in diameter. Floral bracts oblong-lanceolate, acuminate, maculate, 7–20 mm. long. Flowers nodding, green or brownish green. Dorsal sepal oblong to ovate-lanceolate, obtuse or subacute, 4–6.5 mm. long, 1.3–1.7 mm. wide. Lateral sepals linear-oblong to linear-lanceolate, obtuse or acute, somewhat falcate, 5–7.5 mm. long, 1.3–2 mm. wide near the base. Petals linear-spatulate to oblanceolate, obtuse or rounded at the apex, 4–6 mm. long, about 0.5 mm. wide. Lip 4–8 mm. long, the lower half oblong-quadrate with rounded corners, abruptly contracted above into a narrow isthmus and then expanding into a suborbicular, flabellate or transversely



FIG. 30. *Spiranthes elata*. 1, plant ($\times \frac{1}{2}$); 2, flower, side view ($\times 5$); 3, lip, front view, spread out ($\times 5$); 4, column, side view ($\times 5$). Drawn by G. W. Dillon.

elliptic apical lobe; the basal portion of the lip concave-saccate, with the margins involute, the pair of submarginal mammillate calli white; apical lobe 2–5.3 mm. wide, as wide as or wider than the lower part of the lip, somewhat sinuately tridentate at the apex or curled and crenulate on the margins. Column 1.5–3 mm. long. Capsule 7–12 mm. long.

Spiranthes elata and *S. prasophylla* are very closely allied and may, with further study, be considered only varietally distinct. However, they are at present treated as separate entities because of several points of difference. *Spiranthes elata* is characteristically a terrestrial species, whereas *S. prasophylla* is an epiphyte, or essentially so. The lips of the flowers of both species are similar except for the submarginal basal calli of the lip of *S. elata*, which are small and mammillate, while those of *S. prasophylla* are rather long and incurved, resulting in the lip becoming hastate. The scape of *S. prasophylla* is very short, scarcely exceeding the basal leaves, while the scape of *S. elata* is usually quite long, being several times the length of the basal leaves.

Alta Verapaz: Region of Cocolá, northeast of Carchá, *Standley* 70318. Near San Juan Chamelco, *Standley* 92241.—Chimaltenango: Calderas, *Johnston* 1577 (in part).—Escuintla: Below Las Lajas, *Standley* 64781.—Quezaltenango: Finca Pirineos, slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, *Steyermark* 33227; 33771. Along old road between Finca Pirineos and Patzulín, *Standley* 86882; 87130.—San Marcos: Above Finca El Porvenir, between “Todos Santos Chiquitos” and “Loma de la Paloma,” south-facing slopes of Volcán Tajumulco, *Steyermark* 37284. Slopes of barrancas tributary to and bordering Río Vega, between San Rafael at northeast portion of Volcán Tacaná and Guatemala–Mexico line, *Steyermark* 36363 (in part).

Spiranthes eriophora Robins. & Greenm. Amer. Journ. Sci. ser. 3, 1: 165. 1895.

Terrestrial on dry forested slopes, usually at high elevations, up to 3,300 meters alt. Rather common in Mexico, rare in Guatemala.

Plant erect, up to 6 dm. tall; roots fleshy, fasciculate. Scape slender, pale green, glabrous below, densely woolly-pubescent above with articulated hairs, concealed by long somewhat inflated sheaths; sheaths greenish white, scarious, conspicuously brown-striate, long-acuminate. Leaves usually withering before time of flowering, when present basal, fleshy-membranaceous, usually with a petiole; lamina narrowly linear-elliptic to elliptic-lanceolate, acute, up to 30 cm. long including the petiole, up to 3 cm. wide. Spike few- to many-flowered, up to 16 cm. long, spirally arranged. Floral bracts similar to the sheaths of the scape,

much exceeding the flowers. Flowers rather large, fragrant, white or pale green with the throat of the lip orange-yellow and with a green stripe in the center, more or less ringent and nodding. Sepals pubescent on the outer surface. Dorsal sepal elliptic-lanceolate, tapering to an acute to shortly acuminate apex, 1.4–1.9 cm. long, about 5 mm. wide. Lateral sepals obliquely linear-lanceolate, acuminate, 3-nerved, 1.4–1.8 cm. long, 2.8–3.5 mm. wide. Petals adherent to the dorsal sepal, with a long slender claw, obliquely and shortly ovate-lanceolate above, obtuse to acute, 1.4–1.7 cm. long including the claw, 3.5–4.5 mm. wide above. Lip from an arcuate base, adherent to the column to near its apex, broadly pandurate to oblanceolate-pandurate in outline, 1.4–1.9 cm. long, constricted near the apex, with the lower portion obovate to broadly oblanceolate and longitudinally sulcate, with the apical portion suborbicular-ovate and broadly obtuse; lower portion below the constriction 7–9 mm. wide at the widest point, apical portion above the constriction 6–10 mm. wide, with the margins minutely erose; disk glandular-puberulent above; basal callosities obsolescent. Column large, dilated above, about 11 mm. long.

El Progreso: Between Calera and summit of Volcán Siglo, *Steyermark* 43034.—Sololá: Volcán Santa Clara, south-facing slopes to summit, *Steyermark* 47010.—Zacapa: Sierra de las Minas, upper slopes, along Río Repollal to summit of mountain, *Steyermark* 42514.

Spiranthes Funckiana A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 32. 1845. *Pelexia Funckiana* (A. Rich. & Gal.) Schltr. Repert. Sp. Nov. 15: 197. 1918, as *Funkiana*. *P. guatemalensis* Schltr. Repert. Sp. Nov. 15: 197. 1918 (type: Guatemala, between Escamillas and Palahueco, Costa Cura, *Bernoulli* & *Cario* 627).

In moist soil of very humid forests, wooded hillsides or moist savannahs, rarely epiphytic, up to 1,500 meters alt. Uncommon in Mexico, Guatemala and Panama.

Plant slender, glabrous below, glandular-pubescent above with white or brownish articulated hairs, 2.7–4.5 dm. tall; stem green or brownish green. Leaves basal, with slender petioles; lamina elliptic to elliptic-lanceolate, shortly acuminate, 10–13 cm. long, 4–5.5 cm. wide; petiole 8–9.5 cm. long. Spike loosely few-flowered, 8–13 cm. long, 4–4.5 cm. in diameter. Bracts narrowly lanceolate, acuminate, concave, incurved, 2–3 cm. long. Flowers rather large, suberect, spreading, greenish white and yellowish green. Sepals sparingly pubescent on the outer surface; dorsal sepal oblong-elliptic to broadly oblanceolate, obtuse to subacute, shallowly concave, 1.6–1.9 cm. long, 4.2–5 mm. wide; lateral sepals (free part) spreading, conspicuously arcuate-recurved with the apex directed back toward the rachis, obliquely linear-ligulate to linear-oblanceolate, obtuse to subacute, 1.6–2 cm. long, about 3 mm. wide. Petals linear-oblanceolate, obtuse, ciliate along the outer margin, 1.5–1.9 cm. long, 2.5–3 mm. wide above the middle. Lip sagittate, forming a tube, oblanceolate in outline, 1.9–2.3 cm. long, about 5 mm. wide at widest point, constricted near the apex to form a suborbicular-subcordate obtuse conspicuously reflexed apical lobule with minutely undulate-crenulate margins; basal lateral auricles flat, oblong, apiculate-fleshy at the tip; disk densely pilose just above

the base; spur very short. Column 1.2–1.4 cm. long; rostellum linear, slightly denticulate at the apex.

Alta Verapaz: Cobán, *Türckheim* 1156; II 1838. Near the Finca Sepacuite, *Cook & Griggs* 66. Finca Volcán, *Wilson* 307. Finca Los Alpes, *Wilson* 340. Tactic, *Johnston* 1853.—Quezaltenango: Slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, between Finca Pirineos and San Juan Patzulín, *Steyermark* 33609.

Spiranthes Funckiana* var. *olivacea (Rolfe) Ames & Correll, Bot. Mus. Leaflet. Harv. Univ. 10: 66. 1942. *Pelexia olivacea* Rolfe, Kew Bull. 200. 1891. *P. subaequalis* Ames, Sched. Orch. 2: 5. 1923 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, *H. von Türckheim* 7994).

Terrestrial in dense wet forests, up to 1,500 meters alt. Rare in Mexico, Guatemala, Honduras, Nicaragua, and Costa Rica.

Plant slender, glabrous below, pubescent above with brown articulated hairs, 3–6.5 dm. tall. Leaves basal, with very long slender petioles; lamina obliquely ovate-elliptic, abruptly acute or subacuminate, broadly rounded at the base, reddish brown, yellow-green or maculate, 14–17 cm. long, 6–8.5 cm. wide; petiole 14–29 cm. long. Spike cylindrical, loosely many-flowered, 9–25 cm. long, about 4 cm. in diameter. Bracts linear-filiform to linear-lanceolate, acuminate-attenuate, incurved, 1.5–3.5 cm. long. Flowers slender, suberect, spreading, greenish white and yellow. Sepals densely pubescent on the outer surface with articulated hairs; dorsal sepal elliptic-oblong to linear-lanceolate, acuminate, concave, 1.6–1.8 cm. long, 4–5 cm. wide; lateral sepals (free part) spreading, gradually curved to project downward, obliquely linear-lanceolate, acuminate, 1.5–1.8 cm. long, 2–2.2 mm. wide. Petals obliquely linear-oblong, acute to shortly acuminate, ciliate along the outer margin, 1.5–1.6 cm. long, 1.5–2.5 mm. wide above the middle. Lip sagittate, forming a tube, oblongate in outline, slightly puberulent on the outer surface, 1.7–2 cm. long, 4.2–6 mm. wide at the widest point, constricted near the apex to form an orbicular-ovate broadly rounded mucronate reflexed apical lobule with the lateral margins upturned; callosities thickened-mammillate or semiterete and incurved near the apex, 1.5–3 mm. long; disk densely glandular-pubescent in front of the callosities. Column 1–1.2 cm. long; rostellum linear, denticulate at the apex, 1–1.5 mm. long.

Variety *olivacea* may be distinguished from the typical form of the species by its narrower sepals and petals, which are acute or acuminate instead of being obtuse. The base of the lip of var. *olivacea* has thickened mammillate semiterete calli, whereas the lip of *S. Funckiana* has oblong flat apiculate auricles. The general aspect of the two is very similar. However, the petiole is usually longer and the leaf-lamina is usually larger in var. *olivacea* than in typical *S. Funckiana*. The position and appearance of the lateral

sepals is also helpful in separating these two entities in the field. The lateral sepals of var. *olivacea* are not conspicuously arcuate-recurved and directed back toward the rachis as in *S. Funckiana* but are gently curved and directed downward and outward.

Petén: Forest between Finca Yalpamech along Río San Diego and San Diego on Río Cancuen, *Steyermark* 45331. Low forest between Finca Yalpamech and Chinajá, *Steyermark* 45440.—San Marcos: Above Finca El Porvenir on "Todos Santos Chiquitos," slopes of Volcán Tajumulco, *Steyermark* 37114. Pacaya, *Johnston*.

Spiranthes guyanensis (Lindl.) Cogn. in Mart. Fl. Bras. 3, pt. 4: 209. t. 47, fig. 2. 1895. *Goodyera guyanensis* Lindl. Gen. & Sp. Orch. Pl. 494. 1840.

Among grasses in fields and open pine forests, up to 1,200 meters alt. Uncommon but widespread in the West Indies, Mexico, Central America and northern South America.

Plant slender, flexuose, glabrous or sparsely puberulent above, 7–22 cm. tall, with one or two fleshy, fusiform tubers; stem provided with tubular, acuminate bracts. Leaves fugacious, basal when present. Spike short, with few or many flowers, cylindrical, congested, 1.5–6 cm. long, 5–13 mm. in diameter. Bracts lanceolate, acuminate-attenuate, concave, 4–7 mm. long. Flowers minute, white. Dorsal sepal ovate-elliptic, acute or acuminate, deeply concave below the middle, about 3 mm. long, 1–1.3 mm. wide. Lateral sepals obliquely triangular-lanceolate, acute or acuminate, 2.5–3 mm. long, 1–1.2 mm. wide. Petal oblanceolate or linear-spatulate, rounded at the apex, 2–2.5 mm. long, about 1 mm. wide. Lip arcuate-decurved, with the lower two-thirds subrotund and concave, conspicuously constricted above the middle, somewhat dilated above the constriction, with slender lateral auricles on each side at the base, subtruncate at the apex, 2–2.5 mm. long, 2–2.3 mm. wide across the lower two-thirds. Column short, erect, about 1 mm. long.

Izabal: Cristina, *S. F. Blake* 7609.—Petén: Chiché, *C. L. Lundell* 3704.

Spiranthes hemichrea Lindl. Gen. & Sp. Orch. Pl. 473. 1840 (type: Guatemala, *Skinner*). *Spiranthes pulchra* Schltr. Repert. Sp. Nov. 15: 198. 1918 (type: Guatemala, Dept. Sololá, on moist rocks, San Miguelito, *Bernoulli & Cario* 644). *Diaregyne hemichrea* (Lindl.) Schltr. Beih. Bot. Centralbl. 37, Abt. 2: 427. 1920. *D. pulchra* Schltr. Beih. Bot. Centralbl. 37, Abt. 2: 428. 1920. *Sarcoglottis hemichrea* (Lindl.) Ames, Sched. Orch. 2: 9. 1923.

On moist rocks and stones and in rich humus of forests, rarely epiphytic, up to 1,600 meters alt. Uncommon in Mexico, Guatemala and Salvador.

Plant erect, rather stout, glabrous, 3.3–7 dm. tall; stem concealed by imbricating scarious-brown deciduous sheaths. Leaves (when present) basal, elliptic, acute. Spike rather large, densely flowered, pyramidal, 9–17 cm. long, about 3 cm. in diameter. Bracts elliptic-oblong, acuminate, scarious, loosely imbricate, 2–2.5 cm. long. Flowers white, recurved-nodding. Dorsal sepal elliptic-oblong, often narrowed above and below the middle, obtuse to broadly acute and recurved at the apex, concave below the middle, 10–12 mm. long, 3.5–5 mm. wide across the middle. Lateral sepals linear-oblancoolate, obtuse, falcate, 11–12 mm. long, 2.5–3 mm. wide. Petals obliquely oblanceolate, obtuse, prominently recurved and narrowed below the middle, 8.5–9.5 mm. long, 2–2.5 mm. wide. Lip linear-spatulate, constricted and conspicuously recurved at the middle, 1.3–1.5 cm. long; the lower portion below the constriction linear, slightly dilated and pubescent below the two lateral auriculate callosities arising about 3 mm. above the base of the lip; apical portion above the constriction expanded into a lingulate cuneate-ovate lamina with a slightly dilated broadly rounded apex, about 4 mm. wide. Column about 8 mm. long.

Amatitlán: Lake Amatitlán, *Kellerman* 6564.—El Progreso: Sierra de las Minas, between Tulumajillo and Finca Montañita in foothills, *Steyermark* 43359.—Guatemala: 25 miles from Guatemala City, Cerro de Nubes, *Margaret W. Lewis* 100 (in part).—Zacapa: Lava cap near Rincón, *Margaret W. Lewis* 157 (in part). Sierra de las Minas, dry southwest-facing rocky slopes and bluffs of metamorphosed dolomitic rock, Loma El Picacho, above San Rosalía, *Steyermark* 42711. Sierra de las Minas, Valley of Vegona, between Vegas and Calera, *Steyermark* 42966. Barranca Hondo, *Johnston* 1568. Alotepeque, *Rafael Tejada* 226.

Spiranthes hyemalis A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 32. 1845.

Under pines and in *Cupressus* forests in high grass, cool mossy bluffs and on rocky slopes above timber line, rarely on trees, up to 3,260 meters alt. This species is found in the higher altitudes of Mexico and Guatemala.

Plant slender, flexuose, glabrous below, pubescent above the uppermost cauline bract, 0.8–4 dm. tall. Leaves basal, with slender, short petioles, linear-lanceolate, acute or acuminate, 4–23 cm. long (including petiole), 4–18 mm. wide. Inflorescence composed of 1–3 rather large flowers that are subtended by large bracts. Bracts membranous, scarious, oblong-lanceolate, acuminate, concave, clasping the ovaries, with conspicuous hyaline margins, 1.7–3.5 cm. long. Flowers projecting at right angles to the stem or nodding, ringent; the segments spreading, white within, pinkish on the outer surface, disk of the thickened basal portion of the lip cinnabar-red. Dorsal sepal lanceolate, long-acuminate, recurved at the apex, concave below the middle, with 5–7 prominent veins, 1.7–2 cm. long, 5–6 mm. wide. Lateral sepals linear to linear-lanceolate, acuminate-filiform, 1.9–2.4 cm. long, 2.5–3 mm. wide near the base. Petals linear, acuminate, falcate, with 3 prominent veins, 1.5–2 cm. long, 3–3.5 mm. wide. Lip pandurate, oblong-lanceo-

late to oblong-ob lanceolate, obtuse to acute, conspicuously constricted near the middle, 2.1–2.8 cm. long, 5.5–10.5 mm. wide at widest point; lower half thick, deeply cinnabar-red, obovate, much thickened on the margins at the base and densely puberulent, with 7–9 prominent veins; upper half triangular-deltoid to ovate-oblong, with the margins erose, covered with minute papillae, with 5–7 veins extending from the lower half. Column about 1 cm. long.

This species is easily distinguished by its few and comparatively large flowers.

Chimaltenango: Tecpam, *J. R. Johnston* 1326. Cerro de Tecpam, region of Santa Elena, *Standley* 58737; 61041. Tecpam, *Margaret W. Lewis* 214.—Quezaltenango: Uppermost ridge to summit of Volcán Zunil, *Steyermark* 34852.

Spiranthes Llaveana Lindl. in Benth. Pl. Hartw. 72. 1842. *S. Tuerckheimii* Schltr. Repert. Sp. Nov. 2: 131. 1906 (type: Guatemala, Dept. Santa Rosa, grasslands, April, 1887, *H. von Türckheim* 1169).

On loamy slopes of pine and mixed forests, rocky fields, pastures and savannahs, and in leaf mold along streams in barrancas, up to 3,000 meters alt. Widespread in Mexico, uncommon in Guatemala and Honduras.

Plant slender, erect or flexuose, 1.2–5.5 dm. tall; stem purplish brown. Leaves fugacious, when present basal, with a long slender petiole; lamina slightly obliquely elliptic, acute, 5–10 cm. long, 1.5–4 cm. wide; petiole 5–17 cm. long. Spike slender, loosely few-flowered, 4–19 cm. long. Bracts oblong-lanceolate, acuminate, scarious, 7–15 mm. long. Flowers small, ascending or nodding; sepals and petals dusky pink or red; lip white, variously marked with olive-brown, green or red. Sepals lanceolate, acute or shortly acuminate, 8–10 mm. long, 1.5–2.5 mm. wide; lateral sepals slightly oblique. Petals linear-ob lanceolate, obtuse, 7.5–9 mm. long, about 1 mm. wide above the middle. Lip oblong to ob lanceolate, slightly constricted above the middle, fleshy, recurved and crisped at the apex, 8.5–12 mm. long, 4–5 mm. wide; lower portion oblong-quadrate to broadly cuneate, with the lateral margins terminated by more or less obtuse angles just below the constriction, the disk thin and veiny; apical portion when spread out oblong-orbicular to ovate, with undulate-crenulate margins, covered with minute papillae; lateral basal callosities short, thick, slightly incurved and pubescent. Capsule ellipsoid, strongly ribbed, about 1 cm. long.

All of the plants examined, referable to *S. Llaveana*, were found to be essentially alike in appearance. However, when their flowers were examined the lip was found to be very variable. The general outline of the lip is oblong or ob lanceolate and the constriction, in most cases, is quite shallow and often nearly lacking.

Baja Verapaz: Santa Rosa, *Türckheim* 1169. Moist ravine slopes of Sierra de Chuacús, south of San Gerónimo, *Steyermark* 43872.—

El Progreso: Sierra de las Minas, between Calera and summit of Volcán Siglo, *Steyermark* 43035.—Guatemala: Road to Antigua, near San Rafael, *Margaret W. Lewis* 76.—Quiché: Sacabajá, *Heyde & Lux* 3514.

Spiranthes Llaveana var. *violacea* (A. Rich. & Gal.) Ames & Correll in Bot. Mus. Leaflet. Harv. Univ. 10, no. 4: 67. 1942. *Spiranthes violacea* A. Rich. & Gal. in Ann. Sci. Nat. sér. 3, 3: 32. 1845.

In dry grassy fields and in loamy soil of pinelands, up to 2,000 meters alt. Uncommon in Mexico and Guatemala.

Variety *violacea* differs from the typical form mainly in that the flowers are usually smaller and the lip is pandurate instead of being oblong with obscure lateral constrictions. The lip of variety *violacea* is 6–7 mm. long and 3–4 mm. wide. The apical lobule of the lip is orbicular with undulate-crenate margins and is usually wider than the basal portion. The basal half below the conspicuous constriction is obovate to oblong-obovate with the lateral margins rounded toward the constriction. The lip of typical *S. Llaveana* is mostly widest below the slight constriction and the basal half is oblong-quadrate to broadly cuneate with the lateral margins terminated by more or less obtuse angles just below the constriction. The lip of var. *violacea* is white tinged with pink or lavender with the lateral lobules often greenish yellow. The sepals and petals are pink.

Chimaltenango: Chichavac, *Skutch* 325.—San Marcos: Vicinity of Sibinal, *Steyermark* 35961. Six miles south and west of town of Tajumulco, slopes of Volcán Tajumulco, *Steyermark* 36691.

Spiranthes minutiflora A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 32. 1845. *S. nutantiflora* Schltr. Repert. Sp. Nov. 2: 131. 1906 (type: Guatemala, in bushes near Chissoy, November, 1886, *H. von Türckheim* 1102).

In rocky grassy soil under conifers, dry ridges and on open slopes, up to 3,900 meters alt. Uncommon from southern Mexico to Costa Rica.

Plant very slender, glabrous or sparingly puberulent above, 6–25 cm. tall. Leaves fugacious, when present basal, linear-oblong to elliptic-oblong, acute, with slender petioles, 3–12 cm. long (including petiole), 0.7–2.3 cm. wide. Spike slender, loosely few-flowered, 2–10 cm. long. Bracts broadly ovate to oblong-lanceolate, abruptly acute or acuminate, concave and clasping the ovary, 6–10 mm. long. Flowers nodding, greenish white, turning reddish brown with age, lip callus adorned with cinnabar-red stripes. Sepals and petals recurved at the apex, with a central vein. Sepals linear-lanceolate to broadly lanceolate, acuminate or abruptly acute, 3–4.3 mm. long, 0.8–1.3 mm. wide. Petals linear-lanceolate, subobtusate to subacuminate, somewhat falcate, 2.5–3.5 mm. long, less than 1 mm. wide. Lip oblong or oblong-elliptic, obtuse or acute, concave, 3–5 veins, scarcely

constricted near the apex to form a minute apical suborbicular lobule whose margins are slightly undulate, often prominently arcuate-decurved, 3.3–4 mm. long, 1–1.8 mm. wide, with an inconspicuous cinnamon-red striped callus on each side at the base. Column about 2 mm. long. Capsule ovoid, 5–7 mm. long.

Huehuetenango: Sierra Cuchumatanes, *Skutch* 1202. Between Tojquía and Caxín bluff, summit of Sierra de los Cuchumatanes, *Steyermark* 50182. Juniper ravine, alpine areas in vicinity of Tunimá, Sierra de los Cuchumatanes, *Steyermark* 48387.—Quezaltenango: Volcán Santo Tomas, *Steyermark* 34867.—San Marcos: Slopes of Volcán Tajumulco, between Las Canoas and top of ridge, 7 miles from San Sebastián, *Steyermark* 35890. Vicinity of Sibinal, *Steyermark* 35962.—Sololá: Volcán Atitlán, south-facing slopes, *Steyermark* 47499.

Spiranthes obtecta C. Schweinf. Bot. Mus. Leaf. Harv. Univ. 4: 106. 1936–37 (type: Guatemala, road to Mataquescuintla, about twenty miles from Guatemala City, about 8,000 ft., April 21, 1934, *Margaret Ward Lewis* 101).

In shallow layer of topsoil (chiefly semi-decayed pine needles). Apparently endemic to Guatemala.

Plant rather stout, 2.5–3.5 dm. tall; stem flexuose or erect, entirely concealed by long tubular white-scarious imbricating sheaths that are 5–6 cm. long and are marked with brownish purple longitudinal nerves. Leaves fugacious, when present apparently narrowly elliptic with long petioles. Spike dense, 7–8.6 cm. long, about 2 cm. in diameter. Bracts scarious, surpassing and mostly concealing the flowers, ovate-lanceolate, long-acuminate, concave at the base and marked with about 9 prominent longitudinal purplish nerves. Flowers small; sepals pale green; petals white; lip white with a fine green mid-nerve. Sepals recurved at the apex, 3-nerved; dorsal sepal oblong-lanceolate, acuminate, concave, 9.5–12 mm. long, 3–3.2 mm. wide; lateral sepals linear-lanceolate, acuminate, 9–11 mm. long, 1.8–2 mm. wide. Petals strongly adnate to the dorsal sepal forming a galea, elliptic-linear, subacute to obtuse, slightly sigmoid, 3-nerved, 8–9 mm. long, about 2.3 mm. wide across the middle. Lip strongly recurved at the apex and upcurved at the base in natural position, conspicuously constricted just above the middle, the lower portion concave, the apical portion flat with inrolled crenulate margins, when spread out pandurate, 9.5–12 mm. long, 5–6 mm. wide just below the middle; the lower portion flabellate-rhombic with rounded outer angles, cuneate toward the base with thickened margins; apical portion ovate to ovate-quadrate, subacute to truncate at the apex when spread out; disk minutely papillose. Column small, about 5.5 mm. long, with a triangular rostellum that is abruptly contracted above to a linear-ligulate point.

Mrs. Lewis records in her notes that *S. obtecta* is common in Guatemala. However, the type collection cited above is the only one known for the species.

Spiranthes orchioides (Sw.) A. Rich. in La Sagra, Fl. Cub. Fan. 11: 252. 1853. *Satyrium orchioides* Sw. Prodr. 118. 1788. *Stenorrhynchus guatemalensis* Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 376. 1918 (type: Guatemala, Dept. Alta Verapaz, Cobán, *F. C. Lehmann*). Figure 31.

In dry or damp open grassy fields, xerophytic forests and damp soil in pinelands, up to 1,500 meters alt. Widespread in Florida, the West Indies, Mexico and Central and South America.

Plant slender or stout, erect, somewhat scurvy with white papillose scales, whitish glandular-pubescent except for the leaves and rarely the lower part of the scape, 3.5–6.5 (rarely 9) dm. tall. Leaves basal, appearing after anthesis, rarely present at time of flowering, oblong-elliptic, narrowly oblong or oblong-ob lanceolate, obtuse to acute, 1–4 dm. long, 2.5–5 cm. wide. Spike loosely or densely flowered, conspicuous, 6–17 cm. long, 4–6 cm. in diameter. Bracts narrowly lanceolate, acuminate-attenuate, usually punctate with bright red resinous-appearing dots, 1.5–2.5 cm. long. Flowers showy, suberect, grading in color from greenish white to brick-red or deep crimson. Sepals glandular-papillose on the outer surface; dorsal sepal broadly to narrowly lanceolate, acuminate, 1.4–2.2 cm. long, about 7 mm. wide near the base; lateral sepals produced at the base into a short mentum, narrowly lanceolate above, acuminate, 1.5–3 cm. long from the base of the mentum, free portion 3.5–5 mm. wide. Petals lanceolate, acute or acuminate, falcate, 1.3–2 cm. long, about 6 mm. wide at the widest point. Lip sessile, entire or rarely subsagittate, narrowly or broadly obovate-lanceolate, acuminate, 1.5–2.5 cm. long, 5–10 mm. wide at the middle, dilated and saccate near the middle, with slightly revolute margins near the apex; convolute and linear below the dilated middle with a pair of linear flat submarginal calli, pubescent on the disk and along the margins. Column about 1 cm. long; rostellum cuspidate-elongate, bristle-like, rigid, about 5 mm. long. Capsule ellipsoid, 1–1.5 cm. long.

Spiranthes orchioides is a variable species, particularly in the size and color of the flowers. The plants of this species appear quite suddenly after the first rains and then quickly fade, leaving little evidence of their presence.

Alta Verapaz: Savanna north of Concepción, 3–5 miles south-east of Finca Yalpemech, near Alta Verapaz–Petén boundary line, *Steyermark* 45275. Along Río Ixvolay, north and northwest of Finca Cubilgüitz to Quebrada Diablo, *Steyermark* 44788. Between Yakapur and Sibicté, *Steyermark* 44942. Between Cobán and Finca Chimoté, near Rubeltein, *Steyermark* 44204.—Guatemala: Guatemala City, *Lewis* 161.—Petén: Sabana Zizha, La Libertad, *Lundell* 2748; 3677. La Libertad, *Lundell* 3484; 3625. Sabana Tzimintum,

FIG. 31. *Spiranthes orchioides*. 1, inflorescence ($\times \frac{3}{4}$); 2, basal part of plant showing leaves and roots ($\times \frac{3}{4}$); 3, flower, longitudinally dissected to show the column ($\times 2$). Drawn by Blanche Ames.



Lundell 3134. La Libertad-Flores road (peloric form), *Lundell* 3896. Tayasal, *Lundell* 3897.—Quiché: *José Ignacio Aguilar* 1167.—Santa Rosa: Santa Rosa, *Heyde & Lux* 3489.

Spiranthes parasitica A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 32. 1845. Figure 32.

On dry slopes, under conifers and in mixed pine-hardwood forests and cloud-forests, also in meadows and moist shaded soil, rarely epiphytic, up to 3,200 meters alt. Rare in Arizona and Texas, uncommon in Mexico and Central America.

Plant slender, erect, glabrous below, glandular-puberulent above, 1–3.4 dm. tall; stem and sheaths brownish red or light brown. Leaves fugacious, when present basal, with a slender petiole; blade apparently elliptic. Spike very slender, few-flowered, the flowers scattered, 3.5–7 cm. long. Bracts broadly ovate to elliptic-lanceolate, acuminate, very concave, usually concealing the ovary, scarious, white or pinkish, margins conspicuously hyaline, 3-nerved, 0.9–1.5 cm. long. Flowers small, ascending; sepals and petals pink; lip white with three green stripes extending almost to the apex, with a spongy cinnabar-red tissue on the basal portion. Dorsal sepal elliptic-oblong to lanceolate, obtuse to acute, 5–7 mm. long, 1.5–2.5 mm. wide. Lateral sepals somewhat obliquely lanceolate, obtuse to acute, 6–8 mm. long, 1.5–2 mm. wide. Petals obliquely oblanceolate, broadly rounded to subacute at the apex, irregularly crenate above the middle, 5–6.5 mm. long, about 1.5 mm. wide. Lip in natural position concave below, strongly recurved at the apex, constricted just above the middle to form a suborbicular lobule whose margins are undulate-lacerate, when spread out oblong in outline, 6–9 mm. long, 3–5 mm. wide; basal portion oblong-quadrate; disk pubescent below on the cinnabar-red blotch, pubescent on the apical lobule. Column about 4 mm. long. Capsule ovoid, strongly ribbed, about 7 mm. long.

The persistent cinnabar-red blotch on the lower portion of the disk of the lip is characteristic of this species. The plants have the appearance of lacking chlorophyll, very probably the reason for the name.

Chimaltenango: Chichoy Pass, Cerro Tecpam, *Hunnewell* 14667. Santa Elena, *Skutch* 283. Chichavac, *Skutch* 305. Volcán Acate-nango, *Hunnewell* 14675.—Quezaltenango: Uppermost ridge of Volcán Santo Tomás, *Steyermark* 34800.

Spiranthes pauciflora A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 32. 1845.

Terrestrial on dry open pine slopes and in grassy open places in oak-pine forest, up to 2,100 meters alt. Uncommon in Mexico, Guatemala, Honduras and El Salvador.

Plant usually small, erect, up to 4 dm. tall; roots fleshy-clavellate, fasciculate. Scape slender or stout, greenish white, provided with loose-fitting acuminate

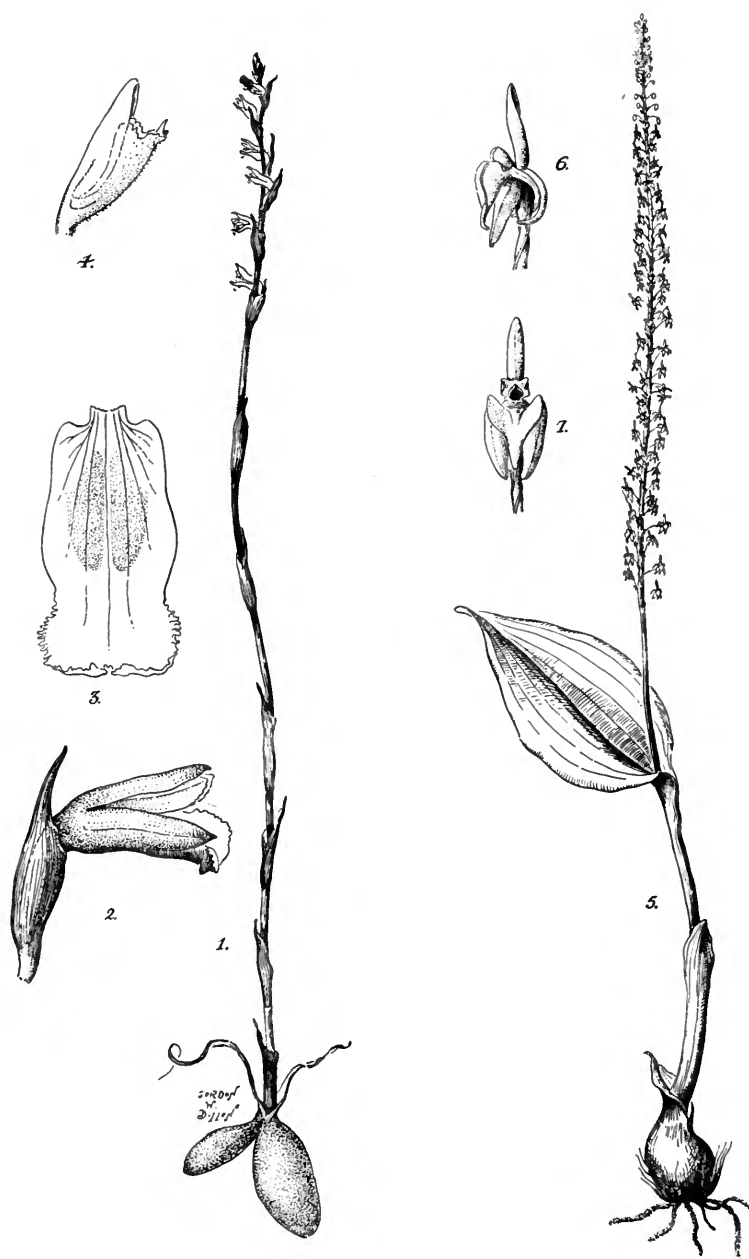


FIG. 32. *Spiranthes parasitica*. 1, plant ($\times \frac{1}{2}$); 2, flower, side view ($\times 3$); 3, lip, spread out ($\times 5$); 4, column, side view ($\times 5$). *Malaxis Ehrenbergii*. 5, plant ($\times \frac{1}{2}$); 6, flower, side view ($\times 5$); 7, flower, front view ($\times 5$). Drawn by G. W. Dillon.

sheaths, glandular-pubescent throughout with articulated hairs. Leaves usually withering away before time of flowering, when present basal, with a slender petiole; lamina elliptic to elliptic-obovate, abruptly acute, about 16 cm. long (including the petiole), about 5 cm. wide. Spike short, composed of one to six suberect flowers, rarely more. Floral bracts triangular-lanceolate, acuminate, longitudinally concave, up to 3 cm. long. Flowers fleshy, pale greenish, veined with darker green, with stout pubescent pedicellate ovaries. Dorsal sepal fleshy and concave below, rather thin and flat above, narrowly lanceolate, tapering to the obtuse to acute apex, 2.2–2.5 cm. long, about 4 mm. wide below the middle. Lateral sepals fleshy, obliquely linear, slightly dilated at the obtuse apex, pubescent on the outer surface, longitudinally sulcate, strongly keeled on the back, 2.5–3.2 cm. long, 4.5–6.5 mm. wide at the widest point. Petals somewhat fleshy, adherent to the dorsal sepal, obliquely linear, obtuse, ciliate on the margins especially at the apex, 1.7–2 cm. long, 3–4 mm. wide. Lip fleshy, 2.4–3.5 cm. long, constricted above the middle with the lower portion oblanceolate and the apical portion triangular-ovate and obtuse or acute when spread out; below the constriction longitudinally concave, 5–7 mm. wide at the widest point; above the constriction the margins strongly involute, 5–9 mm. wide, conspicuously veined; disk puberulent with a pair of short keels below the constriction and a small tuft of hair at the apex of each keel; basal callosities fleshy, smooth, tapering to an acute apex, up to 5 mm. long.

Zacapa: Sierra de las Minas, along Rillito del Volcán de Monos, Volcán de Monos, *Steyermark* 42358.

Spiranthes polyantha Reichb. f. *Linnaea* 18: 408. 1844. Figure 33.

On and among rocks on hills and in lava fields, on springy bluffs and ledges and in leaf-mold in coniferous and hardwood forests, up to 2,500 meters alt. Widespread in southern Florida, Mexico and Guatemala, the Bahama Islands, Puerto Rico and Santo Domingo.

Plant scapose, very slender, erect, flexuose or sinuate-ascending, glabrous below, sparsely pubescent above, 1.5–5.8 dm. tall. Roots tuberous, fleshy, fasciculate. Stem purplish. Leaves clustered at the base, spreading, with slender petioles, elliptic or oblanceolate to linear-lanceolate, obtuse to acuminate, conspicuously reticulate-veined (when dry), 5–28 cm. long, 1.5–5 cm. wide across the blade, reduced above to somewhat inflated sheathing acuminate-attenuate bracts. Spike loosely or densely many-flowered, slender, flexuose, 5–35 cm. long, 1–1.5 cm. in diameter. Floral bracts ovate-lanceolate to lanceolate, acuminate, 4–11 mm. long. Flowers greenish, grayish green or greenish purple, strongly ringent and spreading. Sepals linear to linear-lanceolate, subacute to acute, 3.2–7 mm. long, about 1 mm. wide near the base; dorsal sepal strongly recurved upward

FIG. 33. *Spiranthes polyantha*. 1, plant ($\times \frac{1}{2}$); 2, flower, side view ($\times 4$); 3, flower, front view, spread open ($\times 3$); 4, column, side view ($\times 5$); 5, column, front-ventral view ($\times 5$). Drawn by G. W. Dillon.



above the middle; lateral sepals falcate, upcurved. Petals adherent to the dorsal sepal, linear, somewhat falcate, strongly recurved upward above the middle, 3–5.5 mm. long, less than 1 mm. wide. Lip elliptic-lanceolate to narrowly lanceolate, subacute to acuminate, usually narrowed and strongly arcuate-recurved below the middle, 3.5–6.5 mm. long, 1.5–2.5 mm. wide at the widest point; basal callosities minute. Column about 2.5 mm. long. Capsule sessile, ellipsoid, blunt, 4.5–6 mm. long.

Zacapa: Lava cap near Rincón, alt. 2,500 feet (760 meters), *Margaret Ward Lewis* 157 (in part).

Spiranthes prasophylla Reichb. f. Beitr. Orch. Centr.-Am. 65. 1866 (type: Guatemala, on tree between Hacienda de Pantaleon and Sapote, January 20, 1857, *Wendland*). *S. epiphytica* Schltr. Repert. Sp. Nov. 2: 130. 1906 (type: Guatemala, Dept. Alta Verapaz, epiphytic near Cubilgüitz, *Türckheim* 687; near Cobán, *Türckheim* 1406). Figure 34.

Epiphytic, on rotten logs and rarely terrestrial in moist dense forests, usually at low altitudes, up to 1,300 meters alt. Uncommon in Guatemala, Honduras, Costa Rica and Panama.

Plant low, glabrous below, sparsely pubescent above, 7–25 cm. tall; scape scarcely exceeding the basal leaves. Leaves basal, subsessile or with short slender petioles; lamina elliptic-oblong, acute, rather fleshy, glossy, pale green or purplish green, mostly oblique and tapering into the petiole, 5.5–14 cm. long, 1.5–3 cm. wide; petiole up to 6 cm. long. Spike loosely flowered, often unilateral, 3.5–12 cm. long, 2–2.5 cm. in diameter. Bracts oblong-lanceolate, acuminate, concave, 1–1.5 cm. long. Flowers ascending, green or greenish white, often marked with dark red or lavender. Dorsal sepal oblong-lanceolate, acuminate, concave below the middle, 5–6 mm. long, about 2 mm. wide. Lateral sepals obliquely lanceolate, acuminate, 6–8 mm. long, 1.5–2 mm. wide. Petals linear-ob lanceolate, obtuse to subacute, with the anterior margin slightly dilated, oblique, 4.5–5.2 mm. long, about 1 mm. wide. Lip sagittate, constricted above the middle and then dilated to form an obovate or flabellate apical lobule, 5.5–6.7 mm. long; basal portion quadrate or broadly deltoid, with the basal auriculate incurved callosities very prominent, 3–3.5 mm. wide, the central vein usually carinate or crested along the upper half; apical lobule with crenulate margins, broadly rounded or sinuately tridentate at the apex, 2.2–3.2 mm. wide. Column about 4 mm. long.

A discussion of the near relationship of *S. prasophylla* to *S. elata* has been included under that species.

Alta Verapaz: Along Río Ixvolay, north and northwest of Finca Cubilgüitz to Quebrada Diablo, *Steyermark* 44737.—Izabal: York trail about two miles from Virginia, *Margaret Lewis* 22.—Petén: Low forest between Finca Yalpemech and Chinajá, *Steyermark* 45438.



FIG. 34. *Spiranthes prasophylla*. Plant ($\times 1$); lip (lower right; $\times 5$). Drawn by Blanche Ames.

Spiranthes prasophylla Reichb. f. var. ***cleistogama*** Ames & Correll, Bot. Mus. Leaflet Harv. Univ. 10: 65. 1942 (type: Guatemala, Dept. Alta Verapaz, near Cobán, *Türkheim* II 1673).

Epiphytic on trees in forests, up to 1,400 meters alt. Rare in Guatemala and Costa Rica.

Plant slender, weakly erect, glabrous below, pubescent above, 1–3 dm. tall. Scape slender, two to three times longer than the leaves, provided with several acuminate bracts. Leaves basal, several, clustered, mostly sessile, occasionally shortly petiolate; lamina elliptic-lanceolate, acute, up to 8 cm. long and 2.5 cm. wide. Spike usually conspicuously secund, up to 31 cm. long. Flowers green, cleistogamous, smaller than those of the typical form. Lip pandurate, strongly triangular-deltoid as in the typical form, constricted near the apex to form a triangular-quadrate tridentate lobule at the apex; callosities thin, triangular, inside the basal margin.

Variety *cleistogama* differs from the typical form of the species mainly in its much longer scape, which greatly exceeds the leaves, its conspicuously secund spike, and its cleistogamous flowers.

Represented from Guatemala only by the type collection.

Spiranthes pyramidalis Lindl. Gen. & Sp. Orch. Pl. 473. 1840. (type: Guatemala, common, *Skinner*). *S. cobanensis* Schltr. Beih. Bot. Centralb. 36, Abt. 2: 377. 1918 (type: Guatemala, Dept. Alta Verapaz, near Cobán, *F. C. Lehmann*).

In dry thickets, pine and oak forests, in leaf mold among lava rocks and on loamy exposed slopes, up to 2,300 meters alt. Widespread and rather common in Mexico and Guatemala, uncommon in El Salvador.

Plant slender, glabrous except for the pilose ovaries and flowers, 2–7.5 dm. tall; stem concealed by whitish scarious-membranous loosely imbricating tubular sheaths. Leaves fugacious, when present basal, with rather long petioles; lamina oval to elliptic-lanceolate, acute to subacuminate, tapering into the petiole, 6–13 cm. long, 2.3–5.5 cm. wide; petiole 6–15 cm. long. Spike densely flowered, cylindrical, pyramidal, 5–19 cm. long, 1.5–3 cm. in diameter. Bracts reddish brown, scarious, deeply concave and enclosing the ovary, ovate-rhombic, elliptic, acuminate, 1–2 cm. long, 6–10 mm. wide. Flowers rhombic, dull white, yellow or greenish with a pink tinge, the perianth segments often reticulate-veined. Dorsal sepal elliptic-lanceolate, acuminate, abruptly upcurved at the middle and concave below, 7–9 mm. long, 2–4 mm. wide. Lateral sepals obliquely lanceolate, subobtusely acute and recurved at the apex, somewhat united at the base to form a short mentum, 6–8 mm. long, 1.2–2.1 mm. wide below the middle. Petals linear-elliptic, obtuse and recurved at the apex, sigmoid, 5–6 mm. long, 1.5–2 mm. wide. Lip with a short broad claw, ovate to ovate-oblong, obtuse to subacute, concave, abruptly arcuate-recurved near the middle, 4.2–6 mm. long, 2.5–4 mm. wide below the middle; disk marked with fine brownish striations; lateral basal callosities submarginal, mammillate. Column short, about 2.5 mm. long.

Amatitlán: Pacaya, *Johnston* 1468.—Baja Verapaz: Rocky hills near and above Santa Rosa, in pine-oak forest, *Standley* 91072. Along margin of the big swamp below Pantín, *Standley* 91163. Below Patal, *Standley* 91119. Near Santa Rosa, *Türckheim* II 2220. North of Santa Rosa, *Standley* 69881.—Chimaltenango: Finca Alameda, *Johnston* 1821.—Sacatepéquez: Volcán de Fuego, *Smith* 2634. Near Santa María, *Hunnewell* 14672.—Santa Rosa: Santa Rosa, *Heyde & Lux* 3492. San Rafael, *Margaret Lewis* 159.

Spiranthes rosulata (W. Baxt.) Lindl. Bot. Reg. 29: Misc. p. 60. 1843. *Sarcoglottis rosulata* W. Baxt. in Loud. Hort. Brit. Suppl. 3: 634. 1839 (type: Guatemala). *Sarcoglottis orbiculata* Ames, Sched. Orch. 2: 10. 1923 (type: Guatemala, Dept. Quiché, San Miguel Uspantán, *Heyde & Lux*).

Terrestrial, on forest slopes and along streams, up to 2,100 meters alt. Very rare in Mexico, Guatemala, El Salvador and Honduras.

Plant low, slender or stout, glabrous below, pubescent above with articulated hairs, 1.8–3 dm. tall. Leaves basal, rosulate, oblong to orbicular, obtuse to abruptly acute, rather thin to subcoriaceous, 5–10 cm. long (including the short petiole), 1.3–6.7 cm. wide. Spike short, few-flowered, rather close, about 5 cm. long. Floral bracts linear-lanceolate, acuminate, 1.5–3 cm. long. Flowers green, conspicuously marked with deep green stripes, arcuate-recurved. Sepals coarsely pubescent with articulated hairs on the outer surface; dorsal sepal lanceolate, acute to acuminate, strongly recurved at the apex, 1.7–2.2 cm. long and about 3 mm. wide; lateral sepals linear-lanceolate to linear-ob lanceolate, subobtuse to acute, falcate, 1.5–2 cm. long and 2.5–4 mm. wide. Petals obliquely linear to linear-ob lanceolate, obtuse to subacute, ciliate along the outer margin, about as long as the lateral sepals. Lip 2–2.6 cm. long and about 4 mm. wide, with the lower part narrowly oblanceolate, constricted near the apex to form a short isthmus, then expanded into an ovate or oblong obtuse or acute lobule with finely ciliate margins; disk pubescent at the base, with two parallel patches of fine hairs just below the constriction; basal lateral callosities linear-terete, incurved, 3–4 mm. long. Column slender, about 1 cm. long.

This species differs from *S. acaulis*, to which it is closely allied, by the orbiculate type of leaves and the shape of the lip of the flower. The portion of the lip below the slight constriction is essentially linear instead of being obovate as in *S. acaulis*. The apical portion of the lip also differs somewhat from that of *S. acaulis*.

Chiquimula: Montaña Nube (Montaña Volcanitos), between Socorro Mountain and Cerro Brujo, southeast of Concepción de las Minas, *Steyermark* 30898.—Guatemala: Near Guatemala, 1860, *Hayes*. Road beyond San Juan Sacatepéquez, about 35 km. from

Guatemala City, *Margaret W. Lewis* 191 (this specimen is sterile but probably represents this species).—Huehuetenango: Pine-wooded slopes, along Río Selegua, opposite San Sebastián H., *Steyermark* 50471.—Sacatepéquez: Along Río Guacalate, on road between Antigua and Chimaltenango, *Standley* 81003.—Zacapa: Rich forested slopes in deep ravine along Río Lima, Sierra de las Minas, between Río Hondo and summit of mountain at Finca Alejandría, *Steyermark* 29601. On hill back of Hotel Manchen, *Porter* 12.

Spiranthes rubrocalosa Robins. & Greenm. *Am. Journ. Sci.* 50: 165. 1895.

Terrestrial in forests of cypress, fir and *Arbutus* and on stumps, up to 2,700 meters alt. Rare in Mexico and Guatemala.

Plant slender or stout, erect, glabrous or somewhat pubescent, 2–3.5 dm. tall, with 2–4 fleshy oblong tuberous roots; stem provided with sheathing, sharply acuminate bracts. Leaves 2, basal when present, narrowly lanceolate, acuminate, tapering into the slender petiole, 10–12.5 cm. long including the petiole, 1–1.3 cm. wide. Spike cylindrical, dense or laxly few- to many-flowered, 7–18 cm. long, 1–1.5 cm. in diameter. Floral bracts obliquely ovate to ovate-lanceolate, acuminate, 1–1.5 cm. long, 4.5–6.5 mm. wide. Flowers small, greenish white, conspicuously arcuate-decurved. Sepals 4–5 mm. long, 1.5–2 mm. wide; dorsal sepal oblong-lanceolate, obtuse to acute and recurved at the apex, canaliculate below the middle; lateral sepals obliquely oblong-lanceolate, subacute to acute. Petals obliquely linear-lanceolate, obtuse to acute, conspicuously 1-nerved, 4–4.5 mm. long, 1–1.5 mm. wide. Lip with a short claw, ovate to ovate-elliptic, narrowly obtuse to somewhat truncate at the apex, inconspicuously auricled on each side at the base, ciliate along the somewhat inflexed apical margin, 4–5 mm. long, 1.5–3 mm. wide; disk with two bright red oblong callosities in the middle portion for two-thirds its length. Column 3–4 mm. long.

This species is closely allied to *Spiranthes parasitica* but differs from that species in the stoutness of the plant, the smaller flowers and the entire, not lobed, lip.

Chimaltenango: Santa Elena, *Skutch* 439.

Spiranthes sarcoglossa A. Rich. & Gal. *Ann. Sci. Nat. sér. 3*, 3: 31. 1845.

In grass under conifers, usually above 3,000 meters alt. Very rare in Mexico and Guatemala.

Plant erect, stout or slender, glabrous below, glandular-ciliate above, 2.3–5 dm. tall; stem leafy. Leaves mostly on the lower part of the stem, linear-lanceolate, obtuse to acuminate, 5–17 cm. long, 0.8–2 cm. wide. Spike slender, rather loosely flowered, 9–20 cm. long, about 1.5 cm. in diameter. Bracts ovate-quadrangle to oblong-lanceolate, acuminate, deeply concave, concealing the ovaries, conspicuously glandular-ciliate along the upper margins, 8–14 mm. long, about 5 mm. wide

when spread out. Flowers green, inconspicuous. Dorsal sepal orbicular-ovate, acute and strongly recurved at the apex, deeply concave, 3–3.5 mm. long, about 3 mm. wide. Lateral sepals strongly revolute in natural position, when spread out broadly oblong-deltoid to oblong-lanceolate, subobtusate to acute and slightly oblique at the apex, 3.8–4.2 mm. long, about 2 mm. wide. Petals adherent to the dorsal sepal to form a galea, linear, acute, falcate, sparsely glandular-ciliate along the margins, 3.8–4.3 mm. long, about 1 mm. wide. Lip thick, fleshy, with a short stout claw, the margins undulate-crisped, in natural position deeply concave with the sides suberect, when spread out suborbicular to broadly flabellate, often broader than long, broadly rounded to subtruncate with a reflexed apicule at the apex, 3.5–4.2 mm. long, 4–4.5 mm. wide. Column about 2 mm. long, with a prominent foot.

The general appearance of *S. sarcoglossa* is similar to several species of *Habenaria*, for example *H. limosa*. It is superficially distinguishable from other *Spiranthes* in Guatemala by the glandular-ciliate margins of its floral bracts and by its blunt lip, which outwardly appears to be much shorter than the petals and sepals.

Huehuetenango: Sierra de los Cuchumatanes, 11,100 feet, rare, *Skutch* 1255.

Spiranthes Schaffneri Reichb. f. *Linnaea* 28: 382. 1856. *Pelexia saccata* Rolfe, *Kew Bull.* 195. 1895 (type: Guatemala). *Sarcoglottis Schaffneri* (Reichb. f.) Ames in J. D. Smith, *Enum. Pl. Guat.* 7: 50. 1905. *S. zamororae* Ames, *Sched. Orch.* 2: 13. 1923 (type: Guatemala, Dept. Santa Rosa, Zamorora, *Heyde & Lux* 4625).

In deep vegetable mold in open or dense moist woods or in open grassy patches among rocks, up to 3,000 meters alt. Rather common in Mexico but apparently uncommon in Guatemala.

Plant slender, glabrous below, glandular-pubescent above with whitish hairs, 2.5–7.3 dm. tall; stem yellowish or reddish brown. Leaves absent at time of anthesis, when present subsessile or with a short petiole, oblong-elliptic to linear-oblong or broadly oblanceolate, abruptly acute, often oblique; lamina 8–33 cm. long, 3–9.5 cm. wide. Spike cylindrical, loosely many-flowered, 11–25 cm. long, 2–3.5 cm. in diameter. Bracts lanceolate, acuminate, 1–2.5 cm. long. Flowers small, arcuate-recurved; sepals and petals brownish pink or greenish; lip white. Dorsal sepal elliptic-lanceolate, obtuse, deeply concave, 6–10 mm. long, about 3 mm. wide. Lateral sepals (free part) triangular-oblong to narrowly lanceolate, subobtusate to acute, falcate, 7.5–10 mm. long, 2.5–3.5 mm. wide. Petals narrowly oblanceolate, obtuse to subacute, 6–10 mm. long, 1–1.5 mm. wide. Lip oblanceolate in outline, sagittate, 8–13.5 mm. long, 4–5 mm. wide at the widest point, constricted near the apex to form a quadrate-suborbicular subobtusate reflexed terminal lobule that has minutely crenulate margins; basal portion below the apical constriction obovate or subpanduriform, with the basal thickened and subterete incurved auricles 2–3 mm. long; disk glandular-hairy near the base. Column 4–6 mm. long; rostellum usually denticulate at the apex.

Guatemala: 25 miles from Guatemala City, Cerro de Nubes, 2,600 meters, *Margaret W. Lewis* 100. Guatemala, *Johnston* 1608.—Sololá: Volcán San Pedro, north-facing slopes towards Lago de Atitlán, above village of San Pedro, *Steyermark* 47182.

Spiranthes seminuda Schltr. Repert. Sp. Nov. 3: 18. 1906.

Terrestrial or sometimes epiphytic in forests, usually at high elevations, up to 2,500 meters alt. Uncommon in Mexico and Guatemala.

Plant erect, up to 32 cm. tall, glabrous below, pubescent above, provided at the base with one or more tubular sheaths. Scape slender, terete, provided with several tubular clasping acuminate sheaths. Leaves usually present at time of flowering, basal, several, with a slender petiole; lamina elliptic to ovate-elliptic, acute, up to 17 cm. long including the petiole, 2–5 cm. wide. Spike laxly few-to many-flowered, somewhat one-sided, up to 15 cm. long. Floral bracts elliptic-lanceolate, long-acuminate, concave, scarious, smooth, exceeding the flowers. Flowers small, fleshy, pale yellowish green with a white lip, arcuate-nodding, with stout pubescent pedicellate ovaries. Sepals oblong-elliptic to elliptic-ob lanceolate, obtuse to subacute, pubescent on the outer surface, somewhat dorsally keeled near the apex with the keel sometimes exerted as a short mucro, 6–12 mm. long, 2–3.5 mm. wide; lateral sepals oblique. Petals adherent to the dorsal sepal, obliquely linear-ob lanceolate, obtuse, much narrowed at the base, 7–12 mm. long, 2–2.5 mm. wide above the middle. Lip fleshy, shortly clawed, narrowly sagittate at the base, dilated about the middle and then contracted above; lamina ovate to ovate-lanceolate in outline, somewhat dilated at the obtuse apex, 7–11 mm. long, 3–5 mm. wide about the middle; disk puberulent-granulose near the apex; basal callosities short, terete. Column terete, dilated at the apex, up to 9 mm. long.

Huehuetenango: Near Todos Santos, *Melhus & Goodman* 3608.

Spiranthes speciosa (J. F. Gmelin) A. Rich. in *La Sagra*, Fl. Cub. Fan. 11: 252. 1853. *Serapias speciosa* J. F. Gmelin, Syst. 59. 1791.

Usually epiphytic or in tree-holes in humid forests, also terrestrial, on rocks in thickets and in open plains, up to 3,000 meters alt. Throughout the West Indies, Mexico and Central and northern South America.

Plant short, stout, glabrous throughout, 1–5 dm. tall. Leaves basal, sessile or with short broad petioles; lamina orbicular-ovate, elliptic-oblong, oblong-lanceolate or oblanceolate, abruptly acute or acuminate, tapering into the petiole, usually silver-spotted, 4–20 cm. long, 2–6 cm. wide; petiole up to 10 cm. long. Spike short, crowded, with few or many flowers, 4–10 cm. long, 4–7 cm. in diameter. Bracts exceeding the flowers, narrowly to broadly lanceolate, acuminate, same color as the flowers, 2.5–4 cm. long, 6–15 mm. wide. Flowers bright red to purple-red; sepals and petals usually with involute margins near the apex and recurved.

Dorsal sepal elliptic-lanceolate, acuminate, concave below the middle, about 1.3 cm. long and 4 mm. wide. Lateral sepals lanceolate, acuminate, 1.4–1.6 cm. long, about 4 mm. wide. Petals narrowly elliptic-lanceolate, acuminate, slightly falcate, 1.3–1.4 cm. long, about 3 mm. wide. Lip sessile, cuneate-lanceolate in outline, shallowly 3-lobed, acute or obtuse-apiculate at the apex, the lower half somewhat panduriform, 1.2–1.5 cm. long, 5–6 mm. wide across the lateral lobes; lateral lobes near the middle, broadly rounded; apical lobe oblong, the margins involute near the apex, 2.5–3 mm. wide; disk pubescent on the basal portion, with two flat, thickened calli on each side at the base. Column thick, densely pilose on the anterior surface, 5–7 mm. long; rostellum bristle-like, 3.5–4 mm. long.

Chimaltenango: Epiphytic, above Tecpam, *Skutch* 607. Region of Los Positos, above Las Calderas, *Standley* 80166.—El Progreso: Sierra de las Minas, hills north of Finca Piamonte, between Finca Piamonte and summit of Volcán Santa Luisa, *Steyermark* 43582.—Guatemala: Vicinity of Guatemala City, *Lewis* 161. In market, Guatemala City, *Standley* 58544. In market, Guatemala, *Johnston* 1565.—Zacapa: Trail between Santa Rosalía de Mármol and Vegas, *Steyermark* 42908.

Spiranthes stolonifera Ames & Correll, Bot. Mus. Leaflet. Harv. Univ. 10, no. 4: 63, pl. 3. 1942 (type: Guatemala, Dept. Huehuetenango, Sierra Cuchumatanes [north slope], terrestrial in mossy ground, open woods, August 23, 1934, *A. F. Skutch* 1094). Figure 35.

Terrestrial in open woods and cloud forests, found only at high elevations (up to 3,500 meters alt.) in Sierra de los Cuchumatanes, where it is apparently endemic.

Plant 9–35 cm. tall, aphyllous at time of flowering, slender, rigidly erect, arising from a solitary tuberoid, stoloniferous, slightly geniculate at the base, glabrous below, the upper part covered with a hoary puberulence; stolons producing at intervals solitary small ovoid tuberoids that are as much as 2 cm. long. Stem provided with appressed green tubular sheaths that are rather abruptly subobtuse to acute. Inflorescence two-flowered. Flowers white marked with orange or vermilion-red, subtended by large bracts; pedicellate ovaries covered with a reddish brown glandular puberulence. Floral bracts green, lanceolate, acuminate, about 3.5 cm. long, with involute margins. Sepals densely tuberculose-puberulent on the margins and outer surface. Dorsal sepal strongly recurved above the middle, concave below, elliptic-lanceolate, obtuse to shortly subacuminate, prominently 5-nerved, 1.9–2 cm. long, 4.5–6.5 mm. wide. Lateral sepals free, divergent, directed downward, lightly carinate along the central nerve, lanceolate, subobtuse to acute, slightly oblique, prominently 3-nerved, 1.7–2 cm. long, 3.1–3.5 mm. wide. Petals conspicuously falcate, oblanceolate, obtuse, gradually tapering below the middle, 1.8–2 cm. long, 3–3.2 mm. wide above the middle. Lip arcuate-decurved in natural position, oblong-oblanceolate, constricted above the middle, 1.8–2.2 cm. long; lower portion below the constriction thick, sulcate, minutely pubescent and concave-saccate at the base, provided with submarginal obscure fleshy mammillate

SPIRANTHES

stolonifera Ames & Correll



FIG. 35. *Spiranthes stolonifera*. 1, plant ($\times 1$); 2, flower, front-side view ($\times 2$); 3, flower, front view ($\times 2$); 4, lip, column, and lateral sepals, spread open ($\times 2$); 5, petals and dorsal sepal, spread out ($\times 2$). Drawn by G. W. Dillon.

callosities on each side at the base, with the margins upturned and slightly undulate, puberulent on the margins and outer surface; apical portion above the constriction flat and spreading, broadly ovate to elliptic-subquadrate, broadly rounded to subtruncate or lightly retuse at the apex, with the margin somewhat undulate-crenulate; disk with a sulcate cinnabar-red or deep orange-colored callus on the lower portion. Column clavellate, about 1.2 cm. long, toothed at the apex.

This species is closely allied to *S. hyemalis*, but differs from that species in several characters. *Spiranthes stolonifera* is a rigidly erect, aphyllous plant that develops tuber-bearing stolons. The stem-sheaths are closely appressed and are always abruptly subobtuse to acute. The sepals and petals are also obtuse to acute. Plants of *S. hyemalis* rise from a cluster of fusiform-thickened roots, and the stem, which is commonly flexuose, is leafy below and provided above with rather loose sheaths. The sheaths are acuminate and divergent at the apex. The sepals and petals are ordinarily long-acuminate.

Huehuetenango: Sierra Cuchumatanes, rocky ridge beneath pines, *Skutch* 1254. In juniper woods, Cerro Chemal, summit of Sierra de los Cuchumatanes, *Steyermark* 50297. Wet cloud forest of oaks and pines, between San Mateo Ixtatán and Santa Eulalia, Sierra de los Cuchumatanes, *Steyermark* 49903. Juniper ravine, alpine areas in vicinity of Tunimá, Sierra de los Cuchumatanes, *Steyermark* 48386.

***Spiranthes Tonduzii* Schltr. Repert. Sp. Nov. 9: 26. 1912.**

In dense forests in leaf mold and on rotten logs among rocks, up to 550 meters. Uncommon in Mexico, Guatemala, Honduras and Costa Rica.

Plant very slender, glabrous below, copiously pubescent above with short brown articulated hairs, 2–3.8 dm. tall. Leaves basal, sessile or with short broad petioles, pale green, glaucous, flaccid; lamina oval to elliptic-oblong, acute or shortly acuminate, mostly oblique, 6.5–26 cm. long, 3–6.5 cm. wide; petiole up to 3.5 cm. long. Spike narrowly cylindrical, loosely flowered, 8–25 cm. long, 1.5–2 cm. in diameter. Bracts elliptic-lanceolate to narrowly lanceolate, acuminate, incurved, 1–2 cm. long, about 4 mm. wide. Flowers small, dull white and light yellow. Sepals sparingly pubescent on the outer surface, with the margins involute above the middle; dorsal sepal elliptic-oblong, obtuse to subacute, concave, 5.2–5.5 mm. long, 2–2.2 mm. wide; lateral sepals oblong-elliptic, obtuse, usually widest above the middle, 6–7 mm. long to base of short mentum, 2–3 mm. wide. Petals obliquely oblanceolate, obtuse, with the margins involute above the middle, 5–5.5 mm. long, 1.5–2.2 mm. wide. Lip in natural position conspicuously arcuate-deflexed above the middle with the apex curved back toward the rachis, with the margins upturned and undulate-cripsed, finely hirsute below on the outer surface, when spread out linear-oblanceolate to linear-spatulate, obtuse to subacute, somewhat dilated above and finely ciliate along the apical margin, 5.5–7 mm. long, about 2 mm. wide at the widest point; disk with a puberulent tuft along the center near the

middle; basal lateral callosities terete or semiterete, acute, about 1 mm. long. Column short, thickened, about 3 mm. long; rostellum cuspidate, about 0.5 mm. long. Capsule ovoid, 1 cm. long.

Izabal: Los Amates, *C. C. Deam* 96.

Spiranthes tortilis (Sw.) L. C. Rich. Orch. Europ. Ann. 37. 1817 (in Mém. Mus. Hist. Nat. Par. 4: 59. 1818). *Neottia tortilis* Sw. Kongl. Sven. Vet. Acad. Nya Handl. 21: 226. 1800.

Terrestrial in open grassy plains, dry pinelands and shallow soil of rock crevices, at low altitudes. Widespread from Florida to Louisiana and in the West Indies and Trinidad; rare in Guatemala, British Honduras and Nicaragua.

Plant slender, glabrous below, subglabrous to somewhat pubescent above, up to 7 dm. tall. Leaves basal when present, filiform-terete to narrowly linear, 8–30 cm. long. Inflorescence a slender twisted spike composed of a single row of flowers, 3–22 cm. long. Floral bracts ovate to ovate-lanceolate, acuminate, mostly with hyaline margins, 3–7 mm. long. Flowers white marked with green. Sepals 3.5–6.5 mm. long, 1–2 mm. wide; dorsal sepal oblong-elliptic to oblong-lanceolate, subacute to acute; lateral sepals lanceolate, acute to acuminate. Petals adhering to the dorsal sepal, linear to linear-spatulate, obtuse to subacute, 3.5–5.5 mm. long, about 1 mm. wide. Lip ovate, oblong-quadrate or orbicular-quadrate, often conspicuously constricted just above the middle, strongly recurved, green on the central portion of the disk with the apical margin crenulate-wavy and whitish, 3–6 mm. long, 1.5–3 mm. wide; basal callosities slender or stout, mammillate.

This species is closely allied to *Spiranthes graminea* Lindl., of Mexico, but is separated from that species mainly by its differently formed lip and usually almost glabrous rachis and ovaries.

Izabal: Cristina, *Blake* 7567. Between Milla 49.5 and Cristina, *Steyermark* 38660.

Spiranthes trilineata Lindl. in Benth. Pl. Hartw. 94. 1842 (type: Guatemala, Valley of Guatemala, January, *Hartweg*). *Deiregyne trilineata* (Lindl.) Schltr. Beih. Bot. Centralbl. 37, Abt. 2: 428. 1920.

Grasslands and in mixed oak and pine forests, up to 2,500 meters alt. Very rare in Mexico and Guatemala.

Plant short, erect, somewhat stout, glabrous, 8–15 cm. tall. Leaves fugacious, basal when present. Spike lax, few-flowered, 2–6 cm. long, about 2.5 cm. in diameter. Bracts broadly ovate to oblong-lanceolate, scarious, with 3 conspicuous nerves, acuminate, 8–12 mm. long. Flowers dull white, rather large for the plant, ascending. Sepals recurved at the apex; dorsal sepal linear-lanceolate, acute or broadly acuminate, 8–10 mm. long, 2–2.2 mm. wide; lateral sepals linear-lanceolate or linear-oblong, subobtuse or acute, falcate, 8.5–11 mm. long, 2–2.5 mm. wide. Petals narrowly linear, acute or subacuminate, 8–9.5 mm. long, about 1 mm. wide.

Lip elliptic-oblongate, sagittate, broadly rounded or obtuse at the apex, with the lateral margins turned upward, fleshy and somewhat decurved at the apex; disk pubescent on the basal portion, 9–12 mm. long, 4–5 mm. wide at the widest point; basal calli obtuse, auriculate. Column about 1 cm. long.

Guatemala: *Skinner*.

Spiranthes trilineata* var. *thelymitra (Reichb. f.) L. O. Wms. in Correll, *Lloydia* 10: 209. 1947. *Spiranthes thelymitra* Reichb. f. Beitr. Orch. Centr.-Am. 66. 1866 (type: Guatemala, near Oratoria and Yalpataqua, July 2, 1857, *Wendland* 379). *Deiregyne thelymitra* (Reichb. f.) Schltr. Beih. Bot. Centralbl. 37, Abt. 2: 428. 1920.

More widespread than typical *S. trilineata*, being found in Mexico, Guatemala, El Salvador, Honduras and Costa Rica.

Variety *thelymitra* differs from the typical form in that the lip is conspicuously constricted near the apex to form a suborbicular lobule that is fleshy and covered with minute papillae, with the margins somewhat undulate.

Chimaltenango: Near Chimaltenango, *Bequaert* 6. Alameda, *Johnston* 575.—Guatemala: Along road between Guatemala and San Raimundo, *Standley* 63010. Pamplona (collected by Margaret Lewis), *Standley* 64518. Pamplona, *Margaret Lewis* 155. La Aurora, *Morales* 620.—Escuintla: *Morales Ruano* 980.—Sacatepéquez: Near Santa María, 6,000 feet, *Hunnewell* 14678.—Zacapa: Sierra de las Minas, between Santa Rosalía and Vegona, *Steyermark* 43135.

Spiranthes vernalis Engelm. & Gray, Boston Jour. Nat. Hist. 5: 236. 1845. Figure 36.

In meadows and open forests, up to 3,100 meters alt. A rather common and widespread species in the United States, uncommon in Mexico and Guatemala.

Plant stout or slender, densely and copiously pubescent above, 1.2–11 dm. tall. Leaves basal or extending partly up the stem, suberect and ascending, linear to narrowly lanceolate, acuminate, often strongly keeled. Spike rather densely flowered, 3–15 cm. long, about 1.5 cm. in diameter; the rachis and ovaries mostly covered by a dense mat of reddish brown, articulated hairs. Floral bracts broadly ovate to oblong-lanceolate, acuminate-elongate, concave, 7–15 mm. long. Flowers greenish or yellowish white, in a single rank (rarely in two ranks); parts of perianth somewhat pubescent on the outer surface. Dorsal sepal oblong-lanceolate to lanceolate, obtuse to acute, concave, 5.5–10 mm. long, 2.5–3 mm. wide near the base. Lateral sepals lanceolate, acute, 5–9.5 mm. long. Petals adherent to the dorsal sepal, linear to linear-elliptic, obtuse, 5–9 mm. long, 1–2 mm. wide. Lip thickened, broadly ovate to rhombic-ovate, occasionally ovate-oblong, arcuate-recurved, usually somewhat expanded and undulate-crenulate on the margin at the apex, 4.5–8 mm. long, 2.5–6 mm. wide near the base; lateral basal callosities stout, incurved, pubescent.

This is a very variable species. It is characterized by its more or less densely pubescent rachis and ovaries. The flowers are usually very fragrant. The thick ovate lip and typically rigid acuminate leaves and sheaths of the stem readily separate this species from *S. graminea* Lindl. of Mexico. The lip of *S. graminea* is typically thin and oblong-quadrate and the leaves and sheaths are rather lax and obtuse to acute.

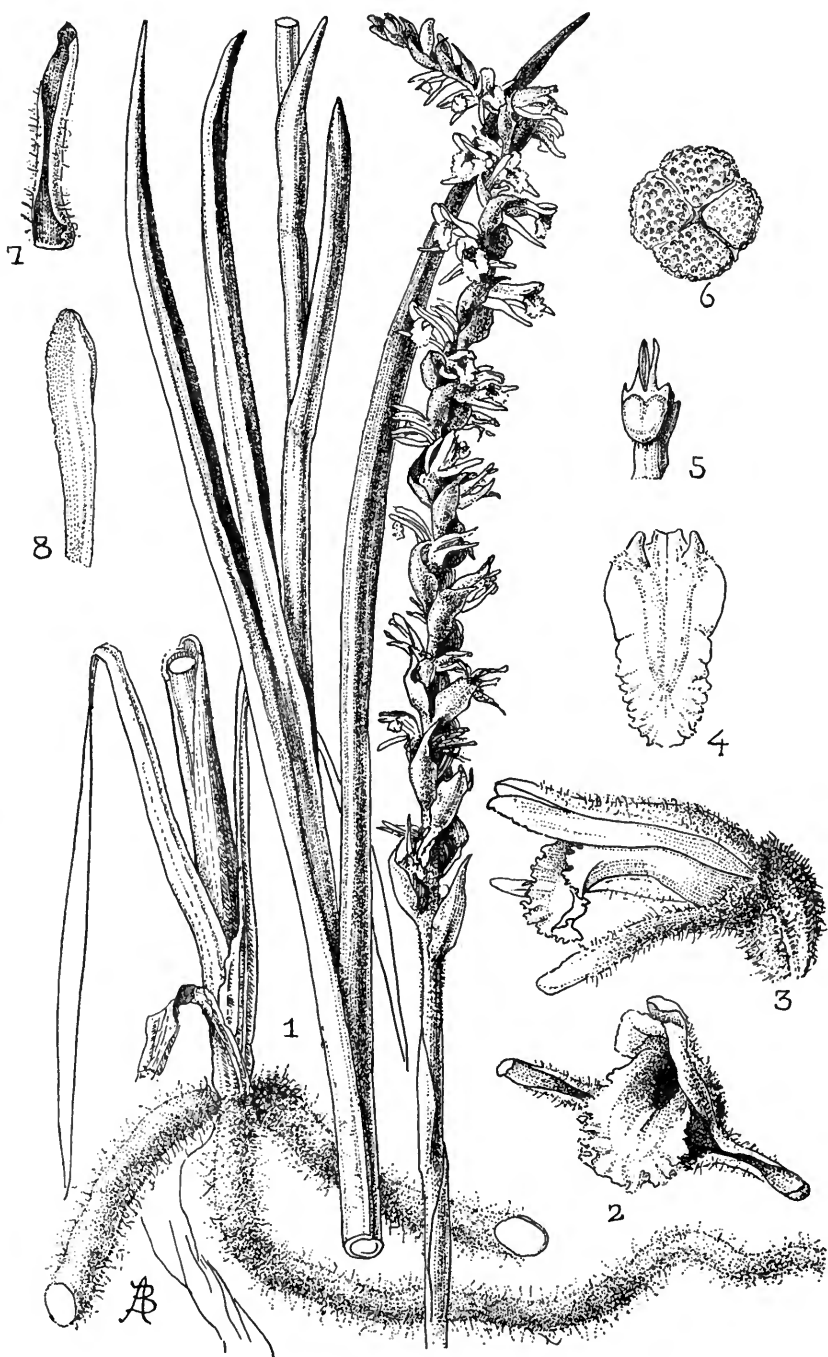
Alta Verapaz: Cobán, *Türckheim* II 1832. Between Tactic and Cobán, *Türckheim* II 2334.—Chimaltenango: Chichavac, *Skutch* 362.—Huehuetenango: Top of Cerro Chemalito, Sierra de los Cuchumatanes, 3½ miles west of Santa Eulalia, *Steyermark* 49920. Cerro Cananá, between Nucapuxlac and Cananá, Sierra de los Cuchumatanes, *Steyermark* 49000. Swamp along creek below Nuca, between Nuca and Quetzal, *Steyermark* 49780.

EXCLUDED SPECIES

Spiranthes gutterosa Reichb. f. Beitr. Orch. Centr.-Am. 67. 1866. This species was reported (as *Sarcoglottis gutterosa* (Reichb. f.) Ames) in Donn. Smith, Enum. Pl. Guat. 7: 49. 1905, as occurring in Dept. Alta Verapaz (*Türckheim* 7993). We have seen no material referable to this plant. On the basis of an illustration of the scape and analytical drawings of the flowers, which we have seen from the Reichenbach Herbarium, it is doubtless a form of *S. acaulis* and perhaps should be included in that species.

Spiranthes lupulina (Lindl.) Hemsl. Biol. Centr.-Am. 3: 301. 1885. This plant was reported from Guatemala by Hemsley. We have seen neither material nor record of the type of this plant and are unable to place it correctly. It appears to be closely allied to *S. aurantiaca* and perhaps may prove to be referable to that species. The description is as follows: Scape glabrous at the base, pubescent above, clothed with cucullate obtuse glabrous imbricating scarious sheaths. Spike oblong, lupulinous. Bracts oblong-lanceolate, villous at the base, much longer than the elongate-conical flowers. Ovary obovate, very villous, twice as short as the villous sepals. Petals pilose. Lip ovate-lanceolate, acuminate, obtuse, pubescent within, biconvex and glabrous at the base.

FIG. 36. *Spiranthes vernalis*. 1, plant ($\times 1$); 2, flower, front view ($\times 4$); 3, flower, side view ($\times 4$); 4, lip, spread out ($\times 4$); 5, column ($\times 4$); 6, pollen tetrad (highly magnified); 7, lateral sepal ($\times 4$); 8, petal ($\times 4$). Drawn by Blanche Ames.



Lindley, in originally describing *Stenorhynchus lupulinus* (Gen. & Sp. Orch. Pl. 479. 1840), wrote as follows: "Apparently a very handsome plant. The stem before me is a foot high, and covered with ventricose leafy imbricated sheaths; the bracts are 3 inches long and an inch broad, and have been of some bright colour, probably pink; they are so large as to form a spike like a head of hops, within which the flowers are concealed."

15. GOODYERA R. Br.

Terrestrial, scapose herbs with creeping rootstocks bearing several thick fibrous roots and with the alternate leaves basal or on the lower part of the stem. Leaves ovate to lanceolate, dark or bluish green, often reticulate-veined or variegated with white, rising from somewhat inflated sheaths, reduced above to sheathing bracts. Inflorescence a lax or dense cylindrical terminal spike. Flowers small, white or pink, often tinged with yellow or green, the oblique petals connivent with the dorsal sepal forming a hood over the lip. Lip sessile, deeply concave or saccate, straight or recurved at the apex, entire, the disk often adorned with glands or fleshy processes. Column short; anther borne on the back; pollinia two, attached to a narrow gland that is held between the forked or 2-toothed beak that terminates the column. Capsule erect, ovoid to ellipsoid.

This genus consists of about twenty-five species that are found in boreal, temperate and tropical regions throughout the world. The typically variegated leaves of many of the species and the spurless lip are characteristic of the genus.

Lip more than 5 mm. long.....*G. major*.
Lip less than 5 mm. long.....*G. striata*.

Goodyera major Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10, no. 4: 68, pl. 4. 1942 (type: Guatemala, Dept. Zacapa, cloud forest in ravine bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, alt. 2,500 meters, October 13, 1939, *J. A. Steyermark* 29886). Figure 37.

Terrestrial in mountain forests, up to 2,600 meters alt. Apparently endemic to Guatemala.

Plant from a prostrate rhizome, erect-ascending, large for the genus, 5-7 dm. tall. Stem leafy and glabrous on the lower half, bracteate and glandular-pubescent above; bracts acuminate, 1.5-3.5 cm. long. Leaves five to eight, rather large, with conspicuous inflated clasping petioles; petioles tubular at the base, up to 4 cm. long; lamina obliquely elliptic-lanceolate, acuminate, thick-membranaceous, 7.5-11.5 cm. long, 2-3.5 cm. wide. Raceme spicate, cylindrical, rather densely flowered, 6.5-7 cm. long, 2.5 cm. in diameter; rachis glandular-pubescent. Floral

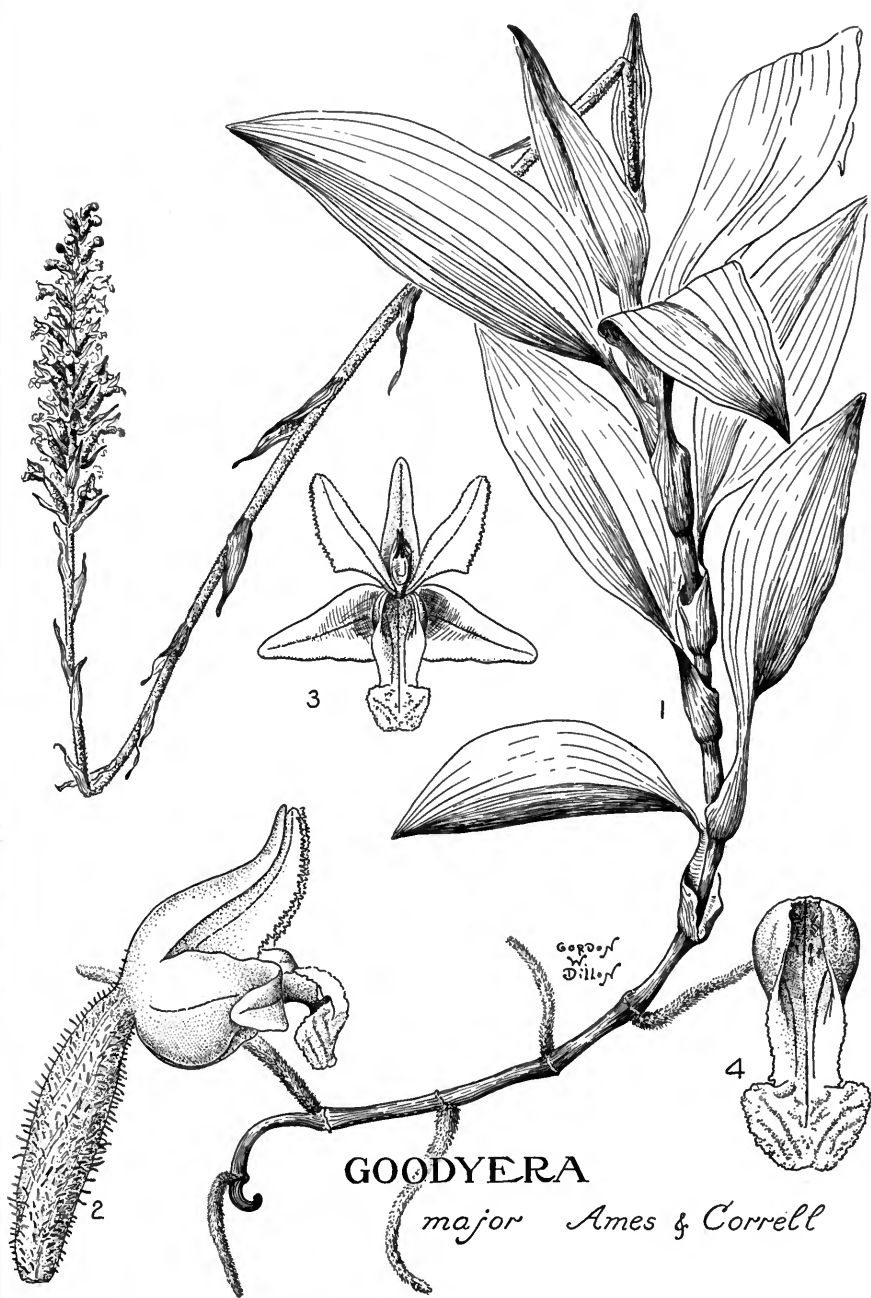


FIG. 37. *Goodyera major*. 1, plant ($\times \frac{1}{2}$); 2, flower, side view ($\times 5$); 3, flower, spread open ($\times 3$); 4, lip, partly spread out ($\times 6$). Drawn by G. W. Dillon.

bracts ovate-lanceolate, acuminate, glandular-pubescent, 9–12 mm. long, about 3.5 mm. wide near the base. Flowers ringent, with stout glandular-pubescent pedicellate ovaries that are about 1 cm. long. Dorsal sepal lanceolate, tapering to an obtuse apex, 1-nerved, canaliculate, 6–6.5 mm. long, about 2 mm. wide. Lateral sepals somewhat oblique, ovate-lanceolate, obtuse, 1-nerved, concave below, 6.5 mm. long, 3.2 mm. wide below the middle. Petals with a slender claw, adherent to the dorsal sepal, semirhombic, obtuse, 1-nerved, erose on the outer margin, slightly denticulate on the inner margin above the middle, 6 mm. long, 2.5 mm. wide about the middle. Lip sessile, arcuate in natural position, with a globose-saccate base, the sac about 2.5 mm. deep and provided with papillae on the inner surface, 3-nerved, erose on the margins above the middle; when spread out broadly oblong-pandurate with a suborbicular-ovate base, 6 mm. long, 4.5 mm. wide across the base, 2.5–3 mm. wide across the apical portion, constricted above the middle and dilated at the broadly rounded to truncate or retuse apex, the apical portion minutely plicate. Column stout, terete, about 4 mm. long.

Goodyera major is the largest known Central American species in this genus. The lip is nearest in shape to that of *G. modesta* Schltr., a Costa Rican species. However, *G. modesta*, besides having much smaller flowers than *G. major*, has an entire lip and linear petals. The nearest ally, *G. dolabripetala* (Ames) Schltr., not only has a laxly flowered raceme of smaller flowers, but the lip has entire margins and is described and illustrated as ovate-lanceolate.

The following collection is in fruit but probably represents this species. Zacapa: Terrestrial, between Loma El Picacho and Cerro de Monos, *Steyermark* 42785.

***Goodyera striata* Reichb. f. Linnaea 18: 409. 1844.**

In mixed oak-pine forests, in leaf mold and on decaying stumps and logs in dense moist forests, up to 3,000 meters alt. Rather common in Mexico and Guatemala.

Plant slender, 2.4–5.2 dm. tall; stem densely or sparingly pubescent with whitish or brown articulated hairs, green or tinged with pink. Leaves basal or on the lower part of the stem, with short-winged petioles; lamina ovate to lanceolate, acute to shortly acuminate, glabrous, variegated with white, 3.5–10 cm. long, 1.5–4 cm. wide; petiole 2.5–4 cm. long. Spike narrowly cylindrical-pyramidal, 6–19 cm. long, about 1.5 cm. in diameter. Bracts lanceolate, acuminate, 7–12 mm. long. Flowers small, dull white, yellowish or pale pink. Dorsal sepal lanceolate, acute to acuminate, concave below, recurved at the apex, 3.5–4.2 mm. long, 1.5–2 mm. wide. Lateral sepals obliquely ovate, acute or shortly acuminate, 3.5–4.1 mm. long, about 2.2 mm. wide. Petals oblanceolate, acute, dilated on the outer margin above the middle, 3.3–4.5 mm. long, about 1.8 mm. wide. Lip sessile, in natural position deeply concave with the margins upturned, when spread out suborbicular-ovate, obtuse to acute, 3.2–4.2 mm. long, 3.5–4.2 mm. wide; disk with small sacs at base, the sacs bearing several fleshy hooked processes, with two hairy fleshy glands on each side near the base. Column 2.5 mm. long. Capsule obliquely ellipsoid, about 1 cm. long.

Alta Verapaz: Samac, *Johnson* 779.—Chimaltenango: Chichavac, *Skutch* 557. Region of Los Positos, above Las Calderas, *Standley* 80234; 80301.—Amatitlán: Pacaya, *Johnston* 1401.—Chiquimula: Upper slopes of Montaña Tajurán, in vicinity of El Barriol, *Steyermark* 30827.—El Progreso: Sierra de las Minas, between Finca Piamonte and top of Montaña Piamonte, along Joya Pacayal, *Steyermark* 43666.—Guatemala: Volcán de Pacaya, above Las Calderas, *Standley* 58449. Calderas, *Johnston* 1116.—Huehuetenango: Cerro Cananá, between Nucapuxlac and Cananá, Sierra de los Cuchumatanes, *Steyermark* 49106. Moist forest on summit, Cerro Pixpíx, above San Ildefonso Ixtahuacán, *Steyermark* 50648.—Jalapa: Volcán Jumay, north of Jalapa, *Steyermark* 32452.—San Marcos: Between San Sebastián and Todos Santos, upper slopes of Volcán Tajumulco, *Steyermark* 36961. Bordering Río Vega, between San Rafael at northeast portion of Volcán Tacaná and Guatemala-Mexico line, *Steyermark* 36362.—Sololá: Volcán Santa Clara, south-facing slopes to summit, *Steyermark* 46970. One-third way up slopes, Volcán San Pedro, north-facing slopes towards Lago de Atitlán, above village of San Pedro, *Steyermark* 47262.—Zacapa: Upper reaches of Río Sitio Nuevo, *Steyermark* 43239. Sierra de las Minas, in cloud forest, between Loma El Picacho and Cerro de Monos, *Steyermark* 42784.—Volcán Zunil, *Skutch* 933; 934.

16. *ERYTHRODES* Blume

Terrestrial leafy herbs, with roots at the base of the stem or from the nodes on the lower part of the stem. Stem erect or prostrate, ascending, often provided with sheathing bracts. Leaves with short petioles that surround the stem at the base, ovate to lanceolate, usually reticulate-veined. Inflorescence a dense or loose spicate raceme of small subsessile flowers. Sepals free, erect or spreading. Petals coherent with the dorsal sepal to form a galea. Lip lobed or occasionally simple, produced below into a simple or didymous saccate spur, ascending from the base of the column, which it lightly embraces. Spur usually provided with four or more mammillate calli or callus-like structures on the interior near the base. Column short; anther erect, the two cells contiguous, distinct; pollinia two, sectile or granular.

This genus consists of about 100 species, which are found in the tropics and subtropics of both hemispheres. These species are at times most perplexing, particularly since a number of ill-defined concepts have been segregated. The apical lobule of the lip may be variously interpreted as being simple, 2-lobed or 3-lobulate. An effort has been made to clarify this difficulty in critical cases. The typically variegated leaves of many of the species and the spurred lip are characteristic of the genus.

1. Lip ovate, not constricted.....*E. ovatilabia*.
1. Lip not ovate, more or less constricted.
 2. Lip including the saccate spur less than 7 mm. long; lamina below the constriction elliptic-oblong to suborbicular, or linear in *E. purpurea*.
 3. Lip abruptly dilated at the apex into two oblong retrorsely recurved lateral lobes.....*E. purpurea*.
 3. Lip not 2-lobed at the apex.
 4. Apical lobe of the lip ovate-subreniform, mucronate or obtuse.
E. Tuerckheimii.
 4. Apical lobe of the lip suborbicular-obcordate or suborbicular and apiculate.
 5. Apical lobe of the lip conspicuously 3-lobulate at the apex; bracts shorter than the flowers at anthesis; plants terrestrial *E. querceticola*.
 5. Apical lobe of the lip not 3-lobulate, at most apiculate; bracts foliaceous, usually exceeding the flowers at anthesis; plants epiphytic.
E. querceticola var. *venustula*.
 2. Lip including the spur more than 7 mm. long; lamina below the constriction linear, obovate or cuneate.
 6. Lip abruptly dilated at the apex into two oblong retrorsely recurved lateral lobes.....*E. purpurea*.
 6. Lip not as above.
 7. Lip cuneate or narrowly triangular-ovate below the short narrow isthmus, mostly wider than the apical lobe; apical lobe transversely linear, mucronate.....*E. vesicifera*.
 7. Lip obovate-obcordate below the constriction, much narrower than the apical lobe; apical lobe orbicular-cordate.....*E. stictophylla*.

Erythroxides ovatilabia Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10, no. 4: 70. pl. 5. 1942 (type: Guatemala, Dept. Chiquimula: Jalapa, Volcán Jumay, north of Jalapa, alt. 1,300–2,200 meters, December 1, 1939, *J. A. Steyermark* 32471). Figure 38.

Terrestrial in oak forest, usually at high elevations, up to 3,000 meters alt. Rare in Mexico and Guatemala.

Plant from a prostrate rhizome, erect-ascending, 3–4 dm. tall. Stem slender, pubescent with whitish articulated hairs, leafy on the lower fourth, bracteate above; bracts acuminate, spreading, up to 3.5 cm. long. Leaves five to eight, petiolate; petiole tubular-inflated below, enveloping the stem, up to 3 cm. long; lamina oblique, ovate-elliptic to broadly elliptic, acute to subacuminate, rounded or tapering at the base, dark green above with a whitish mid-nerve, gray-green beneath, 3–8.5 cm. long, 1.4–3 cm. wide. Raceme densely flowered, spicate, cylindrical, up to 7 cm. long and 2 cm. in diameter; rachis pubescent. Floral bracts ovate-lanceolate, acuminate, 4–7 mm. long, about 2 mm. wide near the base. Flowers small, with pubescent pedicellate ovaries that are up to 6 mm. long. Sepals lanceolate to narrowly elliptic-lanceolate, acuminate or tapering to a narrowly subobtusate apex, 1-nerved, 4.8–5 mm. long, about 1.5 mm. wide below the middle. Petals adherent to the dorsal sepal, semirhombic, narrowly cuneate at the base, obtuse to subacute, 1-nerved, about 4.5 mm. long and 1.5 mm. wide across the dilated middle portion. Lip produced at the base into a slightly bilobed saccate spur, about 7 mm. long including the spur; lamina thin, when spread out ovate (sometimes narrowly so), obtuse to acute, usually with the margins slightly undu-

ERYTHRODES

ovatilabia

Ames & Correll

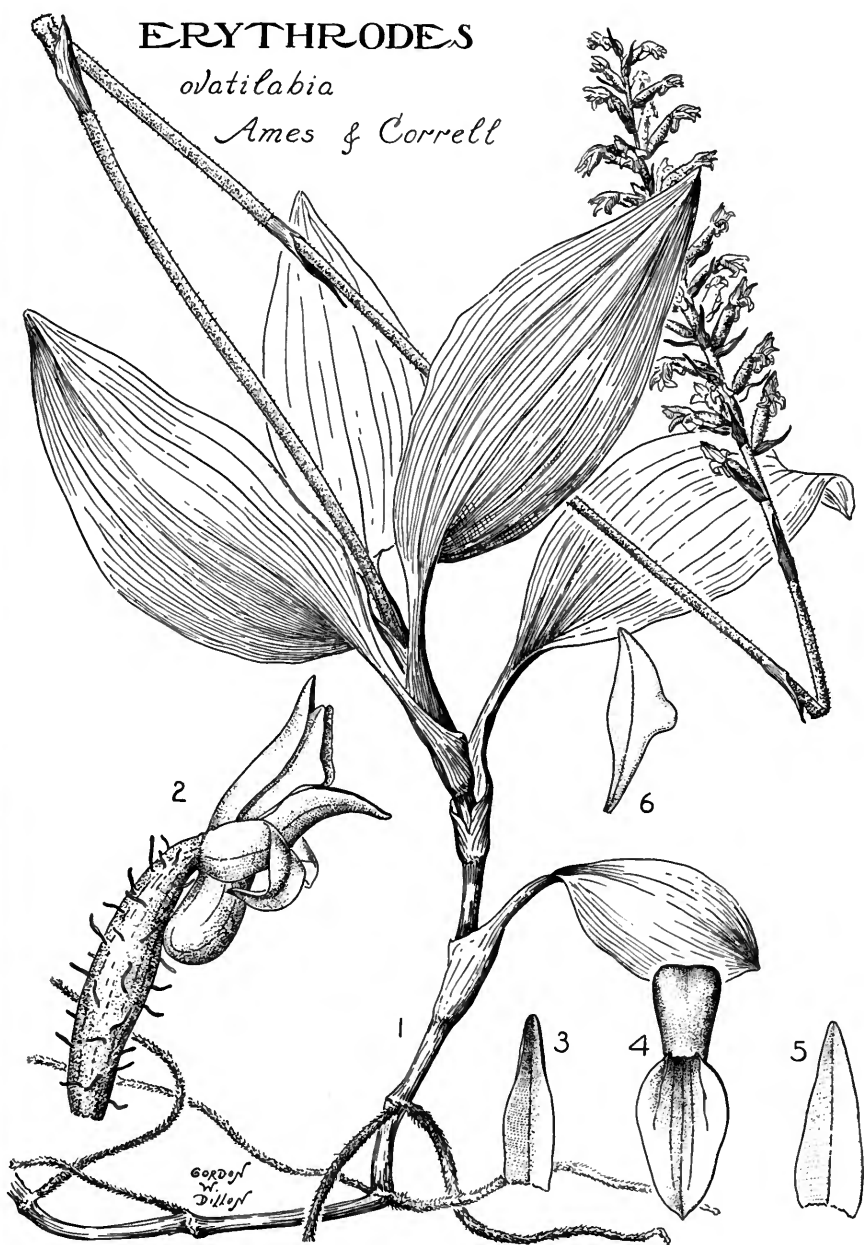


FIG. 38. *Erythroxes ovatilabia*. 1, plant ($\times 1$); 2, flower, side view ($\times 5$); 3, dorsal sepal ($\times 5$); 4, lip, partly spread out ($\times 5$); 5, lateral sepal ($\times 5$); 6, petal ($\times 5$). Drawn by G. W. Dillan.

late, 3-nerved, 4 mm. long, 2.5 mm. wide at the base. Column short, thick, about 2.5 mm. long.

Erythroides ovatilabia is one of the few American species in the genus having a simple lip. Its nearest ally, *E. secunda* Ames, from Mexico, is a much smaller plant with small ovate-subcordate leaves and a laxly few-flowered secund inflorescence. The essentially oval lip of *E. secunda* has a thickened disk and a somewhat constricted crisped apex. The petals are also spatulate instead of being semi-rhombic as in *E. ovatilabia*.

Chiquimula: Upper slopes of Montaña Tajurán, in vicinity of El Barriol, *Steyermark* 30826.—San Marcos: Slopes of barrancas tributary to and bordering Río Vega, between San Rafael at north-east portion of Volcán Tacaná and Guatemala-Mexico line, *Steyermark* 36363 (in part).

Erythroides purpurea Ames, Orch., Fasc. V: 28. 1915. *Physurus purpurea* Ames, Orch., Fasc. II: 259. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, June, 1904, *H. von Türckheim* 8759). *P. luniferus* Schltr. Repert. Sp. Nov. 15: 199. 1918 (type: Guatemala, bank of the Sacinia River, between Mazatenango and San Francisco, January, 1875, *Bernoulli & Cario* 669). *P. argyrostictus* Schltr. Repert. Sp. Nov. 16: 440. 1920 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, April, 1913, *H. von Türckheim* 4054). *Erythroides lunifera* Ames, Orch., Fasc. VII: 71. 1922.

In leaf mold or rich soil of wet dense forests, up to 1,300 meters alt. Rather common in Mexico, Guatemala, Honduras and Costa Rica.

Plant erect or ascending, slender, 1.2–3 dm. tall; scape leafy, pubescent above with brown articulated hairs. Leaves with short petioles that are about 2 cm. long, obliquely ovate, lanceolate or elliptic-oblong, acute or acuminate, usually dark or pale green flecked with white or reticulate with white or deep green, 3–9 cm. long, 1–3.3 cm. wide. Raceme loosely flowered, cylindrical, 5–20 cm. long, up to 2 cm. in diameter. Bracts linear-lanceolate, acuminate, incurved, scarious, 5–10 mm. long. Flowers white or greenish white. Sepals somewhat pubescent with articulated hairs on the outer surface, usually with a tuft of hairs localized near the apex; dorsal sepal linear-liguliform, obtuse, longitudinally concave, 4–5.2 (rarely 3) mm. long, about 1.8 mm. wide; lateral sepals obliquely lanceolate, obtuse, 4–5.5 mm. long, 1.2–1.8 mm. wide. Petals linear to linear-oblong, obtuse, slightly oblique, minutely ciliate along the margin above the middle, 4–5 mm. long, 1–1.5 mm. wide. Lip 6–8.5 mm. long including the saccate spur; lamina linear with the sides upturned, abruptly dilated or divided and reflexed at the apex into two oblong retrorsely recurved lateral lobules that are minutely ciliate, with a short mucro in the shallow sinus at the apex, 3.8–6 mm. wide across the apical lobules when spread out. Capsule ovoid, about 8 mm. long.

This species is variable in its habit. Most of the plants have short peduncles while others have peduncles up to 13.5 cm. in length. The leaves are usually green flecked with silver-white or reticulate-veined with darker green or white. However, they may be variously pigmented as in the case of plants of other species in the genus, such as *E. querceticola*. Several South American segregates approach *E. purpurea* very closely and it is possible that with further study they may be combined with this species.

Alta Verapaz: Cubilgüitz, *Türckheim* 7678; 8463.—Amatitlán: Pacaya, *J. R. Johnston* 1573.—Escuintla: Finca Monterrey, south slope of Volcán de Fuego, *Standley* 64565. Finca El Zapote, *Margaret W. Lewis* 216.—Huehuetenango: Forested slopes in vicinity of Ixcán, Sierra de los Cuchumatanes, *Steyermark* 49429.—Petén: Low forest between Finca Yalpemech and Chinajá, *Steyermark* 45439.—Suchitepequez: Finca Mocá, *F. W. Hunnewell* 14670; *A. F. Skutch* 2112.

Erythrodres querceticola (Lindl.) Ames, Orch., Fasc. V: 29. 1915. *Physurus querceticola* Lindl. Gen. & Sp. Orch. Pl. 505. 1840. *P. vaginatus* Hook. Ic. Pl. t. 449. 1842 (type: Guatemala, *G. U. Skinner*). *Erythrodres vaginata* (Hook.) Ames, Orch., Fasc. V: 29. 1915. *Physurus humidicola* Schltr. Repert. Sp. Nov. 15: 198. 1918 (type: Guatemala, Chilion near Mazatenango, August, 1867, *Bernoulli & Cario* 477). *P. trilobulatus* Schltr. Repert. Sp. Nov. 15: 199. 1918 (type: Guatemala, Dept. Huehuetenango, between Sta. Cruz Almor and Ixcán, September, 1876, *Bernoulli & Cario* 852). Figure 39.

In deep humus and leaf mold of shady barrancas and ravines, and in dense thickets among rocks. Widespread and rather common along the Gulf Coast from Florida to Texas, the West Indies, Mexico and Central America to northern South America(?).

Plant slender or rarely stout, glabrous throughout, 6–43 cm. tall; stem leafy, erect or ascending, light green or brownish green. Leaves with short petioles; lamina ovate, ovate-lanceolate or narrowly lanceolate, acute to acuminate, broadly rounded to subcordate at the base, thin, light or dark green, usually with whitish reticulate veins, drying dull gray-green, straw-color or purplish brown, 1.5–8 cm. long, 1–3 cm. wide below the middle; petiole thin, translucent, surrounding the stem at the base, about 2 cm. long. Raceme few- to many-flowered, loose or dense, 1.5–10 cm. long, 1–2 cm. in diameter. Bracts broadly ovate to lanceolate, acute or acuminate, usually scarious, 4.5–7 mm. long. Flowers subsessile, yellowish green or white. Dorsal sepal narrowly ovate-oblong to lanceolate, subacute to obtuse, concave, 3–4 mm. long, 1–2 mm. wide. Lateral sepals somewhat obliquely ovate, oblong-lanceolate or linear-oblong, obtuse or subacute, 3–4.5 mm. long,

1–2 mm. wide. Petals obliquely linear to linear-lanceolate, obtuse to acute, 3–4.5 mm. long, 1–1.3 mm. wide. Lip 5–7 mm. long including the saccate spur; lamina panduriform, with a conspicuous sinus on each side above the middle, the basal half suborbicular, concave, thickened and partly embracing the column, the upper half suborbicular-obcordate and shallowly or conspicuously 3-lobulate at the apex, 2–2.5 mm. wide across the divergent and broadly rounded lateral lobes, apical lobe triangular-apiculate and strongly reflexed. Spur saccate, descending, provided with three conspicuous nerves. Capsule ellipsoid, 7–9 mm. long.

This species is extremely variable, being represented by several types of habit and numerous variations in the form of the apical portion of the lip of the flowers.

Alta Verapaz: Pansamalá, *Türckheim* 1015. Cubilgüitz, *Türckheim* 8003; *Türckheim* II 204.—Chimaltenango: Lower and middle southwestern slopes of Volcán Fuego, above Finca Montevideo, along Barranca Espinazo and tributary of Río Pantaleón, *Steyermark* 52116.—Izabal: Along Río Bonita, *Steyermark* 41735.—Quezaltenango: Colomba, *Skutch* 1350.—Volcán Zunil, *Skutch* 980.

Erythrodres querceticola* var. *venustula (Ames) Correll, *Lloydia* 10: 210. 1947. *Physurus venustulus* Ames, *Orch.*, Fasc. II: 261. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, December, 1903, *H. von Türckheim* 8591).

Epiphytic. Rare in Guatemala and Costa Rica.

Variety *venustula* is best distinguished from the typical form of the species by its long floral bracts, which are foliaceous, 6–20 mm. long and mostly exceeding the flowers at anthesis. The variety is usually epiphytic in habitat, whereas typical *E. querceticola* is apparently entirely terrestrial. This distinction, however, is arbitrary because terrestrial and epiphytic plants are often found in the same species. The plants of variety *venustula* are weak and drooping, perhaps because of their epiphytic habitat. The apical lobule of the lip of the variety is scarcely or not at all 3-lobed and prominently apiculate as in the species. The flowers may be tinged with red.

Izabal: Epiphyte on branch along Río Tameja, Cerro San Gil, alt. 50 meters, *Steyermark* 41814.—Guatemala: Epiphytic, *Türckheim* II 881.

Erythrodres stictophylla (Schltr.) Ames, *Orch.*, Fasc. VII: 76. 1922. *Physurus stictophylla* Schltr. *Repert. Sp. Nov.* 10: 249. 1911

FIG. 39. *Erythrodres querceticola*. 1, plant ($\times 1$); 2, flower, side view ($\times 5$); 3, dorsal sepal ($\times 5$); 4, petal ($\times 5$); 5, lateral sepal ($\times 5$); 6, lip and spur, front view ($\times 5$); 7, fruits ($\times 1$). Drawn by G. W. Dillon.



(type: Guatemala, Dept. Alta Verapaz, in rotten leaves in high woods near Cobán, November, 1907, *H. von Türckheim* II 1894).

In dense forest, up to 1,400 meters alt. Guatemala.

Plant erect or ascending, 1.4–2.5 dm. tall; scape slender, densely silky pubescent. Leaves on the lower half of the stem, with short petioles that are about 1.5 cm. long, obliquely ovate or lanceolate, acute or shortly acuminate, dark green mottled with white, glabrous, 2.5–5.5 cm. long, 1.3–2.6 cm. wide. Raceme loosely few-flowered, 4–7 cm. long, about 2 cm. in diameter. Bracts lanceolate, acuminate, incurved, glabrous, scarious, 6–9 mm. long. Flowers greenish white, marked with reddish brown. Dorsal sepal lanceolate, obtuse, longitudinally concave, 5.2–6 mm. long, about 2 mm. wide. Lateral sepals obliquely linear-lanceolate or linear-elliptic, obtuse, 5.5–6.5 mm. long, 2–2.3 mm. wide. Petals obliquely narrowly linear-oblong, obtuse, conspicuously dilated on the outer margin, 5–5.2 mm. long, about 1.5 mm. wide. Lip 7.5–9 mm. long including the short saccate spur; lamina pandurate, obtuse, conspicuously constricted at the middle, the lower half obovate-obcordate and about 2.5 mm. wide, the apical half orbicular-ovate to orbicular-cordate, strongly reflexed in natural position and 3.5–4.2 mm. wide. Column short, about 3 mm. long. Capsule cylindrical, about 6 mm. long.

This species is distinctive in that the apical lobule of the lip is much larger than the basal half and the petals are conspicuously dilated on the outer margin. The scape of this species is also densely silky-pubescent, approaching a tomentum.

Alta Verapaz: Finca Volcán, *Wilson* 318.

Erythrodendron Tuerckheimii (Schltr.) Ames, *Orch.*, Fasc. VII: 77. 1922. *Physurus Tuerckheimii* Schltr. *Repert. Sp. Nov.* 2: 132. 1906 (type: Guatemala, Dept. Alta Verapaz, in high woods near Cubilgüitz, July, 1903, *H. von Türckheim* 733). *P. polygonatus* Ames, *Orch.*, Fasc. II: 259. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, April, 1900, *H. von Türckheim* 7678).

Terrestrial in mountain forests, up to 1,800 meters alt. Rare in Guatemala and Honduras.

Plant erect or ascending, slender, 2.5–4 dm. tall; stem pubescent with brown articulated hairs. Leaves on the lower part of the stem, with short petioles, obliquely ovate, oblong-elliptic or elliptic-lanceolate, acute or shortly acuminate, glabrous, 3–7 cm. long, 1.5–3.2 cm. wide. Raceme loosely or densely flowered, cylindrical, 6–10 cm. long, about 1 cm. in diameter. Bracts lanceolate, acuminate, scarious, 7–11 mm. long. Flowers small, pink or brownish marked with white. Sepals sparingly pubescent on the outer surface; dorsal sepal linear-lanceolate or narrowly oblong, obtuse, 2.5–3.2 mm. long, about 1.5 mm. wide; lateral sepals elliptic-oblong, obtuse, slightly oblique, 3–4 mm. long, about 2 mm. wide. Petals obliquely oblong-lanceolate or linear-spatulate, obtuse, 3.2–4 mm. long. Lip about 5 mm. long including the saccate spur; lamina oblong or broadly elliptic with the margins upturned, somewhat constricted above and then expanded into a deflexed

terminal lobule; terminal lobule ovate-subreniform, obtuse or mucronate, with the margins minutely papillose, about 2 mm. long and 3 mm. wide.

This species differs from *E. vesicifera*, to which it is closely allied, mainly by its smaller flowers and differently formed lip. The lip of *E. Tuerckheimii* is an oblong-elliptic type with an ovate-subreniform apical lobule; whereas the lip of *E. vesicifera* is of a cuneate type with the apical lobule more or less 3-lobulate or transversely linear with a rather prominent mucro and separated from the rest of the lip by a short isthmus.

Alta Verapaz: Cubilgüitz, *Türckheim* 8463.

Erythrodies vesicifera (Reichb. f.) Ames, Orch., Fasc. VII: 78. 1922. *Physurus vesicifer* Reichb. f. Beitr. Orch. Centr.-Am. 63. 1866. Figure 40.

In leaf mold and rich soil of dense wet forest and on mossy banks, up to 2,400 meters alt. Rather widespread in Mexico and Central America.

Plant erect or ascending, slender, 1.4–3.6 dm. tall; stem pubescent with brown or whitish articulated hairs. Leaves on the lower part of the stem, with short petioles, obliquely ovate to lanceolate, acute or shortly acuminate, variously pigmented and mottled, usually green or bronze-green, mostly undulate-crenulate along the margins, 3.5–7 cm. long, 1.5–3 cm. wide. Raceme loosely or densely flowered, 4–15 cm. long, 1.5–2 cm. in diameter. Bracts lanceolate, acuminate, incurved, scarious, 6–10 mm. long. Flowers white. Sepals and petals usually conspicuously ciliate along the margins. Sepals elliptic to linear-oblong, obtuse or acute, 5–6 mm. long, 2–2.2 mm. wide. Petals obliquely oblong or oblong-oblancheolate, obtuse, 5–6 mm. long, about 2 mm. wide. Lip 7–9 mm. long including the saccate spur; lamina 2–3.5 mm. wide below the middle, cuneate to narrowly triangular-ovate, constricted above to form a short narrow isthmus and then expanded into an apical lobule that is more or less 3-lobulate or with a transversely linear lobule having a rather prominent mucro; lobule up to 3 mm. wide.

Santa Rosa: Santa Rosa and Dept. Quiché, San Miguel Uspantán, *Heyde & Lux* 3498. Jumaytepeque, *Heyde & Lux* 3854.

QUESTIONABLE AND EXCLUDED SPECIES

Erythrodies loxoglottis (Reichb. f.) Ames. *Physurus loxoglottis* Reichb. f. Beitr. Orch. Centr.-Am. 64. 1866 (type: Guatemala, in a barranca near Guatemala, *Wendland*). It has not been possible to place this nondescript species satisfactorily. It is very closely allied to *E. vesicifera* and may well be placed with it for the present.

Erythrodies maculata (Hook.) Ames was reported from Guatemala by J. D. Smith, Enum. Pl. Guat. 7: 50. 1905 (as *Physurus maculatus*

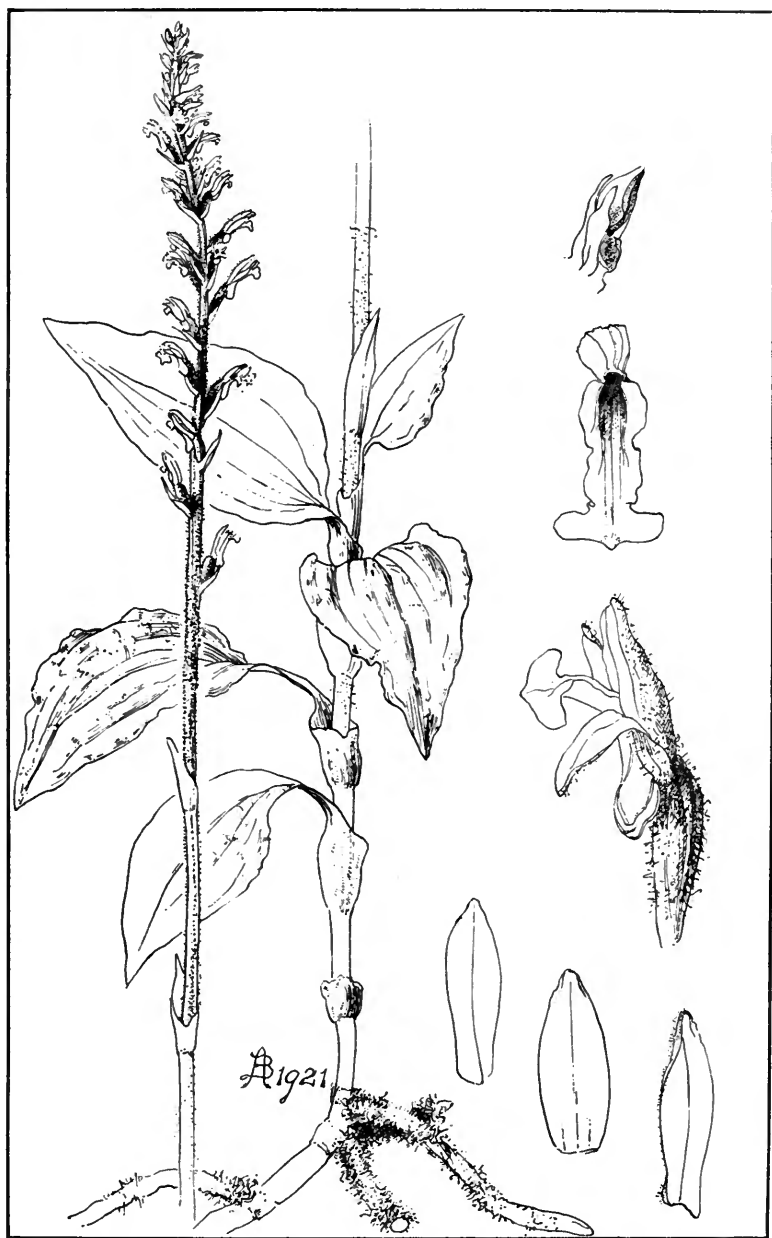


FIG. 40. *Erythroides vesicifera*. Plant ($\times \frac{3}{8}$). Right (top to bottom): column (enlarged); lip, spread out ($\times 5$); flower, side view, partly spread open ($\times 4$); petal ($\times 5$); dorsal sepal ($\times 5$); lateral sepal ($\times 5$). Drawn by Blanche Ames.

Hook.). However, an examination of the specimen (*Türckheim* 8003) upon which this report was based revealed that it is *E. querceticola*, to which *E. maculata* may eventually be referred.

17. *TROPIDIA* Blume

Terrestrial, coarse, slender, leafy and often branching herbs with thick fibrous roots on a short rhizome. Leaves oblong-lanceolate to elliptic-lanceolate, membranaceous, strongly veined and plicate. Inflorescence a compound raceme of numerous small flowers. Lateral sepals connate at the base to form an inconspicuous sac or mentum. Petals and dorsal sepal similar. Lip entire, sessile, with a broadly saccate base, canaliculate, parallel to and partly embracing the column. Column short, straight; anther and rostellum about equal in length; anther erect, lying against the rostellum; pollinia 2, granulose, sectile. Capsule spreading.

This is a small genus of about thirty-five species, which are natives mainly of the East Indies, Malaya, China and Japan. It is represented in this hemisphere by one species.

Tropidia polystachya (Sw.) Ames, Orch., Fasc. II: 262. 1908.
Serapias polystachya Sw. Fl. Ind. Occ. 1415. 1799. Figure 41.

In well-drained stony soil of open woods, shaded hills and in humus and peaty soil in brushwood, up to 500 meters alt. Widespread but not common in southern Florida, the West Indies, Mexico, Guatemala, Costa Rica and the Galapagos Islands.

Plant leafy, glabrous throughout, 2.5–5.3 dm. tall. Leaves distichous, on the upper part of the stem, oblong-elliptic to lanceolate, acute to long-acuminate, thin, drying grayish, 6–28 cm. long, 1.5–5.5 cm. wide. Raceme compound, terminal, on a slender naked peduncle, 3–9 cm. long (flowers rarely occurring also in the axils of leaves along the stem). Bracts subulate to ovate-lanceolate, acute or acuminate with a prominent midrib and hyaline margins, 2–4 mm. long (bracts subtending each branch of the inflorescence much longer, narrowly lanceolate, otherwise similar to the floral bracts). Flowers greenish white or reddish. Dorsal sepal oblong-elliptic, acute, strongly concave, 6–7 mm. long, 2–2.3 mm. wide. Lateral sepals somewhat obliquely oblong-elliptic, acute, gibbous at the base, 6–7 mm. long, 2–3 mm. wide. Petals narrowly ovate to linear-oblong, truncate to subacute at the apex, 5.5–6.2 mm. long, 2–2.3 mm. wide. Lip 4.5–6.5 mm. long, cymbiform, concave-saccate with basal margins strongly involute, thickened with a median groove at the base, constricted near the middle and with the apex thin and somewhat expanded, broadly rounded and often retuse-apiculate; disk pubescent at the middle, with two intramarginal ridges that converge near the apex. Column 3–4 mm. long, terete. Capsule oblong-ellipsoid, prominently 6-ribbed, becoming black at maturity.

Guatemala (fide Schlechter, Beih. Bot. Centralbl. Am. 36: 437. 1918).

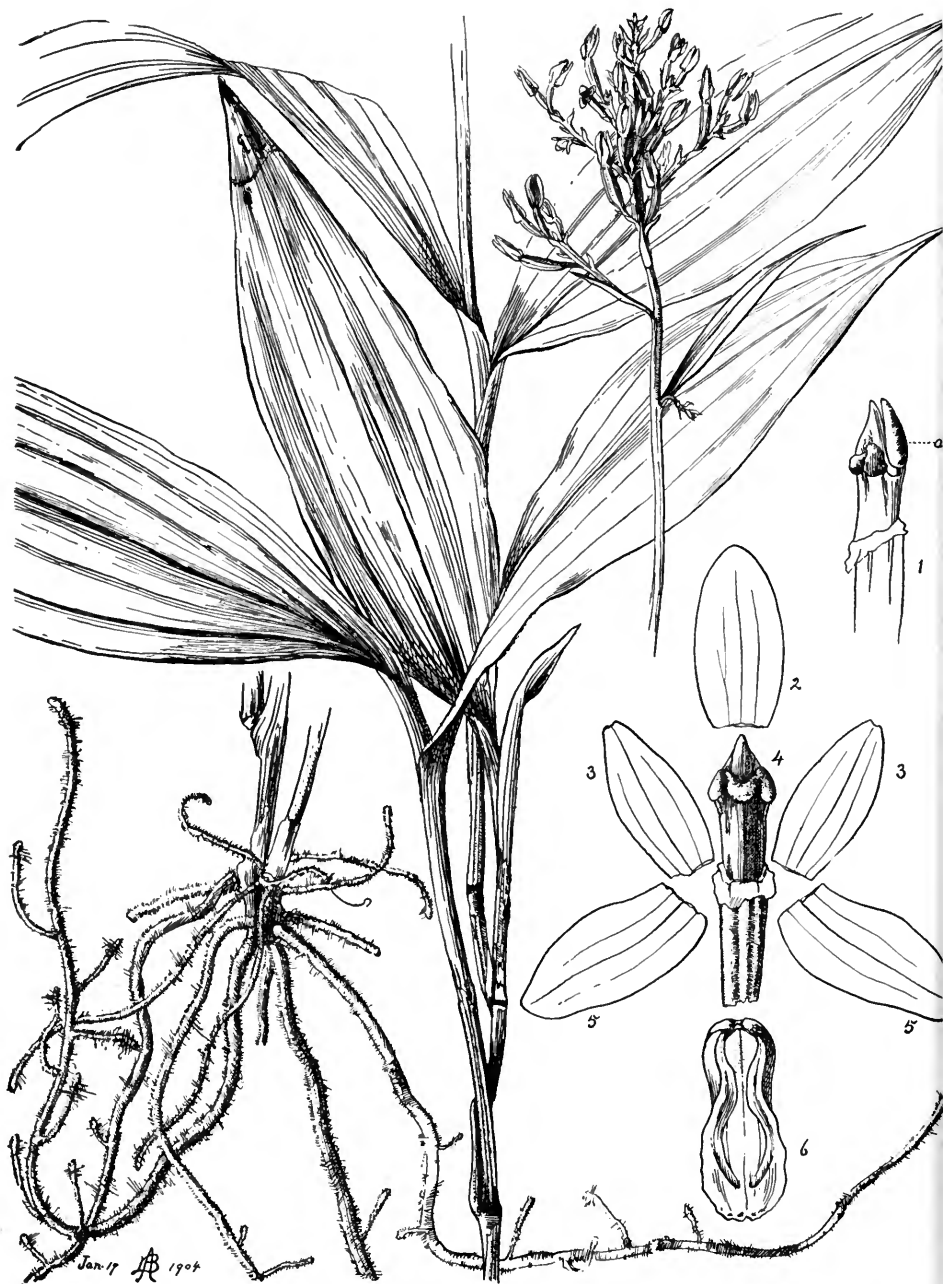


FIG. 41. *Tropidia polystachya*. Plant ($\times \frac{3}{4}$); 1, column, to show anther (a) and upper part of ovary ($\times 4$); 2, dorsal sepal ($\times 4$); 3, petals ($\times 4$); 4, column, front-ventral view and upper part of ovary ($\times 4$); 5, lateral sepals ($\times 4$); 6, lip, from above ($\times 4$). Drawn by Blanche Ames.

18. **CORYMBORCHIS** Thou.

Terrestrial coarse tall leafy herbs, sometimes branching, with thick woody roots clustered on the short rhizome. Sheaths decaying below, spathaceous or passing into leaves above. Leaves ample, plicate, chartaceous, with the petioles sheathing the stem. Flowers rather small, subsessile, in short terminal or axillary subcorymbose panicles. Bracts small, ovate. Sepals and petals linear to oblanceolate. Lip erect from the base of the column and parallel with the column, free, broadly ovate to spatulate, canaliculate, recurved at the apex. Column long, erect, clavellate, terminated by two lobules or auricles; stigma at the base of an erect acuminate rostellum; clinandrium short. Anther erect, narrow, nearly as long as the rostellum, acuminate, with the cells contiguous; pollinia granular, attached to a subulate stalk that depends from a peltate gland of the rostellum; on the fall of the pollinia the rostellum remains bifid. Capsule cylindrical, subterete, crowned by the remains of the perianth.

In this genus there are about a dozen species, which are widely dispersed through the tropics of the world. Two of them are to be found in the western hemisphere.

Corymborchis forcipigera (Reichb. f.) L. O. Wms. Bot. Mus. Leaf. Harv. Univ. 12, no. 7: 237. 1946. *Macrostylis forcipigera* Reichb. f. Bonpl. 2: 96. 1854. *Corymborchis cubensis* Acuña in Bol. Téc. 60, Est. Exp. Agron. Santiago de Las Vegas 51. 1939; emend. and validated by Correll in Bot. Mus. Leaf. Harv. Univ. 8: 125, fig. 1. 1940. Figures 42, 43.¹

Terrestrial in rich soil and humus of shaded dense forests and thickets, up to 1,300 meters alt. Mexico, Guatemala, Costa Rica and the West Indies.

Plant simple, tall, stout, erect, up to 2 meters tall, leaf-sheaths, peduncles and lower surface of the young leaves usually lepidote with brownish scales. Stem terete, occasionally geniculate at the base. Leaves large, crowded on the upper part of the stem, elliptic-lanceolate to narrowly lanceolate, long-acuminate, distichous, sessile, plicate and conspicuously many-nerved, 15–45 cm. long, 3–7.5 cm. wide. Inflorescences one to three lax corymbose panicles, arising in the axils of the uppermost leaves, up to 12 cm. long; peduncle slender, usually somewhat lepidote, up to 8.5 cm. long. Floral bracts ovate-triangular to lanceolate, acute to acuminate, concave and clasping at the base, 3–18 mm. long, 2–3 mm. wide near the base, those subtending the branches of the inflorescence longest. Flowers greenish white or white, arcuate, spreading. Sepals canaliculate, fleshy-thickened, conspicuously dorsally carinate along the mid-nerve; dorsal sepal linear to linear-ob lanceolate, acute to shortly acuminate, incurved, 12–19 mm. long, 2–2.5 mm. wide above the middle; lateral sepals linear-ob lanceolate, acute or abruptly and shortly acuminate, in natural position prominently falcate-recurved, 10–15 mm. long, 2–2.5 mm. wide above the middle. Petals obliquely linear to oblanceolate, acute or abruptly and shortly acuminate, somewhat dilated and concave at the

¹ Figures 42 and 43 were combined after the manuscript had been set in type.



FIGS. 42, 43. *Corymborchis forcipigera*. 1, plant ($\times \frac{1}{6}$); 2, upper flowering portion of plant ($\times \frac{1}{2}$); 3, lip, spread out ($\times 3$). *C. flava*. 4, lip, spread out ($\times 3$). The only other species of *Corymborchis* occurring in this hemisphere, from Costa Rica southward. Drawn by D. E. Tibbitts.

apex with the margins crisped, thinner than the sepals, conspicuously dorsally carinate along the mid-nerve, 11–13.5 mm. long, 2.5–3.5 mm. wide above the middle. Lip in natural position arcuate-decurved above the middle, when spread out linear-spatulate, acute, cucullate-concave and rounded at the base, dorsally carinate along the thickened mid-nerve, 11–14 mm. long; basal portion linear, canaliculate, 6–8 mm. long, 1.5–3 mm. wide; apical portion dilated, ovate to oval, reflexed, with the margins usually undulate-crisped, 5–6 mm. long, 3–4.5 mm. wide; disk with an intramarginal linear callus on each side extending from the base to about the middle of the apical portion. Column clavellate, terete below, 10–12 mm. long. Capsule cylindrical, ribbed, 1.5–2 cm. long.

Alta Verapaz: Near Pansamalá, *Türkheim* 1021. Cubilgüitz, *Türkheim* 8601.—Sololá: South-facing slopes of Volcán Atitlán, above Finca Mocá, *Steyermark* 47928.

The following collections are sterile but probably represent this species: Alta Verapaz: Montaña Yxocubvain, 2½ miles west of Cubilgüitz, *Steyermark* 44989.—Izabal: Cerro San Gil, damp rain-forest, along Río Frío, *Steyermark* 39898.

19. STELIS Swartz

Small epiphytic caespitose herbs with a solitary leaf at the apex; secondary stems provided with loosely clasping sheaths. Roots fibrous, clustered, from a short creeping stem. Leaves fleshy or coriaceous, subsessile or petiolate. Flowers minute or small, numerous, on one or more long slender racemes that rise in the axil of the leaf. Sepals subequal or with the dorsal sepal longest, spreading or cleistogamous, more or less connate; lateral sepals slightly oblique. Petals much shorter than the sepals, with thickened margins. Lip sessile, variously shaped, simple or 3-lobed, about as long as the petals. Column without a foot, short, thickened above; rostellum lingulate; anther terminal, operculate; pollinia 2, waxy, pyriform. Capsule small, ovoid to cylindrical, 3-angled.

In this genus there are more than two hundred species, all natives of tropical America where they occur from Mexico and the West Indies to Brazil and Peru. Because of the usually very small petals and lip, which are fleshy and pliable, the species of *Stelis* are difficult to study in herbarium specimens. Flower-color of the species seems to be extremely variable. Flowers of the same species growing in sun or shade often vary in color, accordingly, from greenish yellow to purplish.

1. Dorsal sepal much longer than the lateral sepals, spreading conspicuously, 2–4 mm. long.....*S. despectans*.
1. Dorsal and lateral sepals subequal.
 2. Column about twice as long as the petals.....*S. ovatilabia*.
 2. Column about equal to the petals in length.
 3. Lip with a tuft of cilia on each side at the base, minutely mucronate at the apex.....*S. tenuissima*.
 3. Lip without a tuft of cilia on each side at the base.

4. Lip not of an ovate, rhombic or reniform type, or with an apiculate or acuminate apex, or with the sepals conspicuously ciliate along the margins.
5. Lip with an acuminate apex or with a conspicuous deltoid-acuminate apicule.
 6. Lip 1 mm. long, truncate or broadly rounded, long-apiculate. *S. guatemalensis*.
 6. Lip less than 1 mm. long, not truncate.
 7. Lip suborbicular-obovate with a prominent deltoid acuminate apicule; sepals glabrous. *S. hymenantha*.
 7. Lip rhombic-lanceolate, inner surface of the sepals short-pubescent.
 8. Petals broadly cuneate, rounded-truncate at the apex. *S. rubens*.
 8. Petals obliquely obovate-cuneate with a conspicuous apicule at the apex. *S. rubens* var. *oxypetala*.
5. Lip not acuminate at the apex.
 9. Lip narrowly oblong or oblong-quadrate.
 10. Lip truncate and sinuately tridentate or apiculate at the apex. *S. cleistogama*.
 10. Lip obtuse with 2 median and marginal falcate calli or lobes curving inward toward the center of the disk. . . . *S. microchila*.
 9. Lip not oblong or oblong-quadrate; sepals usually ciliate on the margins.
 11. Lip with a minute erect apiculate process on the anterior margin, thick-fleshy, quadrate to semiglobular or rhombic.
 12. Lateral sepals 5-nerved. *S. leucopogon*.
 12. Lateral sepals 3-nerved. *S. Endresii*.
 11. Lip without an apiculate process.
 13. Lip oval or occasionally ovate. *S. ciliaris*.
 13. Lip broadly reniform. *S. chihobensis*.
4. Lip of an ovate, rhombic or reniform type, subtruncate, broadly rounded or obtuse at the apex; sepals glabrous.
 14. Floral bracts large, amplexicaul-peltiform with spreading, somewhat revolute margins. *S. parvula*.
 14. Floral bracts ovate-cucullate or tubular, not conspicuously spreading.
 15. Plants large, up to 43 cm. tall; secondary stem more than 4 cm. long; lip semiorbicular to subreniform, broadly rounded or obtuse at the apex. *S. purpurascens*.
 15. Plants small, less than 20 cm. tall; secondary stem less than 4 cm. long; lip not suborbicular or reniform.
 16. Lip somewhat cuneate or rhombic-ovate, subtruncate or broadly obtuse at the apex, about 0.5 mm. long.
 17. Petals obovate-cuneate, from a narrow base; lip with 2 approximate calli in the middle of the disk; sepals often with revolute margins. *S. gracilis*.
 17. Petals broadly flabellate from a wide base; lip with a large fleshy subquadrate callus above the middle of the disk; sepals with incurved margins. *S. Johnsonii*.
 16. Lip not rhombic-cuneate, 0.75-1 mm. long, with a transverse callus near the base of the disk.
 18. Lip triangular-ovate, bidentate at the base; leaves usually linear. *S. bidentata*.
 18. Lip from a broad, flat base, subrhomboidal, not toothed at the base; leaves usually oblanceolate. *S. perplexa*.

Stelis bidentata Schltr. Repert. Sp. Nov. 10: 358. 1912 (type: Guatemala, Dept. Alta Verapaz, near Tactic, *Türkheim* 511; near Cobán, *Türkheim* 1842). Figure 44.

Epiphytic on trees, up to 1,800 meters alt. Mexico and Guatemala.

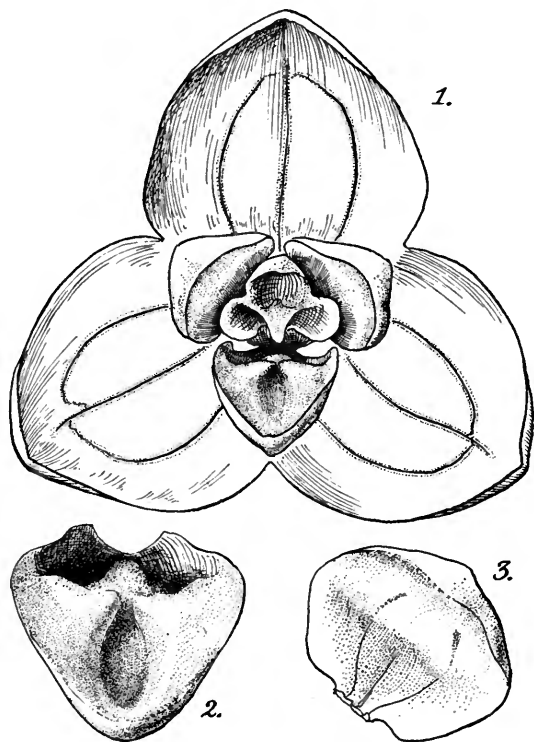


FIG. 44. *Stelis bidentata*. 1, flower ($\times 21$); 2, lip ($\times 25$); 3, petal ($\times 25$). Drawn by Blanche Ames.

Plant densely caespitose, glabrous, up to 15 cm. tall; secondary stem erect, short, with one or two sheaths, 1.5–4 cm. long. Leaves erect, linear or narrowly oblanceolate, obtuse and obliquely bidentate or tridentate at the apex, somewhat oblique, tapering into the very short petioles, 3–8 cm. long, 2.5–7 mm. wide. Inflorescence including the peduncle up to 11 cm. long, loosely few-flowered, slender, filiform. Bracts scarious, broadly ovate-cucullate, shortly acuminate, 1.5–3 mm. long. Flowers small, purplish or white with a greenish, purplish or reddish brown infusion. Pedicellate ovaries ascending, slender, about as long as the bracts. Sepals orbicular-ovate, obtuse, concave, 3-nerved, 1.5–2.2 mm. long, 1.8–2 mm. wide; lateral sepals coherent below the middle. Petals cuneate to suborbicular-rhombic, broadly obtuse, concave, thickened at the apex, 1 mm.

long, about as wide as long. Lip fleshy, triangular-ovate, obtuse, bidentate at the base, deeply concave in front and at the base, somewhat divided near the base by a transverse bilobed callus, about 1 mm. long and 0.8 mm. wide.

The flowers of this species are usually closed during the day, but open at night.

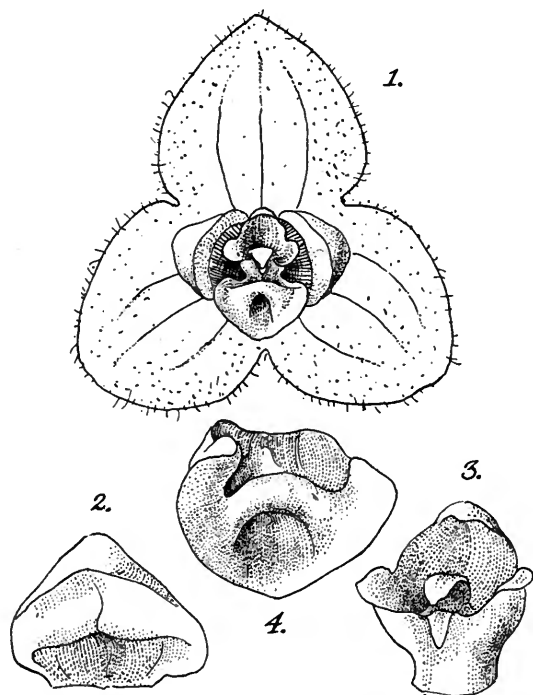


FIG. 45. *Stelis chihobensis*. 1, flower ($\times 11$); 2, petal ($\times 21$); 3, column ($\times 21$); 4, lip ($\times 21$). Drawn by Blanche Ames.

Amatitlán: Pacayá, *Johnson* 1311. Finca Mocá, *J. Bequaert* 48. Mocá, *Margaret W. Lewis* 73.

Stelis chihobensis Ames, Sched. Orch. 1: 3. 1922 (type: Guatemala, Dept. Alta Verapaz, Chihob, *Johnson* 939). Figure 45.

Epiphytic on trees, up to 1,000 meters alt. Guatemala and Costa Rica.

Plant caespitose, glabrous, up to 22 cm. tall; secondary stem erect, rather stout, provided with 3 bracts, 4–9 cm. long. Leaves including the short sulcate petiole 4–9.5 cm. long; lamina ligulate, linear-elliptic, obtuse and obliquely tridentate at the apex, 5–12 mm. wide. Inflorescence including the short peduncle up to 13 cm. long, loosely many-flowered. Bracts obliquely tubular, acute, shorter

STELIS

ciliaris
Lindl.



FIG. 46. *Stelis ciliaris*. Plant ($\times 1$); 1, flower (about $\times 9$); 2, petal (about $\times 13$); 3, lip (about $\times 16$); 4, column and lip, front-side view (about $\times 13$). Drawn by Blanche Ames.

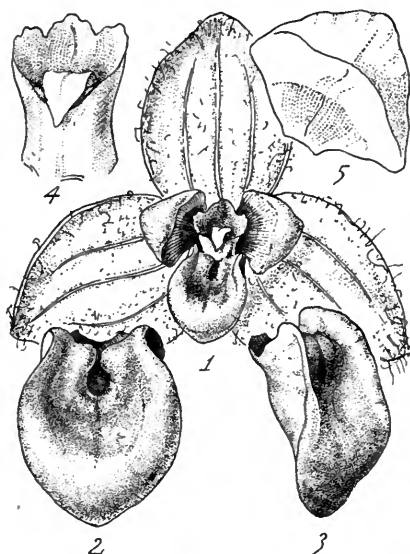


FIG. 47. *Stelis ciliaris*. 1, flower (about $\times 9$); 2, lip, front view (about $\times 16$); 3, lip, front-side view (about $\times 16$); 4, column (anther removed; much enlarged); 5, petal (about $\times 22$). Drawn by Blanche Ames.

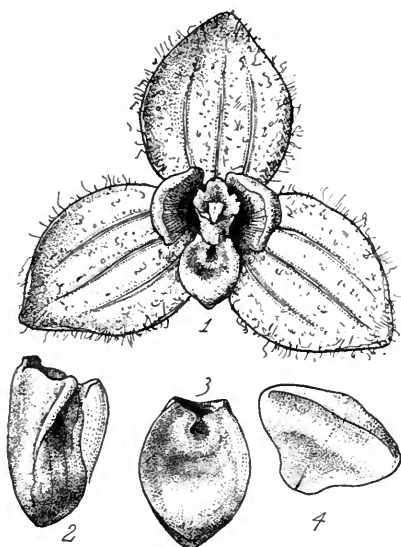


FIG. 48. *Stelis ciliaris*. 1, flower (about $\times 9$); 2, lip, front-side view (about $\times 15$); 3, lip, front view (about $\times 15$); 4, petal ($\times 17$). Drawn by Blanche Ames.

than the pedicellate ovary, about 1.5 mm. long. Flowers small, distichous, bright pale green or yellow. Pedicellate ovary about 2 mm. long. Sepals broadly ovate, obtuse, 3-nerved, glandular-pubescent, the margins minutely ciliolate, about 2 mm. long and 2 mm. wide. Petals subrhomboidal from a wide base, a little less than 1 mm. long. Lip very fleshy, broadly reniform from a short claw, rounded in front, concave, traversed by a thick transverse ridge near the middle, minutely papillose, about 1 mm. long and 1 mm. wide. Column fleshy, dilated toward the summit. Capsule obliquely ellipsoid-pyriform, becoming black with age, about 7 mm. long.

This species is distinguished from closely related species by its distinctly ciliolate sepals.

Represented from Guatemala only by the type collection.

Stelis ciliaris Lindl. Comp. Bot. Mag. 2: 353. 1836. Figures 46-48.

On trees in very humid forests, up to 1,000 meters alt. Wide-spread in Mexico, Guatemala, Honduras, British Honduras and Costa Rica.

Plant caespitose, glabrous, 1-3 dm. tall; secondary stem short, stout, provided with tubular sheaths, up to 3 cm. long. Leaves linear to elliptic-oblongate, obtuse and obliquely tridentate or retuse at the apex, tapering into the short petiole, often oblique, erect, 3.5-15 cm. long, 1-3.2 cm. wide. Inflorescence including the rather long peduncle up to 27 cm. long, exceeding the leaves, slender, loosely many-flowered. Bracts short, obliquely tubular, reddish, 1-2 mm. long. Flowers deep maroon, purplish, showy, small. Pedicellate ovary slender, about 3 mm. long. Sepals broadly ovate to orbicular-elliptic, broadly rounded to subacute, 3-nerved, mostly conspicuously ciliate on the margins, 2-4 mm. long, 2-2.8 mm. wide. Petals broadly cuneate, flabellate or subreniform, thickened along the solitary central vein and above, from a narrow base, 0.75-1.25 mm. long, 1-1.5 mm. wide at the apex. Lip oval or ovate, subtruncate or obtuse and recurved at the apex, fleshy, the lower margins upturned, 1-2 mm. long, about as wide as long; disk with a mamillate callus on each side at the base. Column short, mottled with purple. Capsule obliquely ellipsoid, prominently 6-ribbed, about 1 cm. long.

The illustrations show flowers from three different specimens to demonstrate variability in this species.

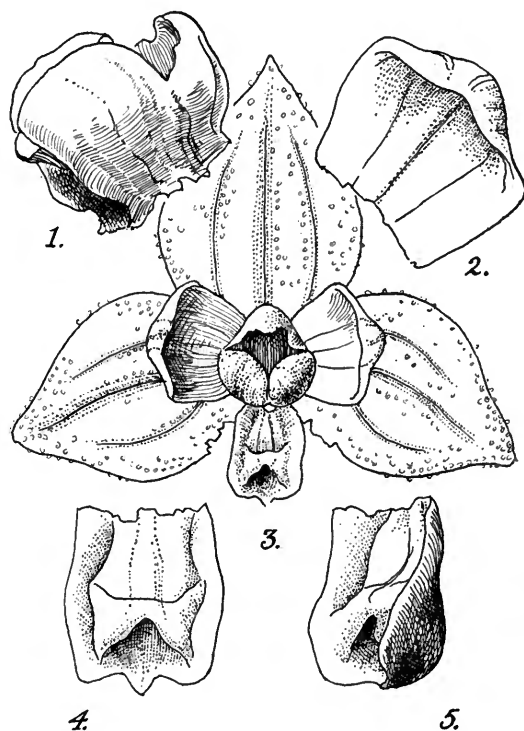


FIG. 49. *Stelis cleistogama*. 1, column, side view ($\times 38$); 2, petal ($\times 38$); 3, flower, sepals broken apart and spread out ($\times 20$); 4, lip, front view ($\times 38$); 5, lip, front-side view ($\times 38$). Drawn by Blanche Ames.

Alta Verapaz and Chiquimula (eastern portions): Chocon Plantation, *Watson* 361.—Izabal: Vicinity of Quiriguá, *Standley* 23900.—Petén: La Libertad, Sabana San Francisco, *Lundell* 2141.

Stelis cleistogama Schltr. Repert. Sp. Nov. 15: 203. 1918 (type: near Guatemala, July, 1866, *Bernoulli & Cario* 505). Figure 49.

Epiphytic. Rare in Guatemala.

Plant slender, about 30 cm. tall, glabrous; secondary stem erect, 8–9 cm. long. Leaves erect, oblanceolate-ligulate, obtuse, tapering gradually into the short petiole, 7.5–10.5 cm. long including the petiole, 1.5–1.8 cm. wide. Inflorescence slender, erect, loosely many-flowered, about 10 cm. long. Bracts cucullate, apiculate. Flowers small, cleistogamous. Sepals ovate, obtuse to acute, 3-nerved, glandulose on the inner surface, about 2 mm. long and 1.5 mm. wide. Petals broadly cuneate-obovate, obtuse and thickened verruculose at the apex, 3-nerved, about 0.75 mm. long and 1 mm. wide. Lip oblong-quadrate, truncate and sinuately tridentate or apiculate at the apex, about 0.75 mm. long and 0.5 mm. wide; disk with a thickened transverse callus above the middle, which is excavated in front. Column short, thick, about as long as the petals.

This species is distinguished from other species of *Stelis* found in Guatemala by its oblong-quadrate lip.

Represented from Guatemala only by the type collection.

Stelis despectans Schltr. Repert. Sp. Nov. 8: 453. 1910. Figure 50.

Epiphytic on trees in forests and open lands. Guatemala and Costa Rica.

Plant small, glabrous, caespitose, 4–19 cm. tall; secondary stem slender, concealed by stramineous sheaths, 0.5–5 cm. long. Leaves erect, linear to linear-oblanceolate, subobtuse and minutely tricuspidate at the apex, 1.5–9 cm. long including the short petiole, 3–6 mm. wide. Inflorescence 1–2, slightly exceeding the leaves, loosely many-flowered, up to 12 cm. long including the short peduncle; raceme fractiflex. Bracts ovate-cucullate to lanceolate-cucullate, apiculate to acuminate, about 1.5 mm. long. Flowers small, spreading-ringent, nodding, pale green to yellow. Pedicellate ovary arcuate-decurved, slender, 2–2.5 mm. long. Sepals adherent at the base, 3-nerved; dorsal sepal oblong-elliptic to elliptic-lanceolate, subobtuse to acute, ascending, the lower half concave, recurved above the middle, much longer than the lateral sepals, 2–4 mm. long, 1–2 mm. wide; lateral sepals obliquely ovate-oblong to suborbicular, obtuse to subacute, strongly concave, 1.5–3.2 mm. long, 1.2–2 mm. wide. Petals obliquely rhombic-obovate with obtuse angles to broadly flabellate with a broadly rounded apex, fleshy-thickened along the apical margin, concave, 1-nerved, 0.5–0.75 mm. long, 0.5–0.8 mm. wide. Lip orbicular-ovate-cucullate to subcordate-cucullate, narrowed above to an obtuse or acute apex, with a thin membranous callus stretched across the lower half to form a hood, 3-nerved, about 0.75 mm. long and 0.5 mm. wide.

Column short, thick, 3-lobed at the apex. Capsule obliquely pyriform-ovoid, conspicuously ribbed, 3-4 mm. long.

Guatemala (fide Schlechter).

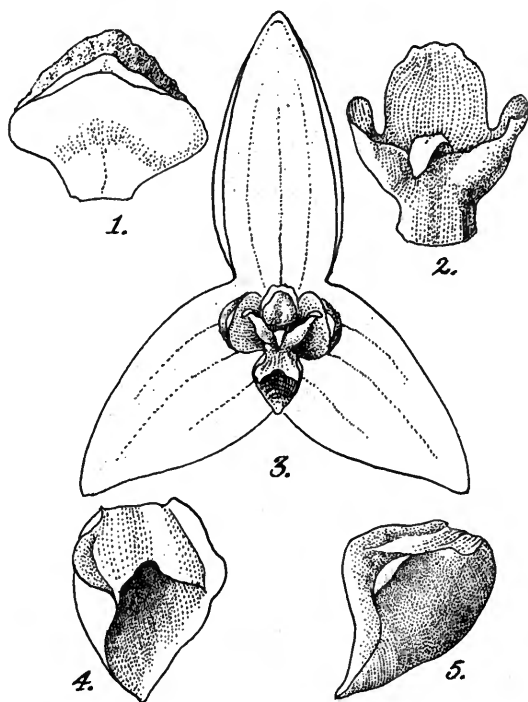


FIG. 50. *Stelis despectans*. 1, petal ($\times 36$); 2, column, front view ($\times 36$); 3, flower ($\times 12$); 4, lip, front-side view ($\times 36$); 5, lip, side view ($\times 36$). Drawn by Blanche Ames.

***Stelis Endresii* Reichb. f. Gard. Chron. 1373. 1870. Figure 51.**

Epiphytic on trees and shrubs in forests, up to 1,600 meters alt. Widespread from Mexico through Central America to Panama, Brazil and Peru.

Plant caespitose, glabrous, up to 2.5 dm. tall. Secondary stem slender, unifoliate, up to 5 cm. long, partly concealed by tubular scarious sheaths. Leaf elliptic-ligulate to oblanceolate, obtuse to rounded at the apex, coriaceous, epetiolate or with a short petiole, 8-12 cm. long, up to 2 cm. wide above the middle. Raceme laxly flowered, up to 2.4 dm. long including the peduncle, exceeding the leaf. Floral bracts infundibuliform, acute, about 2 mm. long, shorter than the pedicellate ovaries. Flowers pinkish, reddish green or purplish red. Sepals subequal, broadly ovate to suborbicular, broadly obtuse, glandular-papillose within, 2.5-4.5 mm. long, 3-5 mm. wide; dorsal sepal 5-nerved; lateral sepals slightly

oblique, 3-nerved. Petals broadly cuneate to flabellate, broadly rounded at the thickened apex, 3-nerved, 0.6–1 mm. long, 1.5–2 mm. wide at the apex. Lip very fleshy, semiglobular or rhombic, 0.5–1 mm. long and wide, with an erect apicule at the apex and a thickened ridge along the middle of the upper surface, with the margins more or less erect to form a thin rim along the sides and in front. Column dilated upward.



FIG. 51. *Stelis Endresii*. 1, flower (about $\times 7$); 2, lip, side view ($\times 20$); 3, lip, front view ($\times 20$); 4, petal ($\times 20$); 5, column (anther removed; about $\times 20$). Drawn by Blanche Ames.

This species is allied to *S. leucopogon*. However, that species usually has larger flowers in which the lateral sepals are always distinctly 5-nerved, and the lip is differently formed. No specimen has been seen from Guatemala. However, since Guatemala is included in the area of distribution of this species it is included here.

Stelis gracilis Ames, Orch., Fasc. II: 266. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, August, 1900, *H. von Türckheim* 7681). Figures 52, 53.

Epiphytic on trees along moist ridges and in dense tropical forests, up to 1,100 meters. Mexico to Costa Rica.

Plants densely caespitose, glabrous, mostly less than 15 cm. tall; secondary stem slender, erect or ascending, 1.5–4 cm. long. Leaves linear-oblong to linear-oblongate, obtuse, rigid, pale green, somewhat oblique, 5–13 cm. long, 5–10 mm. wide. Inflorescence including peduncle slender, filiform, about as long as or exceeding the leaves, up to 15 cm. long. Bracts tubular, obliquely truncate, apiculate, about 1 mm. long. Flowers minute, greenish white. Pedicellate ovary

STELIS gracilis Ames

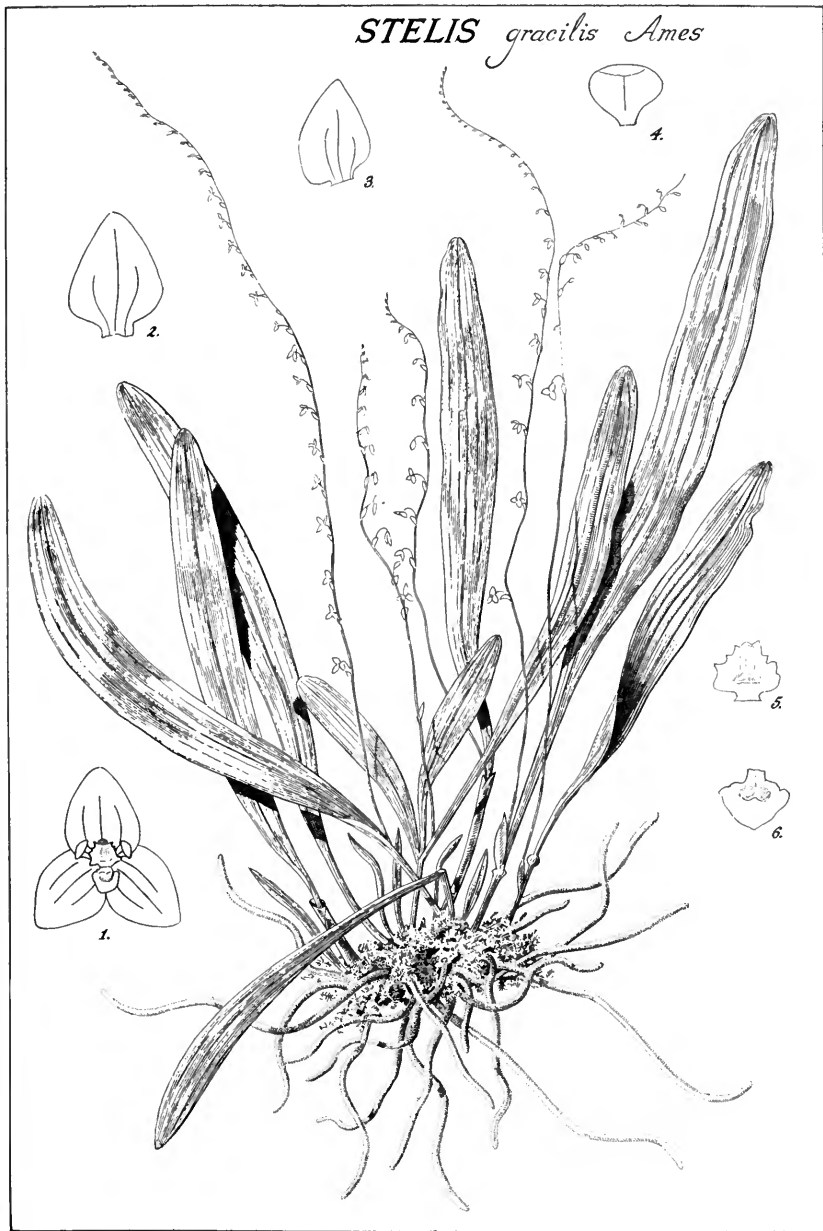


FIG. 52. *Stelis gracilis*. Plant ($\times 1$); 1, flower ($\times 6$); 2, dorsal sepal ($\times 8$); 3, lateral sepal ($\times 8$); 4, petal ($\times 16$); 5, column ($\times 16$); 6, lip ($\times 16$). Original drawing by Oakes Ames; redrawn by D. E. Tibbitts.

slender, exceeding the bracts, about 2 mm. long. Sepals similar, ovate, subacute, the margins revolute, 3-nerved, about 2 mm. long and 1.5 mm. wide. Petals cuneate, fleshy, especially at or near the apex, about 0.5 mm. long and 1 mm. wide at the apex. Lip fleshy, ovate-rhombic to somewhat cuneate, about as long

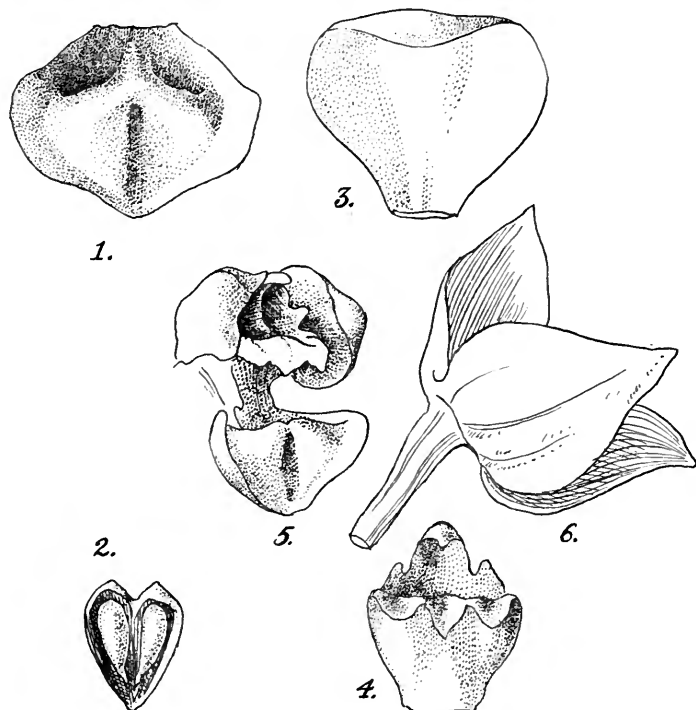


FIG. 53. *Stelis gracilis*. 1, lip ($\times 32$); 2, anther (greatly enlarged); 3, petal ($\times 32$); 4, column, front view ($\times 32$); 5, petals, lip, and column, front-side view ($\times 24$); 6, flower, side view ($\times 12$). Drawn by Blanche Ames.

as the petals, somewhat concave in front; disk with 2 approximate calli in the middle. Column short, triangular; margin of the clinandrium crenate-dentate. Capsule obliquely cylindrical, prominently 6-ribbed, about 5 mm. long.

Alta Verapaz: Cubilgüitz, *Türkheim* II 1891. Chamá, *Johnson* 247.

Stelis guatemalensis Schltr. Bull. Herb. Boiss. 7: 541. 1899 (type: Guatemala, Dept. Huehuetenango, near Yalambohoch, *Seler* 2316). *S. patula* Schltr. Repert. Sp. Nov. 10: 359. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán and Pansamalá, *H. von Türkheim* 698; II 1916; II 1478). Figure 54.

Epiphytic on oaks and pines and on trees in dense rain forests, up to 1,400 meters. Mexico, Guatemala and Costa Rica.

Plants densely caespitose, glabrous, up to 35 cm. tall; secondary stem slender, terete, erect, provided with two sheaths, 5-15 cm. long. Leaves linear-oblong, obtuse and obliquely tridentate at the apex, tapering into the short terete petiole, occasionally oblique, coriaceous, 5-14 cm. long including petiole, 1-2 cm. wide.

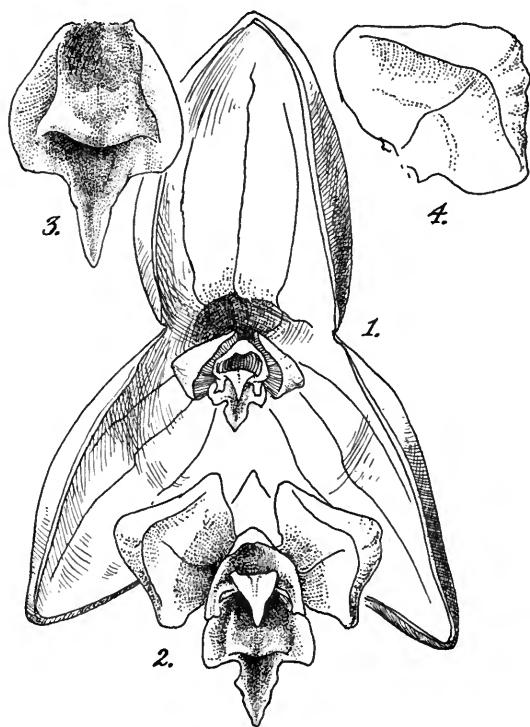


FIG. 54. *Stelis guatemalensis*. 1, flower ($\times 17$); 2, interior parts of flower ($\times 25$); 3, lip ($\times 40$); 4, petal ($\times 40$). Drawn by Blanche Ames.

Inflorescence of 1-3 spikes, subsessile, slender, loosely flowered, up to 25 cm. long. Bracts tubular, obliquely truncate, apiculate, scarious, 1.8-2.5 mm. long. Flowers small, nodding, spreading, greenish white or reddish. Pedicellate ovary slender, arcuate-decurved, a little longer than the bracts. Sepals bilabiate, concave, with involute margins, the lateral ones more or less coherent almost to the apex; dorsal sepal oblong, obtuse to subacute, 3-nerved, 2.5-3.2 mm. long, 2-3.3 mm. wide; lateral sepals obliquely ovate to ovate-oblong, subacute, 2.5-3.2 mm. long, about 2 mm. wide. Petals minute, rhombic-orbicular, with obtuse angles, 0.75-1 mm. long, about as wide as long. Lip fleshy, semioblong-cuneate to suborbicular, truncate or broadly rounded and apiculate at the apex, concave, with a hooded bilobed

callus on the center of the disk, about 1 mm. long, nearly as wide as long. Column short, dilated above, trilobed. Capsule obliquely cylindrical.

Alta Verapaz: Trece Aguas, near Senahú, *H. Pittier* 351. Chamá-Cobán road, *Johnson* 301; 553. Río Cobán, between Cobán and San Pedro, *Johnson* 649.—Huehuetenango: Cerro Negro, two miles east of Las Palmas, Sierra de los Cuchumatanes, *Steiermark* 51705.

Stelis hymenantha Schltr. Repert. Sp. Nov. 10: 291. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, *H. von Türckheim* II 1968). Figure 55.

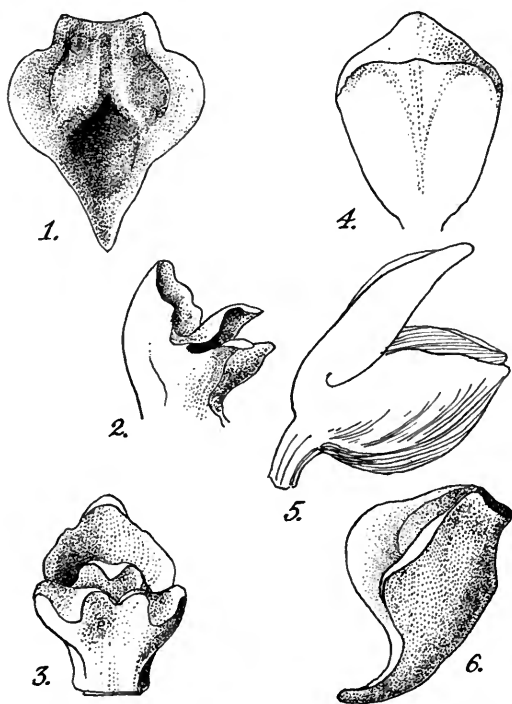


FIG. 55. *Stelis hymenantha*. 1, lip, front view ($\times 39$); 2, column, side view ($\times 56$); 3, column, front view ($\times 56$); 4, petal ($\times 63$); 5, flower, side view ($\times 21$); 6, lip, side view ($\times 39$). Drawn by Blanche Ames.

Epiphytic on trees in oak-pine forests and in dense humid forests, up to 2,800 meters alt. Rather common from southern Mexico to Panama.

Plant densely caespitose or fasciculate, glabrous, 7–27 cm. tall; secondary stem rather stout, terete, erect, covered by two long tubular scarious sheaths, 1.5–8 cm.

long. Leaves erect, linear-oblongate, obtuse and obliquely tridentate at the apex, narrowed at the base, 4–10 cm. long, 4–10 mm. wide. Inflorescence including the short peduncle up to 15 cm. long, solitary, loosely few- to many-flowered, as long as or exceeding the leaves. Bracts tubular-cucullate, subobtusate to acuminate, mostly exceeding the pedicellate ovary, 1.8–3 mm. long. Flowers pale greenish white or greenish yellow, small, slightly nodding, spreading. Pedicel 1.5–2 mm. long, arcuate above the middle. Sepals orbicular-ovate to ovate-elliptic, obtuse to shortly acuminate, connate near the base, shallowly concave, 3-nerved, 1.5–1.7 mm. long, about 1.2 mm. wide. Petals cuneate-obovate, thickened and subtruncate at the apex, somewhat concave, about 0.5 mm. long and 0.3 mm. wide. Lip suborbicular-obovate with a prominent deltoid acuminate apicule, concave, the margins and apicule curved upward, 0.5–0.75 mm. long, usually about as wide as long; disk with two somewhat semilunate calli on each side near the base, which are often rather indistinct from one another. Column small, dilated above, obtuse, bilobed. Capsule ovoid-ellipsoid, 3-angled, 6-ribbed, 4–5 mm. long.

Alta Verapaz: Pansamá, *Türkheim* 1012. On road from Chamá to Cobán, *Johnson* 506. Río Cobán-Cobán San Pedro, *Johnson* 610.—Chiquimula: Middle slopes of Montaña Norte to El Jutal, on Cerro Brujo, southeast of Concepción de las Minas, *Steyermark* 31053.—Huehuetenango: Cerro Pixpí, above San Ildefonso Ixtahuacán, *Steyermark* 50581.—Izabal: Cerro San Gil, uppermost ridges and summit, *Steyermark* 41958.—Quezaltenango: Fuentes Georginas, western slope of Volcán de Zunil, *Standley* 67342. Densely forested damp white sand quebrada, El Pocito, south of San Martín Chile Verde, on road to Colomba, *Standley* 85083.—San Marcos: Barranca Eminencia, road between San Marcos and San Rafael Pié de la Cuesta, in upper part of the barranca between Finca La Lucha and Buena Vista, *Standley* 86483. Between town of Tajumulco and Tecutla (nine miles south and west of Tajumulco), northwestern slopes of Volcán Tajumulco, *Steyermark* 36774. Along Quebrada Canjulá, between Sibinal and Canjulá, Volcán Tacaná, *Steyermark* 36045.—Suchitepequez: Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46645.—Volcán de Ipala, *Pittier* 1870.

Stelis Johnsonii Ames, Proc. Biol. Soc. Wash. 35: 87. 1922 (type: Guatemala, Dept. Alta Verapaz, Chamá, *Johnson* 252). Figure 56.

Epiphytic on trees, up to 300 meters alt. Guatemala.

Plant somewhat caespitose, glabrous, 8.5 cm. tall; secondary stem erect, when young concealed by two elongated tubular sheaths, 1–1.2 cm. long. Leaves 2.5–4 cm. long, up to 6 mm. wide, oblongate, obtuse and minutely bidentate at the apex with a cusp in the sinus, narrowed toward the base into a sulcate petiole that is about 4 mm. long. Inflorescence including the peduncle up to 7.5 cm. long,

solitary or rarely two, loosely few-flowered, filiform. Bracts obliquely funnel-shaped, acute to acuminate, 1.5–2 mm. long. Flowers minute, few, reddish, odorless, not spreading. Pedicellate ovary up to 2.5 mm. long, exceeding the bracts. Sepals adherent at the base, triangular-ovate, obtuse, conspicuously 3-nerved, about 1.5 mm. long and 1.5 mm. wide. Petals flabelliform, thickened at the apex, 3-nerved, about 1 mm. long, 1.25 mm. wide near the apex. Lip rhombic in outline, triangular in side view, margins erect, thickened at the apex, provided

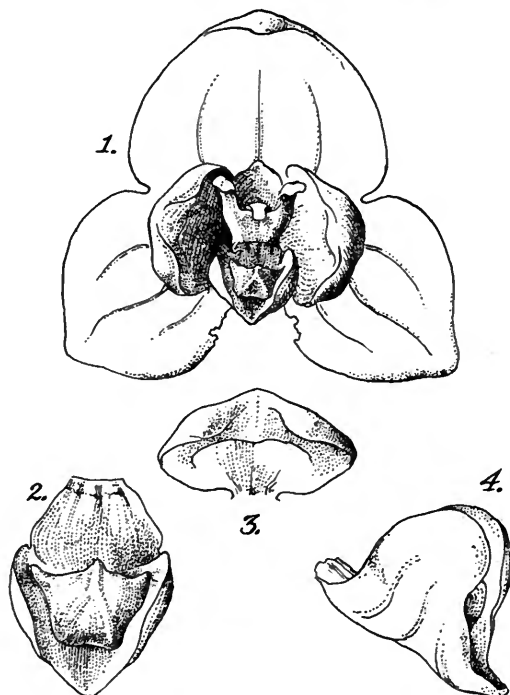


FIG. 56. *Stelis Johnsonii*. 1, flower ($\times 16$); 2, lip, front view ($\times 39$); 3, petal ($\times 21$); 4, lip, side view ($\times 39$). Drawn by Blanche Ames.

with a large fleshy subquadrate callus above the middle of the disk, about 0.5 mm. long. Column short, slender near the base, dilated upwards.

This species is allied to *S. bidentata*, from which it is distinguished by the differently shaped lip.

Represented from Guatemala only by the type collection.

Stelis leucopogon Reichb. f. Beitr. Orch. Centr.-Am. 95. 1866. *S. Bernoullii* Schltr. Repert. Sp. Nov. 15: 201. 1918 (type: Guatemala, Hacienda de las Nubes, Costa Grande, November, 1877, *Bernoulli & Cario*). Figure 57.

Epiphytic on trees, up to 1,500 meters. Guatemala, Costa Rica and Panama.

Plant rather large, glabrous, caespitose, erect, up to 43 cm. tall; secondary stem stout, provided with tubular sheaths, 1.5–15 cm. long. Leaves very thick and coriaceous, subsessile or with a broad short petiole, narrowly elliptic to elliptic-oblanceolate, obtuse and retuse at the apex, occasionally oblique, 7–16.5

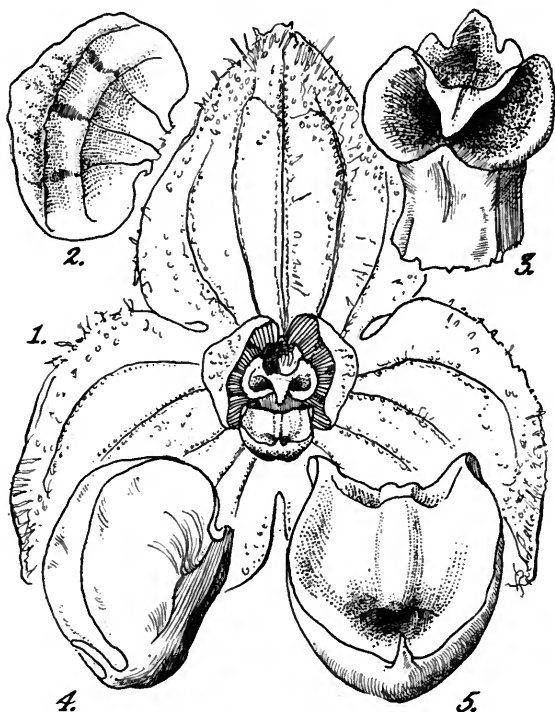


FIG. 57. *Stelis leucopogon*. 1, flower ($\times 8$); 2, petal ($\times 16$); 3, column ($\times 20$); 4, lip, side view ($\times 24$); 5, lip, front view ($\times 24$). Drawn by Blanche Ames.

cm. long, 1–3.5 cm. wide. Inflorescence 1 or 2, rather stout, loosely many-flowered, up to 30 cm. long including the peduncle, subtended by a closely appressed or complanate spathaceous bract that is up to 2 cm. long. Bracts funnel-shaped, obliquely truncate, acute or apiculate. Flowers large for the genus, purplish and greenish, appearing almost simultaneously and remaining open for only a short time during the day. Pedicellate ovary slender, ascending or recurved, 6–8 mm. long. Sepals deltoid-ovate to rhombic-ovate, obtuse, fleshy-thick, 5-nerved, 3.5–8 mm. long, 4–8 mm. wide. Petals broadly flabellate to cuneate, much thickened and truncate-rounded at the apex, glabrous or somewhat glandular-puberulent, 1–1.5 mm. long, 1.25–2.5 mm. wide at the apex. Lip quadrate to subquadrate-ovate, somewhat obliquely truncate at the apex, rounded beneath,

with a minute erect apiculate process on the anterior margin, fleshy, 0.75–1.3 mm. long, 1–2 mm. wide; disk concave, with a longitudinal, somewhat T-shaped slightly raised callus on the basal half in the center. Column short, thick, about 1 mm. long. Capsule obliquely cylindrical, about 1.5 cm. long.

This species varies considerably in the size of the sepals. It has the largest flowers of all the *Stelis* found in Guatemala. The leaves are large, and when dry are very tough, rigid and coriaceous.

Sololá: Western slope of Volcán Atitlán, *Hatch*.—Quezaltenango: Palma, *Skutch* 1433. Finca Mocá, *Bequaert* 49. Mocá, *Lewis* 74; *Bates* 4.

Stelis microchila Schltr. Repert. Sp. Nov. 9: 289. 1911 (type: Guatemala, Dept. Alta Verapaz, near Pansamalá, July, 1886, *H. von Türckheim* 700). Figure 58.

Epiphytic in wet mountain forests, up to 1,650 meters. Occasional in Guatemala, Costa Rica and Panama.

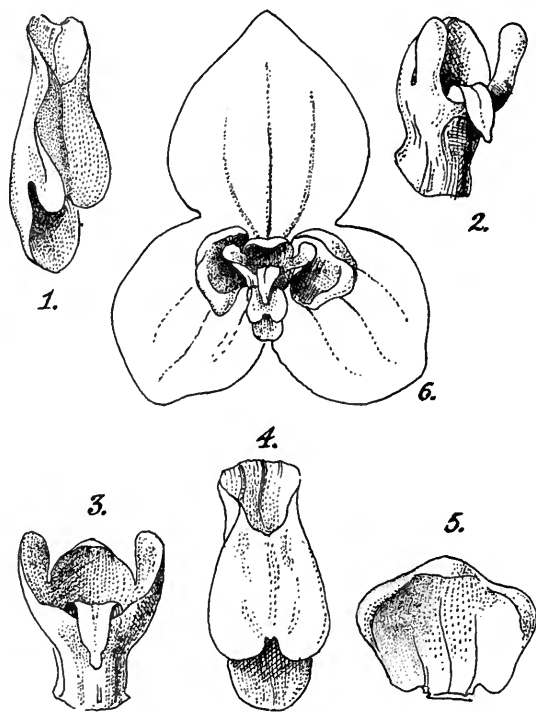


FIG. 58. *Stelis microchila*. 1, lip, front-side view ($\times 63$); 2, column, front-side view ($\times 30$); 3, column, front view ($\times 30$); 4, lip, front view ($\times 63$); 5, petal ($\times 33$); 6, flower ($\times 15$). Drawn by Blanche Ames.

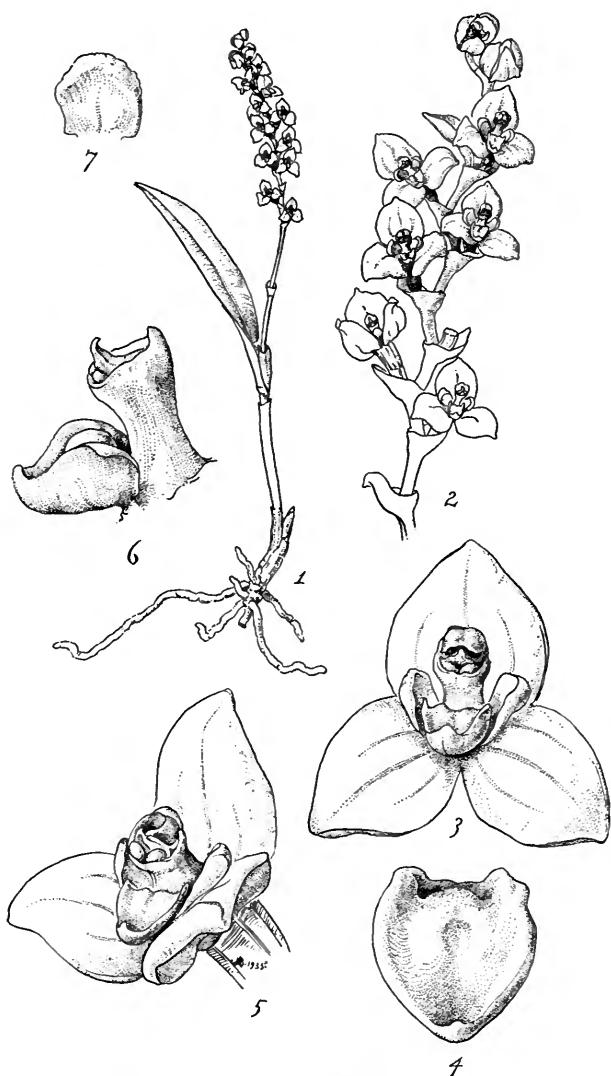
Plant small, densely caespitose, glabrous, 4.5–15 cm. tall; secondary stem very short, 0.5–1.5 cm. long. Leaves erect, linear-oblong to narrowly spatulate, obtuse and minutely tricuspidate at the apex, tapering into the very short petiole, 2–5 cm. long, 4–7 mm. wide, mostly oblique. Inflorescence filiform, rather densely flowered, 2–4 times as long as the leaves. Bracts ovate-cucullate, acuminate, hyaline, 1–2.5 mm. long. Flowers small, reddish-brown or bronze-green, spreading. Pedicellate ovary recurved, 2–2.5 mm. long or slightly longer. Sepals mostly 1-nerved or 3-nerved, the lower fourth adherent, usually coarsely glandular-pubescent; dorsal sepal elliptic to ovate-oblong, obtuse, rarely apiculate, 1.3–3 mm. long, 1.5–2.5 mm. wide; lateral sepals obliquely orbicular-ovate, obtuse, 1.5–2.3 mm. long, 1.2–2 mm. wide. Petals broadly cuneate to subreniform-quadrate, broadly rounded to obtuse, thickened along the apical margin, from a broad base, 3-nerved, 0.75–1 mm. long, about 1 mm. wide. Lip small, fleshy, narrowly oblong, obtuse, with two median and marginal falcate calli or lobes curving inward toward the center of the disk, 0.5–0.75 mm. long, about 0.5 mm. wide. Column short, thick. Capsule ellipsoid, prominently 6-ribbed, about 4 mm. long.

Alta Verapaz: Cobán, *Türkheim* 2494. Cobán, *Johnson* 729. Mountains east of Tactic, on road to Tamahú, *Standley* 71340. Near Cobán, *Standley* 71658. Tactic, *Johnston* 1862. Along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 89823; 89919. Mountains along road between Tactic and the divide on road to Tamahú, *Standley* 91399.—Huehuetenango: Vicinity of Maxbal, about 17 miles north of Barillas, Sierra de los Cuchumatanes, *Steyermark* 48783.

Stelis ovatilabia Schltr. Repert. Sp. Nov. 15: 211. 1918 (type: Guatemala, near Palohuero, Costa Cuca, April, 1878, *Bernoulli & Cario* 583). Figures 59, 60, 61.

Epiphytic on trees in mixed pine-oak forests, up to 3,800 meters. Uncommon in Mexico, Guatemala and Costa Rica.

Plant usually very small, densely caespitose, glabrous, 5–23 cm. tall; secondary stem mostly short and slender, 1–11 cm. long. Leaves erect, linear to linear-spatulate, obtuse and inconspicuously retuse at the apex, 2–13 cm. long, 4–10 mm. wide. Inflorescence slender, up to 10 cm. long including the peduncle, subtended by a conduplicate sheath that is up to 7 mm. long. Bracts ovate-cucullate, clasping the rachis, acute to acuminate, 1.5–2.5 mm. long. Flowers greenish white, small. Pedicellate ovary slender, about 2 mm. long. Sepals broadly ovate to oval, obtuse, fleshy, 3-nerved, 1.5–2 mm. long, about 1.5 mm. wide. Petals sub-orbicular to subreniform, oblique, 1-nerved, fleshy-thickened at the obtuse apex, about 0.5 mm. long and wide. Lip ovate, obtuse, in natural position trulliform, subtruncate and usually auriculate at the base, 3-nerved, somewhat thickened transversely at the base in front of the very short claw, shallowly concave in front, 0.75–1 mm. long, about 1 mm. wide. Column dilated at the apex, almost twice as long as the petals, about 1 mm. long. Capsule ovoid, conspicuously 6-ribbed, 2–4 mm. long.



STELIS

ovatilabia

Schltr.

FIG. 59. *Stelis ovatilabia*. 1, plant ($\times 1$); 2, raceme ($\times 4$); 3, flower, front view ($\times 11$); 4, lip ($\times 22$); 5, flower, side view ($\times 11$); 6, column (anther removed; $\times 21$); 7, petal ($\times 21$). Drawn by Blanche Ames.

Stelis ovatilabia is distinguished from other species in Guatemala in having an elongated column that is almost twice as long as the petals. The illustrations show flowers from three different specimens to demonstrate variability in this species.

Amatitlán: Volcán Pacaya, *Shannon* 3670.—Chimaltenango: Tecpam, *Bates* 19. Chichavac, *Skutch* 374. Calderas, *Johnston* 1470; 1471.—Guatemala: Slopes of Volcán de Pacaya, between

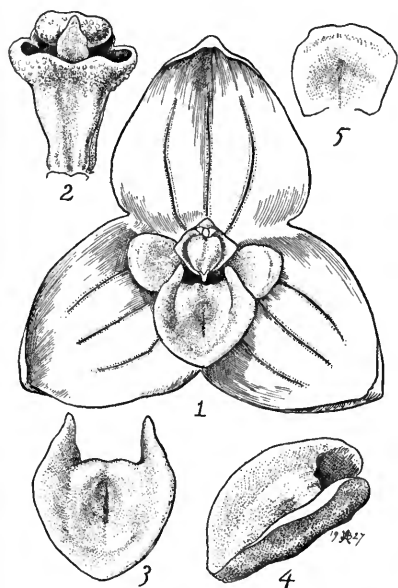


FIG. 60. *Stelis ovatilabia*. 1, flower (about $\times 13$); 2, column, front view ($\times 20$); 3, lip, front view ($\times 20$); 4, lip, side view ($\times 20$); 5, petal ($\times 22$). Drawn by Blanche Ames.

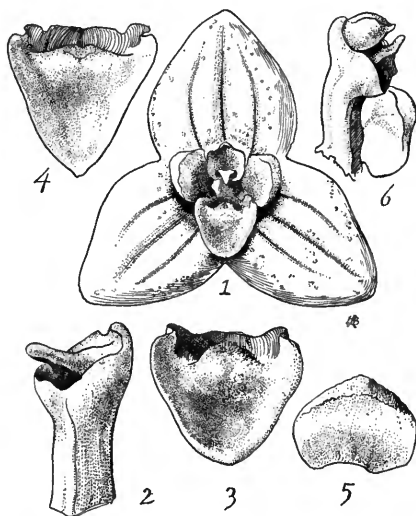


FIG. 61. *Stelis ovatilabia*. 1, flower (about $\times 11$); 2, column, front-side view (anther removed; about $\times 22$); 3, lip (about $\times 20$); 4, lip from the type (about $\times 20$); 5, petal (about $\times 24$); 6, column with petal attached (about $\times 18$). Drawn by Blanche Ames.

San Francisco Sales and the base of the active cone, *Standley* 80762.—Sololá: Volcán Atitlán, south-facing slopes, *Steyermark* 47401.—Suchitepequez: Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46683; 46646.

Stelis parvula Lindl. *Fol. Orch.* (Stelis) 7. 1858.

Epiphytic on trees in forest, up to 1,900 meters alt. Uncommon in Guatemala and Nicaragua. Common in Costa Rica.

Plant slender, short, glabrous, 5–14 cm. tall; secondary stem ascending or erect, 1–4.5 cm. long, concealed by tubular loosely appressed brownish sheaths.

Leaves including the petiole 2–6.5 cm. long; lamina linear, elliptic or linear-oblongate, obtuse and tridenticulate at the apex, abruptly tapering into the rather long petiole, 5–13 mm. wide. Inflorescence including the peduncle 6–10 cm. long, slender, densely flowered. Bracts large for the plant, amplexicaul-peltiform, dilated into an oblique suborbicular-ovate lamina with revolute margins, apiculate, 1.5–3.2 mm. long. Flowers white, greenish yellow or purplish, minute. Pedicellate ovary slender, about 1.5 mm. long. Sepals deltoid-ovate, rounded-obtuse to subacute, adherent at the base, conspicuously 3-nerved, 1.5–2.5 mm. long, 1.5–2.7 mm. wide. Petals orbicular-obovate to transversely elliptic-rhombic, truncate to obtuse and fleshy-thickened at the obscurely verruculose apex, 3-nerved, 0.5–1.3 mm. long, about as wide as long. Lip ovate-subcordate or rhombic with obtuse angles and upturned lateral margins, 0.75–1.2 mm. long, 1–1.5 mm. wide; disk with a tuberos callus on each side below the middle, the calli coherent to form a transverse ridge. Column minute, dilated. Capsule obliquely ellipsoid, about 6 mm. long, prominently 3-angled and 6-ribbed.

This species is distinctive in having unusually large floral bracts that are amplexicaul-peltiform with spreading, somewhat revolute margins.

Alta Verapaz: Road Chamá to Cobán, *Johnson* 320.

Stelis perplexa Ames, Sched. Orch. 1: 7. 1922 (type: Guatemala, Dept. Alta Verapaz, banks of Chisaxte River, below Secanquim, May 9, 1905, *H. Pittier* 308).

Epiphytic, up to 900 meters alt. Uncommon in Guatemala and Honduras.

Plant caespitose, glabrous, up to 16 cm. tall; secondary stem erect, rather stout, about 2.5 cm. long, when young concealed by tubular sheaths, monophyllous. Leaves ligulate, linear or narrowly oblanceolate, obtuse, often minutely and obliquely tridentate at the apex, 3–9 cm. long, 5–10 mm. wide. Inflorescence including the short peduncle up to 14 cm. long, exceeding the leaves, loosely few- to many-flowered. Bracts surrounding the rachis, obliquely funnel-shaped or ovate-cucullate, obtuse to acute, 1.5–2.3 mm. long. Flowers usually about 4 mm. apart, small, light green. Pedicellate ovary exceeding the bracts, up to 3 mm. long. Sepals orbicular-ovate, obtuse to acute, coherent below the middle, fleshy, 3-nerved, 2–3 mm. long, 2–2.2 mm. wide. Petals broadly rhomboid from a wide base, obtuse-angled at the summit and thickened, narrowly triangular in cross section at the tip, scarcely 1 mm. long and 1 mm. wide at the tip, 3-nerved. Lip subrhomboidal from a wide base, obtuse-angled at the tip, 0.75–1 mm. long, 0.75–1 mm. wide, much thickened, with a transversely thickened callus in the middle of the disk, apical half of lip in front of the callus strongly concave; callus dilated at each side, constricted at the center. Column dilated above, equaling the petals.

This species differs from *S. gracilis*, to which it is closely allied, in its broader sepals and stouter peduncles.

Alta Verapaz and Chiquimula (eastern portions): *Watson* 221C.—Chiquimula: Volcán Quezaltepeque, 3–4 miles northeast of Quezaltepeque, *Steyermark* 31475.—Izabal: 40 miles from coast, *Lewis* 6.

Stelis purpurascens A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 18. 1845. *S. curvata* Schltr. Repert. Sp. Nov. 10: 358. 1912 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, July, 1907, *H. von Türckheim* II 1889). *S. Carioi* Schltr. Repert. Sp. Nov. 15: 202. 1918 (type: Guatemala, near Guatemala, November, 1865, *Bernoulli & Cario*). *S. fulva* Schltr. Beih. Bot. Centralbl. 36, Abt. 2:

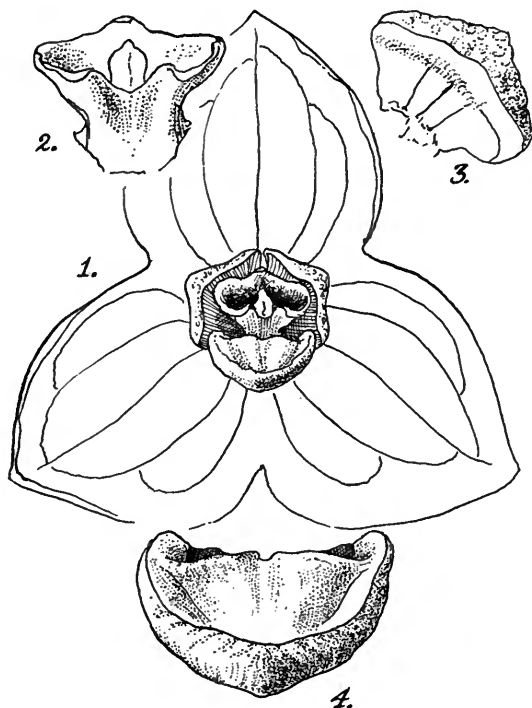


FIG. 62. *Stelis purpurascens*. 1, flower ($\times 11$); 2, column ($\times 18$); 3, petal ($\times 18$); 4, lip ($\times 26$). Drawn by Blanche Ames.

388. 1918 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, May, 1913, *H. von Türckheim* 4064). Figure 62.

Epiphytic on trees in damp forests, up to 1,800 meters alt. Rather common and widespread in Mexico, Guatemala, Honduras, El Salvador and Costa Rica.

Plant stout, glabrous, somewhat caespitose, up to 43 cm. tall; secondary stem erect or ascending, 4–19 cm. long. Leaves linear-oblancoolate, oblong or oblong-lanceolate, obtuse and retuse at the apex, sessile or subsessile, usually oblique, 5–20 cm. long, 0.7–4 cm. wide. Inflorescence 1–2, up to 33 cm. long including the peduncle, loosely many-flowered, arising from a prominent conduplicate lanceo-



STELIS rubens Schltr.

FIG. 63. *Stelis rubens*. Plant ($\times 1$); 1, flower (about $\times 11$); 2, petal ($\times 20$); 3, lip, from above ($\times 20$); 4, lip, side view ($\times 20$); 5, column (anther removed; $\times 20$); 6, lip, side view (drawn from the type of *S. Tuerckheimii*; about $\times 20$); 7, flower (drawn from the type of *S. rubens*; about $\times 11$); 8, petal ($\times 20$); 9, lip, side view ($\times 20$); 10, lip, from above ($\times 20$). Drawn by Blanche Ames.

late sheath, which is up to 2.5 cm. long. Bracts ovate-cucullate, clasping the rachis, acute, acuminate or apiculate, 1.5–5 mm. long. Flowers spreading, reddish brown, purplish or purplish green. Pedicellate ovary recurved, about 3 mm. long. Sepals orbicular-ovate, ovate-elliptic or subrhombic, obtuse to subacute, adherent to about the middle, 3–6-nerved with the nerves mostly carinate on the outside, 2–4 mm. long, 3–4 mm. wide. Petals small, cuneate-obovate to broadly flabellate, subtruncate-obtuse at the apex, with the apical margin thickened and more or less verrucose, about 1 mm. long, 0.9–1.25 mm. wide. Lip fleshy, semiorbicular to subreniform, broadly rounded or obtuse at the apex, occasionally with a slight protuberance at the apex, about 1 mm. long, about as wide as long; disk 3-nerved, provided with a transverse somewhat constricted fleshy ridge below the middle. Column short, about as long as the petals. Capsule obliquely ellipsoid, prominently 3-ribbed, 8–10 mm. long.

This species is extremely variable. It is very similar in habit to *Stelis leucopogon* but is distinguished from that species by its smaller flowers.

Alta Verapaz: Chamá, *Johnson* 240.—Amatitlán: Pacaya, *Johnson* 1384.—Guatemala: Large swamp east of Tactic, *Standley* 92342. Volcán de Pacaya, above Las Calderas, *Standley* 58496.—Quezaltenango: Above Mujulía, between San Martín Chile Verde and Colomba, *Standley* 85563.—Santa Rosa: Laguna de Carrizal, *Heyde & Lux* 4627.—Suchitepequez: Southwestern lower slopes of Volcán Zunil, in vicinity of Finca Montecristo, southeast of Santa María de Jesús, *Steyermark* 35256.—“Guatemala,” *Bates* 13.

Stelis rubens Schltr. Repert. Sp. Nov. 8: 564. 1910 (type: Guatemala, Dept. Alta Verapaz, near Cubilgüitz, September, 1904, *H. von Türckheim* II 1061). *S. Tuerckheimii* Schltr. Repert. Sp. Nov. 8: 564. 1910 (type: Guatemala, Dept. Alta Verapaz, near Cubilgüitz, August, 1904, *H. von Türckheim* II 79). Figure 63.

Epiphytic on trees, up to 1,100 meters alt. Rare in Mexico, Guatemala and British Honduras.

Plant slender, caespitose, glabrous, up to 23 cm. tall; secondary stem very slender and short, 1–4 cm. long. Leaves erect, narrowly linear-oblong, obtuse and minutely tridentate at the apex, tapering into the petiole, 4–13 cm. long, 4–7 mm. wide. Inflorescence filiform, somewhat flexuose, up to 21 cm. long. Bracts ovate-cucullate, subtruncate to acute, occasionally apiculate, 1–1.2 mm. long. Flowers minute, spreading, white or yellowish green tinged with purple. Pedicellate ovary slender, recurved, 1.5–2.2 mm. long. Sepals broadly ovate, obtuse to apiculate, coherent below the middle, minutely papillose-puberulent on the inner surface, 3-nerved, 1.3–2 mm. long, about 1 mm. wide; dorsal sepal suberect-recurved. Petals fleshy, broadly cuneate, rounded-truncate at the apex, thickened on the apical margin and rarely apiculate, about 0.5 mm. long, about as wide as long. Lip obscurely 3-lobed or rhombic-lanceolate, arcuate with a sharply upturned acute tip, fleshy, the lateral lobes rounded and erect, apical lobe narrowly lanceo-

late or triangular-cymbiform, about 0.75 mm. long; disk with a thickened sub-orbicular-elongate tubercle in the middle. Column short, the apical margin erose-denticulate.

Izabal: 40 miles from coast, *Lewis* 5.

Stelis rubens* var. *oxypetala (Schltr.) Ames, Bot. Mus. Leaflet. Harv. Univ. 2, no. 1: 23. figs. pp. 6-7. 1934. *S. oxypetala* Schltr. Repert. Sp. Nov. 15: 203. 1918 (type: Guatemala, Dept. Petén, near Faclus, September, 1877, *Bernoulli & Cario* 624). Figure 64.

Variety *oxypetala* differs from the typical form of the species in the unusual, thin texture of the petals, which are obliquely obovate-cuneate with a conspicuous apicule at the apex. The apical margin is also usually irregularly crenulate. The plants and flowers are usually larger than those of typical *S. rubens*.

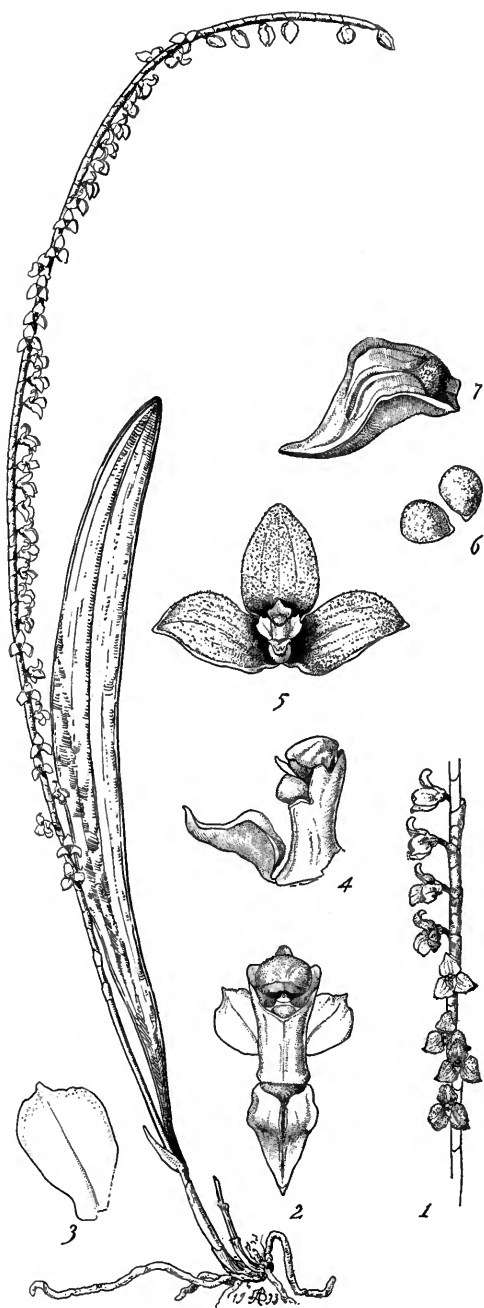
Represented from Guatemala only by the type collection of *S. oxypetala*.

Stelis tenuissima Schltr. Repert. Sp. Nov. 15: 204. 1918 (type: Guatemala, Dept. Quezaltenango, Sta. María Ikibal, May, 1878, *Bernoulli & Cario* 590). Figure 65.

Epiphytic on trees in forests, up to 2,250 meters alt. Rare in Mexico and Guatemala.

Plant slender, glabrous, densely caespitose, 9-14 cm. tall; secondary stem slender, 1-5 cm. long. Leaves linear to semiterete, obtuse, obliquely and minutely tridentate at the apex, erect to strongly recurved above the middle, 3-7 cm. long, 1.5-3 mm. wide. Inflorescence filiform, loosely many-flowered, up to 11 cm. long including the peduncle. Bracts obliquely ovate-cucullate, acute or apiculate, 1.2-1.5 mm. long. Flowers minute, purplish brown or yellowish. Pedicellate ovary slender, about 1.5 mm. long. Sepals orbicular-ovate, obtuse to subacute, the lower third coherent, 1-3-nerved, concave, 1-1.5 mm. long, 1-1.2 mm. wide. Petals obliquely orbicular-quadrate to broadly cuneate-reniform, broadly rounded to obtuse at the apex, 1-3-nerved, shallowly concave, 0.5-1 mm. long, 0.75-1 mm. wide. Lip suborbicular to orbicular-rhombic, minutely mucronate, with the obtuse-rounded lateral margins upturned and a tuft of cilia on each side at the base, 3-nerved, 0.75-1 mm. long, 0.5 mm. or more wide; disk with a thickened and fleshy ovate callus on the lower half. Column short, thick, dilated at the triangular obtuse apex.

FIG. 64. *Stelis rubens* var. *oxypetala*. Plant ($\times 1$); 1, a portion of the raceme (about $\times 2$); 2, column, with the petals and lip attached ($\times 20$); 3, petal ($\times 20$); 4, column and lip, side view showing the protuberant stigma, the obliquely erect rostellum, and the anther ($\times 20$); 5, flower (about $\times 8$); 6, pollinia (much enlarged); 7, lip (much enlarged). Drawn by Blanche Ames.



This species may be distinguished from other species of *Stelis* found in Guatemala by the two tufts of cilia on each side at the base of the lip and by the extremely slender, often semiterete leaves.

Quezaltenango: Finca Pirineos, lower south-facing slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché,

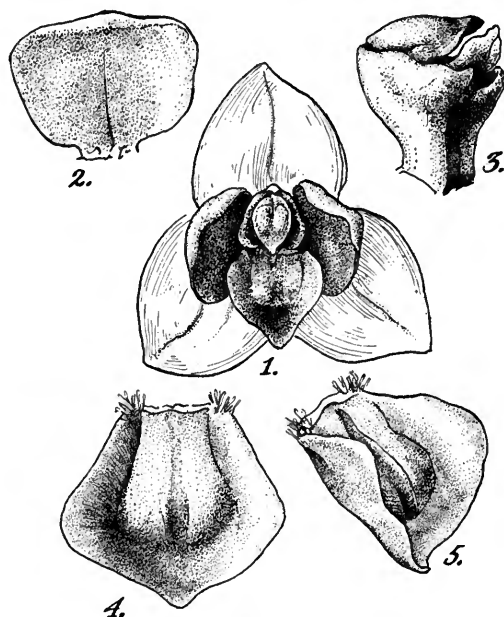


FIG. 65. *Stelis tenuissima*. 1, flower ($\times 23$); 2, petal ($\times 30$); 3, column, front-side view ($\times 40$); 4, lip, front view ($\times 40$); 5, lip, front-side view ($\times 40$). Drawn by Blanche Ames.

Steyermark 33190. Montaña Chicharro, on lower southeast-facing slopes of Volcán Santa María, 2-4 miles south of Santa María de Jesús, *Steyermark* 34305. Region of Las Nubes, south of San Martín Chile Verde, *Standley* 83838.

20. PHYSOSIPHON Lindl.

Small epiphytic caespitose herbs with a solitary leaf at the apex; secondary stems erect or ascending, provided with tubular sheaths. Roots fibrous from a short creeping stem. Leaves fleshy or coriaceous, narrowed at the base. Flowers small, in elongate racemes that rise in the axil of the leaf. Sepals connate for more than half their length to form an obliquely 3-angled inflated tube that is spreading or ventricose at the base and constricted at the mouth, free above and spreading.

Petals and lip minute compared to the sepals, enclosed at the base of the sepaline tube. Lip articulated to the base or foot of the column, 3-lobed (in ours) or entire, fleshy, canaliculate. Column small, erect-arcuate, subterete, 3-lobed; anther terminal, operculate, incumbent; pollinia 2, ovoid, ceraceous. Capsule small, ellipsoid.

This is a small genus of perhaps a half dozen species which are found in tropical America. It is very closely allied to *Masdevallia* and *Pleurothallis*.

Sepals less than 5 mm. long.....*P. minor*.
 Sepals more than 5 mm. long.....*P. tubatus*.

Physosiphon minor Rendle, Journ. Bot. 38: 275. 1900.

Epiphytic on trees, up to 2,300 meters alt. Rare in Guatemala, Honduras and Costa Rica.

Plant densely caespitose, up to 13 cm. tall, provided at the base with several sheaths that conceal the secondary stem and the lower part of the peduncle and petiole; sheaths brownish, tubular, loosely appressed, dilated at the mouth, up to 1.5 cm. long; roots fibrous, whitish, smooth, slender. Secondary stem slender, up to 2 cm. long, erect, unifoliate. Leaf shortly petioled; lamina oblong-elliptic to narrowly elliptic, obliquely tridenticulate at the rounded to obtuse apex, sulcate above, fleshy-coriaceous, up to 6 cm. long (including the petiole) and 1.3 cm. wide. Peduncle usually one, occasionally as many as three, filiform, provided with several short scarious bracts; raceme laxly flowered, with as many as fifteen flowers. Floral bracts ovate-cucullate, embracing the rachis, obliquely truncate, up to 3 mm. long. Flowers pale yellow on the upper half, deep maroon at the base, subdistichous, with slender pedicellate ovaries that exceed the bracts. Sepals united to above the middle to form a tube that is about 2 mm. long, 3-nerved, prominently keeled on the back, 3.5-4 mm. long; free part ovate-oblong, acute, about 1 mm. wide. Petals obliquely cuneate-oval to elliptic-cuneate, with the margins irregular at the obtuse apex, 1-nerved, membranaceous, 1 mm. long, about 0.5 mm. wide. Lip 3-lobed, arcuate in natural position, 3-nerved, about 2 mm. long and 1 mm. wide; lateral lobes small, thin, erect, rounded; mid-lobe very fleshy-thickened, suborbicular, obtuse, with the margin obscurely erose. Column with a prominent foot, sulcate on the ventral surface, irregularly toothed at the apex, about 3 mm. long including the concave foot.

Huehuetenango: Northwest of Cuilco, two-thirds of the way up Cerro Chiquihui above Carrizal, *Steyermark* 50803.

Physosiphon tubatus (Lodd.) Reichb. f. in Walp. Ann. 6: 188. 1861. *Stelis tubatus* Lodd. Bot. Cab. t. 1601. 1830. *Physosiphon guatemalensis* Rolfe, Kew Bull. 197. 1891 (type: Guatemala). Figure 66.

Epiphytic on trees, especially oaks, in wet or dry forests, up to 3,500 meters alt. Rather common in Mexico and Guatemala.



FIG. 66. *Physosiphon tubatus*. 1, two flowering plants ($\times 1$); 2, petal ($\times 10$); 3, lip, spread out ($\times 10$); 4, lip and column, side view ($\times 10$); 5, column, front view ($\times 10$). Drawn by G. W. Dillon.

Plant glabrous, erect or ascending, caespitose, 0.75–4.7 dm. tall; secondary stem stout, encased by scarious tubular sheaths, 1.5–12 cm. long. Leaves elliptic to oblanceolate, obtuse and minutely retuse at the apex, with a short sulcate petiole, fleshy, 4–15 cm. long including the petiole, 1.5–3 cm. wide. Inflorescence stout, with numerous approximate flowers, 8–42 cm. long including the peduncle. Bracts tubular-spathaceous, acute or acuminate, scarious, dorsally carinate, 3–6.5 mm. long. Flowers vary in color from greenish yellow to brick red. Sepals 6–22 mm. long, including the sepaline tube; free part spreading, elliptic-oblong to elliptic-lanceolate, obtuse or acute and mucronate, 3-nerved, dorsally carinate along the mid-nerve, 3–10 mm. long, 0.8–3 mm. wide. Petals small, enclosed at the base of the sepaline cup, obliquely obovate-spatulate to oblong-cuneate, subtruncate, obtuse or obscurely 3-lobed at the apex, prominently 1-nerved, 1.5–2.5 mm. long, 0.6–1 mm. wide. Lip small, 3-lobed, somewhat arcuate and canalliculate, conspicuously dorsally carinate along the 3 nerves, the upper part clasping the column, 2–3.2 mm. long, 1–2.2 mm. wide across the lateral lobes when spread out; lateral lobes semiquadrate, truncate, turned upward; terminal lobe ovate, obtuse, crenulate along the margin, often papillose on the upper surface; disk fleshy-thickened below the lateral lobes. Column slender, semiterete, arcuate, 3-lobed at the apex, 2–3.2 mm. long. Capsule ellipsoid, 3-angled, 8–10 mm. long.

This species is extremely variable, particularly in the length of the sepals and in flower color. A complete series was found in the size of the flowers, from 6 to 22 mm. long. It is known as "monja."

Amatitlán: Near Lake Atitlán, road from Panajachel, *Margaret Ward Lewis* 81.—Chimaltenango: *Johnston* 1245.—Guatemala: Calderas, *Porter* 3.—Huehuetenango: Aguacatán, *Skutch* 1918. Aguacatán, *Johnston* 1707. Above Democracia on trail towards Jutal, *Steyermark* 51036. Aguacatán road, 10 km. east of Huehuetenango, *Standley* 82101.—Quiché: Cunén, *Heyde & Lux* 3490.—San Marcos: Finca Vergel, near Rodeo, *Standley* 68948.—Santa Rosa: Volcán Jumaytepeque, *Heyde & Lux* 4620.—Sololá: Volcán Atitlán, south-facing slopes, *Steyermark* 47430.—Zacapa: Sierra de las Minas, between Santa Rosalía de Mármol and San Lorenzo, *Steyermark* 43153.

21. MASDEVALLIA Ruiz & Pavon

Epiphytic herbs with creeping rhizomes; secondary stem short, terminated by a solitary leaf, enclosed by scarious sheaths. Leaves fleshy, coriaceous, linear or oblanceolate. Peduncle scapose, 1–several-flowered, arising at the base of the petiole. Flowers small or large, variously colored. Sepals connate or connivent to form a tube at the base, free portion spreading, terminated by a cauda or shortly acuminate. Petals much smaller than the sepals, linear-oblong, dolabriform or rhombic-quadrate. Lip small, polymorphic, articulated to the foot of the column, subsessile or with a slender claw. Column erect or curved, with or without wings, produced into a short foot at the base, apex entire or variously toothed; anther terminal, operculate, incumbent, 1-celled; pollinia 2, ceraceous.

This is a large and complex genus of some 250 species, which are natives of tropical America. They are commonly found at high elevations in cool mountain regions. Some of the species of *Masdevallia* are extremely variable in regard to the sepals. It is quite possible that growth of the sepals continues after anthesis and after fertilization has occurred, thus causing the apical portion and caudae to become farther elongated. At one time this was an exceptionally popular genus with orchid fanciers and some of the rarer and more attractive species commanded fabulous prices.

1. Lip strongly constricted near the middle, pandurate; apical lobule calceolate-saccate.
2. Lip about 5 mm. long; apical lobule about 2 mm. wide. *M. pusilla*.
2. Lip more than 8 mm. long; apical lobule 5-6 mm. wide. . . . *M. erythrochaete*.
1. Lip not strongly constricted near the middle; apical portion not calceolate-saccate.
3. Petals linear-oblong; lip linear-oblong to oblong-lanceolate, cordate at the base, not broadest above the middle.
4. Free part of the lateral sepals more or less abruptly caudate. *M. floribunda*.
4. Free part of the sepals triangular, shortly acuminate, not caudate. *M. tubuliflora*.
3. Petals not linear-oblong; lip oblong-spatulate to flabellate or obscurely trilobed and ovate.
5. Petals obliquely ovate-lanceolate, 1 mm. or less wide. . . . *M. chontalensis*.
5. Petals not as above, 2 mm. or more wide.
6. Sepals long-caudate; column wings long, narrow, decurved. *M. linearifolia*.
6. Sepals shortly acuminate; column wings obtuse or acute. . . . *M. simula*.

Masdevallia chontalensis Reichb. f. *Otia Bot. Hamb.* 17. 1878.

Epiphytic on trees in forests, up to 2,000 meters alt. Rare in Guatemala, rather widespread in Costa Rica, Nicaragua and Panama.

Plant caespitose, glabrous, 5.5-11 cm. tall. Secondary stem short, up to 1 cm. long, unifoliate, concealed by tubular chartaceous sheaths. Leaf erect, fleshy-coriaceous, grass-green above, pale green beneath, linear-elliptic to narrowly oblanceolate, minutely tridenticulate at the obtuse apex, tapering to a short petiole, 2-8.5 cm. long, 3-9 mm. wide. Inflorescence regularly 2-flowered, exceeding the leaves. Floral bracts infundibuliform, obtuse-apiculate, scarious, 3-5 mm. long. Flowers white, tipped with yellow; pedicellate ovaries about 5 mm. long. Sepals united to near the apex to form a sepaline tube, 3-nerved, tapering at the apex to form thickened semiterete caudae; sepaline tube 1.1-1.7 cm. long including the caudae; caudae up to 8 mm. long. Petals with a short claw, obliquely ovate-lanceolate, obtuse-apiculate at the apex, 2.6-3.6 mm. long, about 1 mm. wide, provided on the inner surface with a fleshy nipple and an intramarginal linear callus on the anterior margin. Lip broadly oblong-spatulate, dilated near the apex, obtuse, erose on the apical margin, decurved above the middle in natural position and with the lateral margins slightly reflexed, 3-4.2 mm. long, 1.3-1.8 mm.

wide; disk longitudinally sulcate in the center with the canal bordered by thickened ridges. Column 3 mm. long, erose on the thin apical margin. Capsule light green, obliquely ellipsoid, 6-ribbed, 1-2 cm. long.

Izabal: Cerro San Gil, uppermost ridges and summit, *Steyermark* 41957.

Masdevallia erythrochaete Reichb. f. Gard. Chron. 2: 392. 1882.

Epiphytic on trees, up to 1,250 meters. Rare in Guatemala and Costa Rica.

Plant glabrous, caespitose; secondary stem obsolete, less than 5 mm. long, enclosed by large loose scarious sheaths. Leaves linear or linear-ob lanceolate, obtuse to acute and minutely tridentate at the apex, tapering into the long triangular-sulcate petioles, dorsally carinate along the mid-rib, 11-21 cm. long, 9-20 mm. wide. Peduncle horizontal or descending from the base of the petiole, recurved near the apex, provided with several tubular sheaths, 2-3-flowered, 9-28 cm. long. Sepals united near the base to form a wide shallow cup 4.5-9 cm. long from the base to the tip of the caudae; free portion ovate-deltoid, 1.1-1.5 cm. wide, long-caudate, the inner surface covered with small elongated papillae, white-yellow, spotted with crimson-purple; caudae 3.5-7 cm. long, crimson-purple. Petals oblong to oblong-obovate, broadly rounded-retuse and denticulate at the apex, white or pale pink and brown-spotted, 1-nerved, 3-3.5 mm. long, 1-2 mm. wide; inner surface with a triangular lamella near the middle, papillose above the lamella. Lip pandurate, deeply constricted below the middle to form two lobes, arcuate-recurved and fleshy at the base, pale pink to almost white, 9-12.5 mm. long; basal portion canaliculate, rhombic-cuneate and about 4 mm. wide when spread out, the margins just below the constriction somewhat revolute, with two intramarginal calli on the disk; apical portion calceolate, semiorbicular-saccate, with the three central veins lamellate and the branch veins of the lateral veins lamellate on the marginal half, 5-6 mm. wide. Column short, thick, recurved, toothed at the apex, narrowly winged, 3-4 mm. long.

Guatemala (fide Schlechter).

Masdevallia floribunda Lindl. Bot. Reg. 29: Misc. p. 72. 1843. *M. Tuerckheimii* Ames, Orch., Fasc. II: 265. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, August, 1903, *H. von Tuerckheim* II 464).

Epiphytic on trees in damp forests, up to 1,500 meters. Rather widespread in Mexico, Guatemala and Honduras.

Plant glabrous, densely caespitose, up to 15 cm. tall; secondary stem short, erect or erect-spreading, up to 1 cm. long. Leaves oblanceolate to oblong-spatulate, obtuse or broadly rounded and obliquely tridenticulate at the apex, narrowed into the slender sulcate petiole; fleshy, 4-14 cm. long, 1-2 cm. wide above the middle. Peduncle 2.5-10.5 cm. long including the pedicellate ovary, slender, wiry, dull green streaked with crimson, 2-flowered. Bracts appressed, membranous,

apiculate, 1–1.5 cm. long. Sepals yellow-white with crimson spots, 3-nerved, more or less abruptly tapering into the caudae. The caudae brownish orange and 3–14 mm. long; dorsal sepal 11–21 mm. long, united to the lateral sepals for about 6 mm., ovate-oblong, free part subrotund, deltoid; lateral sepals 11–20 mm. long, united for 10–13 mm., oblong-elliptic, free part obliquely ovate to semiorbicular. Petals linear-oblong, obtuse-truncate and retuse, apiculate or toothed at the apex, with a pointed keel on the anterior margin, white, 5–5.5 mm. long, 1.2–1.5 mm. wide. Lip linear-oblong to oblong-lanceolate, cordate and thickened at the base, obtuse-rounded and reflexed at the apex, denticulate along the apical margin, 4.5–6 mm. long, 1.5–2 mm. wide, white with crimson spots; disk laterally and medianly bilamellate. Column green-purplish, suberect, thick, 4–5 mm. long. Capsule obliquely cylindrical, about 12 mm. long.

This is an extremely variable species, particularly in the length of the caudae. The sepals may be abruptly or gradually tapering into the caudae.

Alta Verapaz: Cobán, *Türckheim* 3996.—Izabal: Along slopes, Río Frío, *Steyermark* 39966.

The following collection is sterile but probably represents this species: Quezaltenango: Lower south-facing slopes of Volcán Santa María, between Finca Pirineos and Los Positos, between Santa María de Jesús and Calahuaché, *Steyermark* 33714.

Masdevallia linearifolia Ames, Sched. Orch. 5: 7. 1923 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, August, 1900, *H. von Türckheim* 7784).

Epiphytic on trees in dense tropical forests, up to 650 meters alt. Rare in Guatemala and Honduras.

Plant small, glabrous, densely caespitose, 2–4 cm. tall; secondary stem concealed by scarious sheaths, up to 6 mm. long. Leaves linear to linear-oblancoate, obtuse and obliquely tridentate at the apex, coriaceous, 1.2–3.2 cm. long, 1–2 mm. wide near the apex. Peduncle with the pedicellate ovary 5–10 mm. long, filiform, 1-flowered, subtended by several scarious apiculate sheaths. Flowers light yellow to brownish red, spotted with purple, more or less concealed among the secondary stems and leaves. Sepals united at the base, dorsally carinate along the nerves, 3-nerved lateral sepals united almost to the middle; dorsal sepal elliptic-oblong, caudate-attenuate, thickened at the tip, concave, 5.5–8.5 mm. long, about 2 mm. wide; lateral sepals obliquely ovate, triangular, caudate-attenuate, with a transversely thickened callus on the anterior half of the inner surface at mouth of tube orifice, 5.2–6 mm. long, about 2 mm. wide. Petals dolabriform, obtuse, 2-nerved, emarginate on the anterior margin, 2–2.2 mm. long, 2–2.2 mm. wide just below the apex; inner surface with a papilliform callus on or near the anterior margin below the middle on the upper half. Lip with a slender claw, obovate-unguiculate, sagittate, obtusely rounded, with the lateral margins erose or subfimbriate, 2–2.5 mm. long, 1.3–1.5 mm. wide; lateral basal auricles slender, retrorse, parallel with or appressed to the claw; disk with a prominent

complanate callus at the base of each auricle. Column slender, curved, with a deflexed or pendent triangular-acuminate acute wing on each side near the summit, 3 mm. long. Capsule obliquely obovoid-pyriform, conspicuously 3-angled, about 1 cm. long.

This species is closely allied to *Masdevallia simula* but is distinguished from that species by its conspicuously caudate sepals, sharply toothed lip-plate and long, narrow decurved column wings.

Represented from Guatemala only by the type collection.

Masdevallia pusilla Rolfe, Kew Bull. 335. 1893. *M. Johannis* Schltr. Repert. Sp. Nov. 10: 359. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, November, 1907, *H. von Türckheim* II 1993).

Epiphytic in damp forests, up to 1,600 meters. Rare in Guatemala, Costa Rica and Ecuador.

Plant caespitose, glabrous, 12–15 cm. tall; secondary stem short, enclosed by scarios sheaths. Leaves erect-spreading, ligulate, obtuse to subacute and tridentulate at the apex, tapering into the short petioles, dorsally carinate, 10–15 cm. long, 7–13 mm. wide. Peduncle slender, arcuate-deflexed, descending or horizontal from the base of the petiole, dull reddish green, provided with small distant tubular-amplexicaul bracts, 1–3-flowered, 6–12 cm. long. Bracts about 6 mm. long, acuminate. Sepals united near the base into an oblique semiorbicular tube, up to 3.2 cm. long from the base to the tip of the caudae, ovate-triangular to ovate-oblong, with the inner surface covered with elongated papillae, pale yellowish green spotted with dark purple-brown; caudae variable in length, 8–22 mm. long. Petals obliquely oblong, obtuse-rounded and reflexed at the apex, irregularly denticulate along the apical margin, decurrent at the base, papillose on the inner surface near the apex, keeled along the solitary central vein, yellow-white with a pair of large purple blotches, 2.2–3.5 mm. long, about 1 mm. wide. Lip constricted and reflexed above the middle, panduriform when spread out, 3-veined, 3.2–5 mm. long, with numerous light brown spots and some purplish lines near the base; basal portion with erect sides, canaliculate, when spread out orbicular-rhombic, with thickened calli along the lateral veins 3.2–3.5 mm. wide; apical lobe calceolate, semiorbicular-saccate, with thickened keels along the 3 nerves that branch out from the thickened constriction, about 2 mm. in diameter. Column short, thick, about 3 mm. long; clinandrium irregularly denticulate.

This species is easily distinguished from *Masdevallia erythrochaete*, which it resembles in habit, by the very small apical lobe of the lip.

Represented from Guatemala only by the type collection of *M. Johannis*.

Masdevallia simula Reichb. f. Gard. Chron. 1: 8. 1875. *M. guatemalensis* Schltr. Repert. Sp. Nov. 15: 201. 1918 (type: Guatemala, Dept. Alta Verapaz, near Cubilgüitz, August, 1903, *H. von Türckheim* II 490). Figure 67.

Epiphytic in dense tropical forests, up to 600 meters. Uncommon in Guatemala, Honduras and Costa Rica.

Plant small, glabrous, densely caespitose, 3–10 cm. tall; secondary stem short, less than 1 cm. long, enclosed by short scarious sheaths. Leaves erect or erect-spreading, narrowly linear to linear-oblongate, obtuse and tridenticulate at the apex, often tinged with purple, 2–10 cm. long, 1.5–5 mm. wide. Peduncle with the pedicellate ovary less than 1 cm. long, slender, 1-flowered. Flowers small, suberect. Sepals united at the base to form a short saccate tube, dorsally carinate along the three nerves, white marked with purple; dorsal sepal elliptic-oblong, tapering into the shortly acuminate apex, longitudinally concave, incurved at the apex, 6–12 mm. long, 3.5–5 mm. wide; lateral sepals obliquely orbicular-

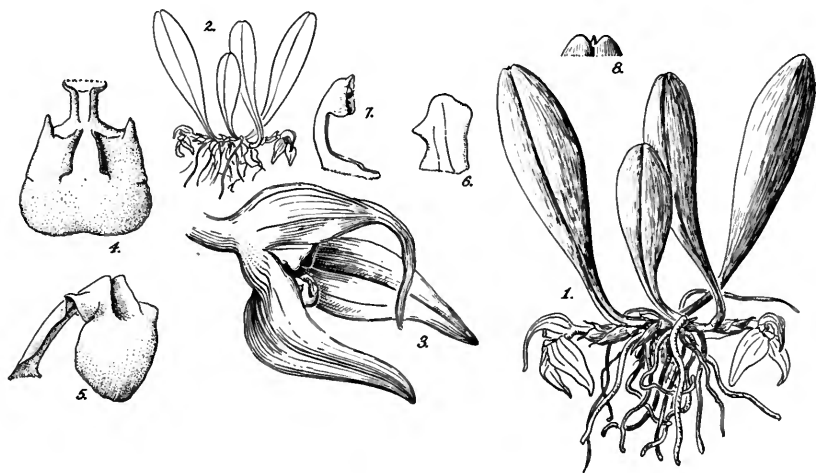


FIG. 67. *Masdevallia simula*. 1, plant (about $\times 1$); 2, plant ($\times \frac{1}{2}$); 3, flower, side view ($\times 4$); 4, lip, from above ($\times 5$); 5, lip, front-side view, natural position ($\times 6$); 6, petal ($\times 4$); 7, column, side view ($\times 6$); 8, tip of leaf (enlarged). Drawn by Dorothy O. Allen.

ovate to ovate-oblong, tapering into the shortly acuminate recurved apex, with a transversely thickened lamella on the inner surface at the orifice of the sepaline tube, 6–8 mm. long, 3.2–4 mm. wide. Petals obliquely rhombic-quadrate or quadrate and bilobed at the apex, the angles or lobes obtuse, white with purple markings, 2–3.5 mm. long, 2–3 mm. wide near the apex. Lip sagittate, obscurely trilobed-ovate to broadly flabellate, with a prominent deltoid-acute spreading auricle on each side at the base, the lobules broadly rounded with the apical lobule decurved and unevenly crenulate along the margin, transparent white, 3.2–5 mm. long including the short slender claw, 3–3.5 mm. wide; disk 3-nerved, with the lateral veins fleshy-thickened just above the auricles. Column purple, toothed at the apex, with short acute or obtuse deflexed wings near the apex. Capsule obliquely ovoid, glabrous, triangular, prominently 6-ribbed, 5–7 mm. long.

This species is represented in Guatemala only by the type collection of *M. guatemalensis*.

Masdevallia tubuliflora Ames, Orch., Fasc. II: 265. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, January, 1902, *H. von Türkheim* 512). Figure 68.

Epiphytic on trees. Rare in Guatemala, Honduras and Costa Rica.

Plant small, caespitose, glabrous, 7–9 cm. tall; secondary stem obsolete, erect, less than 1 cm. long. Leaves oblanceolate, broadly rounded and retuse at the apex, 3.5–9.5 cm. long, 8–12 mm. wide. Peduncle including pedicellate ovary 6–8 cm. long, slender, filiform, with a solitary flower. Flowers recurved-nodding, white or yellowish with a purple blotch in the throat of the calyx. Sepals united into a recurved tube for about two-thirds their length, conspicuously 3-nerved. Dorsal sepal 1.5–1.9 cm. long to the base of the tube; free part somewhat thickened, linear-lanceolate, acute, fleshy. Lateral sepals 1.3–1.7 cm. long to the base of the tube; free part falcate, obliquely triangular, fleshy-thickened. Petals obliquely linear-oblong, obtuse-apiculate at the apex, slightly dilated at the middle, conspicuously 1-nerved, with an intramarginal linear callus on the inner surface extending from about the middle to near the apex, 4–4.2 mm. long, about 1.2 mm. wide. Lip linear-lanceolate, cordate at the base, acute-apiculate at the apex, denticulate along the margin near the apex, tuberos-thickened on the lower surface at the base, about 4 mm. long, 1.2–1.5 mm. wide near the base; disk with two lamellate calli near the middle along the two lateral veins. Column short, thick, tridentate at the apex, 3.5–4 mm. long.

This species is closely allied to *Masdevallia Livingstoneana* Reichb. f., a Costa Rican and Panamanian species, but differs from that species in that the sepaline tube is narrowly cylindrical instead of being urceolate and the free part of the dorsal sepal is directed forward instead of being conspicuously recurved.

Represented from Guatemala only by the type collection.

DOUBTFUL SPECIES

Masdevallia jalapensis Kränzl., Repert. Sp. Nov. Beih. 34: 117. 1925 (type: Guatemala, saxicola et terrestris in quercetis haud densis in via a Sta. Rosa Jalapam in 1500 m.s.m. [F. C. Lehmann 1296!])—Herb. Boissier.—Barbey-Unicum!).

Kränzlin compared *M. jalapensis* with *Pleurothallis immersa*, and in our opinion this concept is very probably referable to the genus *Pleurothallis*. Kränzlin described his plant as having a raceme 11 cm. long composed of about twenty flowers. The dorsal sepal was also described as being almost free to the base and the lateral sepals were united to form a cymbiform bifid lamina. In Central America we know no species of *Masdevallia* that approach this description. There are, however, several species of *Pleurothallis*,



FIG. 68. *Masdevallia tubuliflora*. Plant ($\times 1$); 1, petal ($\times 10$); 2, lip ($\times 7$). Original drawing by Oakes Ames; redrawn by D. E. Tibbitts.

especially *P. immersa*, which closely resemble the description of *M. jalapensis*.

22. SCAPHOSEPALUM Pfitzer

Epiphytic repent or caespitose herbs consisting of an abbreviated or elongated primary stem and short unifoliate secondary stems that are provided with scarious sheaths. Leaves coriaceous, contracted below into a short petiole. Peduncles lateral from the lowermost node of the secondary stem, provided with several short scarious bracts and supporting a lax many-flowered spicate raceme. Flowers small. Sepals spreading, narrow, sharply acute or more or less caudate at the apex; dorsal sepal free or essentially free; lateral sepals united into a concave bifid lamina that has a retrorse fleshy excrescence near the apex of each sepal. Petals smaller than the sepals. Lip uppermost, small, variously shaped and adorned on the disk with lamellae, articulate with the column-foot. Column incurved, dilated and emarginate or winged above, produced at the base into a short foot; clinandrium oblique, concave, with the margins variously denticulate; anther terminal, operculate, incumbent, cucullate, 1-celled; pollinia two, cereous, narrowly ovoid, compressed. Capsule narrowly obovoid, erostrate, lightly costate.

This is a small genus of about twenty species that are confined to the American tropics. The lateral inflorescence, a character that has apparently been previously overlooked, is unique in the Pleurothallidinae.

Scaphosepalum Standleyi Ames, Sched. Orch. 9: 24, *fig. 4*. 1925. Figure 69.

Epiphytic on trees in forests, up to 2,000 meters alt. Uncommon in Guatemala, Honduras and Costa Rica.

Plant up to 1.5 dm. tall; rhizome abbreviated. Secondary stems densely caespitose, abbreviated, up to 1 cm. long, slender, unifoliate, nearly concealed by short scarious sheaths. Leaves erect, narrowly elliptic to oblanceolate, tridenticulate at the obtuse apex, tapering below to a short sulcate petiole; lamina coriaceous, up to 10 cm. long and 1.5 cm. wide; petiole up to 2.5 cm. long. Peduncle lateral from the lowermost node of the secondary stem, filiform, provided with several minute closely appressed tubular bracts. Raceme slender, with the flowers opening in succession. Floral bracts ovate, acute, concave, about equal to the pedicellate ovaries, about 3 mm. long. Flowers dark purple-red or purplish green, distichously arranged. Dorsal sepal free, 5–7 mm. long, oblong, obtuse, strongly concave below the middle; apical half thickened, convex, dorsally carinate with the keel becoming evanescent above the middle of the sepal. Lateral sepals 6–9 mm. long, united almost throughout their length; lamina broadly elliptic, bidentate at the apex, strongly concave, 3.5–5.5 mm. wide, furnished above the middle (on each mid-nerve) with a blunt papilliform retrorse callosity, strongly carinate exteriorly along the mid-nerve of each sepal with the keels terminating in prolonged rostriform appendages. Petals semielliptic, 2-nerved, acute, shortly aristate beneath the lip, about 3 mm. long and 1.2 mm. wide. Lip linguiform, obtuse, 3-nerved at the base, strongly bicarinate on the disk near the middle, with the keels more

or less crescentiform, 2-3 mm. long, about 1 mm. wide. Column 2-3 mm. long, produced at the base into a conspicuous foot, dilated above, tridentate at the apex with the apical margin obscurely denticulate.

Izabal: Along creek between Virginia and Lago Izabal, Montaña del Mico, *Steyrmark* 38823.

23. LEPANTHES Sw.

Small or dwarf epiphytic herbs with a short rhizome that gives rise to caespitose erect slender unifoliate secondary stems concealed by sheaths. Sheaths tubular, enlarged and dilated at the oblique apex and marked with several longitudinal ridges, usually ciliate. Leaves sessile or subsessile, more or less rigidly coriaceous, orbicular to linear, with a prominently or obscurely tridentate apex. Racemes axillary, solitary or fasciculate. Flowers usually small, few or numerous, sometimes solitary, 2-ranked. Sepals spreading or erect, subequal, broadly ovate to narrowly lanceolate, united at the base; lateral sepals more or less connate. Petals minute, with the short claw adnate to the base of the column, simple or transversely bilobed, usually much wider than long. Lip minute, adnate at the base or just above the base of the column, 2- or 3-lobed; lobes variously shaped, erect, with the large lateral lobes parallel to and embracing the column. Column short, fleshy; anther terminal, operculate, usually obovate; pollinia two, waxy, pyriform, pedicellate. Capsule obovoid.

This is a complex and difficult genus of about sixty species which are usually found at high elevations in the mountains of tropical America. Many of the described species are closely allied or poorly defined.

1. Inflorescence exceeding the leaves.
2. Petals simple, not 2-lobed; lip 3-lobed, with the mid-lobe small and smooth.
L. Johnsonii.
2. Petals unequally 2-lobed; lip 2-lobed, at most with an apicule in the sinus.
3. Dorsal sepal 6 mm. or less long, subacute or caudate.
4. Dorsal sepal shortly caudate; leaves less than 1.2 cm. long. *L. gibberosa*.
4. Dorsal sepal subacute; leaves 1.5 cm. or more long. *L. oreocharis*.
3. Dorsal sepal 7 mm. or more long, long-acuminate. *L. guatemalensis*.
1. Inflorescence shorter than the leaves.
5. Lip with a ciliate apicule or short pubescent mid-lobe in the sinus between the lateral lobes.
6. Lateral lobes of lip ciliate at the apex, with a ciliate apicule in the sinus; petals more than 2.5 mm. wide. *L. samacensis*.
6. Lateral lobes of lip smooth, with a small pubescent lobe in the sinus; petals less than 2.5 mm. wide.

FIG. 69. *Scaphosepalum Standleyi*. Plant (about $\times 2$); 1, flower, side view, with the perianth segments spread out, showing the external rostrate appendages of the lateral sepals and the retrorse appendages on the inner surface (about $\times 8$); 2, column, front-side view (about $\times 14$); 3, lip (about $\times 12$); 4, petal (about $\times 12$). Drawn by Blanche Ames.



SCAPHOSEPALUM
Standleyi
Ames

7. Lateral lobes of lip crescentiform and overlapping; leaves elliptic to oblanceolate.....*L. excedens*.
7. Lateral lobes of lip oblong-subquadrate, not overlapping; leaves ovate.
L. appendiculata.
5. Lip without a ciliate apicule or pubescent mid-lobe, at most with a smooth apicule in the sinus.
8. Dorsal sepal 5.5 mm. or more long.
9. Petals with the suborbicular lobes about equal, usually less than 3 mm. wide; leaves ovate to elliptic-oblong.....*L. acuminata*.
9. Petals with the narrow lobes unequal, 3 mm. or more wide; leaves narrowly elliptic to linear-lanceolate.....*L. inaequalis*.
8. Dorsal sepal usually much less than 5.5 mm. long.
10. Leaves suborbicular-ovate to elliptic-lanceolate, 8 mm. or more wide; flowers conspicuously distichously arranged.....*L. Turrialvae*.
10. Leaves narrowly elliptic to linear-lanceolate, 8 mm. or less wide; flowers not conspicuously distichous.
11. Leaves acuminate; dorsal sepal 3-3.5 mm. long.....*L. stenophylla*.
11. Leaves obtuse to acute; dorsal sepal up to 5 mm. long.*L. oreocharis*.

Lepanthes acuminata Schltr. Repert. Sp. Nov. 10: 355. 1912
(type: Guatemala, Dept. Alta Verapaz, Cobán, September, 1907,
H. von Türckheim II 1965).

On rotten logs and epiphytic on trees in mountain forests, up to 1,800 meters alt. Rare in Guatemala and Honduras.

Plant small, erect, up to 8 cm. tall. Secondary stem slender, up to 6 cm. long, monophyllous, concealed by 3-8 tubular sheaths; sheaths conspicuously dilated and shortly acuminate at the apex, profusely hispid along the prominent nerves and margin of the apex. Leaves ovate to elliptic-oblong, abruptly constricted above to form a narrowly obtuse and tridenticulate apex, marginate, 1-2.8 cm. long, 4.5-12 mm. wide. Racemes 1-2, laxly several-flowered, slender, about 1 cm. long including the short filiform peduncle. Floral bracts oblong-cucullate, apiculate, about 2 mm. long, hispid dorsally and on the margins. Flowers small, slender, suberect. Sepals united at the base, slightly thickened at the apex, greenish; dorsal sepal broadly lanceolate, long-acuminate, 3-nerved, 6-7 mm. long, 2-2.5 mm. wide near the base; lateral sepals obliquely ovate-lanceolate, long-acuminate, somewhat 2-nerved, united for about 1.5 mm., 5-6 mm. long, 2-2.5 mm. wide above the point of coalescence. Petals 1.3-2 mm. long, 2.5-3.2 mm. wide, broadly obcordate or transversely bilobed with the lobes oblong-orbicular and broadly rounded, forming an obtuse angle. Lip reddish, 1.25-2.3 mm. long, about 2 mm. wide, cordate at the base with the angles obtuse, forcipate-bilobed above, with a pubescent suberect submarginal tubercle on the lower surface near the broadly obtuse sinus; apical lobes linear-falcate, subobtusely to acute, with a thin membranous lamella on the upper surface. Column reddish, slender, exceeding the lip in length.

This species is distinguished by its lanceolate, long-acuminate sepals and rotundate-lobed petals.

Alta Verapaz: Cobán, *Johnson* 730. Samác-Cobán, *Johnson* 766. Samác, *Johnson* 876. Near Cobán, *Türckheim* II 1840 (in part).

Lepanthes appendiculata Ames, Sched. Orch. 3: 9. 1923 (type: Guatemala, Dept. Alta Verapaz, Samac, October 20, 1920, Harry Johnson 879).

Epiphytic on trees. Rare in Guatemala.

Plant erect or ascending, up to 9.5 cm. tall. Secondary stem 1.5–7 cm. long, monophyllous, slender, the longer ones with six closely appressed sheaths that are hispidulous along the prominent nerves; sheaths dilated at the summit, terminating in an acute tip, purplish when dry. Leaves ovate, acuminate and obliquely tridenticulate at the apex, contracted at the base into a short sulcate petiole, coriaceous, 2–3 cm. long, up to 1.7 cm. wide. Peduncles 1–3, shorter than the leaf, filiform, with the raceme about 1.5 cm. long. Floral bracts minute, dorsally hispid. Flowers distichous, crowded. Sepals united at the base. Dorsal sepal ovate-elliptic, subacute, somewhat 3-nerved, 2.5–3 mm. long, 1.8–2 mm. wide. Lateral sepals coherent to about the middle, obliquely orbicular-ovate, subapiculate, 2-veined, about 2 mm. long and 1.5 mm. wide across the free portion near point of coalescence. Petals obliquely crescentiform or deeply bilobed with the lobes subquadrate and obtuse, 1 mm. long, about 2 mm. wide. Lip 1–1.5 mm. long, about 1.8 mm. wide, 3-lobed, auriculate on each side at the base; lateral lobes oblong-subquadrate, obtuse, much exceeding the middle lobe, carinate on the upper surface; middle lobe fleshy, deltoid-rounded, thicker than wide, covered with glandular spreading hairs, narrowed into the slender claw. Column slender, gradually dilated toward the summit.

In habit *Lepanthes appendiculata* resembles *L. samacensis*, but differs from it in the form of the petals and lip. In the shape of the petals, it is comparable to *L. acuminata*.

Represented from Guatemala only by the type collection.

Lepanthes excedens Ames & Correll, Bot. Mus. Leaflet. Harv. Univ. 10: 72, pl. 6. 1942 (type: Guatemala, road to Mataquescuintla, about 18 miles from Guatemala City, alt. about 6,000 feet, February 19, 1935, Margaret Ward Lewis 105). Figure 70.

Apparently endemic to Guatemala.

Plant minute, erect or ascending, caespitose, epiphytic, usually less than 4 cm. tall. Roots simple, white, filiform. Secondary stem filiform, red, unifoliate, less than 1.5 cm. long, concealed by two or more infundibuliform sheaths. Sheaths dilated and acute at the apex, lightly costate, with the costae and apical margin ciliate. Leaves dark green or ruddy, especially on the lower surface and near the margins, elliptic to oblanceolate, obtuse to subacute and tridenticulate at the apex, tapering at the base into the short petiole, marginate, fleshy, glabrous, somewhat undulate-contracted on the margins and conduplicate-ensiform with age, up to 13 mm. long including the petiole and 5.5 mm. wide. Inflorescences one or two, commonly a little shorter than the leaf, loosely 3- to 8-flowered. Floral bracts ovate-cucullate, acute, glabrous, less than 1 mm. long, longer than the pedicellate ovaries. Flowers extremely small, somewhat arcuate-recurved, about 3 mm. long. Sepals pale yellowish green, united at the base. Dorsal sepal elliptic-

lanceolate, acute, concave below the middle, 3-nerved, up to 3 mm. long and 1.5 mm. wide near the base. Lateral sepals united to about the middle, obliquely ovate-elliptic, acute, up to 2.5 mm. long and 1 mm. wide above the point of coalescence. Petals green and reddish-purple, broadly flabelliform-bilobed, with an apicule in the sinus, up to 0.5 mm. long and 1.2 mm. wide; posterior lobe oblong-lanceolate, obtuse; anterior lobe obliquely quadrate, truncate or retuse at the apex. Lip bright purple, with a rather broad involute claw, 3-lobed, obovate in outline, about 1 mm. long, usually narrower than long; lateral lobes not auriculate at the base, linear-oblongate, crescentiform, broadly rounded at the apex, incurved so as to overlap one another, lightly keeled near the middle; mid-lobe small, narrowly ovate-triangular, subacute, pubescent. Column cylindrical, fleshy, about 1.2 mm. long, with a dorsal flap near the apex, acute-apiculate at the apex; clinandrium tridentate; pollinia two.

This species is easily identified by its peculiar lip, which has rather broad lateral lobes that are incurved in front so as to overlap. The column and petals are also distinctive and are useful in separating the species from nearly allied entities. The specific name signifies "overlapping" in reference to the position of the lateral lobes of the lip.

Represented from Guatemala only by the type collection.

Lepanthes gibberosa Ames, Sched. Orch. 3: 12. 1923 (type: Guatemala, Dept. Alta Verapaz, Ainal, July, 1886, *H. von Türckheim* 967).

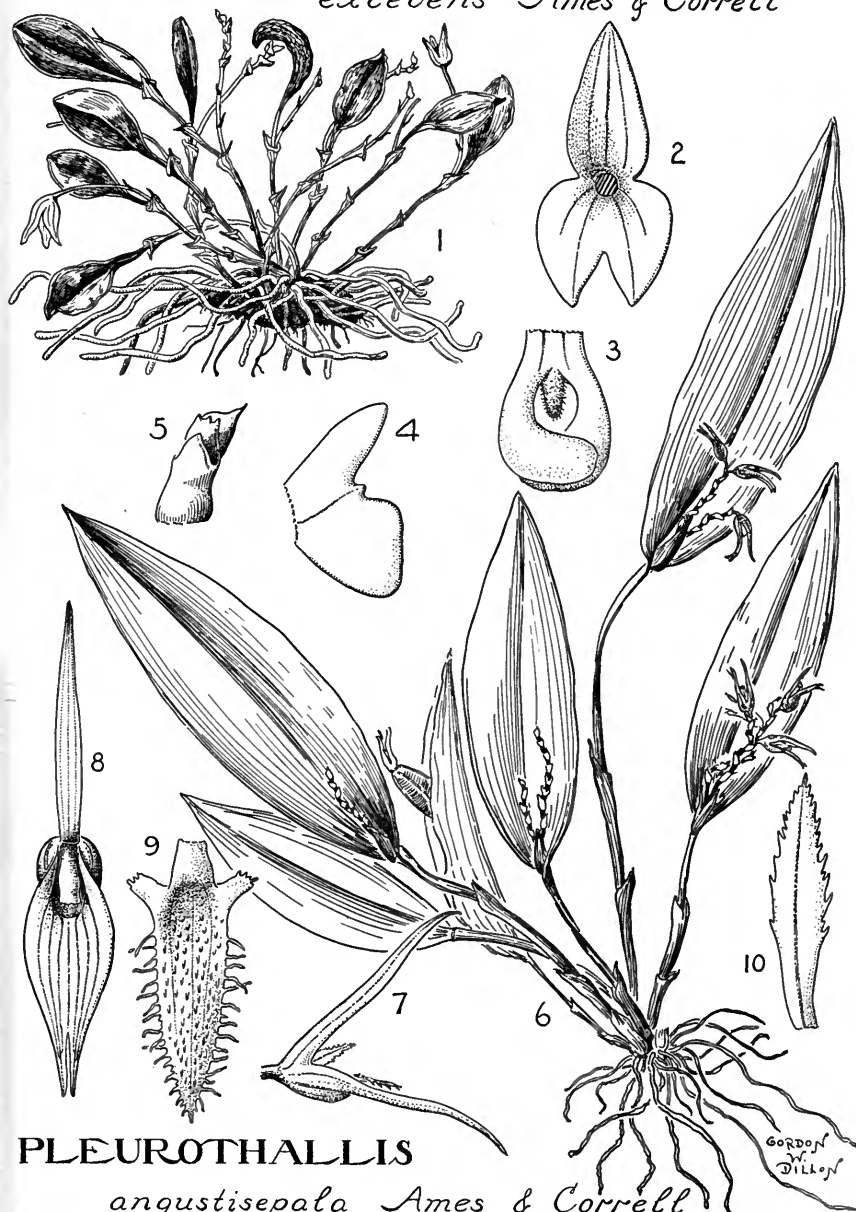
Epiphytic, up to 1,400 meters alt. Rare in Guatemala.

Plant small, caespitose, up to 5 cm. tall including the inflorescence. Secondary stem monophyllous, 1.3-2 cm. long, concealed by several elongated sheaths; sheaths with hispid nerves and the margin of the infundibuliform summit hispid. Leaves elliptic, coriaceous, marginate, shortly petiolate, up to 9 mm. long and 5 mm. wide. Peduncles 2 or more, exceeding the leaves, 2 cm. or more long; raceme lax, several-flowered. Floral bracts infundibuliform, dorsally hispid, 1.5 mm. long. Flowers pink and red. Sepals united at the base. Dorsal sepal triangular-ovate, with a shortly caudate tip, 3-nerved, 6 mm. long, 3.5 mm. wide where it joins the lateral sepals. Lateral sepals about 6 mm. long, coherent nearly to the middle, forming a deeply bilobed 4-nerved lamina that is 4 mm. wide, each lobe of which is abruptly narrowed into a linear-caudate termination 2.5 mm. long; at the base of the caudate termination each sepal is strongly protuberant on the inner margin. Petals transversely obliquely linear-lanceolate, with the anterior lobe narrow and acuminate, about 1 mm. long and 2.5 mm. wide. Lip 1.75 mm. long, cordate at the base with the auricles rounded, deeply bilobed in

FIG. 70. *Lepanthes excedens*. 1, plant ($\times 2$); 2, sepals, spread out ($\times 7\frac{1}{2}$); 3, lip, from above ($\times 20$); 4, petal ($\times 20$); 5, column, dorsal-side view ($\times 15$). *Pleurothallis angustisepala*. 6, plant ($\times \frac{1}{2}$); 7, flower, side view ($\times 2$); 8, sepals, spread out, and column ($\times 2$); 9, lip, spread out ($\times 5$); 10, petal ($\times 7\frac{1}{2}$). Drawn by G. W. Dillon.

LEPANTHES

excedens Ames & Correll



PLEUROTHALLIS

angustisepala Ames & Correll

front, the lobes obtuse, each with a membranaceous keel. Column slender, about 1.5 mm. long.

This species is closely allied to *Lepanthes guatemalensis*, from which it differs in that the lateral sepals are protuberant on the inner margin near the base of the caudate tip.

Represented from Guatemala only by the type collection.

Lepanthes guatemalensis Schltr. Repert. Sp. Nov. 10: 355. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, June, 1908, *H. von Türckheim* II 2387). *L. Tuerckheimii* Schltr. Repert. Sp. Nov. 10: 357. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, *H. von Türckheim* 15 [November, 1877], 45 [1878], 11 [September, 1907]).

Epiphytic on trees in mountain forests, up to 3,000 meters alt. Rare in Guatemala.

Plant small, caespitose, up to 12 cm. tall. Secondary stem erect or ascending, slender, monophyllous, up to 5 cm. long, concealed by 2-4 long tubular sheaths; sheaths slightly dilated at the apex, with the prominent nerves and apical margins minutely hispid. Leaf erect, elliptic to broadly obovate, minutely retuse at the broadly rounded apex, marginate, abruptly tapering into the short petiole, 0.8-2 cm. long, 3-8 mm. wide. Raceme slender, loosely few-flowered, usually with the rachis retrofracted, up to 11 cm. long including the peduncle, exceeding the leaf; peduncle filiform, glabrous. Floral bracts ovate-cucullate, apiculate, minutely and sparsely hispid on the outer surface, about 1.5 mm. long. Flowers suberect, pink and red. Sepals united at the base, 3-nerved; dorsal sepal broadly ovate-lanceolate, long-acuminate, 7-9 mm. long, 3-4.5 mm. wide at the base; lateral sepals obliquely elliptic-lanceolate, long-acuminate, united at the base for about 1.5-2.5 mm., 7-8 mm. long, 2-3 mm. wide above the point of coalescence. Petals transversely obliquely linear-lanceolate or bilobed, 3.5-4 mm. wide, about 1 mm. long; posterior lobe oblong-quadrate, broadly rounded; anterior lobe narrowly acuminate. Lip broadly subcordate-cuneate, with broadly obtuse angles on each side at the base, forcipate-bilobed above with a glabrous linear suberect apicule in the broad sinus, 1.3-2 mm. long, almost as wide as long; lateral lobes falcate-lanceolate, obtuse, lightly carinate, with a membranaceous keel on the upper surface. Column slender, about 1.25 mm. long.

Alta Verapaz: Cobán, *Türckheim* 2495.—El Progreso: Sierra de las Minas, between Finca Piamonte and top of Montaña Piamonte along Joya Pacayal, *Steyermark* 43702a.—Zacapa: Sierra de las Minas, between Cerro de Monos and upper slopes of Monte Virgen, *Steyermark* 42883.

Lepanthes inaequalis Schltr. Repert. Sp. Nov. 10: 356. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, November, 1877, *H. von Türckheim*).

Epiphytic on trees, up to 1,400 meters alt. Rare in Guatemala.

Plant erect or ascending, caespitose, 6–14 cm. tall. Secondary stem slender, monophyllous, 3–9 cm. long, concealed by 4–9 tubular sheaths; sheaths spreading revolute and acuminate at the apex, with the costae and apical margin densely ciliate. Leaf erect or spreading, elliptic to linear-lanceolate, subobtuse to acuminate and tridenticulate at the apex, glabrous, marginate, somewhat undulate-constricted along the margins, usually with a purple tinge particularly along the margins, 1.8–5 cm. long, 4–8 mm. wide. Racemes 1–3, filiform, 3–6-flowered, up to 1 cm. long including the peduncle. Floral bracts ovate-cucullate, shortly acuminate, about as long as the pedicellate ovaries, dorsally ciliate. Flowers erect-spreading, white-red. Sepals united at the base; dorsal sepal triangular-ovate, acute to subacuminate, 3-nerved, 6–6.5 mm. long, about 4 mm. wide at the base; lateral sepals united to about the middle, obliquely ovate or semicordate, shortly acuminate, 2-nerved, 5–6 mm. long, 2.5–3 mm. wide just above the point of coalescence. Petals transversely obliquely bilobed, 3–4.5 mm. wide, 1-nerved; posterior lobe obliquely oblong or orbicular-quadrangle, subtruncate at the apex, 1.8–2 mm. wide; anterior lobe obliquely triangular or oblong-quadrangle, broadly obtuse at the apex, 0.9–1.1 mm. wide. Lip concave, cordate at the base with broadly obtuse lobes on each side, forcipate-bilobed above, with a minute apicule in the sinus, about 2.5 mm. long, 2.2–2.5 mm. wide; lobes falcate, lanceolate-triangular, obtuse, each longitudinally carinate. Capsule conspicuously oblique, ovoid, about 6 mm. long.

Alta Verapaz: Samac-Cobán, *Johnson* 767. Samac, *Johnson* 886.

Lepanthes Johnsonii Ames, Sched. Orch. 2: 24. 1923 (type: Guatemala, Dept. Alta Verapaz, Chamá, July 26, 1920, *Harry Johnson* 420).

Epiphytic on trees, up to 900 meters alt. Rare in Guatemala.

Plant minute, glabrous, 3.5 cm. tall. Secondary stem concealed by about 3 closely appressed elongated hispidulous sheaths, about 1 cm. long; sheaths dilated abruptly at the summit into a thickened ring-like hispid rim that is produced on one side into a slender rigid acute point, 3–4 mm. long. Leaves elliptic, coriaceous, apiculate and denticulate at the apex, contracted at the base into an abbreviated slender petiole, conspicuously marginate, 1–1.2 cm. long, 4 mm. wide. Peduncles 1 or 2; raceme about 1.5 cm. long, lax, usually 4-flowered. Bracts of the inflorescence tubular-infundibuliform, dorsally hispid. Flowers about 2 mm. apart, pink-purple. Sepals united, forming a 3-lobed calyx with the lobes caudate-tipped; dorsal sepal triangular-caudate, 1 cm. long to the base, free portion about 3.5 mm. wide; lateral sepals 1.1 cm. long to base, about 7 mm. long to the sinus, free portion triangular-caudate, 4 mm. wide. Petals narrowly triangular, acute, oblique, 3 mm. long in a line parallel to the dorsal sepal, 0.75 mm. wide near the point of insertion, rounded on the outer angle nearest the point of insertion. Lip 3-lobed; lateral lobes much larger and longer than the middle lobe, similar to the petals, 2 mm. long, 0.5 mm. wide, rounded at the base; mid-lobe about 0.5 mm. long, longer than broad, porrect, obtuse. Column fleshy, short.

This species is distinctive among the Guatemalan species of *Lepanthes* in that the flowers are extremely large in relation to the size of the diminutive vegetative parts of the plant.

It is represented from Guatemala only by the type collection.

Lepanthes oreocharis Schltr. Repert. Sp. Nov. 10: 483. 1912 (type: Guatemala, on a mountain ridge, May, 1900, A. Wendt).

Epiphytic on trees in mixed forests at high altitudes, up to 3,500 meters alt. Rare in Mexico and Guatemala.

Plant small, erect or ascending, caespitose, 4–10 cm. tall. Secondary stem slender, provided with 3–4 long tubular sheaths 1.5–7 cm. long; sheaths costate, obliquely dilated at the apex, shortly acuminate, ciliate along the costae and margin of the apex. Leaves elliptic, linear or lanceolate, obtuse to acute and tridenticulate at the apex, coriaceous, subsessile, green mottled with purple, 1.5–4 cm. long, 3–7 mm. wide. Raceme one or several, rather densely flowered, filiform, 1.2–3 cm. long including the short peduncle. Bracts tubular-cucullate, scarious, subtruncate or acute, about 1 mm. long. Flowers small, glabrous. Sepals pale yellow with a purple hue, united at the base; dorsal sepal ovate to ovate-oblong, subacute, up to 5 mm. long; lateral sepals obliquely oblong-elliptic, subobtuse to apiculate, connate to about the middle, about as long as the dorsal sepal. Petals dull yellow, transversely bilobed, forming a right angle, glabrous, 2–3.5 mm. wide; posterior lobe subquadrate-oblong, broadly round or obtuse at the apex; anterior lobe oblong, obtuse, a little shorter and narrower than the posterior lobe. Lip with a short narrow claw, 1.3–2 mm. long, orange with purple suffusion, quadrate-auriculate at the base, with the auricles obtuse, bipartite above the middle, with a short mucro in the sinus, the lobes obliquely lanceolate and very obtuse; disk with two longitudinal curved calli extending from the base of the lip to above the middle of each of the apical lobes. Column glabrous, slender.

Quezaltenango: Volcán Zunil, *Steyermark* 34673.—Sololá: Volcán Santa Clara, south-facing slopes to summit, *Steyermark* 47009.—Zacapa: Cloud forest in ravine bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29839. Forested slopes near summit of Sierra de las Minas, near Finca Alejandría, *Steyermark* 29807.

Lepanthes samacensis Ames, Sched. Orch. 2: 25. 1923 (type: Guatemala, Dept. Alta Verapaz, Samác, October 20, 1920, *Harry Johnson* 880).

Epiphytic on trees in dense or open forests, up to 1,400 meters alt. Rare in Guatemala and Honduras.

Plant small, caespitose, up to 5.2 cm. tall. Secondary stem erect or ascending, 0.7–3.5 cm. long, with 2–4 elongated tubular sheaths; sheaths lanceolate and acute, at the summit often blackish, with the nerves hispidulous. Leaves suborbicular, apiculate and tridenticulate at the apex, marginate, coriaceous, 8–22 mm. long

including the abbreviated petiole and apicule, 5–14 mm. wide. Inflorescence usually solitary, about 1 cm. long; peduncle filiform, with a closely appressed bract near the middle, about 5 mm. long; raceme densely few-flowered, about 5 mm. long. Floral bracts ovate-cucullate, dorsally hispid, 1–1.5 mm. long. Flowers minute. Sepals pink, 1-nerved, often beaded along the margins; dorsal sepal coherent at the base with the laterals, ovate-lanceolate, acute, about 3 mm. long and 1.2 mm. wide; lateral sepals coherent to about the middle, about 2 mm. long, forming a suborbicular bilobed lamina about 2 mm. wide, lobes obliquely deltoid-acute and about 1 mm. wide, with the outer margins minutely ciliate. Petals red, transversely subrescentiform and 3–4 mm. wide, with the margins minutely ciliate; posterior lobe deltoid-lanceolate, obtuse, 0.75–1 mm. wide; anterior lobe narrowly lanceolate, acute. Lip red, 1–1.5 mm. long, up to 1.25 mm. wide, subquadrate-cordate, the base with an elongate auricle on each side, apex deeply cleft to about the middle or bilobed with a densely ciliate suberect apicule in the sinus; lateral lobes narrowly oblong and slightly incurved with a conspicuously ciliate apex, convergent. Column reddish, slender up to the bilobed apex.

This species is closely allied to *L. Turrialvae* but is, in part, distinguished from that species by the ciliate apicule and lateral lobes of the lip.

Alta Verapaz: Cobán, *Türkheim* II 1840 (in part).

Lepanthes stenophylla Schltr. Repert. Sp. Nov. 10: 396. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, September, 1907, *H. von Türkheim* II 1969).

Epiphytic on trees, at high elevations, up to 3,000 meters alt. Rather common in Guatemala.

Plant small, erect or ascending, densely caespitose, 4–11.5 cm. tall. Secondary stem filiform, monophyllous, 4.5–9 cm. long, concealed by 3–7 tubular sheaths; sheaths somewhat dilated and acute to long-apiculate at the apex, minutely ciliate along the costae and on the apical margin. Leaf erect or erect-spreading, linear-lanceolate, acuminate and tridentate at the apex, glabrous, marginate, somewhat undulate-constricted along the margins, 1.5–3 cm. long, 3.5–5 mm. wide. Racemes 1–several, shorter than the leaves, up to 1.5 cm. long including the peduncle, filiform, loosely many-flowered. Floral bracts ovate-cucullate, apiculate, dorsally sparingly ciliate. Flowers small, erect-spreading, yellow-reddish. Sepals united at the base; dorsal sepal ovate, acute to shortly acuminate, 3-nerved, 3–3.5 mm. long, 1.5–2.5 mm. wide; lateral sepals united to about the middle, obliquely ovate, shortly acuminate, 2-nerved, 2.5–3 mm. long, 1–1.8 mm. wide just above the point of coalescence. Petals transversely bilobed, about 3 mm. wide; posterior lobe obliquely oblong, obtuse, 0.5–0.8 mm. wide; anterior lobe triangular-oblong, subacute, about 0.35 mm. wide. Lip concave, subquadrate-cordate, obtusely cordate at the base, forcipate-bilobed above, with a minute apicule in the sinus; lobes obliquely triangular-falcate, obtuse to subacute, 1.5–1.75 mm. long.

Lepanthes stenophylla is closely allied to *L. inaequalis* but differs from that species, in part, by having much smaller flowers and

differently shaped petals. The plants are also usually much smaller than those of *L. inaequalis*.

Alta Verapaz: Chamá, *Johnson* 418. Río Cobán, between Cobán and San Pedro, *Johnson* 607; 608. Cobán, *Johnson* 731. Samác-Cobán, *Johnson* 768.—El Progreso: Sierra de las Minas, between Finca Piamonte and top of Montaña Piamonte, along Joya Pacayal, *Steyermark* 43702.—Zacapa: Cloud forest in ravine bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29838 (in part).

Lepanthes Turialvae Reichb. f. Bonpl. 3: 225. 1855. *L. scopula* Schltr. Repert. Sp. Nov. 10: 356. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, May, 1908, *H. von Türckheim* II 1840).

Epiphytic on trees in dense or open forests, up to 3,000 meters alt. Widespread from Mexico to Panama.

Plant erect, caespitose, up to 16 cm. tall. Secondary stem slender, monophyllous, concealed by 3–6 tubular sheaths; sheaths dilated and acuminate at the apex, varying in color from green to black, hispid along the prominent costae and apical margin. Leaf coriaceous, suborbicular-ovate to elliptic-lanceolate, obtuse to abruptly acuminate and tridenticulate at the apex, green to bronze-green with the under side usually purplish red, marginate, somewhat constricted near the apex, 2.5–7 cm. long, 0.8–3 cm. wide. Racemes 1 to 4, shorter than the leaves, up to 4.5 cm. long including the filiform peduncles, rather densely many-flowered. Floral bracts shorter than the pedicels, cucullate, acute to acuminate, dorsally muricate-papillose. Flowers distichous, spreading, with the rachis closely pressed against the surface of the leaf. Sepals united at the base, pale greenish yellow to brownish red or pink; dorsal sepal triangular-ovate, acute to shortly acuminate, 3-veined, 2.5–3.5 mm. long, 1.8–2.2 mm. wide near the base; lateral sepals united to above the middle, obliquely ovate-elliptic, acute, 2-veined, 2.5–3.5 mm. long, 1–1.5 mm. wide above the point of coalescence. Petals transversely bilobed to form right angles, deep yellow, 2.5–4.2 mm. wide, up to 1.2 mm. long; posterior lobe falcate-lanceolate, obtuse to acute; anterior lobe shorter and narrower than the posterior lobe, obliquely triangular to lanceolate, acute. Lip yellow-red, concave, cordate at the base with the basal lateral auricles obtuse, forcipate-bilobed above, with a minute puberulent apicule in the sinus, 1.2–1.5 mm. long, up to 2 mm. wide; apical lobes triangular-falcate, obtuse to subacute. Column bright magenta red-yellow, arcuate. Capsule yellowish green, glossy, conspicuously oblique, about 8 mm. long.

Alta Verapaz: Chamá, *Johnson* 421. Samác, *Johnson* 877. Vicinity of Laguna Sapalá (Chajvovuch), one mile southwest of Sibicté, *Steyermark* 44908. Along Río Ievolay, north and northwest of Finca Cubilgüitz to Quebrada Diablo, *Steyermark* 44774.—Chimaltenango: Santa Elena, near Tecpam, *Lewis* 65.—Izabal: Cerro San Gil, along Río Frío, *Steyermark* 39915.—Santa Rosa: fide

Lewis.—Zacapa: Cloud forest in ravine bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, Steyermark 29837.

24. PLEUROTHALLIS R. Br.

Small or medium-sized epiphytic herbs with caespitose or approximate secondary stems from a creeping primary stem or rhizome, not pseudobulbous; secondary stems unifoliate or rarely 2-(or more) leaved. Leaves mostly coriaceous, sessile or with a petiole. Inflorescence terminal or rarely lateral, fasciculate, racemose or sometimes a solitary flower at the apex of an elongate peduncle. Flowers small, subtended by small inconspicuous bracts. Sepals about the same length or nearly so, erect or spreading; dorsal sepal free or connate with the lateral sepals for a short distance, rarely clavellate at the apex; lateral sepals slightly connate at the base to entirely united, mostly concave or gibbous under the column-foot. Petals shorter or narrower than the sepals, rarely as long as the sepals, sometimes clavellate at the apex. Lip shorter or rarely a little longer than the petals, simple or 3-lobed, generally contracted and jointed with the base of the column, mostly unguiculate. Column equaling or shorter than the lip, winged or wingless, produced into a foot or footless at the base; foot, when present, almost obsolete to as long as the column; anther terminal, operculate, incumbent, 1- to 2-celled; pollinia two or four, waxy. Capsule subglobose to ellipsoid.

Pleurothallis is a large New World genus of approximately six hundred species that are commonly found in the montane regions of the tropics and subtropics. The genus comprises a group of species notable for their outward dissimilarity and polymorphism. It is of interest to note that in most of the species found in the *Pleurothallidinae* the sepals are extremely variable, especially as to size, while the lip and petals are remarkably constant as to morphology and size, varying only slightly in comparison with the variation evidenced in the sepals.

The following key is entirely artificial and is prepared solely for identifying the species of *Pleurothallis* which are found in Guatemala. The species have been combined in each series without thought of the affinity of the species included. Closely allied species may thus be scattered in each of the series.

- A. Sheaths of the stem dilated above (as in *Lepanthes*), ciliate-hispid along the prominent nerves and marginate apex. I. Series *Lepanthiformes*.
- A. Sheaths closely appressed to the stem or, if not appressed, without prominent nerves or a marginate hispid apex.
 - B. Inflorescence shorter than the subtending leaf, 1-flowered, fasciculate or racemose. II. Series *Brachystachyae*.
 - B. Inflorescence longer than the subtending leaf (occasionally subequal), racemose or sometimes 1-flowered at the apex of an elongate peduncle. III. Series *Elongatae*.
- I. Series *Lepanthiformes*. The species comprising this small group are characterized by having lepanthoid sheaths that conceal the secondary stem. The

sheaths are dilated at the apex and are conspicuously ciliate-hispid on the prominent nerves and margin of the ostiole. The inflorescence in our species is racemose, either exceeding or shorter than the subtending leaf.

1. Lip distinctly 3-lobed.....*P. crucilabia*.
1. Lip not 3-lobed, of an oblong or linear type.
 2. Petals obliquely triangular, shortly acuminate, entire...*P. triangulipetala*.
 2. Petals not triangular, obtuse or broadly rounded at the apex.
 3. Petals entire; secondary stems elongate, usually bearing more than one leaf.....*P. Broadwayi*.
 3. Petals ciliate or fimbriate along the margins; secondary stems short, bearing only one leaf.
 4. Secondary stems straight; lip thin, with a callus near the base.
P. Blaisdellii.
 4. Secondary stems fractiflex; lip with a bifurcate callus extending from near the base to beyond the middle of the disk.....*P. ciliaris*.
- II. Series *Brachystachyae*. The plants in this series are characterized by having a short inflorescence that is exceeded by the subtending leaf. The inflorescence may be a single flower, a fascicle of flowers, a solitary raceme or a fascicle of racemes. The sheaths of the stem are not ciliate.
 1. Leaves cordate; inflorescence composed of one or several flowers, fasciculate.
 2. Lip 4 mm. or more long; plants large, often up to 6.5 dm. tall.
 3. Lip ovate-oblong to oblong-lanceolate; dorsal sepal ovate to ovate-elliptic, less than 9 mm. long.....*P. Matudiana*.
 3. Lip ovate-triangular to oblong-quadrate; dorsal sepal suborbicular to elliptic, more than 10 mm. long.....*P. cardiothallis*.
 2. Lip less than 3.2 mm. long; plants mostly smaller than the preceding species, less than 3 dm. tall.
 4. Lip orbicular-ovate to subcordate-ovate.....*P. pansamala*.
 4. Lip triangular-hastate to triangular-ovate or with a blunt lobule on each side at the base.....*P. pansamala* var. *triangulabia*.
 1. Leaves not cordate; inflorescence composed of a solitary flower or several flowers in a fascicle or raceme.
 5. Apex of the petals and dorsal sepal clavellate or long-caudate; usually with the lip distinctly 3-lobed.
 6. Peduncle and rachis setose-pubescent; leaves linear, less than 3.5 cm. long.....*P. setosa*.
 6. Peduncle and rachis smooth; leaves ovate, not linear, more than 3.5 cm. long.
 7. Lip 5-6 mm. long; petals filiform, 6-9 mm. long..*P. xanthophthalma*.
 7. Lip about 10 mm. long; petals lanceolate, nearly 20 mm. long.
P. Amesiana.
 5. Apex of the petals and dorsal sepal not clavellate; lip not prominently 3-lobed, at most with small lateral lobules.
 8. Plants distinctly repent.
 9. Leaf more than 5 cm. long.....*P. vittata*.
 9. Leaf less than 5 cm. long.
 10. Leaves orbicular or elliptic, when mature less than 1 cm. long, closely appressed to the bark of trees.
 11. Lip oblong, with a triangular lobule on each side near the middle, about 2.5 mm. long.....*P. Lewisae*.
 11. Lip narrowly ligulate, with the margins of the basal half strongly inrolled, about 1.5 mm. long.....*P. comayaguensis*.
 10. Leaves linear-lanceolate to linear-spatulate, when mature more than 2 cm. long, erect.

12. Lip with a small lobule on each side near the base; disk ecallose or bicallose; column with a short foot about 1 mm. long.
13. Secondary stem about 3 mm. long; leaf linear-ob lanceolate; lip ecallose.....*P. sertularioides*.
13. Secondary stem usually more than 1 cm. long; leaf lanceolate; lip bicallose.....*P. Carioi*.
12. Lip without a tooth or lobule on each side; disk smooth or granulose-papillose; column without a foot.
14. Petals ovate-elliptic, subacute; disk of lip granulose-papillose.....*P. repens*.
14. Petals lanceolate, acuminate; disk of lip smooth.
P. minutalis.
8. Plants caespitose.
15. Lip auriculate or sagittate.
16. Lip triangular-lanceolate, without calli, with prominent denticulate auricles, about 6 mm. long.....*P. angustisepala*.
16. Lip sagittate, with a median callus at the base, about 4 mm. long.
P. violacea.
15. Lip neither auriculate nor sagittate.
17. Peduncle completely embraced by the lower part of the leaf.
18. Lip ovate-oblong, with a small semiorbicular lobule on each side near the base; disk densely papillose throughout.
P. gacayana.
18. Lip ovate-oblong to oblong, with the margins thickened; disk not papillose.....*P. circumplexa*.
17. Peduncle free from the leaf.
19. Leaves obovate to spatulate.
20. Ovary and capsule profusely echinate; lip more than 2.5 mm. long.....*P. tribuloides*.
20. Ovary and capsule not echinate, conspicuously 3-angled; lip less than 1.5 mm. long.....*P. stenostachya*.
19. Leaves elliptic to lanceolate.
21. Lip ovate-cordate to ovate-subquadrate, less than 2.5 mm. long; petals linear-lanceolate.
22. Flowers numerous, glomerate; petals more than 4 mm. long.
P. ruscifolia.
22. Flowers several, fasciculate; petals less than 3 mm. long.
P. leucantha.
21. Lip ovate-oblong to oblong or oblong-elliptic, more than 3 mm. long; petals oblong-elliptic to spatulate.
23. Petals 1 mm. or less wide.....*P. hondurensis*.
23. Petals 1.5 mm. or more wide.
24. Inflorescence both terminal and lateral; pollinia two.
P. Johnsonii.
24. Inflorescence terminal only; pollinia four.*P. ophiocepala*.
- III. Series Elongatae. The plants in this series are characterized by having an inflorescence that exceeds the subtending leaf. The inflorescence may be either a single flower or a many-flowered raceme. The sheaths of the stem are not ciliate-hispid.
1. Apex of the petals and dorsal sepal clavellate.....*P. Amesiana*.
1. Apex of the petals and dorsal sepal not clavellate.
2. Lip ovate, elliptic-oblong or oblong-lanceolate, occasionally subpandurate, entire, without auricles or distinct lobes.

3. Lip distinctly ovate to ovate-oblong, obtuse to acuminate, conspicuously widest below the middle.
 4. Lip subacute to acuminate, less than 3 mm. long; dorsal sepal ovate-lanceolate to oblong-elliptic, less than 4.5 mm. long.
 5. Lip with a callus in front of the claw; inflorescence less than 2 cm. long; column with a short foot.....*P. pedicellaris*.
 5. Lip ecallose; inflorescence up to 10.5 cm. long; column without a foot.
 6. Petals oblong-elliptic to spatulate; raceme straight..*P. compacta*.
 6. Petals linear-lanceolate; raceme fractiflex.
 - P. lancilabris* var. *oxyglossa*.
 4. Lip obtuse, 3 mm. or more long; dorsal sepal linear to narrowly lanceolate, more than 6 mm. long.
 7. Entire inflorescence granulose-ciliate; petals linear-lanceolate.
 - P. plumosa*.
 7. Inflorescence not granulose-ciliate, glabrous; petals oblong-quadrate to oblanceolate.
 8. Lip verruculose.....*P. cobanensis*.
 8. Lip not verruculose, with a fleshy callus near the apex.
 - P. platystylis*.
3. Lip elliptic to oblong-lanceolate, sometimes slightly dilated at the base or constricted below the middle.
 9. Inner surface of sepals long-hirsute.....*P. hirsuta*.
 9. Inner surface of sepals not hirsute.
 10. Lip with a distinct constriction below the middle, more than 3 mm. long; leaves usually about equaling or shorter than the secondary stems, rarely twice as long.
 11. Sepals narrowly lanceolate, caudate-acuminate, papillose-pubescent on the inner surface; lateral sepals free almost to the base.
 - P. dolichopus*.
 11. Sepals ovate-oblong to elliptic-lanceolate, glabrous on the inner surface; lateral sepals united almost to the apex.
 - P. Ghiesbreghtiana*.
 10. Lip not constricted below the middle, 3 mm. or less long; leaves more than twice as long as the secondary stems.
 12. Lip ciliate or pubescent along the margins.
 13. Lip pubescent along the margins, prominently sulcate, thickened on each side of the groove, with a mammillate process on each side at the base.....*P. abjecta*.
 13. Lip ciliate along the apical margins, not sulcate, without mammillate processes, somewhat angled at the base.
 - P. corniculata*.
 12. Lip not ciliate or pubescent along the margins.
 14. Plant repent.....*P. minutalis*.
 14. Plant caespitose.
 15. Petals obovate to lanceolate; lip lightly carinate along the lateral nerves.....*P. Grobyi*.
 15. Petals linear-triangular; lip not carinate..*P. yucatanensis*.
2. Lip not ovate, either obovate, panduriform, 3-lobed, auricled, hastate or provided with conspicuous angles or teeth.
 16. Peduncle and rachis setose-pubescent.....*P. setosa*.
 16. Peduncle and rachis not setose-pubescent, at most glandular-pubescent.
 17. Lip more than 5 mm. long, provided with a prominent auricle or denticulate lobule on each side at the base.

18. Ovary and capsule densely muricate; petals ligulate-lanceolate, less than 2.5 mm. wide; lip with a denticulate lobule on each side at the base.....*P. muricata*.
18. Ovary and capsule not muricate, glabrous; petals oblong-obovate, more than 2.8 mm. long; lip auriculate at the base.
19. Inflorescence subtended by a large spathaceous sheath 2-8 cm. long; raceme essentially straight, loosely many-flowered.
P. Tuerckheimii.
19. Inflorescence subtended by an inconspicuous spathaceous sheath less than 1.5 cm. long; raceme often fractiflex, 1- to few-flowered.
P. pachyglossa.
17. Lip less than 4 mm. long, not conspicuously auriculate.
20. Lateral lobes of the lip large, parallel to the mid-lobe.
P. segoviensis.
20. Lateral lobes, if present, not parallel to the mid-lobe.
21. Lip triangular-sagittate or hastate.
22. Lip triangular-sagittate; leaves 10 cm. or more long.
P. immersa.
22. Lip hastate; leaves less than 5 cm. long.
23. Petals linear to narrowly lanceolate, about 0.5 mm. wide; lateral sepals slightly united at the base.....*P. hastata*.
23. Petals oblong-spatulate, about 1 mm. wide; lateral sepals united almost to the apex.....*P. abbreviata*.
21. Lip not triangular-sagittate or hastate.
24. Lip narrowly ligulate to lanceolate, prominently toothed or angled on each side at the base.
25. Peduncle supporting a congested few-flowered spike, glabrous; lip bicarinate.....*P. Brighamii*.
25. Peduncle 1- to 2-flowered, densely glandular-puberulent; lip ecarinate.....*P. glandulosa*.
24. Lip 3-lobed, obovate or panduriform, usually slightly constricted at about the middle.
26. Petals obovate, broadly rounded or obtuse at the apex, entire; lip broadest below the middle, 3-lobed or panduriform.....*P. fuegi*.
26. Petals not obovate; lip broadest above or at about the middle, simple or lobed.
27. Lip obovate, entire; petals cuneate below, linear-caudate above, irregularly dentate.....*P. samacensis*.
27. Lip 3-lobed; petals linear-falcate.
28. Lip 3-lobed near the apex; petals entire.
P. segregatifolia.
28. Lip 3-lobed at the base; petals laciniate..*P. Pringlei*.

Pleurothallis abbreviata Schltr. Repert. Sp. Nov. 10: 352. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, November, 1877, *H. von Türckheim* 10).

Epiphytic on trees, up to 1,350 meters alt. Rare in Guatemala.

Plant very small, caespitose, glabrous except for the lip, up to 3 cm. tall. Secondary stem almost obsolete, concealed by small scarious sheaths, monophyllous. Leaf erect, obovate-spatulate, obtuse-apiculate at the apex, tapering into

the short petiole, marginate, up to 1 cm. long including the petiole, 2-3.5 mm. wide. Raceme solitary, loosely 4-12-flowered, up to 3 cm. long including the setiform peduncle. Floral bracts ovate-cucullate, apiculate, about 1 mm. long, about equal to the pedicellate ovaries. Flowers small, reddish purple. Dorsal sepal oblong-cymbiform, subacute, glabrous, 3-nerved, 2.75-3 mm. long, about 1.2 mm. wide when spread out. Lateral sepals united almost to the apex to form an oval bifid lamina with the apical lobules obtuse and converging; lamina about 3 mm. long and 2 mm. wide, 4-nerved, with the inside nerves dorsally carinate. Petals oblong-spatulate, abruptly acuminate, falcate, 2.2-2.5 mm. long, about 1 mm. wide. Lip hastate, with two mammillate processes on each side of the claw at the base, obtuse at the apex, ciliate along the margin, about 2 mm. long and 0.7 mm. wide above the middle; basal angles incurved, when spread out obtusely rounded; disk with two large conspicuous thickened intramarginal keels extending from the base to the apex and projecting beyond the apex so as to form an apparently retuse apex. Column about 2 mm. long, dilated above, denticulate at the apex, with the foot almost obsolete.

This species is characterized by having a hastate lip traversed by two very large fleshy conspicuous keels.

Alta Verapaz: Cobán, *Johnson* 651.

Pleurothallis abjecta Ames, Sched. Orch. 2: 17. 1923 (type: Guatemala, Dept. Alta Verapaz, Chamá, August 5, 1920, *Harry Johnson* 905). Figure 75.

Epiphytic on trees in open forests, up to 1,300 meters alt. Rare in Mexico, Guatemala, Honduras and Costa Rica.

Plants densely caespitose, glabrous except for the lip, less than 3 cm. tall. Secondary stem up to 5 mm. long, monophyllous, concealed by scarious sheaths that are deciduous. Leaf obovate, oblanceolate or spatulate, obtuse-apiculate at the apex, tapering into the slender sulcate petiole, marginate, coriaceous, erect, up to 1.8 cm. long including the petiole, 3-4 mm. wide near the apex. Raceme solitary, few-flowered, slightly exceeding the leaves, up to 2 cm. long including the filiform peduncle; peduncle provided with several minute fugaceous sheaths. Floral bracts about 2 mm. long, scarious, tubular, acute. Flowers small, reddish purple, subfasciculate. Pedicellate ovary up to 4 mm. long, the slender pedicels about 2 mm. long and persistent. Dorsal sepal elliptic-lanceolate, obtuse to acute, elongate-cucullate, 3-nerved, 3.5-4 mm. long, about 1.2 mm. wide. Lateral sepals coherent almost to the apex to form a triangular-ovate or elliptic lamina with two convergent free tips that are subacute; lamina 4-nerved, 3-4 mm. long, about 2 mm. wide. Petals triangular-lanceolate from a broad base, acuminate, 1-nerved, 2-3 mm. long, about 1 mm. wide near the middle. Lip entire, narrowly linguiform or oblong-lanceolate, obtuse, entire and provided with shaggy glandular hairs at the apex, below provided with hairs of irregular length along the strongly deflexed margins, 2.5-3 mm. long, hardly 1 mm. wide; disk sulcate to about the middle, thickened on each side of the groove, with the thickened margin of the groove extended below into two mammillate processes. Column produced into a short foot, dilated above, denticulate at the apex, about 2 mm. long.

This species is closely allied to *Pleurothallis abbreviata*, from which it differs in having an entire lip.

Represented from Guatemala only by the type collection.

Pleurothallis Amesiana L. O. Wms. Bot. Mus. Leaf. Harv. Univ. 8: 143. 1940.

Epiphytic in dense moist forests, up to 1,700 meters alt. Rare in Guatemala and Costa Rica.

Plant with a creeping rhizome that gives rise to numerous crowded secondary stems, up to 20 cm. tall; roots fibrous, flexuous, glabrous, numerous. Secondary stems up to 15 cm. long, unifoliate, entirely concealed by whitish scarious sheaths; sheaths distichous, somewhat inflated and dorsally carinate, approximate or more or less imbricating. Leaf with a short petiole, ovate-elliptic, tridenticulate at the obtuse apex, rounded or somewhat cuneate at the base, fleshy-coriaceous, dorsally carinate along the mid-nerve, up to 6.5 cm. long and 3 cm. wide. Inflorescences usually several, 1-flowered, about equaling or surpassing the leaf; peduncle filiform, naked, subtended by three clasping sheaths. Flower large for the genus, yellowish, tinged or spotted with reddish brown or purple, the pedicellate ovary nearly concealed by a close tubular membranaceous bract. Sepals and petals with a slight fleshy thickening at the very base. Dorsal sepal lanceolate, with an elongate caudate tip, up to 2.7 cm. long, about 3 mm. wide near the base, dorsally carinate, 5-nerved; cauda filiform, about 1.5 cm. long, fleshy, with a thickened ellipsoid apex. Lateral sepals apparently free or connate into a lamina that is oblanceolate-oblong, about 2.6 cm. long and 9 mm. wide above the middle, bidentate at the subacute apex, concave at the base, 12-nerved beyond the middle. Petals similar to the dorsal sepal but much smaller, nearly 2 cm. long, about 1.5 mm. wide near the base, 3-nerved with the lateral nerves marginal, toothed on each side near the base with the anterior tooth rather prominent and falcate-lanceolate. Lip lanceolate in outline, 3-lobed near the base, about 1 cm. long including the minute claw, rounded at the base with a thickened margin, abruptly truncate at the apex; lateral lobes very small and inconspicuous, triangular-falcate, incurved, acuminate, setulose; mid-lobe semiorbicular at the base then abruptly narrowed to form an elongate oblong termination of which the margins (especially the lateral ones) are shortly and irregularly lacerate; disk 3-nerved, with two fleshy converging keels near the margins of the suborbicular basal portion, the oblong terminal part densely papillose on the inner surface. Column slender, arcuate, clavate above, with a prominent triangular fleshy dilation at the base.

This species is similar in habit and vegetative appearance to *P. xanthophthalma*, but the flowers are very different in the two species.

Quezaltenango: Along old road between Finca Pirineos and Patzulín, *Standley* 87029.—San Marcos: Above Finca El Porvenir, along Río Cabús to within two miles of Cueva de las Palomas, south-facing slopes of Volcán Tajumulco, *Steyermark* 37983.—

Suchitepequez: Southwestern lower slopes of Volcán Zunil, bordering quebradas and barrancas between Finca Montecristo and Finca Asturias, southeast of Santa María de Jesús, *Steyermark* 35275.

Pleurothallis angustisepala Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10, no. 4: 74. pl. 6. 1942 (type: Guatemala, Dept. Alta Verapaz, above Tamahú, on tree, alt. 900–1,200 meters, April 5, 1939, *P. C. Standley* 70958). Figure 70.

Epiphytic on trees and shrubs, up to 1,200 meters alt. Rare in Guatemala.

Plant coarse, erect or ascending, glabrous, caespitose, 11–25 cm. tall. Secondary stem rigid, monophyllous, 2.5–11 cm. long, provided with several scarios, somewhat inflated sheaths. Leaf sessile, oblong-elliptic to lanceolate, shortly acuminate and minutely tridenticulate at the apex, coriaceous, dark purple on the lower surface, 6–13 cm. long, 1.5–3.5 cm. wide. Racemes one to several, essentially sessile, rigid, densely few-flowered, up to 4.3 cm. long, enclosed at the base by a scarios conduplicate sheath; sheath acuminate, up to 1.5 cm. long. Floral bracts infundibuliform, acute-apiculate, scarios, 3–4.5 mm. long. Flowers rather large, yellow or greenish yellow, with short pedicels; pedicels about as long as the bracts. Sepals granulose on the inner and outer surfaces and along the margins. Dorsal sepal narrowly linear, long-acuminate, 3-nerved, sulcate below the middle, 1.6–1.7 cm. long, 1.5–2 mm. wide. Lateral sepals united almost to the apex to form an elliptic-lanceolate lamina; lamina sharply bifid, conspicuously gibbous at the base, 6-nerved, dorsally carinate along the mid-nerve of each sepal especially below the middle, 1.6–1.8 cm. long, 6.5–7.2 mm. wide at or near the middle. Petals linear-ob lanceolate, acute to shortly acuminate, with the margins irregularly long-serrate above the middle, 1-nerved, 3.5–4.5 mm. long, about 1 mm. wide. Lip strongly arcuate at the base, with a prominent claw; lamina triangular-lanceolate, shortly acuminate, with a prominent denticulate auricle on each side at the base, irregularly fimbriate along the margins, 6–6.3 mm. long, 2.5–3 mm. wide at the base; disk 3-nerved, coarsely papillose; claw fleshy-thickened, subquadrate, with a minute tooth on each side at the base, 1.5–2 mm. long, 1.2–1.5 mm. wide. Column rather stout, broad, irregularly crenate at the apex, 3–4 mm. long, with a foot 3–4 mm. long. Capsule obliquely ellipsoid, about 2 cm. long.

Pleurothallis angustisepala is easily distinguished from *P. Rowleei* Ames, a close ally found in Costa Rica and Panama, by its narrowly linear dorsal sepal and differently shaped fimbriate and auriculate lip.

Alta Verapaz: Above Tamahú, on tree, *Standley* 70895. Growing on under side of limbs, Tukurú, on a small shrub at about two to three feet from the ground, November 28, 1920, *Johnson* 1169.

Pleurothallis Blaisdellii S. Wats. Proc. Am. Acad. Arts & Sci. 23: 284. 1888 (type: Guatemala, Chocon forests, 1885, *S. Watson*). Figure 71.

Epiphytic on trees in dense forests and in coffee plantations, up to 1,200 meters alt. Widespread and fairly common from Mexico to Costa Rica.

Plant erect or spreading, caespitose, up to 15 cm. tall. Secondary stem slender, monophyllous, up to 9 cm. long, concealed by tubular closely appressed lepanthoid sheaths; sheaths dilated above to form an ovate-lanceolate acute lamina, hispidulous along the costae and margins of the lamina. Leaf ovate-oblong to narrowly lanceolate, broadly rounded to acute and obliquely tridenticulate at the apex, coriaceous, marginate, 2.5–7 cm. long, 7–20 mm. wide. Racemes one or several, fasciculate, few-flowered, enclosed at the base by the uppermost sheath of the stem, up to 3 cm. long including the short filiform peduncle. Floral bracts ovate-cucullate, acute, scarious, about 1 mm. long. Flowers purplish red or bronze-green, on slender arcuate pedicels that are about 2 mm. long. Sepals more or less ciliate along the margins especially on the lower part, 3-nerved, mostly carinate along the mid-nerve; dorsal sepal lanceolate, acute, strongly concave at the base, somewhat recurved above the middle, 4–7 mm. long, 1.7–2 mm. wide at the base; lateral sepals united almost to the middle, obliquely linear-oblong to linear-lanceolate, obtuse or subacute, fleshy-thickened, gibbous at the base, 4–7 mm. long, 1–1.5 mm. wide above the point of coalescence. Petals obliquely oblong-quadrate, broadly rounded and irregularly fimbriate at the apex, 1-nerved, 1.5–2.2 mm. long, 0.5–1 mm. wide. Lip arcuate below the middle in natural position, linear or oblong-pandurate, slightly dilated at the cordate base with the minute obtuse auricles incurved, obtuse at the apex with the margins slightly reflexed, pubescent along the margins especially at the apex, 2.5–3 mm. long, 0.6–1.1 mm. wide; disk 3-nerved, minutely glandulose, with a transverse callus that is prominently thickened at the middle near the base of the lip. Column slender, dilated upward, somewhat 3-lobed at the apex with the margins deeply and unevenly fringed, about 2 mm. long, with a foot about 1 mm. long. Capsule globose, about 6 mm. long.

This species resembles *Pleurothallis ciliaris* very closely but may be distinguished, in part, from that species by its straight instead of fractiflex stem.

Guatemala: Pacaya, Johnston 1405. The following collections are sterile but probably represent this species: Sacatepéquez: Wooded quebrada just above Barranca Hondo, Standley 88942.—Santa Rosa: Las Vinas, Heyde & Lux 6248.

Pleurothallis Brighamii S. Wats. Proc. Am. Acad. 23: 285. 1888 (type: Guatemala, on trees in the forests of Chocon, *S. Watson*). Figure 72.

Epiphytic on trees and vines, up to 350 meters alt. Widespread but not common from Guatemala and British Honduras to Panama.

Plant small, caespitose, glabrous, less than 10 cm. tall. Secondary stem almost obsolete, monophyllous, less than 5 mm. long, concealed by whitish scarious sheaths. Leaves bright green, glossy, oblanceolate to elliptic-oblong, obtuse to acute and tridenticulate at the apex, up to 8 cm. long and 1 cm. wide. Peduncle

filiform, up to 8 cm. long including the congested few-flowered spike, usually exceeding the leaves, provided with several small inconspicuous scarious sheaths. Floral bracts imbricated, striate, acuminate-cuspidate. Flowers small, delicate, yellowish with reddish brown stripes or marked with green and brown. Pedicels filiform, up to 6 mm. long. Sepals slightly united at the base, minutely papillose along the margins; dorsal sepal elliptic-oblong, acute-apiculate to shortly acuminate, 3-nerved, dorsally carinate along the central nerve, 6–10.5 mm. long, 2.5–3.5 mm. wide; lateral sepals united to above the middle, elliptic-oblong, obtuse-apiculate, 3-nerved, dorsally carinate along the central nerve, 6.5–12 mm. long, 2–3.5 mm. wide above the point of coalescence. Petals obliquely obovate or spatulate, subacute, 2-nerved, 2–3 mm. long, 1–1.5 mm. wide. Lip narrowly ligulate, broadly rounded at the apex, ciliate along the apical margin, slightly canaliculate and recurved in natural position, somewhat fleshy, with a tooth on each side at the base and a tooth on each side just above the base, 3-nerved, 2–3 mm. long, 0.75–1 mm. wide; disk with a fleshy thickening at the base and two intramarginal thickened keels extending from the lateral teeth to above the middle. Column short, thick, dilated above, toothed at the apex.

Izabal: Río Chacón, *Johnson* 1180. Jocoló, Río Jocoló, *Johnson* 1281. Cayuga, between Bananera and Entre Rios, *Lewis* 179. Bay of Santo Tomás, between Escobas and Santo Tomás, *Steyermark* 39332. Between Virginia and Lago Izabal, Montaña del Mico, *Steyermark* 38824. Along Río Frío, Cerro San Gil, *Steyermark* 39914.—Petén: San Clemente to Dos Arroyas, *Bartlett* 12816. Monte Santa Teresa, *Lundell* 2668.

Pleurothallis Broadwayi Ames, Orch., Fasc. II: 267. 1908. Figure 78.

Epiphytic on trees, up to 2,400 meters alt. Widespread in the West Indies, Mexico, and Central America from Guatemala to Panama and Venezuela.

Plant erect or ascending, caespitose, up to 12 cm. tall. Secondary stem slender, rigid or flexuous, 1–4-leaved, 1–7 cm. long, concealed by lepanthoid sheaths; sheaths membranaceous, closely appressed, dilated and apiculate at the apex, ciliate on the costae and somewhat recurved margins, about 7 mm. long. Leaves suberect, scattered along the stem, obovate to elliptic-oblong, obtuse and retuse at the apex, coriaceous, glabrous, conspicuously marginate, 7–19 mm. long, 3–8 mm. wide. Peduncles terminal or lateral, filiform, exceeding the subtending leaf, supporting a loose few-flowered raceme, 1.5–5 cm. long including the raceme.

FIG. 71. *Pleurothallis Blaisdellii*. Flowering plant ($\times 1$); 1, lip, front-side view ($\times 10$); 2, petal ($\times 6$); 3, lateral sepals ($\times 4$); 4, column, side view ($\times 6$). *P. dentipetala* (not found in Guatemala; native to Costa Rica). Flowering plant ($\times 1$); 1, flower, with petal pulled aside, front-side view (about $\times 4$); 2, lip, front-side view ($\times 6$); 3, lip, front view ($\times 6$); 4, petal ($\times 4$). *P. Johnsonii*. Flowering plant ($\times 1$); 1, lip, front-side view ($\times 3$); 2, petal ($\times 3$); 3, lateral sepals ($\times 2$). Drawn by Eleonor B. Phillips.



Floral bracts minute, ovate-cucullate, about 1 mm. long. Flowers yellow-green, marked with purple, with short filiform arcuate pedicellate ovaries that are about 2 mm. long. Sepals ovate-lanceolate to narrowly lanceolate, acute to acuminate, concave below, 1-nerved, 3-6 mm. long, 0.9-2 mm. wide; lateral sepals oblique. Petals thin, obovate to spatulate, obtuse or broadly rounded at the apex, 1-nerved, 1-2 mm. long, up to 1 mm. wide. Lip with a short claw, arcuate in natural position, when spread out rhomboid-elliptic to oblong, the lower half somewhat dilated, obtuse, 3-nerved, thickened at the apex, 2-2.5 mm. long, about 1 mm. wide; disk bicarinate, somewhat papillose above the middle. Column erect, bialate at the apex, about 1.5 mm. long, with a short foot. Capsule obliquely ovoid, about 3 mm. long.

This species is distinctive in that it usually has more than one leaf on the secondary stem, an uncommon character in the species of *Pleurothallis* found in Guatemala.

Guatemala: Volcán de Pacaya, above Las Calderas, Standley 58463.

Pleurothallis cardiothallis Reichb. f. Bot. Zeit. 15: 158. 1857. *P. acutipetala* Schltr. Repert. Sp. Nov. 10: 35. 1912 (type: Guatemala, Dept. Alta Verapaz, near Pansamalá, February, 1886, *H. von Türckheim* 860; near Cobán, November, 1907, *H. von Türckheim* II 1997).

Epiphytic on trees in dense tropical or cloud forests, occasionally terrestrial, up to 2,000 meters alt. Widespread from Mexico to Costa Rica.

Plant erect, slender or somewhat stout, glabrous, caespitose, 2-6.5 dm. tall. Secondary stem rigid, monophyllous, up to 5.5 dm. long and 6 mm. in diameter, provided with two or more scarious fugaceous tubular sheaths. Leaf broadly cordate-ovate to cordate-lanceolate, contracted into a long-acuminate or caudate apex, coriaceous, spreading or held almost horizontal, 10-24 cm. long, 3-10.5 cm. wide below the middle. Flowers ringent, fasciculate, subcoriaceous, appearing one at a time, varying in color from deep red to greenish yellow, with slender pedicellate ovaries that are up to 3 cm. long, subtended by scarious tubular bracts that are about 1 cm. long; base of inflorescence enclosed in a compressed conduplicate scarious spathe that is up to 3.5 cm. long. Sepals somewhat united at the base, papillose-puberulent along the margins and on the outer surface. Dorsal sepal suborbicular to elliptic, broadly rounded to obtuse-apiculate at the apex, concave, 6-12-nerved, 10-19 mm. long, 5-14 mm. wide. Lateral sepals entirely united into

FIG. 72. I. *Pleurothallis verecunda* (not found in Guatemala; native of Costa Rica and Panama). Flowering plant ($\times 1$); 1, flower ($\times 6$); 2, lip and column, side view ($\times 5$); 3, lip, front-side view ($\times 7$); 4, petal ($\times 6$). II. *P. Brighamii*. Flowering plant ($\times 1$); flower, partly spread open ($\times 3$). III. *P. Grobyi*. Flowering plant ($\times 1$); flower, spread out ($\times 4$). Drawn by Blanche Ames.



a suborbicular to broadly elliptic lamina; lamina broadly rounded to subacute at the apex, concave, 6–12-nerved, 9.5–19 mm. long, 6.5–16 mm. wide. Petals lanceolate to linear-lanceolate, acuminate, falcate, 3-nerved, often subauriculate at the base of the anterior margin. Lip with a short claw, fleshy-thickened, ovate-triangular, ovate-quadrate or obliquely oblong-quadrate, obtuse-apiculate to shortly acuminate, ciliate above along the apical margin, 3-nerved, somewhat auriculate on each side at the base, 4–10 mm. long, 3–6 mm. wide at the base; disk with a shallowly concave depression at the base. Column short, thick, fleshy, up to 3 mm. long. Capsule cylindrical, slightly oblique, prominently 6-ribbed, 3–5 cm. long.

Although the flowers of this species vary considerably in size, there seems to be little difference in their morphology.

Alta Verapaz: Cobán, *Türckheim* 3811. Road Chamá to Cobán, *Johnson* 505; 507. Near Cobán, *Johnson* 934. Finca Mocca, *Johnson* 78. Mountains east of Tactic, on road to Tamahú, *Standley* 71281. Tactic, *Johnston* 1827. Large swamp just east of Tactic, *Steyermark* 43963. Wet forest near Tactic, above the bridge across Río Frío, *Standley* 90485.—Chiquimula: Cerro Tixixí (Tishishí), 3–5 miles north of Jocotán, *Steyermark* 31564.—Huehuetenango: Cerro Negro, two miles east of Las Palmas, Sierra de los Cuchumatanes, *Steyermark* 51675.

Pleurothallis Carioi Schltr. Repert. Sp. Nov. 15: 205. 1918 (type: Guatemala, Dept. Suchitepequez, Chilion near Mazatenango, August, 1866, *Bernoulli & Cario* 496).

Epiphytic in dense tropical forests, up to 1,000 meters alt. Uncommon in Mexico, British Honduras, Guatemala and Honduras.

Plant small, glabrous, creeping and closely appressed to the bark of trees; rhizomes provided with scarious sheaths. Secondary stems ascending, monophyllous, 1–1.5 cm. apart, up to 5 cm. long, with two tubular scarious sheaths near the base. Leaf elliptic-lanceolate to linear-lanceolate, acuminate and obliquely tridenticulate at the apex, coriaceous, with the margins somewhat revolute, 2–4.3 cm. long, 4–9 mm. wide. Peduncles several, fasciculate, 1-flowered, 4–6 mm. long, enclosed by a compressed spathe 3–4 mm. long. Floral bracts ovate-cucullate, acute, about 2 mm. long. Flowers pale green with purple stripes. Dorsal sepal oblong-elliptic or ligulate, obtuse to subacute, 3-nerved, 4–4.5 mm. long, about 1.5 mm. wide. Lateral sepals united to form a suborbicular-ovate lamina; lamina subacute and bidentate at the apex, concave-cucullate below the middle, several-nerved, 4–4.5 mm. long, about 3 mm. wide. Petals obliquely ligulate, obtuse to acute, somewhat dilated about the middle, ciliate along the apical margins, 1-nerved, 2–2.5 mm. long, about 0.8 mm. wide. Lip with a short claw, arcuate below the middle in natural position, when spread out subhastate-elliptic, obtuse, with a small lobule on each side near the base, ciliate-denticulate along the apical margins, 2–3 mm. long, about 1 mm. wide; disk with a fleshy callus on each side in front of the lateral lobules, papillose above the middle. Column semiterete,

denticulate at the apex, about 2 mm. long with a foot about 1 mm. long. Capsule obliquely ellipsoid, prominently 3-angled, about 1 cm. long.

Represented from Guatemala only by the type collection.

Pleurothallis ciliaris (Lindl.) L. O. Wms. *Caldasia* no. 5: 14. 1942. *Specklinia ciliaris* Lindl. Bot. Reg. 24: Misc. 31. 1839.

Epiphytic on shrubs and trees in dense damp forests and coffee plantations, up to 1,300 meters alt. Widespread in Mexico, Guatemala, Honduras and Costa Rica.

Plant ascending or spreading, caespitose, 5-14 cm. tall. Secondary stem slender, fractiflex, monophyllous, 3-8.5 cm. long, concealed by lepanthoid sheaths; sheaths closely appressed, with a conspicuous free portion that is ovate to ovate-lanceolate and up to 10 mm. long, ciliate along the costae and apical margins. Leaf oblong-elliptic, lanceolate or linear-lanceolate, subobtuse to acute and minutely tridenticulate at the apex, glabrous, coriaceous, purplish green, 2-6.5 cm. long, 3.5-13 mm. wide. Peduncles several, fasciculate, filiform, bearing few-flowered racemes, up to 2.5 cm. long including the raceme, enclosed at the base by the uppermost stem sheath. Floral bracts ovate-cucullate, apiculate, purplish-tinged, mostly less than 1 mm. long. Flowers purplish red or yellowish green, with filiform arcuate pedicellate ovaries that are about 2 mm. long. Dorsal sepal oblong-elliptic, subacute, cymbiform, 3-nerved, ciliate along the margins, 3-4 mm. long, 1.2-2 mm. wide. Lateral sepals united into a suborbicular-oblong lamina that separates easily; lamina often retuse, 6-nerved, gibbous at the base, recurved above the middle with the ciliate margins upturned, about 3.5 mm. long and 2-3 mm. wide. Petals cuneate to oblong-quadrate, rounded at the apex, irregularly denticulate-ciliate on the apical margins, 1-1.3 mm. long, about 0.5 mm. wide. Lip arcuate-decurved in natural position, with a small mammillate auricle on each side at the base, when spread out broadly oblong-spatulate, broadly rounded at the apex, 3-nerved, ciliate along the margins, 1.5-2 mm. long, 0.5-1 mm. wide; disk with a linear callus extending from the base to about one-third the length of the lip where it forks. Column slender, recurved, 1.5-2 mm. long, toothed at the apex, with a foot about 1 mm. long. Capsule obliquely ovoid, 5-6 mm. long.

Izabal: Vicinity of Quiriguá, *Standley* 23901. Los Andes District, *Lewis* 42.—Petén: La Libertad, *Lundell* 3893. Sábana San Francisco, La Libertad, *Lundell* 2138.

Pleurothallis circumplexa Lindl. Bot. Reg. 24: Misc. 24. 1838.

Epiphytic on trees in forests and on cliffs, up to 3,000 meters alt. Common in Mexico, less common from Guatemala to Costa Rica.

Plant erect, slender, caespitose, glabrous except for the flowers, 10-35 cm. tall. Secondary stem 3-winged, monophyllous, 4.5-24 cm. long. Leaf tapering into and continuous with the secondary stem, broadly ovate, elliptic-oblong or lanceolate, obtuse to subacute and retuse at the apex, with an apicule in the sinus, often

oblique, pinnately veined below, dorsally keeled along the mid-vein, 6–14 cm. long, 2–5 cm. wide. Peduncle united its entire length with the leaf, up to 4 cm. long; raceme one or several, fasciculate, few-flowered, up to 2.5 cm. long, subtended by spathaceous acuminate sheaths that are 6–11 mm. long. Floral bracts ovate to ovate-lanceolate, cucullate, acute or shortly acuminate, silver-spotted, scarious, 3–4 mm. long. Flowers distichous, reddish brown or brownish yellow, with slender puberulent pedicellate ovaries that are about 3 mm. long. Sepals densely puberulent on the outer surface. Dorsal sepal oblong-obovate, broadly rounded at the apex, 3-nerved, canaliculate below, 3.5–5.5 mm. long, 1.5–3 mm. wide above the middle. Lateral sepals united their entire length or nearly so, forming a suborbicular-elliptic lamina; lamina entire or retuse at the apex, concave, 6-nerved, 3.5–4 mm. long, 3.5–3.8 mm. wide. Petals obliquely linear to lanceolate, obtuse to acute, irregularly serrulate along the upper margins, conspicuously 1-nerved, 2–3 mm. long, 0.5–1 mm. wide. Lip fleshy-thickened, ovate-oblong to oblong, obtuse to broadly rounded at the apex, canaliculate with the margins thickened, usually irregularly crenulate along the apical margin, 2.5–3 mm. long, 1–2 mm. wide; disk with three rather prominent nerves that are thickened at their tips, often dorsally carinate along the mid-nerve, with a linear callus on each side below the middle. Column broadly winged above, with the margins of the wings irregularly serrate, about 2.5 mm. long. Capsule obliquely cylindrical, 2–3 cm. long.

This species is unique in that the peduncle is completely embraced by the lower part of the leaf so as to cause the flowers to appear epiphyllous.

Alta Verapaz: Near the Sepacuite, *Cook & Griggs* 456. Cobán, *Türckheim* II 1836; II 1663. Cobán, *Johnson* 728.—Guatemala: Road to El Salvador, about four miles from Guatemala City, *Lewis* 72.—Quezaltenango: Near and above Volcán Santa María, Santa María de Jesús, *Steyermark* 33922.—Santa Rosa: Chiapas, *Heyde & Lux* 6240.—Zacapa: Sierra de las Minas, slopes of Monte Virgen, around summit of mountain, *Steyermark* 42608.

Pleurothallis cobanensis Schltr. Repert. Sp. Nov. 11: 42. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, October, 1885, *H. von Türckheim* 798).

Epiphytic in woods, up to 1,350 meters alt. Rare in Guatemala and Costa Rica.

Plant erect, slender, glabrous, 15–30 cm. tall. Secondary stem terete, mono-phyllous, 4–9 cm. long, provided with two or three loose scarious sheaths. Leaf erect, elliptic-oblong to elliptic-oblong, obtuse and incised at the apex, coriaceous, tapering at the base into the short sulcate petiole, 4.5–9.5 cm. long, 1.5–2.6 cm. wide. Raceme solitary, slender, loosely many-flowered, up to 25 cm. long including the peduncle; peduncle provided with several scarious appressed tubular bracts, subtended by a spathaceous sheath that is up to 2.5 cm. long. Floral bracts ovate-cucullate, obtuse or acute, 4–6 mm. long. Flowers erect-

spreading, apparently purplish, with slender pedicels that are up to 6 mm. long. Dorsal sepal lanceolate, shortly acuminate, 3-nerved, dorsally carinate along the mid-nerve, 7-8.5 mm. long, about 3 mm. wide below the middle. Lateral sepals united almost to the apex to form a bifid lamina; lamina oblong-elliptic, 6-nerved, conspicuously carinate along the central nerve of each sepal with the carinae extending beyond the apex to form boat-shaped tips, 7.5-9 mm. long, about 4 mm. wide, with the free part shortly acuminate. Petals oblong-obovate or oblong-quadrate, somewhat oblique, broadly rounded at the apex, conspicuously 3-nerved with the nerves thickened above, denticulate along the apical margins, verruculose above the middle on the outer surface, 3.2-4 mm. long, 1.5-2 mm. wide. Lip arcuate-recurved and dilated at the base, in natural position with the dilated lateral margins erect, 3-nerved with the nerves dorsally carinate; when spread out ovate-lanceolate, obtuse, dilated below the middle, 3.5-4.2 mm. long, 1.8-2.5 mm. wide across the lateral lobules; disk longitudinally thickened along the median line with the ridge verruculose, roughly verruculose above the middle and along the apical margins. Column short, thick, 3-3.5 mm. long, 3-lobed at the apex, with a foot that is about 1 mm. long.

Pleurothallis cobanensis is closely allied to *P. platystylis* but differs from that species mainly in that the lip is verruculose instead of being glabrous.

This species is represented from Guatemala only by the type collection.

Pleurothallis comayaguensis Ames, Bot. Mus. Leaf. Harv. Univ. 4: 31. fig. p. 33. 1936. Figure 73.

Epiphytic on trees in dense damp forests, up to 1,200 meters alt. Rare in Guatemala and Honduras.

Plant creeping and closely appressed to the bark of trees. Secondary stems almost obsolete, from a creeping rhizome about 3 mm. apart, rigid, monophyllous, up to 1 mm. long. Leaf elliptic or lenticular, fleshy, conspicuously marginate, up to 6 mm. long, 3-3.5 mm. wide. Peduncles borne singly in the axils of the leaves, glabrous, up to 6 mm. long, with a tubular bract at the base, supporting about 4 small red flowers that open in succession. Floral bracts tubular-cucullate, acute, about 2 mm. long. Dorsal sepal oblong, obtuse, strongly concave, smooth, 3-nerved, about 2 mm. long and 0.5 mm. wide. Lateral sepals coherent almost to the apex to form an orbicular lamina; lamina strongly concave at the base, smooth, about 2 mm. long and 1.5 mm. wide. Petals lanceolate, obtuse, 1-nerved, with several elongate glandular hairs on the margins, about 2 mm. long, hardly 1 mm. wide. Lip narrowly ligulate, obtuse at the apex, about 1.5 mm. long and 0.5 mm. wide, with the margins of the basal half strongly inrolled, sometimes almost contiguous over the lower half of the disk; margins of the apical half deflexed, rather closely beset with elongated glandular hairs, shortly glandulose at the tip and on the depressed or canaliculate central portion of the glandulose disk, auriculate on each side at the base, with the auricles rounded and curved inward. Column dilated upward from a slender base, about 2 mm. long, cucullate at the apex with the margins of the clinandrium irregularly fringed.

PLEUROTHALLIS

comayaguensis
Ames



FIG. 73. *Pleurothallis comayaguensis*. 1, part of plant ($\times 2$); 2, 3, and 4, flowers ($\times 10$); 5, lip, from above ($\times 15$); 6, column, with anther removed ($\times 15$); 7, anther (much enlarged); 8, pollinia (much enlarged); 9, petal ($\times 15$). Drawn by Blanche Ames.

Vegetatively, this species bears a strong resemblance to *Pleurothallis Lewisae*, but differs from it markedly in the structure of the flower. The structure of the lip and column resembles *P. abjecta*.

Petén: La Libertad, *Lundell* 2235. Sábana San Francisco, La Libertad, *Lundell* 2140.

Pleurothallis compacta (Ames) Ames & C. Schweinf. Sched. Orch. 10: 24. 1930. *Stelis compacta* Ames, Orch., Fasc. III: 76, t. 53. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, May, 1901, *H. von Türckheim* 7991). *Platystele compacta* Ames, Proc. Biol. Soc. Wash. 35: 85. 1922.

Epiphytic on trees in dense or open forests, up to 2,400 meters alt. Fairly common in Guatemala, Honduras and Costa Rica.

Plant erect, glabrous, densely caespitose, up to 10 cm. tall. Secondary stem nearly obsolete, less than 5 mm. long, monophyllous, concealed by whitish scarios sheaths. Leaf linear-oblancoelate, obtuse and obliquely tridenticulate at the apex, coriaceous, 1–5.5 cm. long, 1.5–3.5 mm. wide. Peduncle solitary, filiform, exceeding the leaf, provided with several short scarios sheaths, up to 10.5 cm. long including the raceme; raceme cylindrical, compact, densely many-flowered. Floral bracts ovate-cucullate, acuminate, apiculate, scarios, dorsally carinate, 1.5–2.2 mm. long. Flowers green-yellow, usually purple-spotted, with slender persistent pedicels 2–3 mm. long. Sepals dorsally carinate along the solitary nerve; dorsal sepal oblong-elliptic, subacute, 1–3 mm. long, 1–1.5 mm. wide; lateral sepals free almost to the base, obliquely oblong-elliptic to suborbicular-obovate, broadly rounded at the apex, 1–2.6 mm. long, 1–2 mm. wide. Petals obliquely oblong-elliptic to oblanceolate-spatulate, broadly rounded at the apex, dorsally carinate along the solitary nerve, 1–3 mm. long, 1–1.5 mm. wide. Lip ovate-cordate to suborbicular-ovate, acute or shortly acuminate, fleshy, 1–1.5 mm. long, about 1 mm. wide. Column erect, thick, footless. Capsule obliquely globose, 2–3 mm. long.

This species superficially resembles some of the species of *Stelis* found in Guatemala. However, the long, thin petals as well as other floral characters immediately distinguish it from *Stelis*. It is closely related to *P. lancilabris* and *P. lancilabris* var. *oxyglossa*.

Represented from Guatemala only by the type collection.

Pleurothallis corniculata (Sw.) Lindl. Bot. Reg. 28: Misc. 83. 1842. *Epidendrum corniculatum* Sw. Prodr. 123. 1788. *P. jocolensis* Ames, Sched. Orch. 2: 19. 1923 (type: Guatemala, Dept. Izabal, Jocoló, Río Perdonalis, December 25, 1920, *Harry Johnson* 1048).

Epiphytic on trees and vines in dense forests or jungles, up to 750 meters alt. Widespread, but not very common in the West

Indies, Mexico, Guatemala, Honduras, Costa Rica and British Guiana.

Plant small, glabrous, densely caespitose, up to 5 cm. tall. Secondary stem often almost obsolete, monophyllous, up to 8 mm. long, concealed by several brownish tubular scarious sheaths. Leaf with a short sulcate petiole, obovate to oblong-elliptic, obtuse and minutely tridenticulate at the apex, coriaceous, marginate, 1.3–4 cm. long including the petiole, 4–8 mm. wide. Peduncle solitary, filiform, 1-flowered, 2–4.5 cm. long, provided with a minute scarious bract near the middle. Floral bract tubular, dilated upward, scarious, 2–2.5 mm. long. Flowers light green or yellow, with filiform arcuate pedicellate ovaries that are up to 9 mm. long. Dorsal sepal linear-lanceolate to elliptic-lanceolate, narrowly obtuse to acute at the apex, canaliculate, 3-nerved, dorsally carinate along the mid-nerve, 5–6.5 mm. long, 1.7–2 mm. wide. Lateral sepals united almost to the apex to form a narrowly triangular-lanceolate lamina; lamina subobtuse and bidentate at the apex, 6-nerved, dorsally carinate along the mid-nerve of each sepal, 5–6 mm. long, 1.75–2.5 mm. wide near the base. Petals obliquely obovate to elliptic-lanceolate, the anterior margin conspicuously dilated above, shortly acuminate at the minutely ciliate thickened apex, mostly 2-nerved, dorsally carinate along the central nerve with the keel extending as a posterior apicule, 2.2–2.5 mm. long, 1–1.2 mm. wide. Lip arcuate in natural position, canaliculate with the basal somewhat dilated margins upturned, when spread out oblong-ligulate, obtuse and minutely papillose-ciliate at the apex, 3-nerved, 2–3 mm. long, 0.8–1 mm. wide. Column short and fleshy, 3-toothed at the summit, 1.5–2 mm. long, with a foot that is about 1 mm. long.

This species is closely related to *P. Brighamii*, from which it differs in having smaller flowers, which are more delicate in texture, and in having the lateral sepals coherent nearly to the apex.

Represented from Guatemala only by the type collection of *P. jocolensis*.

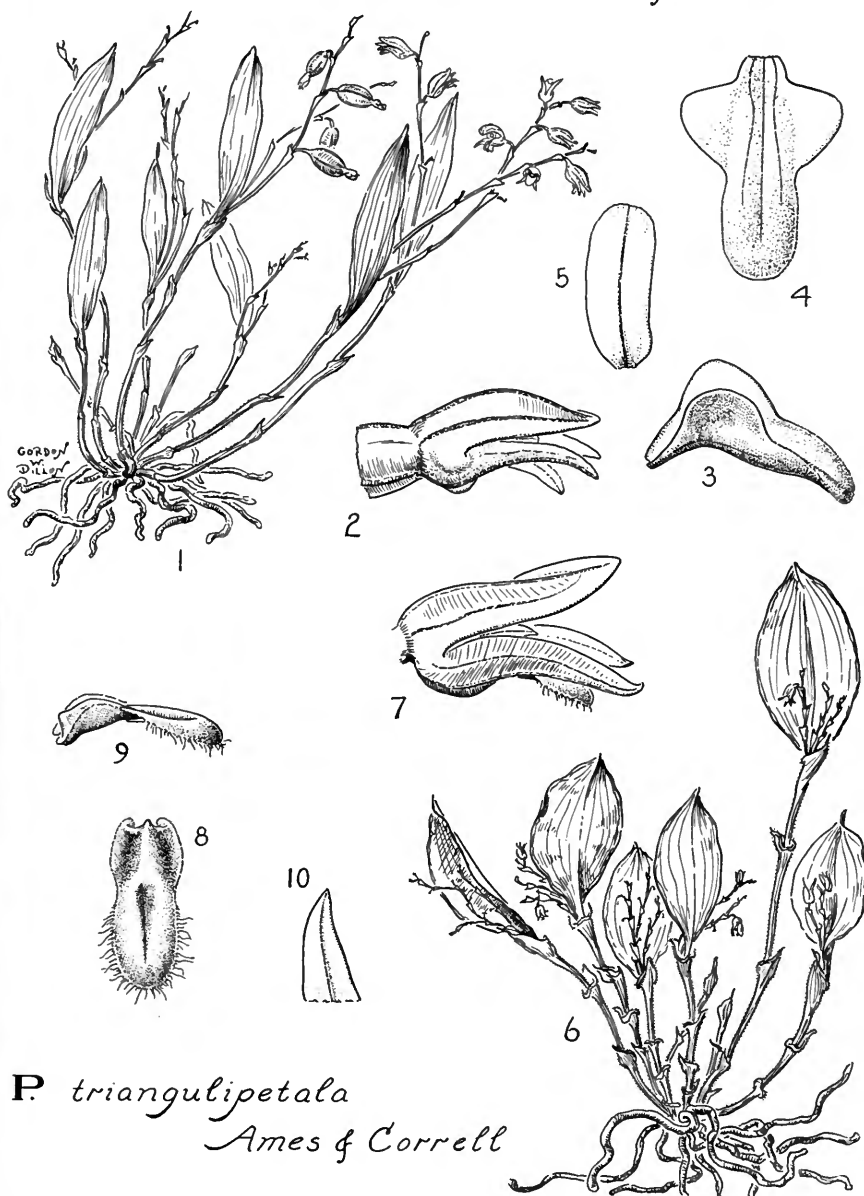
Pleurothallis crucilabia Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10, no. 4: 76. pl. 7. 1942 (type: Guatemala, Dept. Guatemala, Volcán de Pacaya, above Las Calderas, alt. 1,800–2,400 meters, November 30, 1938, *P. C. Standley* 58433). Figure 74.

Epiphytic on trees. Apparently endemic to Guatemala.

Plant small, erect or ascending, caespitose, up to 7.5 cm. tall. Secondary stem slender, monophyllous, 2–3.5 cm. long, concealed by lepanthiform sheaths; sheaths tubular, acuminate-apiculate at the slightly dilated apex, sparingly hispid along the costae and on the apical margin. Leaf linear-oblong, acute, coriaceous, marginate, glabrous, 1.5–2.5 cm. long, about 5 mm. wide. Peduncles usually two, slender, up to 4 cm. long including the loosely few-flowered raceme. Floral bracts infundibuliform, acute-apiculate, scarious, 1.5–2 mm. long. Flowers pale yellow, glabrous, strongly arcuate, with slender persistent conspicuously arcuate pedicels that are about 3 mm. long. Dorsal sepal elliptic-oblong, acute, deeply cymbiform, 3-nerved, dorsally carinate along the nerves, 4.5–5.3 mm. long, 2.5–3 mm. wide below the middle. Lateral sepals united to about the middle,

PLEUROTHALLIS

crucilabia Ames & Correll



P. triangulipetala
Ames & Correll

FIG. 74. *Pleurothallis crucilabia*. 1, plant ($\times 1$); 2, flower, side view ($\times 5$); 3, lip, side view from above ($\times 10$); 4, lip, spread out ($\times 10$); 5, petal ($\times 10$). *P. triangulipetala*. 6, plant ($\times 1$); 7, flower, side view ($\times 10$); 8, lip, from above ($\times 10$); 9, lip, side view ($\times 10$); 10, petal ($\times 10$). Drawn by G. W. Dillon.

gibbous at the base, obliquely triangular-lanceolate, acuminate, decurved, dorsally prominently carinate along the solitary nerve, 4–5 mm. long, 2–2.5 mm. wide across the united basal portion. Petals obliquely oblong, broadly rounded at the apex, 1-nerved, 2–2.5 mm. long, 0.8–1 mm. wide. Lip with a short claw, arcuate in natural position, hastately 3-lobed when spread out, 3-nerved with the nerves extending slightly above the middle of the lip, 3–3.2 mm. long including the claw, 1.8–2.2 mm. wide across the lateral lobes; lateral lobes broadly rounded, slightly thickened on the apical margins; mid-lobe oblong-quadrate, subtruncate at the apex, about 1 mm. wide. Column short, stout, fleshy, tridentate at the apex, 2 mm. long, with a foot about 1 mm. long. Capsule obliquely globose, about 4 mm. long.

This species is unique among Guatemalan species of *Pleurothallis* in that it has a subequally three-lobed lip. There seems to be no closely allied species in Central America. The Jamaican *P. trilobata* Fawc. & Rendle has a similarly shaped lip. However, that species is a minute plant less than 1 cm. tall and the lip is only about one-half as long as that of *P. crucilabia*.

Represented from Guatemala only by the type collection.

Pleurothallis dolichopus Schltr. Repert. Sp. Nov. 10: 394. 1912 (type: Guatemala, in mountains between Cobán and Tactic, December, 1907, *H. von Türckheim* II 2072). *P. lamprophylla* Schltr. Repert. Sp. Nov. 15: 205. 1918 (type: Guatemala, Dept. Quezaltenango, between Palohueci and Xuilpach, April, 1878, *Bernoulli & Cario* 582).

Epiphytic on trees in forests and open country, occasionally terrestrial, up to 3,000 meters alt. Rather common from Mexico to Costa Rica.

Plant erect, slender, caespitose, glabrous except for the flowers, 15–40 cm. tall. Secondary stem terete, monophyllous, up to 20 cm. long, provided with two or three tubular scarious closely appressed sheaths that are up to 7 cm. long. Leaf erect, oblong to oblong-elliptic, broadly rounded or obtuse and minutely retuse at the apex, with a small cusp in the sinus, tapering into the short sulcate petiole, coriaceous, 6.5–14 cm. long including the petiole, 1.5–3.8 cm. wide. Racemes several, fasciculate in the axil of the leaf, erect, rather densely many-flowered, with all the flowers open at the same time, usually longer than the leaf, up to 20 cm. long including the short peduncle, with several short scarious imbricating spathaceous sheaths at the base. Floral bracts tubular-cucullate, apiculate, 3–5 mm. long. Flowers suberect-spreading, with slender arcuate pedicels that are 5–9 mm. long. Sepals pale yellow or greenish yellow, narrowly lanceolate, caudate-acuminate, often strongly revolute at the apex, 3-nerved, glabrous on the outer surface, papillose-puberulent on the inner surface, 8–21 mm. long, 1.7–2.2 mm. wide near the base; lateral sepals somewhat falcate. Petals translucent, obliquely oblong to oblanceolate, broadly rounded or obtuse at the apex, glabrous, dorsally carinate along the solitary central nerve, 3–4.8 mm. long, 1–2 mm. wide. Lip

reddish brown, with three purple striae at the base, in natural position arcuate-recurved, oblong to somewhat oblong-spatulate, obtuse, somewhat constricted below the middle, crenulate-dentate along the apical margin, the lower half much thickened, conspicuously 3-nerved with the nerves dorsally carinate, 3–5 mm. long, 1–2.2 mm. wide above the middle; disk canaliculate, with a conspicuous keel along each lateral nerve and a light keel along the mid-nerve, the keels converging near the apex of the lip, the lateral keels often erect thickened wings below the middle. Column slender, glabrous, lacerate at the apex, 2.5–3 mm. long, with a foot that is about 1.5 mm. long.

Chimaltenango: Chichavac, *Skutch* 463.—El Progreso: Sierra de las Minas, hills between Finca Piamonte and slopes southeast of Finca Piamonte, *Steyermark* 43438. Sierra de las Minas, hills north of Finca Piamonte, between Finca Piamonte and summit of Volcán Santa Luisa, *Steyermark* 43479.—Huehuetenango: Above San Juan Ixcay, Sierra de los Cuchumatanes, *Steyermark* 49989. Salamá, *Skutch* 1055.—San Marcos: Barranca Eminencia, above San Rafael Pie de la Cuesta, *Standley* 68654 [?sterile].—Suchitepequez: Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46649. Near Concepción de las Minas, *Lewis* 120. Volcán Atitlán, *Hatch & Wilson* 369.

Pleurothallis fuegi Reichb. f. Beitr. Orch. Centr.-Am. 97. t. 10. 1866 (type: Guatemala, Volcán de Fuego, January 20, 1857, *Wendland*).

Epiphytic on trees in dense wet mountain forests, up to 2,700 meters alt. Uncommon in Guatemala, Honduras and Panama.

Plant erect, glabrous, densely caespitose, up to 6 cm. tall. Secondary stem almost obsolete, up to 5 mm. long, monophyllous, concealed by short scarious tubular sheaths. Leaf obovate to oblanceolate, obtuse and tridenticulate at the apex, conspicuously marginate, subcoriaceous, 1.2–2 cm. long including the slender sulcate petiole, 2.5–6 mm. wide. Peduncle solitary, filiform, supporting a lax few-flowered raceme, up to 4.5 cm. long including the raceme, provided with several minute bracts. Floral bracts tubular-cucullate, apiculate, 1–2 mm. long. Flowers minute, pale bronze-green or whitish green, marked with purple, with slender pedicels that are about 2 mm. long. Dorsal sepal elliptic to narrowly lanceolate, extended into a long cauda, concave, dorsally carinate along the three nerves, 4.5–9 mm. long from the base to the tip of the cauda, 1.8–2.5 mm. wide. Lateral sepals united for 2–3 mm. at the base, obliquely lanceolate, extended into long caudae, dorsally carinate along the one nerve, 4–8 mm. long, about 2 mm. wide above the point of coalescence. Petals obliquely obovate, obtuse to broadly rounded at the apex, 1-nerved, 1.25–3 mm. long, 0.5–1 mm. wide. Lip somewhat 3-lobed, arcuate-decurved, 3-nerved, 2.2–4 mm. long, including the short claw, 1–1.5 mm. wide across the lateral lobes; lateral lobes semiorbicular or obtusely angled, erect in natural position; apical lobe oblong to oblong-elliptic, obtuse, somewhat convex. Column short, 1.2–1.8 mm. long, with a foot about 1.5 mm. long.

This species is similar to *P. samacensis* in habit but is distinguished from that species by dissimilar floral characters.

Alta Verapaz: Cobán, *Türckheim* II 1966. Cobán, *Muenschner* 12041. Mountains east of Tactic, on road to Tamahú, *Standley* 71170. Mountains along road between Tactic and the divide on road to Tamahú, *Standley* 91459. Tactic, *Johnston* 1863.—Chimaltenango: Calderas, *Johnston* 1473.—Chiquimula: Volcán Quezaltepeque, 3–4 miles northeast of Quezaltepeque, *Steyermark* 31498.—Quezaltenango: Densely forested damp white sand quebrada, El Pocito, south of San Martín Chile Verde, on road to Colomba, *Standley* 84942.—San Marcos: Along road above Barranca Eminencia, *Standley* 68521.—Suchitepequez: Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46713.—Zacapa: Sierra de las Minas, cloud forest in ravine bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29838.

Pleurothallis gacayana Schltr. Repert. Sp. Nov. 21: 335. 1925 (type: Guatemala, Amatitlán, Forêts de Las Cachiflanas, Volcán de Gacaya, April, 1921, *Tonduz* 413).

Epiphytic on trees in forests, up to 1,200 meters alt. Rare in Guatemala and Costa Rica.

Plant erect, short, caespitose, glabrous, 9–11 cm. tall. Secondary stem 3-winged, monophyllous, 3–8 cm. long, provided with two loose tubular scarious sheaths. Leaf erect to suberect, sessile, decurrent on the stem, oblong-elliptic, obtuse-retuse at the apex, fleshy-coriaceous, 5–7 cm. long, 1.5–2.2 cm. wide. Racemes 1–2, at the summit of the stem near the middle or on the lower part of the leaf, very short, compactly few-flowered, distichous, up to 1 cm. long, lower part enveloped by a conduplicate acuminate spathe that is up to 1.1 cm. long. Floral bracts erect-spreading, imbricated, ovate-lanceolate, acute, concave. Flowers yellow, fleshy. Dorsal sepal oblong-spatulate, broadly rounded or obtuse at the apex, sparingly ciliolate along the margins, somewhat papillose-puberulent on the outer surface, 3-nerved, canaliculate, 5.2–6.2 mm. long, 2.1–2.5 mm. wide. Lateral sepals united to form a broadly ovate or oval lamina; lamina bifid or broadly rounded at the apex, ciliolate along the margins, somewhat papillose-puberulent on the outer surface, 6-nerved, 4.5–5 mm. long, 4–4.8 mm. wide. Petals oblong-lanceolate, acute, irregularly serrulate along the margins, glabrous, conspicuously 1-nerved, 2–3.5 mm. long, about 1 mm. wide. Lip with a short claw, the sides of the basal half incurved in natural position; lamina when expanded ovate-oblong, 2.5–4 mm. long including the claw, about 2.2 mm. wide near the base, provided with an indistinct very small semiorbicular lobule on each side near the base, margins finely and irregularly erose; disk densely papillose throughout, with a pair of indistinct thickened keels near the middle on each side. Column slender, more or less arcuate, bialate at the apex, with the wings denticulate at the summit.

This species closely resembles *P. circumplexa* in habit, but differs from that species mainly in the floral characters.

Represented from Guatemala only by the type collection.

Pleurothallis Ghiesbreghtiana A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 16. 1845. *P. incompta* Reichb. f. Bonpl. 2: 24. 1854. *P. longissima* Lindl. Fol. Orch. (Pleurothallis) 31. 1859.

Epiphytic on trees in open pine-oak forest and dense forests, up to 1,500 meters alt. Common in the West Indies and Mexico to Panama.

Plant erect, slender, caespitose, glabrous, 12–60 cm. tall. Secondary stem terete, monophyllous, 4–18 cm. long, provided with several scarious fugaceous sheaths. Leaf oblong-elliptic, linear or oblanceolate, retuse and obtuse at the apex, usually marginate, up to 17 cm. long, 1–3 mm. wide. Raceme solitary, slender, loosely many-flowered, up to 45 cm. long including the peduncle; peduncle provided with several scarious tubular bracts that are about 3 mm. long, with a complanate acuminate sheath at the base that is 1–2.5 cm. long. Floral bracts ovate-cucullate, apiculate, scarious, about 3 mm. long. Flowers ringent-nodding, translucent, yellow or greenish yellow, with slender arcuate pedicels that are about 1 cm. long. Dorsal sepal ovate-oblong to elliptic-lanceolate, subobtuse to shortly acuminate and recurved at the apex, deeply concave, 3-nerved, 6–12 mm. long, 3–3.5 mm. wide. Lateral sepals united their entire length or nearly so to form an elliptic or elliptic-suborbicular bidentate lamina; lamina longitudinally concave, 6-nerved, dorsally carinate along the central nerve of each sepal, 5–11.5 mm. long, 3.5–5.5 mm. wide. Petals with a short narrow claw, obliquely oblong-lanceolate to narrowly lanceolate, obtuse-apiculate to subacute at the apex, 1–3-nerved with the lateral nerves usually joining the central nerve above, 5–11 mm. long including the claw, 1.7–4 mm. wide. Lip with a short claw, in natural position arcuate-decurved, canaliculate below with the margins of the lower half erect; when spread out oblong-pandurate, slightly constricted below the middle, broadly rounded at the apex, with the margins often irregularly crenulate, 3-nerved, 3.5–6.2 mm. long, 2–3.2 mm. wide, conspicuously constricted below the middle; portion below the constriction fleshy-thickened, orbicular-ovate to obcordate; portion above the constriction thin, flat, suborbicular to oblong-quadrate. Column short, irregularly toothed at the apex, 2–4 mm. long. Capsule ellipsoid, slender, about 1.5 cm. long.

Some plants of this species have cleistogamous flowers for which the name *P. Ghiesbreghtiana* var. *cleistogama* L. O. Wms. has been proposed. According to Hayes the species "has a delicious fragrance."

Amatitlán: Pacaya, Johnston 1406.—Baja Verapaz: North of Santa Rosa, Standley 69871. Near Panajaché, Lewis 156.—Escuintla: Along Río Guacalate, Standley 58281.—Sacatepéquez: Near Las Lajas, Standley 58300.—Suchitepéquez: Southern lower slopes of Volcán Zunil, vicinity of Finca Alvidas, east of Pueblo Nuevo,

Steyermark 35450.—“Guatemala”: *Skinner*.—“On trees, Nov. 1860,” *Hayes*.

Pleurothallis glandulosa Ames, Sched. Orch. 6: 60 (November 3), 1923. *P. vittariaefolia* Schltr. Repert. Sp. Nov. Beih. 19: 26, 198 (November 25), 1923.

Epiphytic on trees in forests, up to 1,000 meters alt. Widespread but not common from Mexico to Panama.

Plant small, densely caespitose, 2–5 cm. tall. Secondary stem almost obsolete, monophyllous, up to 5 mm. long, concealed by a short white scarious sheath. Leaf erect, linear-subfiliform to narrowly linear-oblong, obtuse and obliquely tridentate at the apex, coriaceous, glabrous, 2–4 cm. long, 1–3 mm. wide. Peduncle 1–2-flowered, filiform, copiously glandular-puberulent, 1.5–4.5 cm. long, with a closely appressed scarious tubular sheath near the middle. Floral bract tubular, scarious, apiculate, 2.5–3.5 mm. long, minutely papillose on the outer surface. Flowers greenish yellow or reddish yellow, with filiform puberulent pedicellate ovaries that are up to 8 mm. long. Dorsal sepal elliptic to narrowly lanceolate, subobtusely to acute, concave, 3-nerved, dorsally carinate along the nerves with the carinae and margins glandular-papillose, 4.2–8 mm. long, 1.5–2.6 mm. wide. Lateral sepals united to about the middle, oblong-lanceolate to linear-lanceolate, acute, 3-nerved, dorsally carinate along the nerves with the carinae and margins glandular-papillose, 4.2–8 mm. long, 1–2 mm. wide above the point of coalescence. Petals obliquely obovate, dilated above on the anterior margin, contracted into the acute-mucronate tip, 2-nerved, glabrous, 1.7–3.1 mm. long, 1.1–2 mm. wide near the apex. Lip with a short claw, conspicuously arcuate in natural position, lanceolate to linear-oblong with a cordate or somewhat sagittate base, the basal lateral teeth suberect, broadly rounded or obtuse at the conspicuously ciliate apex, 3-nerved, 2–4 mm. long, 1–2 mm. wide; disk fleshy-thickened below the lateral teeth, somewhat glandular. Column slender, 2–3 mm. long, 3-toothed at the apex, with broad wings on the anterior margins. Capsule obliquely obovoid, about 6 mm. long.

Guatemala: Presa Forest, Finca Mocá, south slope, Volcán Atitlán, *Hatch & Wilson* 344.

Pleurothallis Grobyi Batem. ex Lindl. Bot. Reg. 21: t. 1797. 1835. *P. marginata* Lindl. Bot. Reg. 24: Misc. 42. 1838 (type: Guatemala, *Skinner*). *P. choconiana* S. Wats. Proc. Am. Acad. 23: 285. 1888 (type: Guatemala, in the Chocon forests and at the ruins of Quiriguá, March and April, 1885, *S. Watson*). Figure 72.

Epiphytic on trees in dense forests, up to 1,500 meters alt. Widespread in the West Indies, Mexico, Central America and northern South America.

Plant erect or spreading, densely caespitose, glabrous, 3–15.5 cm. tall. Secondary stem almost obsolete, monophyllous, less than 6 mm. long, concealed by a white scarious sheath. Leaf obovate, elliptic-oblong or oblanceolate, broadly

rounded or obtuse and retuse at the apex, with a cusp in the sinus, coriaceous, conspicuously marginate, usually purplish on the lower surface, with a short sulcate petiole, up to 7 cm. long including the petiole, 3.5–11 mm. wide. Raceme solitary, loosely few-flowered, somewhat fractiflex, 2.5–15 cm. long including the long filiform reddish peduncle. Floral bracts minute, tubular-cucullate, apiculate, scarious, 1–2 mm. long. Flowers greenish white, yellow, marked with reddish purple, ringent, with filiform pedicels that are 3–5 mm. long. Dorsal sepal ovate-oblong to oblong-lanceolate, acuminate, concave, 3-nerved, 3.2–10 mm. long, 1.5–3 mm. wide. Lateral sepals united to form an ovate-elliptic to lanceolate bidentate lamina; lamina 4-nerved, concave, 3.1–11.5 mm. long, 2–3 mm. wide. Petals obliquely obovate to lanceolate, obtuse to acute, 1-nerved, 1.1–2.5 mm. long, 0.5–0.8 mm. wide. Lip linear-ligulate to oblong, broadly rounded to obtuse at the apex, canaliculate, 3-nerved, 1.7–3 mm. long, 0.4–1.1 mm. wide; disk lightly carinate along the lateral nerves. Column somewhat winged on each side on the anterior margins, tridentate at the apex, 1.2–3 mm. long.

Although the flowers of this species vary greatly in size, the floral segments are morphologically constant.

Alta Verapaz: Cubilgüitz, *Türkheim* 7673. Vicinity of Laguna Sapalá (Chajvovuch), one mile southwest of Sibicté, *Steyermark* 44909. Chamá, *Johnson* 971.—Chiquimula: Montaña Castilla, vicinity of Montaña Cebollas, along Río Lucía Saso, three miles southeast of Quezaltepeque, *Steyermark* 31306.—Escuintla: Escuintla, *Smith* 2253. Near Escuintla, *Hunnewell* 14676.—Izabal: Vicinity of Quiriguá, *Standley* 23902; 24197 (in part). Río Dulce, between Livingston and six miles up river, on north side (right side going up river), *Steyermark* 39430. Along Río Bonita, Cerro San Gil, *Steyermark* 41692.—Petén: La Libertad, *Lundell* 2339. Along Río Santa Mónica, between Cedral and Ceibal, *Steyermark* 46052. Forest between Finca Yalpemech along Río San Diego and San Diego on Río Cancuen, *Steyermark* 45344.—Sacatepéquez: Near Barranca Hondo, southeast of Alotenango, *Standley* 64975.—Osuna, *Johnston* 1569.

Pleurothallis hastata Ames, Orch., Fasc. II: 268. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, December, 1901, *H. von Türkheim* 501). *P. scopula* Schltr. Repert. Sp. Nov. 9: 28. 1910 (type: Guatemala, Dept. Alta Verapaz, epiphytic in high woods of Cubilgüitz, May, 1903, *H. von Türkheim* II 1180). Figure 75.

Epiphytic on trees in dense woods, up to 900 meters alt. Rare in Mexico, Guatemala, Honduras and Costa Rica.

Plant small, glabrous, densely caespitose, up to 5.5 cm. tall. Secondary stem almost obsolete, up to 3.5 mm. long, monophyllous, concealed by a minute scarious fugaceous sheath. Leaf oblanceolate-spatulate to oblong-lanceolate, obtuse to acute and minutely tridenticulate at the apex, coriaceous, conspicuously

marginate, 1-3 cm. long including the slender sulcate petiole, 1.2-4 mm. wide. Peduncle filiform, 2.5-4.5 cm. long, few- or many-flowered. Floral bracts scarious, oblong with an aristate cauda at the apex, about 2 mm. long. Flowers fasciculate, green-purple, spotted at the base, opening one at a time, with filiform pedicels that are about 5 mm. long. Sepals ovate-lanceolate to oblong-lanceolate, with a fleshy cauda that is about 2 mm. long, 3-nerved, dorsally carinate along the nerves, 5-7 mm. long including the cauda, 1-1.5 mm. wide; lateral sepals oblique, united for about 2 mm. Petals linear to narrowly lanceolate, acute to acuminate, oblique, irregularly serrate particularly along the anterior margin, 1-nerved, 2-3 mm. long, about 0.5 mm. wide. Lip with a short claw, somewhat 3-lobed, rhombic-ligulate or subhastate, obtuse to broadly rounded at the apex, 2-3.2 mm. long, 1.5-2 mm. wide across the lateral lobes, 3-nerved, with a small retrorse tooth on each side of the claw; terminal lobe fleshy-thickened on the minutely papillose disk, oblong, with the thin margins irregularly toothed or shortly fimbriate; lateral lobes triangular, subacute, somewhat crenulate on the upper margins, fleshy-thickened on the disk between them. Column slender, about 2 mm. long. Capsule obliquely obovoid, about 7 mm. long.

Represented from Guatemala only by the type collections.

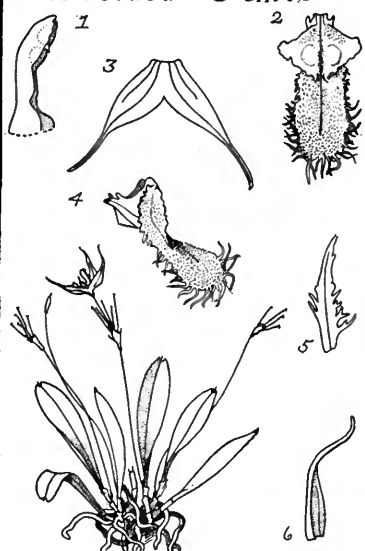
Pleurothallis hirsuta Ames, Orch., Fasc. II: 270. 1908.

Epiphytic or on cliffs in dense mountain forests, at high elevations, up to 3,000 meters alt. Widespread in Mexico, Guatemala and Honduras.

Plant caespitose, up to 15 cm. tall, glabrous except for the flowers. Secondary stem slender, terete below, trigonous above, unifoliate, provided below with two close-fitting sheaths, up to 11 cm. long. Leaf elliptic-oblong, tridenticulate at the obtuse apex, rigidly coriaceous, strongly keeled along the center on the back, up to 5.5 cm. long and 2 cm. wide. Peduncles one to three, filiform; raceme laxly few-flowered, exceeding the leaf. Floral bracts cucullate, mucronate at the dilated apex, shorter than the slender pedicel. Flowers hirsute, ringent, greenish yellow, mottled or spotted with deep purple. Dorsal sepal oblong-elliptic in outline, obtuse, deeply concave below, reflexed above, 3-nerved, with a dorsal keel that terminates in a mucro, hirsute on the inner surface near the margin, 6-7 mm. long, about 3 mm. wide. Lateral sepals arcuate-decurved, somewhat sigmoid in outline, united on the lower half to form a saccate mentum, spreading above, obliquely elliptic, subacute, with a dorsal keel that terminates in a mucro, hirsute on the inner surface above, 3-nerved, 4-4.5 mm. long, 2-2.5 mm. wide. Petals

FIG. 75. *Pleurothallis hastata*. Flowering plant ($\times 1$); 1, column, side view ($\times 8$); 2, lip, front view ($\times 8$); 3, lateral sepals ($\times 3$); 4, lip, side view ($\times 8$); 5, petal ($\times 6$); 6, dorsal sepal ($\times 3$). *P. samacensis*. Flowering plant ($\times 1$); 1, flower, front-side view ($\times 4$); 2, lip, front-side view ($\times 9$); 3, column, side view ($\times 8$). *P. diveza* (not found in Guatemala; native to Costa Rica). Flowering plant ($\times 1$); 1, flower, front-side view, with lateral sepal pulled back ($\times 3$); 2, petal ($\times 5$); 3, lip, front-side view ($\times 10$). *P. abjecta*. Flowering plant ($\times 1$); 1, lateral sepals ($\times 4$); 2, petal ($\times 4$); 3, dorsal sepal ($\times 4$); 4, lip, front-side view ($\times 7$); 5, lip, front view ($\times 7$); 6, column, side view ($\times 5$). Drawn by Eleonor B. Phillips.

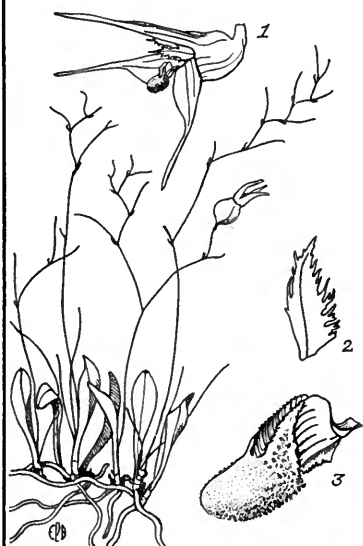
Phastata Ames



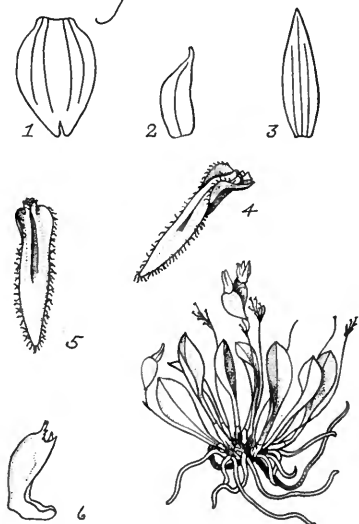
P. samacensis Ames



P. divexa Ames



P. abjecta Ames



PLEUROTHALLIS

obliquely spatulate, fleshy at the obtuse apex, conspicuously 3-nerved with the nerves dorsally carinate, about 3 mm. long and 1.5 mm. wide near the apex. Lip articulate with the column-foot, with a slender claw, arcuate at the base and again at the apex; lamina oblong, rounded at the apex, about 2 mm. long and 1.5 mm. wide; disk with an intramarginal keel on each side below the middle, with a prominent mid-nerve; claw linear, adorned with a sulcate callus. Column winged, somewhat trilobulate at the apex and denticulate along the margins, with a prominent foot, about 3 mm. long. Capsule obliquely ellipsoid, 6-ribbed, sharply 3-angled, about 1 cm. long.

The trigonous secondary stem is a unique characteristic of this species.

Chiquimula: Volcán Quezaltepeque, 3-4 miles northeast of Quezaltepeque, *Steyermark* 31478.—Huehuetenango: Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, *Steyermark* 48615.

Pleurothallis hondurensis Ames, Sched. Orch. 7: 20. *pl.* 15. 1908. Figure 78.

Epiphytic on trees in lowland forests especially along rivers, up to 600 meters alt. Rare in Guatemala and Spanish Honduras.

Plant up to 2.5 dm. tall, from an elongated rhizome. Roots coarsely fibrous, whitish, spreading. Secondary stem 5-12 cm. long, 1-1.5 mm. thick, partly concealed by several tubular sheaths, the uppermost one very much elongated. Leaf solitary at apex of stem, coriaceous, 7.5-13 cm. long, 1.3-2 cm. wide above the middle, elliptic-lanceolate to oblanceolate, acute, longer than the racemes. Peduncles fasciculate in the axil of the leaf, enclosed at the base by a closely appressed sheath, 4-5 cm. long including the few-flowered raceme, rather stout. Floral bracts infundibuliform, acute, scarious, 1.5-2 mm. long. Flowers about eight, greenish white or yellowish striped with purple, with slender pedicellate ovaries that are about 3 mm. long. Dorsal sepal oblong, acute, 3-nerved, about 1 cm. long and 1 mm. wide. Lateral sepals coherent almost to the apex to form a lanceolate 6-nerved lamina; lamina 9 mm. long, with the central nerve of each sepal produced at the tip into a distinct keel. Petals oblong, acute, somewhat dilated above the middle, with the margins somewhat denticulate, about 3 mm. long and 1 mm. wide. Lip unguiculate, with a small retrorse lobule on each side of the base of the claw, expanded above into an oblong acute lamina that is truncate at the base; lamina fleshy, conspicuously 3-nerved, with the nerves prominent on the under surface, about 5 mm. long and 2 mm. wide near the middle. Column 2.5 mm. long, produced into a conspicuous foot.

This species is apparently a heliophyte, and when exposed to strong sunlight the leaves become suffused with a bronzy purple hue. The flowers vary in coloration, but are normally yellowish, with distinct purplish stripes along the veins of the sepals. The petals are more or less hyaline, with a broad central band of carmine or rose-purple.

Izabal: South-facing lower ridges of Cerro San Gil (El Armitano), opposite Cayuga, *Steysmark* 39484. Los Andes District, near Entre Rios, *Margaret W. Lewis* 33.

Pleurothallis immersa Lind. & Reichb. f. Bonpl. 3: 224. 1855. *P. lasiosepala* Schltr. Repert. Sp. Nov. 11: 43. 1912 (type: Guatemala, near Pansamalá and Rubelcrúz, February, 1886, *H. von Türckheim* 859).

Epiphytic on trees in open oak-pine forests, up to 1,500 meters alt. Widespread but not common in Mexico, Guatemala, Honduras, Costa Rica and northern South America.

Plant rather large, erect, caespitose, glabrous except for the flowers, 18–47 cm. tall. Secondary stem short, stout, 2.5–7 cm. long, monophyllous, concealed by two brown tubular sheaths. Leaf oblong-oblancoolate, broadly rounded to obtuse and retuse at the apex, glabrous, coriaceous, 10–19 cm. long, 2–3.8 cm. wide. Raceme loosely many-flowered, conspicuously fractiflex, 17–40 cm. long including the slender peduncle; peduncle provided with several short scarious sheaths. Floral bracts ovate-cucullate, acute-apiculate, scarious, 3–5 mm. long. Flowers dusky greenish yellow or purplish brown with dark nerves, with slender pedicels usually extending at right angles to the rachis; pedicels persistent, 3–8 mm. long. Sepals densely pubescent on the inner surface. Dorsal sepal elliptic-lanceolate, acute, cymbiform below the middle, conspicuously recurved above the middle, 3-nerved, strongly keeled dorsally below the middle, 8–14 mm. long, 2.5–4 mm. wide. Lateral sepals united almost to the apex to form an oblong-elliptic bifid lamina; lamina 6-nerved, dorsally carinate along the mid-nerve of each sepal, 8–13 mm. long, 4.2–5.5 mm. wide. Petals obovate-spatulate, subtruncate-obtuse at the apex, dorsally fleshy-thickened along the center especially at the apex, 3–4 (rarely up to 5.5) mm. long, 1.8–2.5 (rarely up to 3.5) mm. wide. Lip conspicuously arcuate-decurved in natural position, sagittate or triangular-hastate when spread out, with an oblong-quadrate thickened claw that has a short mammillate process on each side at the base, 3–4 (rarely 6) mm. long including the claw, 1.3–2 (rarely 3) mm. wide; disk 3-nerved, the central vein slightly thickened, with an intramarginal linear callus on each side extending from the lateral triangular auricles to the apex of the lip. Column slender, arcuate, narrowly winged on the anterior margins with the wings irregularly denticulate, 3-lobed at the apex with the margins toothed, 3–3.5 mm. long, with a foot 1–1.5 mm. long. Capsule ellipsoid, about 2 cm. long.

In Schlechter's description of *P. lasiosepala*, the petals and lip were said to be 5.5 mm. long and 6 mm. long, respectively. We saw no specimens having such large petals and lip.

Zacapa: Sierra de las Minas, trail between Santa Rosalía de Mármol and Vegas, *Steysmark* 42927.

Pleurothallis Johnsonii Ames, Sched. Orch. 2: 21. 1923 (type: Guatemala, Dept. Alta Verapaz, Chamá to Cobán, August 15, 1920, *Harry Johnson* 901). Figure 71.

Terrestrial or growing on rocks, up to 2,800 meters alt. Rare in Guatemala and Honduras.

Plant ascending or spreading, glabrous, caespitose, up to 26 cm. tall. Secondary stem rather stout, rigid, monophyllous, 4–14 cm. long, concealed by loose overlapping sheaths of which the uppermost one often encloses the base of the leaf. Leaf with a short sulcate petiole, oblong-lanceolate to oblong-elliptic, acute, conduplicate below the middle, 8–13 cm. long, 2.5–5.4 cm. wide. Peduncles terminal and lateral, supporting a few-flowered short raceme; terminal peduncle rising from the base of the leaf, up to 4 cm. long including the raceme; lateral peduncles rising at the base of the secondary stems, flexuous, up to 7 cm. long including the raceme, provided with short inflated scarious apiculate sheaths. Floral bracts suborbicular-flabellate, truncate-apiculate, involute, scarious, purple-spotted, about 4 mm. long. Flowers reddish, purple-blotched, fleshy. Sepals glandular-papillose on the inner and outer surfaces and along the apical margins, several-nerved; dorsal sepal ovate-lanceolate to oblong-elliptic, subobtuse to acute and thickened at the apex, concave at the base, 7–13 mm. long, 3.5–5 mm. wide; lateral sepals free to below the middle, obliquely triangular to oblong-elliptic, obtuse-apiculate and thickened at the apex, the upper part concave-cucullate, dorsally carinate along the mid-nerve, 7–10 mm. long, 2.5–5 mm. wide. Petals obliquely rhombic-spatulate, subacute, glandular-papillose on the inner and outer surfaces, conspicuously long-ciliate along the upper margins, 3-nerved, 5–8 mm. long, 1.5–2.2 mm. wide above the middle. Lip arcuate, ligulate, ovate-oblong, abruptly subacute to broadly rounded at the apex, apical margins somewhat crenulate, 5.5–7 mm. long including the short cuneate claw, 2–3.5 mm. wide; disk 3-nerved, with a V-shaped callus just above the claw and a fleshy verruculose linear callus along each lateral nerve, verruculose just in front of the V-shaped callus and on the upper half of the lip. Column slender, 3-lobed at the apex, about 5 mm. long, with a prominent foot about 3 mm. long. Capsule large, strongly ribbed, ellipsoid, about 3 cm. long.

This species is unusual among the Guatemalan *Pleurothallis* in that it bears both terminal and lateral inflorescences on the same plant.

Chiquimula: Montaña Nube (Montaña Volcancitos), between Socorro Mountain and Cerro Brujo, southeast of Concepción de las Minas, *Steiermark* 30888.—San Marcos: Barrancas six miles south and west of town of Tajumulco, northwestern slopes of Volcán Tajumulco, *Steiermark* 36694; 36687.—Zacapa: Sierra de las Minas, upper slopes, along Río Repollal to summit of mountain, *Steiermark* 42505.

Pleurothallis lancilabris (Reichb. f.) Schltr. var. ***oxyglossa*** (Schltr.) C. Schweinf. Bot. Mus. Leaf. Harv. Univ. 6: 200. 1938. *P. oxyglossa* Schltr. Repert. Sp. Nov. 10: 354. 1912 (type: Guatemala, Dept. Alta Verapaz, in high woods, near Cobán, February, 1908, *H. von Türckheim* II 2422a).

Epiphytic on trees, up to 1,900 meters alt. Uncommon in Mexico, Guatemala and Costa Rica.

Plant small, erect or ascending, densely caespitose, glabrous, 1.5–8 cm. tall. Secondary stem almost obsolete, less than 5 mm. long, monophyllous, concealed by a whitish scarious sheath. Leaf narrowly obovate to linear-spatulate, obtuse and obliquely tridenticulate at the apex, membranaceous, marginate, 1–3.5 cm. long, 2–4 mm. wide near the apex. Raceme solitary, slender, laxly few- to many-flowered, prominently fractiflex, up to 7.5 cm. long including the short filiform peduncle. Floral bracts minute, ovate-cucullate, shortly acuminate, scarious, 1–1.5 mm. long. Flowers pale green to reddish green, distichous, with filiform persistent pedicels 3–4 mm. long. Sepals ovate-lanceolate, long-acuminate, attenuate, ciliolate along the margins, concave below, 1-nerved, 2.5–4.5 mm. long, 1–1.2 mm. wide near the base; lateral sepals somewhat oblique. Petals narrowly linear-lanceolate, long-acuminate, attenuate, falcate, ciliolate along the margins, 1-nerved, 1.5–4 mm. long, about 0.5 mm. wide. Lip fleshy, ovate-lanceolate, long-acuminate, attenuate, 1–3-nerved, ciliolate along the margins, fleshy-thickened on the disk at the base, 2–3 mm. long, 0.8–1 mm. wide near the base. Column short, footless, broadly 2-winged at the apex, less than 1 mm. long.

Variety *oxyglossa* differs from typical *P. lancilabris* mainly in its fractiflex rachis and more elongate-acuminate floral segments.

Izabal: Near Puerto Barrios, *Lewis* 26a [somewhat intermediate between *P. lancilabris* and var. *oxyglossa*].

Pleurothallis leucantha Schltr. Repert. Sp. Nov. 10: 353. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, May, 1907, *H. von Türckheim* II 2425).

Epiphytic on trees, up to 1,350 meters alt. Rare in Guatemala.

Plant small, erect or ascending, caespitose, glabrous, 10–16 cm. tall. Secondary stem terete, slender, monophyllous, 3–9.5 cm. long, provided with two closely appressed tubular sheaths. Leaf erect or erect-spreading, lanceolate, somewhat abruptly acuminate with the apex tridenticulate, coriaceous, 4–7 cm. long, 7–16 mm. wide. Inflorescence fasciculate, up to 1.5 cm. long including the abbreviated peduncle, with the small greenish yellow flowers erect-spreading; peduncle subtended by a small compressed apiculate spathe that is 5–6 mm. long. Floral bracts minute, orbicular-cucullate, about 1.5 mm. long. Dorsal sepal broadly ovate to elliptic, obtuse to subacute, 3-nerved, 3.25–4.2 mm. long, about 3 mm. wide. Lateral sepals united almost to the apex to form an orbicular-ovate bidentate lamina; lamina 4-nerved, dorsally carinate along the mid-nerve of each sepal, 3.25–4 mm. long, about 3 mm. wide. Petals obliquely linear-lanceolate, acute, with irregularly serrulate margins, inconspicuously dorsally carinate along the solitary central nerve, 2.5–3 mm. long, about 0.5 mm. wide. Lip fleshy-thickened, in natural position recurved at the base with the basal rounded margins curved upward, with the margins minutely crenulate; when spread out suborbicular-reniform to broadly ovate-cordate, obtuse-apiculate at the apex with the apicule somewhat incurved, about 2 mm. long and 1.5 mm. wide across the lower part; disk 3-nerved, conspicuously fleshy-thickened near the base. Column short, thick, about 1.5 mm. long.

Pleurothallis Sanchoi Ames, a Costa Rican species, is closely allied to this species and, with further study, may prove to be conspecific.

Alta Verapaz: Río Cobán, Cobán-San Pedro, *Johnson* 609.

Pleurothallis Lewisae Ames, Proc. Biol. Soc. Wash. 44: 41. 1931 (type: Guatemala, Dept. Izabal, near Puerto Barrios, August, 1930, *Margaret Ward Lewis* 2). Figure 76.

Epiphytic on mango tree (our material), at low altitudes. Rare in Guatemala and Honduras.

Plant creeping and closely appressed to the bark of trees. Secondary stems from a creeping rhizome, distichous, directed obliquely forward, monophyllous, 2.5–6 mm. long, concealed by scarious nervose sheaths. Leaf oval to orbicular, minutely tridenticulate at the rounded apex, with the surface minutely pustulose and glossy, 6–10 mm. long, 5–6.5 mm. wide. Peduncle simple or often in pairs, usually 2–3-flowered, shorter than or equaling the leaf, sheathed at the base. Floral bracts ample, hispidulous, infundibuliform. Flowers small, opening in succession, with slender glabrous pedicellate ovaries. Sepals yellow, oblong-lanceolate, acute, 3-nerved, smooth, about 5 mm. long and 1 mm. wide; dorsal sepal strongly concave, cymbiform; lateral sepals free almost to the base, the united basal portion forming a short mentum. Petals purplish, oblong, abruptly rounded at the apex where they are shortly apiculate, 1-nerved, with the surface and margins densely and minutely glandulose, about 4 mm. long and 1 mm. wide. Lip purplish, oblong, acute, fleshy, 3-nerved, with a triangular lobule on each side near the middle, densely and minutely glandulose, about 2.5 mm. long. Column slender at the base, dilated upward, about 2 mm. long, margin of the clinandrium irregularly fringed.

The glabrous sepals and ovary, the lobulate lip and the 2- or more-flowered inflorescence serve to distinguish *P. Lewisae* from closely related species.

Represented from Guatemala only by the type collection.

Pleurothallis Matudiana C. Schweinf. Bot. Mus. Leaflet. Harv. Univ. 5: 102. 1938.

Epiphytic on trees, up to 2,400 meters alt. Rare in Mexico and Guatemala.

Plant erect, somewhat stout, glabrous, caespitose, up to 35 cm. tall. Secondary stem rigid, monophyllous, up to 25 cm. tall, provided with two scarious fugaceous tubular sheaths. Leaf narrowly cordate-ovate to cordate-lanceolate, acuminate, with a minutely tridenticulate tip, coriaceous, somewhat conduplicate at the base, 6.5–11 cm. long, 1.8–3.7 cm. wide. Flowers ringent, fasciculate, with slender pedicels, subtended by short scarious imbricating bracts; base of inflorescence surrounded by a small conduplicate spathe. Dorsal sepal ovate to ovate-elliptic, acute, concave below, recurved above the middle, 3-nerved, often dorsally

PLEUROTHALLIS

Lewisae Ames



FIG. 76. *Pleurothallis Lewisae*. 1, Honduran plant ($\times 1$); 2, Guatemalan plant ($\times 1\frac{1}{3}$); 3, lip ($\times 12$); 4, flower, front-side view ($\times 8$). Drawn by Blanche Ames.

carinate along the nerves, 6–9 mm. long, 3.7–5.7 mm. wide. Lateral sepals united into a broadly ovate or oblong-elliptic lamina; lamina subobtuse, acute or sharply bidentate at the apex, concave below, with the margins often somewhat revolute, 6-nerved, dorsally bicarinate, 6.5–8.2 mm. long, 3–6 mm. wide. Petals parallel to and surrounding the lip in natural position, obliquely filiform or narrowly linear, acute or attenuate, 1-nerved, with the margins minutely denticulate-crenulate, 6–8 mm. long, 0.5–0.9 mm. wide. Lip with a short claw, fleshy-thickened, ovate-oblong to oblong-lanceolate, acute-apiculate at the apex, slightly arcuate at the base and longitudinally sulcate in natural position, with the margins minutely and irregularly crenulate, 4.1–5.2 mm. long, 2–2.7 mm. wide across the dilated base. Column short, stout.

P. Matudiana is vegetatively similar to a number of species of the alliance of *P. cardiophyllis*. It is distinguished from closely allied species by its oblong type of lip.

El Progreso: Sierra de las Minas, pine-oak woods, hills between Finca Piamonte and slopes southeast of Finca Piamonte, *Steyermark* 43430.—Guatemala: Volcán de Pacaya, *Johnston & Porter* (*Margaret W. Lewis* 201). Volcán de Pacaya, above Las Calderas, *Standley* 58497. Slopes of Volcán de Pacaya, between San Francisco Sales and the base of the active cone, *Standley* 80771.—Jalapa: Volcán Jumay, north of Jalapa, *Steyermark* 32381.—San Marcos: Barranca Eminencia, above San Rafael Pie de la Cuesta, *Standley* 68462.—Zacapa: Sierra de las Minas, between Cerro de Monos and upper slopes of Monte Virgen, *Steyermark* 42853. Sierra de las Minas, slopes of Monte Virgen, around the summit of the mountain, *Steyermark* 42605. Cloud forest in ravine bordering Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29876.

***Pleurothallis minutalis* Lindl.** *Fol. Orch.* (*Pleurothallis*) 40. 1859.

Epiphytic on trees in forests, up to 2,100 meters alt. Rare in Mexico and Guatemala.

Plant small, less than 5 cm. tall, with a creeping rhizome that gives rise at intervals to short secondary stems; rhizome concealed by scarios-fibrous sheaths. Secondary stems concealed by scarios-fibrous sheaths, short, ascending, unifoliate, about 5 mm. long. Leaves obovate to oblanceolate, obliquely tridentate at the rounded to obtuse apex, coriaceous, sulcate, up to 4 cm. long and 7 mm. wide. Peduncles one or several from the apex of the secondary stem, 1- or 2-flowered, shorter or longer than the leaves. Floral bracts tubular, apiculate, more or less spotted with purple. Flowers yellowish or light reddish brown, with the lip dark purplish brown and vernicose. Dorsal sepal ovate-lanceolate, tapering to the acute apex, concave, 3-nerved, 3.5–3.7 mm. long, about 1.5 mm. wide near the base. Lateral sepals obliquely elliptic-lanceolate, acuminate, somewhat united at the base, 3-nerved, dorsally carinate, 3.5–4.5 mm. long, about 1 mm. wide below the

middle. Petals lanceolate, acuminate, irregularly ciliate, 3–4 mm. long, about 0.7 mm. wide near the base. Lip elliptic-lanceolate, acute, fleshy, articulate to the base of the column by a short thin thread-like claw, 2.5–3 mm. long, 0.8–1 mm. wide. Column slender, about 2 mm. long, dilated at the apex into a thin lacinate membrane.

Guatemala: Purchased in the market in Guatemala City, collected within a radius of 20–30 miles of the city, *Margaret W. Lewis* 26A.

Pleurothallis muricata Schltr. Repert. Sp. Nov. 10: 293. 1912 (type: Guatemala, Dept. Alta Verapaz, Cobán, May, 1907, *H. von Türckheim* II 2392). *Kraenzlinella muricata* (Schltr.) Rolfe, Orch. Rev. 23: 326. 1915.

Epiphytic on trees in forests, up to 2,000 meters alt. Uncommon from Guatemala to Panama.

Plant erect, rather stout, glabrous, 18–55 cm. tall. Secondary stem short, terete, monophyllous, usually tinged with maroon, 2–7 cm. long, provided at the base with a loose tubular scarious sheath. Leaf erect or suberect, linear-oblong to elliptic, obtuse and minutely tridenticulate at the apex, sessile, coriaceous, 7–17 cm. long, 1.3–4.3 cm. wide. Raceme usually solitary, greatly exceeding the leaf, loosely many-flowered, often fractiflex, 14–48 cm. long including the long peduncle; peduncle with several scarious bracts that are about 12 mm. long and a short sheath at the base. Floral bracts compressed, ovate-cucullate, subacute to acuminate, dorsally carinate, falcate-incurved, a little longer than the pedicels, 1–1.5 cm. long. Flowers erect-spreading, reddish brown and maroon marked with green-yellow. Sepals usually minutely papillose-pulvereous on the outer surface, dorsally carinate along the mid-nerve; dorsal sepal oblong to oblong-lanceolate, obtuse to subacute, cymbiform, 6–7-nerved, 1–2 cm. long, 5–8.5 mm. wide below the middle; lateral sepals obliquely oblong to lanceolate, obtuse to acute, shallowly canaliculate, 5–6-nerved, with the conspicuous dorsal carinae thin and irregularly toothed at the apex, 1.2–2.3 cm. long, 4–6 mm. wide. Petals obliquely ligulate-lanceolate, often slightly narrowed at the base, obtuse-apiculate to acute, 2–3-nerved, lightly dorsally carinate along the mid-nerve, 7–10 mm. long, 2–2.5 mm. wide. Lip with a short claw, fleshy-thickened, in natural position strongly arcuate-decurved; lamina oblong-elliptic to oblong-lanceolate, obtuse to subacute, usually narrowed below the middle, with entire or somewhat crenulate margins, provided at the base on each side with a thin erect-spreading triangular obtuse denticulate lobule, 7–11 mm. long including the claw, 2–4 mm. wide at the middle; disk usually minutely papillose-pulvereous, rarely subglabrous. Column semiterete below, winged above on the anterior margins, canaliculate, recurved, irregularly toothed at the apex, 5–8 mm. long, with a foot 2.5–4 mm. long. Ovary densely muricate, about 1.5 cm. long.

Alta Verapaz: Along road, between San Cristóbal Verapaz and Chixoy, *Steyermark* 43883.—El Progreso: Sierra de las Minas, trail between Finca Piamonte east to Finca San Miguel, passing Finca Polonia, Finca Delicias, and aldea Cimientio, *Steyermark* 43738.

Pleurothallis ophiocephala Lindl. Bot. Reg. 24: Misc. 34. 1838.

Epiphytic on trees in damp forests and coffee plantations, up to 1,200 meters alt. Common in Mexico; uncommon in Guatemala and Costa Rica.

Plant stiffly erect, caespitose, glabrous except for the flowers, 1.4–4.5 dm. tall. Secondary stem terete, rather stout, monophyllous, 6.5–25 cm. long, provided with 2–3 tubular fugaceous sheaths. Leaf with a short sulcate petiole, oblong to lanceolate, obtuse to shortly acute and minutely retuse at the apex, often oblique, coriaceous, 7–20 cm. long including the petiole, 1.3–4 cm. wide. Flowers 1–3, fleshy, yellow with purplish spots, ringent, in a terminal fascicle, sheathed by scarious apiculate imbricating bracts that are up to 1.8 cm. long, with pedicellate ovaries that are about 1.3 cm. long. Sepals oblong-elliptic to oblong-ligulate, broadly rounded or obtuse at the apex, concave below the middle, fleshy-thickened and convex above the middle, densely silky-pubescent along the thin minutely involute margins, papillose with irregularly broken transverse ridges on the inner surface, scurfy with brownish stellate scales on the outer surface; dorsal sepal 7–11-nerved, 1.5–2.8 cm. long, 5–8 mm. wide; lateral sepals oblique, 5–6-nerved, 1.3–2.5 cm. long, 2.5–3.5 mm. wide, connate at first to form a broad elliptic lamina, later usually separating almost to the base. Petals with a short narrow claw, obovate-oblong to oblong-elliptic, broadly rounded at the apex, with a white villous fringe on the margins, papillose-ciliolate on the inner and outer surfaces, 3-nerved, somewhat dorsally carinate along the mid-nerve, 5–8 mm. long including the claw, 2.2–3.2 mm. wide. Lip loosely hinged to the foot of the column, in natural position arcuate with two minute inflexed processes on each side near the base; lamina oblong-elliptic, obtuse, 3–3.2 mm. long, 1.5–2 mm. wide; disk with 2 keels on each side near the middle. Column short, thick, about 2.5 mm. long; pollinia four. Capsule ovoid-cylindrical, with broad scurfy ridges, 1.5–2 cm. long.

This species has very interesting flowers of which Lindley (Bot. Reg. 24: Misc. 48. 1838) writes that they are “. . . so similar to the head of a snake with the jaws open, that it is difficult at first sight to believe it really a flower that one looks upon. To add to the deception, the small labellum is shaped like a tongue, and moves up and down when you peep into the mouth of the flower.”

Suchitepequez: Southern lower slopes of Volcán Zunil, vicinity of Finca Alvidas, east of Pueblo Nuevo, *Steyermark* 35451.—Woodlot near Virginia and west coast of Guatemala near Escuintla, *Lewis* 28.—Eastern portions of Vera Paz and Chiquimula, Chocon forests?, *Watson*.—“Guatemala:” *Spinden*.

Pleurothallis pachyglossa Lindl. Bot. Reg. 26: Misc. 68. 1840. *P. formosa* Schltr. Repert. Sp. Nov. 10: 291. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, October, 1907, *H. von Türckheim* II 1995).

Epiphytic on trees in forests, up to 1,600 meters alt. Fairly common from Mexico to Costa Rica.

Plant erect or ascending, glabrous, up to 35 cm. tall. Secondary stem slender, terete, monophyllous, up to 15 cm. long, provided with two closely appressed brownish scarious tubular sheaths that are up to 7 cm. long. Leaf erect-spreading, elliptic-oblong to lanceolate, subobtusate to shortly acuminate and tridentate at the apex, tapering into the short sulcate petiole, 5–14 cm. long, 1.5–2.5 cm. wide. Raceme solitary, often fractiflex, one-flowered or with a few scattered flowers, exceeding the leaves, up to 25 cm. long including the slender petiole, with a small inconspicuous tubular spathaceous sheath at the base; sheath brownish, scarious, up to 1.5 cm. long. Floral bracts minute, tubular-cucullate, acute to acuminate, about 5 mm. long. Flowers rather large, spreading, reddish or dull purplish, with slender pedicels that are up to 15 mm. long. Dorsal sepal cymbiform, lanceolate, acuminate, 3-nerved, somewhat ciliate along the margins, lightly carinate along the mid-nerve, 1.5–2.4 cm. long, 4–5.2 mm. wide below the middle. Lateral sepals united almost to the apex to form a bifid lamina; lamina broadly lanceolate, longitudinally concave, 4- to 6-nerved, dorsally carinate along the central nerve of each sepal, 1.5–2.3 cm. long, 5–7 mm. wide, with the free parts acuminate. Petals oblong-obovate, obtuse to broadly rounded at the apex, somewhat oblique, 3-nerved, shallowly cucullate at the apex, verruculose above the middle on the outer surface, inner surface papillose-ciliate within the upper margins, 6–10 mm. long, 3–4.2 mm. wide. Lip with a short somewhat arcuate claw, linear-lanceolate, obtuse to acute, conspicuously auriculate at the base with the auricles extending as wings to about the middle of the lip, verruculose above the middle, 7–14 mm. long, up to 3.5 mm. wide near the base; disk 3-nerved, with a fleshy-thickened sulcate callus extending from between the auricles to the apex of the lip, the callus tuberculate-crested at the base; auricles thin, subquadrate, broadly rounded. Column short, entire or slightly toothed at the apex, about 3 mm. long, with a foot about 2 mm. long. Capsule ellipsoid, about 2 cm. long.

Alta Verapaz: Cobán, *Türckheim* 799. Río Frío, *Johnson* 734. Road from Chamá to Cobán, *Johnson* 828.

Pleurothallis pansamalae Schltr. Repert. Sp. Nov. 10: 354. 1912 (type: Guatemala, Dept. Alta Verapaz, epiphytic in Pansamála, February, 1887, *H. von Türckheim* 797; in woods near Cobán, November, 1906, *H. von Türckheim* II 1538).

Epiphytic on trees in dense forests, up to 2,300 meters alt. Rather common and widespread in Mexico, Guatemala and British Honduras.

Plant erect or ascending, slender, glabrous, densely caespitose, 9–24 cm. tall. Secondary stem rigid, monophyllous, 5–16 cm. long, provided with two or more closely appressed scarious fugaceous tubular sheaths. Leaf cordate-ovate to narrowly cordate-lanceolate, acuminate, coriaceous, somewhat conduplicate at the base, 4–9.5 cm. long, 1.1–3.5 cm. wide below the middle. Flowers greenish marked with yellow, red or brown, fasciculate, with slender filiform pedicels, subtended by scarious ovate-cucullate bracts; base of inflorescence enclosed by a compressed

elliptic cuspidate subcoriaceous spathe that is up to 1.3 cm. long. Dorsal sepal ovate to broadly elliptic, obtuse, concave, 3-nerved, dorsally carinate along the nerves, 3.5–5 mm. long, 2.8–3.5 mm. wide. Lateral sepals wholly united into an orbicular-ovate lamina; lamina broadly rounded to obtuse at the apex, 2–4-nerved, dorsally carinate along the nerves, 3.1–4.5 mm. long, 3–3.5 mm. wide. Petals obliquely linear to linear-lanceolate, subobtuse to long-acuminate, with the margins irregularly denticulate, 1-nerved, often lightly dorsally carinate along the nerve, 3–3.75 mm. long, 0.5–0.75 mm. wide. Lip orbicular-ovate to subcordate-ovate, acute-apiculate at the apex with the apicule suberect, 3-nerved, finely and irregularly crenulate along the margins, 2–3 mm. long, 2–2.5 mm. wide; disk fleshy-thickened, with a transverse fleshy ridge at the base. Column short, thick, about 2 mm. long. Capsule obliquely ellipsoid-cylindrical, prominently 6-ribbed, up to 1.5 cm. long.

Alta Verapaz: *Türckheim* 3809. Road, Chamá to Cobán, *Johnson* 504. Chihob, *Johnson* 875. Near Cobán, *Standley* 71619. Mountains east of Tactic, on road to Tamahú, *Standley* 71280. Tactic, *Johnston* 1865. Se Shun, *Cook & Griggs* 108. Finca Mocca, *Johnson* 52. Along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 89890. Mountains along road between Tactic and the divide on road to Tamahú, *Standley* 91451.—Chiquimula: Cerro Tixixí (Tishishí), 3–5 miles north of Jocotán, *Steyermark* 31575.—Guatemala: Slopes of Volcán de Pacaya, between San Francisco Sales and the base of the active cone, *Standley* 80744.—Suchitepequez: Volcán Zunil, *Skutch* 942.

Pleurothallis pansamalae* var. *triangulabia Correll, *Lloydia* 10: 210. 1947 (type: Guatemala, Volcán Zunil, 2,600 meters alt., epiphytic on tree trunk in heavy forest, flowers greenish, August 4, 1934, *A. F. Skutch* 942A).

Epiphytic on trees in dense forests, up to 2,600 meters alt. Rare in Mexico and Guatemala.

Plant erect or ascending, glabrous, caespitose, 10–24 cm. tall. Secondary stem rigid, slender, monophyllous, 6–20 cm. long, provided with two closely appressed scarious tubular fugaceous sheaths. Leaf cordate-ovate to cordate-lanceolate, abruptly acuminate and curved at the apex, obliquely tridenticulate at the tip, coriaceous, lightly marginate, 4–10 cm. long, 2–4 cm. wide below the middle. Flowers green, fasciculate, with slender short pedicels up to 1 cm. long, enclosed at the base by a conduplicate sheath up to 1 cm. long. Dorsal sepal oblong-elliptic, subobtuse to acute, concave below the middle, 3-nerved, 4.2–5.5 mm. long, 2.3–3.2 mm. wide. Lateral sepals united to form a broadly ovate lamina; lamina subacute, concave below the middle, 4-nerved, 4.5–5 mm. long, 2.5–3.2 mm. wide. Petals linear-lanceolate, shortly acuminate, falcate, 1-nerved, irregularly serrulate along the margins, 3.5–4 mm. long, about 0.5 mm. wide. Lip with a short claw, fleshy-thickened, triangular-hastate to triangular-ovate or with a blunt lobe on each side at the base, acute-apiculate at the apex with the

apicule erect, irregularly crenulate along the margins, 2.3–3 mm. long, 1.8–2.2 mm. wide across the lateral lobules; lateral lobules or auricles subquadrate, upcurved; disk 3-nerved, with a thick mammillate callus at the base. Column short, thick, fleshy, about 1.5 mm. long.

Variety *triangulabia* is similar to the typical form in habit, but differs from it mainly in the shape of the lip, which is triangular-hastate with a prominent auricle or lobule on each side at the base. The leaf is also larger than in typical *P. pansamalae*.

Quezaltenango: Palmar, *Skutch* 1424.—Suchitepequez: Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46697.

Pleurothallis pedicellaris Schltr. Repert. Sp. Nov. 10: 395. 1912 (type: Guatemala, Dept. Alta Verapaz, Cobán, June, 1907, *H. von Türckheim* II 2423).

Epiphytic on trees and on stumps of forests up to 1,400 meters alt. Rare in Guatemala.

Plant small, glabrous, densely caespitose, up to 3.5 cm. tall. Secondary stem almost obsolete, mostly less than 3 mm. long, monophyllous, concealed by several scarious whitish sheaths. Leaf erect, broadly ovate to oblanceolate-spatulate, obtuse and retuse at the apex with an apicule in the sinus, 0.7–2 cm. long including the petiole, 2.5–5 mm. wide. Peduncle solitary, erect, filiform, up to 2 cm. long including the few-flowered raceme. Floral bracts ovate-cucullate, acute, about 1 mm. long. Flowers yellow, distichous, with slender persistent pedicels that are about 3 mm. long. Dorsal sepal narrowly lanceolate, acuminate, 1-nerved, 2.5–3.8 mm. long, 1–1.2 mm. wide. Lateral sepals obliquely ovate to elliptic-lanceolate, shortly acuminate, 1-nerved, ciliate along the apical margin, 2.1–3.8 mm. long, 0.8–1.5 mm. wide. Petals obliquely linear-lanceolate, falcate, shortly acuminate, ciliate along the margins, 1-nerved, 2–3 mm. long, 0.6–1 mm. wide. Lip ovate-linguiform, subacute, fleshy, 1–1.8 mm. long, 0.5–1 mm. wide; disk with a transverse fleshy ridge at the base in front of the short claw. Column short, stout, 3-lobulate at the apex, 0.5–1 mm. long.

This species is closely allied to *P. fuegi* but differs from that species mainly in the shape of the lip, petals and column.

Alta Verapaz: Cobán, Cemetery Calvacia, *Johnson* 550. Cobán, *Johnson* 652. Finca Volcán, *Wilson* 239.

Pleurothallis platystylis Schltr. Repert. Sp. Nov. 10: 395. 1912 (type: Guatemala, Dept. Alta Verapaz, between Tactic and Cobán, December, 1906, *H. von Türckheim* II 1600). *P. Bernoullii* Schltr. Repert. Sp. Nov. 15: 204. 1918 (type: Guatemala, Dept. Guatemala, near Guatemala, December, 1865, *Bernoulli & Cario* 499).

Epiphytic on trees in forests, up to 2,500 meters alt. Uncommon in Mexico, Guatemala and Honduras.

Plant erect or ascending, slender, glabrous, 15–35 cm. tall. Secondary stem terete, monophyllous, 4–18.5 cm. long, provided with two or three tubular scarious sheaths. Leaf erect, oblong-ligulate to oblanceolate, broadly rounded or obtuse and minutely incised at the apex, coriaceous, tapering into the short sulcate petiole, 5–12 cm. long, 1.2–3.5 cm. wide. Raceme one or two, slender, loosely many-flowered, secund, 10–20 cm. long including the short peduncle. Floral bracts tubular, cucullate, apiculate, about 4 mm. long. Flowers yellow or greenish yellow, erect-spreading, with slender arcuate pedicels that are 6–8 mm. long. Sepals often recurved above the middle with the apical margins somewhat involute, dorsally carinate along the mid-nerve; dorsal sepal oblong-linear to narrowly lanceolate, obtuse to acute, 3-nerved, 6–9 mm. long, about 2 mm. wide; lateral sepals united for about half their length, oblong-linear, obtuse-apiculate to acute, somewhat oblique, 3-nerved, 6.5–9 mm. long, about 1.8 mm. wide above the point of coalescence. Petals obliquely oblanceolate, broadly rounded or obtuse at the apex, glabrous, conspicuously 3-nerved, apical margins minutely crenulate, 4–5 mm. long, 1.5–1.8 mm. wide. Lip with a short narrow sulcate claw, in natural position arcuate-decurved and canaliculate, with the lateral margins erect, 3-nerved, dorsally carinate along the nerves; when spread out ovate-oblong, mostly oblong-quadrate above the dilated middle portion, subtruncate to obtuse at the apex, crenulate along the apical margins, glabrous, 4–4.5 mm. long including the claw, about 2 mm. wide at the widest point; disk with a fleshy callus near the apex, often lightly keeled below the callus along the lateral nerves. Column thick, short, about 3 mm. long, with a foot that is 1.5–2 mm. long. Capsule obliquely ellipsoid, about 1 cm. long.

Alta Verapaz: Near Cobán, *Türkheim* II 1867. Cobán, *Türkheim* 3998. Finca Mocca, *Johnson* 91. From Chamá to Cobán, *Johnson* 860. La Isla, south of Santa Cruz, *Standley* 89241. Large swamp just east of Tactic, *Steyermark* 44019.—Jalapa: Volcán Jumay, north of Jalapa, *Steyermark* 32375.—Quiché: Cerro Putul, "Zona Reyna," *Skutch* 1829.—Zacapa: Cloud forest, on summit of Sierra de las Minas, in vicinity of Finca Planados, *Steyermark* 29979.

***Pleurothallis plumosa* Lindl. Bot. Reg. 28: Misc. 72. 1842.**

Epiphytic on trees, up to 1,000 meters alt. Rare in Guatemala, Costa Rica, Trinidad and Venezuela.

Plant erect, caespitose, up to 19 cm. tall. Secondary stem short, rather stout and rigid, monophyllous, up to 4.5 cm. long, provided with one or more fugaceous sheaths. Leaf obliquely oblong to oblong-elliptic, obtuse and retuse at the apex with a slender cusp in the sinus, coriaceous, glabrous, 5–7 cm. long, 1.3–2.3 cm. wide. Peduncles 1–2, erect, exceeding the leaf, densely granulose-ciliate, up to 14.5 cm. long including the few- to many-flowered raceme, with a lanceolate conduplicate membranaceous sheath at the base about 1 cm. long. Floral bracts ovate-cucullate, acute, granulose-ciliate, about 3 mm. long. Flowers subsessile, greenish yellow or orange, usually marked inside with purple dots. Pedicels and

ovaries densely granulose-ciliate; pedicels stout, about 1 mm. long. Sepals densely granulose-ciliate on the outer surface and along the margins. Dorsal sepal linear, acute-apiculate, shallowly sulcate below the middle, fleshy-thickened and semi-terete at the apex, 3-nerved, about 12 mm. long, 1.3–2 mm. wide. Lateral sepals united almost to the apex to form an oblong-elliptic lamina; lamina bifid, 6-nerved, about 12 mm. long and 5 mm. wide. Petals obliquely linear-lanceolate, shortly acuminate-apiculate, irregularly and deeply fringed along the margins, 1-nerved, 3–3.5 mm. long, about 1 mm. wide. Lip fleshy, with a prominent claw, ovate, obtuse, ciliate along the somewhat upturned margins, 3-nerved, about 4 mm. long including the claw and 2 mm. wide; disk fleshy-thickened just in front of the claw, with a thickened keel on each side below the middle. Column slender, slightly arcuate, irregularly toothed at the apex, about 3 mm. long, with a foot about 1.2 mm. long. Capsule obliquely cylindrical, prominently 6-ribbed, about 1.5 cm. long.

Guatemala (fide Schlechter).

Pleurothallis Pringlei Schltr. Repert. Sp. Nov. 3: 20. 1906.

Epiphytic on trees in forests or on the face of cliffs, up to 3,000 meters alt. Rare in Mexico and Guatemala.

Plant erect, up to 8 cm. tall, consisting of a creeping rhizome that gives rise at frequent intervals to short secondary stems, forming dense mats; rhizome concealed by fibrous-scarious sheaths; roots filiform, whitish, fibrous. Secondary stems up to 2 cm. long, unifoliate, concealed by several lepanthiform sheaths; sheaths nervose, dilated and marginate at the apex, with the apical margin minutely hispid. Leaf oblanceolate to elliptic-spatulate, tridenticulate at the rounded to obtuse apex, dull green above, purplish beneath, coriaceous, sulcate, abruptly narrowed at the base to form a short petiole, up to 3.5 cm. long and 1.2 cm. wide. Peduncle solitary, filiform, provided with one or two short bracts; raceme laxly few-flowered. Floral bracts ovate-cucullate, obtuse, shorter than the pedicellate ovaries. Flowers small, dull purplish brown, yellowish brown at the base. Dorsal sepal ovate-oblong, acute, 3-nerved, concave, glabrous, 4–4.5 mm. long, about 1.5 mm. wide below the middle. Lateral sepals connate below the middle, obliquely lanceolate to ovate-lanceolate, acute to subacuminate, 3-nerved, glabrous, 4–4.5 mm. long, about 1 mm. wide. Petals linear to linear-lanceolate, irregularly lacinate on the margins above, acuminate, oblique, 1-nerved, 2–3 mm. long, less than 1 mm. wide. Lip 3-lobed at the base, somewhat cordate at the base, articulate with the column-foot, 3-nerved, glabrous, 2–3 mm. long, about 1 mm. wide; lateral lobes minute, obliquely ovate, acute, incurved, with the margins erose; mid-lobe oblong-elliptic, obtuse. Column about 2 mm. long, with a short foot, 3-lobed and denticulate at the apex, with the mid-lobe slender, linear and lacinate. Capsule obovoid, about 7 mm. long, somewhat 3-angled.

Quezaltenango: Hot springs along Río Samalá, opposite railroad tracks, below Zunil, *Steyermark* 34969.

Pleurothallis repens Ames, Orch., Fasc. II: 271. 1908 (type: Guatemala, Dept. Alta Verapaz, Cubilgüitz, December, 1901, *H. von Türckheim* 496).

Epiphytic on trees, up to 350 meters alt. Rare in Guatemala.

Plant creeping and closely appressed to the bark of trees; rhizome clothed with scarious sheaths. Secondary stems erect or ascending, monophyllous, 5-10 mm. long, with a scarious fugaceous sheath at the base; sheath oblique and shortly acuminate at the apex. Leaf linear-spatulate to narrowly linear-ob lanceolate, obtuse and minutely tridenticulate at the apex, tapering below the middle, green above, apparently glaucous on the lower surface, 2.5-4.5 cm. long, 2-3 mm. wide. Peduncle solitary, erect or ascending, few-flowered, up to 1.5 cm. long. Floral bracts cucullate-lanceolate, about 1 mm. long. Flowers small, with slender pedicels about 2.5 mm. long. Sepals ovate to ovate-lanceolate, acute, 1-nerved, about 3 mm. long and 2 mm. wide. Petals ovate-elliptic, subacute, 1-nerved, about 2.5 mm. long and 1.5 mm. wide. Lip ligulate, obtuse, with the margins revolute, about 3 mm. long and 1 mm. wide; disk thickened, granulose, papillose on the central portion. Column short, without a foot.

This species is vegetatively similar to *P. sertularioides*, but differs from that species markedly in the structure of the flowers.

Represented from Guatemala only by the type collection.

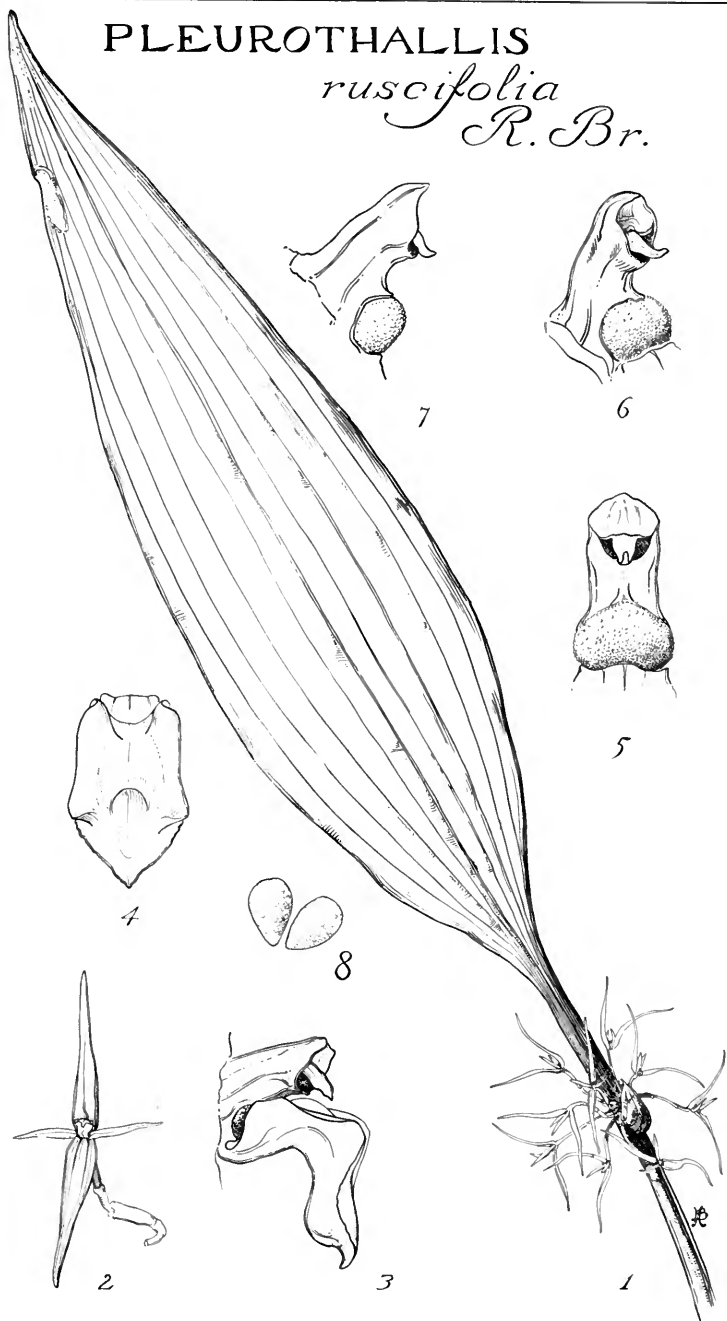
Pleurothallis ruscifolia (Jacq.) R. Br. in Ait. Hort. Kew. 2, 5: 211. 1813. *Epidendrum ruscifolium* Jacq. Sel. Stirp. Am. 226. t. 133. f. 3. 1763. Figure 77.

Epiphytic on trees in forests, on rotten logs, rarely terrestrial, up to 1,850 meters alt. Widespread in the West Indies, Guatemala, Costa Rica, Panama and northern South America.

Plant erect or ascending, glabrous, caespitose, 1-5 dm. tall. Secondary stem rigid, monophyllous, 6-40 cm. long, provided with several scarious fugaceous sheaths. Leaf oblong-elliptic to lanceolate, acute to acuminate and obliquely tridenticulate at the apex, often somewhat falcate, coriaceous, 7-19 cm. long, 1.5-5.3 cm. wide, abruptly contracted at the base into the short sulcate petiole. Flowers pale green to pale yellow, in a dense cluster near the base of the petiole, glomerate, spreading, with slender pedicels. Pedicels about 1 cm. long, inclosed by a conduplicate membranaceous sheath about 6 mm. long. Dorsal sepal ovate-lanceolate, long-acuminate, strongly concave near the base, 3-nerved, 6-10 mm. long, 2.5-3.5 mm. wide below the middle. Lateral sepals united to form an ovate-lanceolate to lanceolate lamina; lamina long-acuminate, 4-nerved, with the margins somewhat involute, 6-10 mm. long, 3-3.5 mm. wide near the base. Petals obliquely linear-lanceolate to subfiliform, acute to acuminate-attenuate, 3-nerved, 4.2-9 mm. long, 0.5-1 mm. wide near the base. Lip fleshy, with a short claw, arcuate to almost conduplicate in natural position, when spread out ovate to ovate-subquadrate, triangular-acute at the apex, with the upper margins irregularly

FIG. 77. *Pleurothallis ruscifolia*. 1, leaf and inflorescence ($\times 1$); 2, flower, front view ($\times 2$); 3, lip and column, side view (anther removed; $\times 10$); 4, lip, from above ($\times 10$); 5, 6, and 7, column, from different angles, to show pulvinate foot, rostellum, and stigmatic orifice under rostellum (anther removed; about $\times 15$); 8, pollinia (much enlarged). Drawn by Blanche Ames.

PLEUROTHALLIS
ruscifolia
R. Br.



crenulate, 2-2.3 mm. long, 1-1.5 mm. wide below the middle; disk 3-nerved, with the mid-nerve somewhat fleshy-thickened below the middle of the disk. Column 1-1.5 mm. long, with a short apicule at the apex. Capsule cylindrical, strongly 6-ribbed, 10-16 mm. long.

Pleurothallis ruscifolia is an extremely variable species in its floral segments.

Guatemala (fide Schlechter).

Pleurothallis samacensis Ames, Sched. Orch. 2: 22. 1923 (type: Guatemala, Dept. Alta Verapaz, Samac to Cobán, October 20, 1920, *Harry Johnson* 765). Figure 75.

Epiphytic on trees in shady forests, up to 1,450 meters alt. Rare in Guatemala.

Plant small, glabrous, densely caespitose, up to 5 cm. tall, including the peduncle. Secondary stem almost obsolete, up to 3 mm. long, monophyllous, concealed by chartaceous whitish sheaths. Leaf oblanceolate, obtuse and retuse at the apex with a minute apicule in the sinus, up to 1.6 cm. long including the slender sulcate petiole, up to 4 mm. wide. Peduncle solitary, filiform, supporting a lax 2-3-flowered raceme, up to 4.7 cm. long including the raceme, provided with several infundibuliform bracts. Floral bracts tubular-cucullate, scarious, about 1 mm. long. Flowers purplish, with slender pedicellate ovaries that are about 3 mm. long. Dorsal sepals linear-triangular or narrowly lanceolate, terminating in a slender caudate tip, 3-nerved, with glandular-ciliate margins, about 5 mm. long. Lateral sepals free almost to the base, obliquely triangular-lanceolate, caudate-tipped, lightly carinate along the one nerve, margin glandular-ciliate, about 4 mm. long and 1 mm. wide. Petals with the lower third cuneate-oblong, dentate and aristate where they are abruptly narrowed to form the linear-caudate terminal two-thirds, 1-nerved, about 4 mm. long and 0.5 mm. wide. Lip about 2.25 mm. long, somewhat angled on each side at the base, gradually dilated to about the middle, when it becomes expanded into an obovate lightly retuse lamina with unevenly denticulate margins; basal third of the disk ornamented with a flabellate callus. Column 2 mm. long, dilated upwards, entire, cucullate at the summit.

Represented from Guatemala only by the type collection.

Pleurothallis segoviensis Reichb. f. Bonpl. 3: 223. 1855. *P. Wercklei* Schltr. Repert. Sp. Nov. 9: 213. 1911. *P. Johannis* Schltr. Repert. Sp. Nov. 17: 140. 1921 (type: Guatemala, Dept. Alta Verapaz, Pansamalá, October, 1885, *H. von Türckheim* 801). *P. amethystina* Ames, Sched. Orch. 4: 14. 1923 (type: Guatemala, Dept. Alta Verapaz, Samac, October 20, 1920, *Harry Johnson* 878).

Epiphytic on trees in dense or open forests, up to 1,800 meters alt. Widespread and rather common from Mexico to Panama.

Plant erect or ascending, densely caespitose, glabrous except for the flowers, up to 22 cm. tall. Secondary stem slender, monophyllous, 1.5-5 cm. long, con-

cealed by tubular closely appressed scarious sheaths. Leaf erect, oblanceolate-ligulate, obtuse and retuse-denticulate at the apex, coriaceous, 5–13 cm. long, 5–14 mm. wide. Raceme solitary, slender, loosely few- to many-flowered, up to 17 cm. long including the filiform peduncle, mostly exceeding the leaf; peduncle provided with several inconspicuous closely appressed tubular sheaths. Floral bracts tubular, shortly acuminate, 3–5 mm. long. Pedicellate ovary up to 8 mm. long, slender, arcuate. Flowers varying in color from yellow-green with brown markings to deep purplish-red. Sepals somewhat united at the base, 3-nerved with the central nerve dorsally carinate. Dorsal sepal lanceolate, acute-apiculate, slightly canaliculate, with somewhat revolute margins, more or less pilose intramarginally on the inner surface, 5.2–10 mm. long, 1.5–3.2 mm. wide. Lateral sepals united to form a narrowly elliptic lamina that is bidentate at the apex; lamina with somewhat revolute margins, more or less pilose intramarginally on the inner surface, 5–10 mm. long, when spread out 2.2–4.2 mm. wide. Petals obliquely oblong to oblong-quadrate, obtuse to subacute-apiculate, glabrous, 1-nerved, 2.2–3.5 mm. long, 0.75–2 mm. wide. Lip with the short claw 2.5–4 mm. long, glabrous, unequally 3-lobed, slightly arcuate-decurved; lateral lobes arising from the base, porrect, usually upturned, obliquely oblong to lanceolate-falcate, obtuse to acute at the apex, broadly rounded or truncate at the base, up to 2.2 mm. long and 0.75 mm. wide; middle lobe oblong, broadly rounded at the apex, 3-nerved, 2.3–3.5 mm. long, 0.7–1.5 mm. wide, with two mammillate thickenings on the disk at the base and two intramarginal thickened carinae arising at the lateral lobes and extending to above the middle of the disk. Column produced into a short foot at the base, lightly curved, dilated above, 2.5–3 mm. long; clinandrium minutely serrulate.

The flowers of this species are variable in both coloration and size. The size differences range from the small-flowered form segregated as *P. Johannis* to the large-flowered forms segregated as *P. amethystina* and *P. Wercklei*. The lateral lobes of the lip are also variable in their development. In some specimens the lateral lobes are mere protuberances while in others the lobes are slender-falcate and well developed. Because of this series of growth development of the lateral lobes of the lip and the various sizes found in the floral segments, many segregates have been derived from this species.

Alta Verapaz: Pansamalá, *Türckheim* 801A. Near Cobán, *Türckheim* II 1839. Cobán, *Türckheim* 3997.—Guatemala: About eighteen miles from Guatemala City, on road to Mataquescuintla, *Lewis* 104.—Huehuetenango: Southeast of Maxbal, about seventeen miles north of Barillas, Sierra de los Cuchumatanes, *Steyermark* 48891.—Quezaltenango: Along old road between Finca Pirineos and Patzulín, *Standley* 86982.

Pleurothallis segregatifolia Ames & C. Schweinf. Sched. Orch. 8: 33. 1925.

Epiphytic on trees, up to 1,500 meters alt. Rare in Guatemala and Costa Rica.

Plant dwarf, caespitose, up to 7.5 cm. tall; roots stout for the plant, fibrous, flexuous, glabrous. Secondary stems minute, 4-6 (rarely up to 9) mm. long, unifoliate, invested below with tubular scarious sheaths. Leaf suborbicular to obovate or cuneate-spatulate, 6 (rarely 12 mm.) long, commonly 4-5 mm. wide, minutely tridenticulate at the rounded apex, more or less cuneate below, margined, fleshy-coriaceous, often tinged with purple, mid-nerve dorsally carinate; petiole up to 6 mm. long, channelled, gradually merging into the cuneate leaf-base. Inflorescences much surpassing the leaf, one to several; peduncles filiform, usually about 3 cm. long, up to 4.5 cm. long below the raceme. Raceme suberect or flaccid, up to 3 cm. long, loosely flowered; rachis fractiflex. Floral bracts minute, infundibuliform. Flowers as many as eleven, purplish, membranaceous. Dorsal sepal elliptic-oblong, terminating in a hollow obtuse horn, dorsally carinate, up to 4.2 mm. long and 1.5 mm. wide, 3-nerved. Lateral sepals obliquely semiovate, connate to about their middle, forming a distinct mentum with the column-foot, about 3.8 mm. long, free part about 1.5 mm. wide below, obtuse at the cucullate tip, dorsally carinate, 2-nerved. Petals linear-falcate, about 3 mm. long, less than 1 mm. wide above the middle, obtuse to subacute, 1-nerved. Lip ligulate and recurved in natural position, 3-lobed near the apex with the lateral lobes erect, when expanded lanceolate-obovate in outline, about 2.8 mm. long (excluding the claw), 1.2 mm. wide above the middle, 3-nerved; lateral lobes semicuneate with a rounded apex; mid-lobe orbicular, recurved. Column about 2 mm. long, arcuate, terminating in a petaloid 3-lobulate wing.

Chiquimula: Cerro Tixixí (Tishishí), 3-5 miles north of Jocotán, *Steyermark* 31554.

Pleurothallis sertularioides (Sw.) Spreng. Syst. Veg. 3: 721. 1826. *Epidendrum sertularioides* Sw. Prodr. 122. 1788.

Creeping on trees in forests, usually at low elevations, up to 900 meters alt. Mexico, Guatemala and Honduras.

Plant with a slender creeping rhizome that gives rise at frequent intervals to short unifoliate secondary stems; rhizome concealed by short scarious-fibrous sheaths, about 1 mm. in diameter. Secondary stems short, ascending, about 3 mm. long, unifoliate, concealed by a solitary sheath; sheath scarious-fibrous, brownish, subtruncate and apiculate at the apex. Leaf linear-oblancheolate to linear-spatulate, obtuse, much narrowed below, up to 4 cm. long and 4 mm. wide above the middle. Peduncles usually two, from the summit of the secondary stem, filiform, 1- or 2-flowered. Floral bracts minute, infundibuliform, apiculate. Flowers yellowish, with filiform pedicels that exceed the bracts. Sepals triangular-lanceolate, acute, 3-nerved, dorsally carinate along the mid-nerve, 4-5 mm. long, 1-1.5 mm. wide below the middle; dorsal sepal sulcate below, recurved above; lateral sepals slightly oblique, united near the base to form a short mentum with the column-foot. Petals falcate-lanceolate, acuminate, 1-nerved, 3-3.5 mm. long, 1 mm. or slightly less wide near the base. Lip fleshy, linear, narrowed at the fleshy-thickened obtuse apex, 3-nerved, provided just above the base with a minute tooth-like upcurved lobule, 2.5-3 mm. long, about 0.8 mm. wide. Column about 2 mm. long, with

a short foot about 1 mm. long, obscurely 3-lobulate at the apex with the apical margin denticulate. Capsule obovoid, strongly 3-angled, 5-7 mm. long.

Although they are quite distinct florally, this species and *P. repens* are extremely close vegetatively. They differ somewhat in the two following vegetative characters. The leaves of *P. repens* are apparently glaucous on the lower surface and the sheaths of the rhizome and secondary stems are shortly acuminate at the oblique apex. On the other hand, the leaves of *P. sertularioides* are grass-green on both sides and the apex of the sheaths is subtruncate with a rigid mucro terminating a dorsal keel.

Izabal: Cerro San Gil, along Río Bonita, *Steyermark* 41725. Shores of Lago Izabal, opposite San Felipe, between San Felipe and mouth of Río Juan Vicente, *Steyermark* 39678.—Petén: Along Río San Martín, between Cerro Ceibal and Ceibal, *Steyermark* 46175.

Pleurothallis setosa C. Schweinf. Bot. Mus. Leafl. Harv. Univ. 9: 64. 1941.

Epiphytic on trees in forests, up to 500 meters alt. Rare in British Honduras, Guatemala and Costa Rica.

Plant very small, densely caespitose, 2-4 cm. tall; roots numerous, filiform, white, fibrous. Stems minute, slender, terete, up to 5 mm. long, concealed by a scarious tubular sheath, unifoliate. Leaf shortly petioled, linear to narrowly oblong-elliptic, acute to subacute at the minutely tridenticulate apex, dark green, fleshy-coriaceous, longitudinally sulcate, up to 3 cm. long and 2.5 mm. wide. Raceme 2- to 7-flowered, flowers dichotomously arranged; peduncle and rachis filiform, conspicuously setose-pubescent, subtended at the base by a scarious sheath. Floral bracts minute, scarious. Flowers densely flecked with maroon, about equaling the leaves. Dorsal sepal free, lanceolate, long-caudate, concave below, 3-nerved with the nerves dorsally carinate, sparingly provided with long hairs on the outer surface, 9-10 mm. long, 2-2.5 mm. wide below the middle. Lateral sepals abruptly caudate with the caudae thickened, connate to a point beyond the middle into a deeply concave lamina that is 4-nerved with the nerves dorsally carinate, oblique at the base, provided with long hair on the outer surface, the free part obliquely ovate, 9-11.5 mm. long. Petals long for the genus, lanceolate, subfalcate, long-caudate, prominently 1-nerved with the nerve red, with the central margins irregularly fimbriate, 6-6.5 mm. long, about 2 mm. wide near the base. Lip obovate in outline, somewhat obscurely 3-lobed, deeply and densely fimbriate except near the base, 5-6 mm. long, up to 4.5 mm. wide, broadly rounded in front, cuneate at the base with the margins smooth, slightly constricted below the middle; disk 3-nerved with the mid-nerve long and thickened near the apex, divided into two portions, with the basal part minutely biauriculate, smooth at the base then abruptly callose-thickened through the center, the thickenings soon dividing into two branches that extend to the tips of the converging keels, with the upper part much larger and suborbicular, densely studded with papillae. Column up to 3.3 mm. long, rather broadly winged above the base,

with a pair of thin longitudinal keels near the center. Capsule conspicuously dilated.

The conspicuously setose-pubescent peduncle and rachis of this species are characteristic. It appears to be allied to *P. samacensis* but has much narrower leaves and larger flowers with dissimilar lateral sepals.

Izabal: La Vigia, between Bananera and Quiriguá, U. F. Co. R. R., *Margaret W. Lewis* 174.

Pleurothallis stenostachya Reichb. f. *Linnaea* 18: 399. 1844. *P. minutiflora* S. Wats. Proc. Am. Acad. 23: 286. 1888 (type: Guatemala, Chocon Forests, *S. Watson*). *P. myriantha* Lehm. & Kränzlb. in Engl. Bot. Jahrb. 26: 445. 1899 (type: Guatemala, epiphytic around Matasano and Retalhuleu, June 19, 1882, *Lehmann* 1598). Figure 78.

Epiphytic on trees in dense humid forests, up to 900 meters alt. Widespread and fairly common from Mexico to Panama.

Plant rather small, glabrous, densely caespitose, 3–9.5 cm. tall. Secondary stem slender, monophyllous, 1.5–3.5 cm. long, concealed by several tubular whitish scarious sheaths that are up to 2 cm. long and fugaceous. Leaf with a rather long slender petiole, obovate to linear-spatulate, obtuse and minutely tridenticulate at the apex, coriaceous, conspicuously marginate, 1.5–8 cm. long including the petiole, 4–10 mm. wide. Peduncles one to several, fasciculate, filiform, few- to many-flowered, up to 1.5 cm. long. Floral bracts ovate-cucullate, acute, distichous, scarious, 1–1.5 mm. long. Flowers greenish or orange-yellow, marked with purple, with slender pedicels that are 2–4 mm. long. Sepals ovate to oblong-elliptic, obtuse to acute, concave, 1-nerved, somewhat dorsally carinate along the nerve, 1.2–2.2 mm. long, about 1 mm. wide; lateral sepals oblique, united for a short distance at the base. Petals obliquely lanceolate, subacute to acute, 1.3–1.5 mm. long, about 0.5 mm. wide. Lip ovate-oblong to obovate-oblong, broadly rounded or obtuse at the apex, fleshy-thickened, minutely papillose-ciliate along the margins and on the disk, 1–1.2 mm. long, 0.5–0.75 mm. wide. Column short, broadly winged, about 0.5 mm. long. Capsule obliquely obovoid, conspicuously 3-angled, about 4 mm. long.

The fruits of this species are conspicuously 3-angled.

Alta Verapaz: Cubilgüitz, *Türckheim* 7783.—Izabal: 40 miles from coast, *Lewis* 3. Quiriguá, *Porter* 25. Vicinity of Quiriguá,

FIG. 78. *Pleurothallis Broadwayi*. Flowering plant ($\times 1$); 1, flower, front-side view, partly spread open (with lip detached; $\times 5$); 2, lip ($\times 10$); 3, petal ($\times 10$). *P. stenostachya*. Flowering plant ($\times \frac{3}{4}$); 1, flower ($\times 11$); 2, petal ($\times 13$); 3, lip ($\times 16$); 4, lateral sepals ($\times 10$). *P. hondurensis*. Flowering plant ($\times \frac{2}{3}$); 1, column and petal ($\times 7$); 2, anther with pollinia *in situ* (much enlarged); 3, pollinia (much enlarged); 4, lip, spread out ($\times 5$); 5, lateral sepals ($\times 3$); 6, petal ($\times 7$); 7, flower, side view ($\times 3$). Drawn by Blanche Ames.

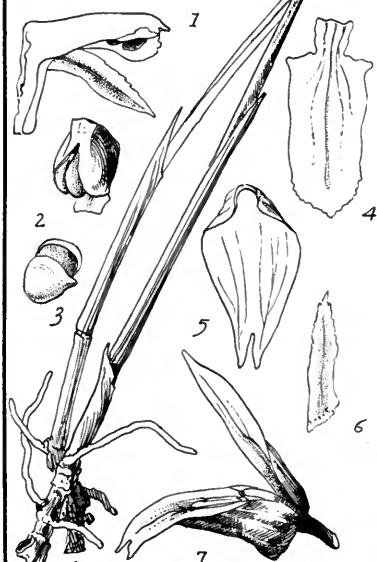
PLEUROTHALLIS

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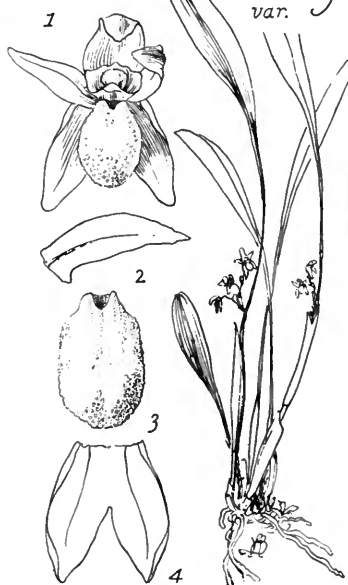


P. stenostachya

Reichb.f.
var.



P. hondurensis Ames



Standley 24197 (in part). Between Puerto Barrios and Santo Tomás, *Steyermark* 42018.—Petén: Naachtun, *Lundell* 1156.

Pleurothallis triangulipetala Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10, no. 4: 77, pl. 7. 1942 (type: Guatemala, Dept. Sacatepéquez, Barranca Hondo, lower slopes of Volcán de Fuego, alt. about 1,800 meters, December 16, 1938, *P. C. Standley* 60278). Figure 74.

Epiphytic on trees. Apparently endemic to Guatemala.

Plant small, erect, caespitose, up to 8 cm. tall. Secondary stem slender, monophyllous, 1.8–5 cm. long, concealed by three to six lepanthiform sheaths; sheaths tubular, acute-apiculate at the dilated apex, hispid along the prominent costae and apical margin. Leaf with a short sulcate petiole, suborbicular to broadly elliptic, obtuse and retuse at the apex with a cusp in the sinus, marginate, glabrous, coriaceous, 2–3 cm. long, 1–1.5 cm. wide. Peduncles several, filiform, glabrous, about 1.5 cm. long including the few-flowered raceme. Floral bracts ovate-cucullate, subacute, scarious, tinged with purple, about 2 mm. long. Flowers small, purplish white, with slender pedicels that are about as long as the bracts. Dorsal sepal triangular-ovate, obtuse, 3-nerved, sparingly ciliate on the apical margins, 4 mm. long, 2.2 mm. wide at the base. Lateral sepals united almost to the apex to form a broadly elliptic lamina; lamina obtusely bifid, 4 mm. long, 2.5 mm. wide, 6-nerved, dorsally carinate along the mid-nerve of each sepal, sparingly ciliate on the apical margins. Petals obliquely triangular, shortly acuminate, entire, 1-nerved, 1.5 mm. long, about 0.7 mm. wide at the base. Lip arcuate-decurved in natural position, linear-oblong when spread out, obtuse, slightly dilated below the middle with the margins somewhat upturned, apical margins deflexed, silky-pubescent along the margins, with a small incurved auricle on each side at the base, 2.5 mm. long, about 1 mm. wide; disk obscurely 3-nerved, provided in the middle of the lower third with a linear callus that divides and extends above the middle of the lip as two slightly thickened ridges. Column short, stout, fleshy, irregularly serrate at the apex, 1.5 mm. long, with a broad foot about 1 mm. long. Capsule subglobose, about 5 mm. long.

This species is closely allied to *P. Blaisdellii* and *P. gnomonifera* Ames, a Costa Rican and a Panamanian species, but differs from those species mainly by its entire triangular petals and essentially glabrous sepals.

Represented from Guatemala only by the type collection.

Pleurothallis tribuloides (Sw.) Lindl. Gen. & Sp. Orch. Pl. 6. 1830. *Epidendrum tribuloides* Sw. Prodr. 123. 1788.

Epiphytic on trees in dense damp forests, up to 1,300 meters alt. Widespread and fairly common in the West Indies, Mexico and Central America.

Plant erect or spreading, densely caespitose, up to 8 cm. tall. Secondary stem almost obsolete, less than 8 mm. long, monophyllous, concealed by white

scarious imbricating sheaths. Leaf obovate to oblanceolate, broadly rounded or obtuse and retuse at the apex with a cusp in the sinus, subcoriaceous, sulcate, glabrous, up to 7 cm. long and 1.5 cm. wide. Inflorescence a compact 1-3-flowered raceme that is less than 1 cm. long including the abbreviated peduncle, provided with loose white scarious sheaths and bracts. Flowers fleshy, brick-red or deep maroon. Sepals granular-ciliate on the outer surface, coarsely ciliate along the margins, with papillae scattered over the inner surface above the middle; dorsal sepal oblong-lanceolate to somewhat oblanceolate, subobtusate to acute at the apex, 3-nerved, concave below the middle, 5-8 mm. long, 2-3 mm. wide near the slightly decurrent base; lateral sepals united into an ovate-triangular, acute lamina that is 6-nerved, concave, 5-8 mm. long and 3-4 mm. wide. Petals obliquely rhombic-obovate, acute, fleshy-thickened and somewhat dorsally carinate above the middle, 2-nerved, 2.7-3 mm. long, 1.2-1.5 mm. wide. Lip arcuate-decurved and sulcate in natural position, linear when spread out, with an obtuse angle or tooth on each side below the middle, broadly rounded at the apex, 3-nerved, ciliate along the margins especially at the apex, 2.8-3.5 mm. long, 1-1.5 mm. wide; disk fleshy-thickened just in front of the short claw, fleshy-thickened along the upturned margins above the lateral teeth. Column slender, arcuate, narrowly winged above on the anterior margins, tridentate at the apex, 2-2.5 mm. long, with a foot about 1.5 mm. long. Capsule globose, densely and profusely echinate, 6-8 mm. long.

Of all the Guatemalan species of *Pleurothallis* this is the only one that has densely echinate capsules.

Izabal: La Vigia, between Bananera and Quirigua, *Lewis* 175.

Pleurothallis Tuerckheimii Schltr. Repert. Sp. Nov. 10: 292. 1912 (type: Guatemala, Dept. Alta Verapaz, near Cobán, November, 1907, *H. von Türckheim* II 1996).

Epiphytic on trees and occasionally on logs and terrestrial in rain forests, up to 2,600 meters alt. Widespread and fairly common from Mexico to Panama.

Plant erect, rather large, glabrous, 1.5-7 dm. tall. Secondary stem stout, terete, monophyllous, up to 25 cm. long, provided with two large tubular sheaths; sheaths complanate, deep brown, glossy, scarious, subacute, fugaceous, up to 10 cm. long. Leaf oval, oblong-elliptic or lanceolate, obtuse and minutely tridentate at the apex, coriaceous, 4-25 cm. long, 2-7.5 cm. wide. Raceme solitary, loosely many-flowered, exceeding the leaves, up to 35 cm. long including the stout peduncle, with a large conspicuous tubular complanate spathaceous sheath at the base; sheath reddish brown, glossy, subcoriaceous, slightly falcate, 2-8 cm. long. Floral bracts deltoid-cucullate, obtuse to subacute, shorter than the pedicels. Pedicels slender, about 8 mm. long. Flowers large, reddish brown and white. Sepals minutely papillose-puberulent on the outer surface, with the apical margins somewhat involute, brown. Dorsal sepal lanceolate, acuminate, concave below the middle, 3-nerved, somewhat dorsally carinate along the nerves, 1.3-2.5 cm. long, 4-7 mm. wide. Lateral sepals united almost to the apex to form a bifid lamina; lamina elliptic-oblong, longitudinally concave, 4- to 6-nerved, dorsally carinate along the central nerve of each sepal, 1.3-2.7 cm. long, 5-9 mm. wide,

with the free parts lanceolate and acuminate. Petals white, oblong-obovate, broadly rounded at the apex, slightly oblique, with three conspicuous brown nerves, concave-cucullate at the apex, papillose above the middle on the outer surface, 5–9.5 mm. long, 2.8–4.2 mm. wide. Lip with an arcuate short claw, linear-lanceolate, subacute to acuminate, fleshy-thickened, with the margins strongly reflexed, conspicuously auriculate at the base with the auricles extending as narrow wings part way up the lip, 5.5–10 mm. long, about 3 mm. wide near the base when spread out; disk 3-nerved, with a thickened bilamellate papillose callus between the auricles extending as inconspicuous intramarginal keels above the middle of the lip; auricles thin, broadly rounded, suberect, up to 2.5 mm. long. Column short, 4-toothed at the apex, 3–4 mm. long, with a foot 1.5–2 mm. long. Capsule oblong-cylindrical, about 2 cm. long.

This species is closely allied to *P. pachyglossa*, from which it is easily distinguished, in part, by the broader leaves, larger sheaths on the stem and the large spathaceous sheath at the base of the inflorescence.

Alta Verapaz: Finca Mocca, *Johnson* 51. Between Cobán and San Pedro, *Johnson* 756. Mountains along the road between Tactic and the divide on the road to Tamahú, *Standley* 91358. Large swamp east of Tactic, *Standley* 92390. Along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 89892.—Chiquimula: Middle slopes of Montaña Norte to El Jutal, on Cerro Brujo, south-east of Concepción de las Minas, *Steyermark* 31025.—Zacapa: Cloud forest, on summit of Sierra de las Minas, in vicinity of Finca Planados, *Steyermark* 29998. Sierra de las Minas, between Loma El Picacho and Cerro de Monos, *Steyermark* 42903. Sierra de las Minas, slopes of Monte Virgen, around summit of mountain, *Steyermark* 42627.

Pleurothallis violacea A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 16. 1845.

Epiphytic on trees, up to 1,500 meters alt. Rare in Mexico and Guatemala.

Plant erect or ascending, glabrous, caespitose, 7–19 cm. tall. Secondary stem slender, rigid, monophyllous, 2.5–6.5 cm. long, provided with two scarious loosely fitting sheaths. Leaf lanceolate, acuminate, coriaceous, tinged with purple, 4–12.5 cm. long, 0.9–2.5 cm. wide. Racemes 1–several, subsessile, fasciculate, few-flowered, up to 2.8 cm. long, enclosed at the base by a short conduplicate bract that is up to 13 mm. long. Floral bracts infundibuliform, apiculate, scarious, purple-tinged, 1.8–3 mm. long. Flowers reddish-purple tinged with green, with slender pedicellate ovaries that are about 3 mm. long. Sepals fleshy-thickened, minutely papillose on the outer surface, dorsally carinate along the mid-nerve; dorsal sepal linear-lanceolate, acuminate, canaliculate, 3-nerved, 6–7 mm. long, 1.5–2 mm. wide; lateral sepals connate almost to the apex, soon separating nearly to the base, obliquely ovate, acute-apiculate and upcurved at the apex, concave, 3-nerved, 6–7 mm. long, 3–4 mm. wide. Petals obliquely linear, obtuse and

crenulate or apiculate at the apex, about 3 mm. long and 0.25 mm. wide. Lip with a slender claw, fleshy-thickened, strongly conduplicate and arcuate-decurved in natural position, 3-nerved, minutely papillose on the outer surface above, when spread out sagittate, somewhat 3-lobed, about 4 mm. long including the claw and 3 mm. wide across the lateral lobules; lateral lobules oblique, retrorsely ovate, obtuse; apical lobule fleshy-thickened, triangular-semiterete; disk ornate with a thick erect callus at the base, vernicular above the middle; claw with a mammillate process on each side at the base. Column about 3 mm. long, crenulate at the apex, with a column foot 12 mm. long. Capsule cylindrical-ovoid, about 1.5 cm. long.

Alta Verapaz: Quebraba Seabras, Finca Arenal, *Wilson* 287.—Road between Moran and Barbarena, *Lewis* 210.

***Pleurothallis vittata* Lindl. Bot. Reg. 24: Misc. 73. 1838.**

Epiphytic on trees in dense humid forests, up to 1,270 meters alt. Uncommon in Mexico, Honduras and Panama.

Plant up to 27 cm. tall, from a thick creeping rhizome; rhizome about 3 mm. thick, concealed by fibrous-scarious sheaths. Secondary stem erect-ascending, terete, about 2 mm. thick, unifoliate, up to 15 cm. long, provided with several long clasping fibrous-scarious sheaths. Leaf linear-oblong to oblong-elliptic, obliquely tridenticulate at the obtuse apex, coriaceous, often tinged with red, up to 12.5 cm. long and 2.5 cm. wide, exceeding the inflorescences. Peduncles one or several, from the apex of the secondary stem, short, rigid, stout, up to 6.5 cm. long including the few-flowered raceme, subtended by several scarious sheaths. Floral bracts infundibuliform, acute, surrounding the rachis, about as long as the pedicellate ovaries. Flowers glaucous yellow, stained or marked with reddish brown, with stout pedicellate ovaries. Sepals fleshy, puberulent on the outer surface. Dorsal sepal free, oblong-elliptic to oblong-oblancoolate, acute to subobtuse, very fleshy-thickened and somewhat recurved above the middle, 3-nerved, 5.5–8 mm. long, 1.5–2 mm. wide. Lateral sepals connate to near the apex to form a bifid lamina; lamina broadly elliptic, ciliate on the margins, forming a short mentum at the base, 5.5–8 mm. long, 2.8–5 mm. wide about the middle. Petals rhombic-obovate, from a narrow base, broadly obtuse at the apex, with the margins more or less lacinate, 1-nerved, 1.5–2.5 mm. long, 1–1.5 mm. wide at widest point. Lip fleshy, oblong-elliptic in outline, obtuse, obscurely 3-lobed, with the lateral lobes minute and erect, with a minute auricle on each side at the base, 3-nerved, 2–4 mm. long, 1–2 mm. wide; disk with a fleshy sulcate callus between the lateral lobes. Column about 3 mm. long, denticulate at the apex, with a prominent concave foot.

No specimen has been seen from Guatemala. However, since that country is within the area of distribution of this species it is included here.

***Pleurothallis xanthophthalma* (Reichb. f.) L. O. Wms. Bot. Mus. Leaf. Harv. Univ. 8: 144. 1940. *Restrepia xanthophthalma* Reichb. f. Hamb. Gartenzeit. 21: 300. 1865. *R. Lansbergii* "Reichb. f." ex Hook. Bot. Mag. 87: t. 5257. 1861 (type: Guatemala).**

Epiphytic on trees in humid forests, up to 2,300 meters alt. Uncommon in Mexico, Guatemala, Honduras and Costa Rica.

Plant erect, caespitose, glabrous, 6–20 cm. tall. Secondary stem slender, monophyllous, 3–13 cm. long, entirely concealed by sheaths; sheaths distichous, imbricating, infundibuliform, somewhat inflated, dorsally appressed into sharp keels, acute-apiculate, whitish, scarious, the lowermost flecked with purple. Leaf bright green, often purplish beneath or mottled with purple, ovate-lanceolate to linear-oblong, obtuse and obliquely tridenticulate at the apex, coriaceous, 4–8 cm. long, 1.2–2.8 cm. wide. Peduncles one to several, filiform, up to 1.5 cm. long, provided with two short hyaline sheaths, enclosed at the base by the uppermost sheath of the stem. Flowers nodding, white or pale greenish yellow, spotted with purple. Dorsal sepal narrowly triangular-lanceolate, terminated by terete fleshy tips, canaliculate, 5-nerved, 8.5–13 mm. long, about 2 mm. wide at the base. Lateral sepals united almost to the apex to form an oblong-elliptic lamina; lamina bifid, with the teeth subacute, with the apical margins minutely involute, concave below the middle, usually 12-nerved, 8.5–12 mm. long, 5–6 mm. wide. Petals linear-filiform, dilated into a terete fleshy apex, 3-nerved, 6–9 mm. long, about 0.3 mm. wide. Lip 3-lobed, 5–6 mm. long including the short claw, about 2.5 mm. wide across the lateral lobes; central portion or lobe ovate-lanceolate, obtuse, irregularly denticulate along the margins; lateral lobes much smaller than the central lobe, triangular-linear, terminated by filiform caudae, porrect, up to 2.5 mm. long; disk transversely thickened just in front of the claw, prominently 3-nerved, with the lateral nerves lightly carinate, thickened along the mid-nerve at the base. Column arcuate, terete at the base, dilated above, 3–4 mm. long. Capsule obliquely ellipsoid, strongly ribbed, about 1.5 cm. long.

Alta Verapaz: Cobán, *Türckheim* 4057. Cubilgüitz, *Türckheim*. Along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 90140.—Baja Verapaz: Salamá, *Johnston* 1820.—Guatemala: Mocá, Gordon-Smith Finca, and road to Mataquescuintla, eighteen miles from Guatemala, *Lewis* 70.—Quezaltenango: Along road between Finca Pirineos and Calahuaché, *Steyermark* 35018.—San Marcos: Finca El Porvenir, on Potrero Matasán along Río Cabús, Volcán Tajumulco, *Steyermark* 37572.

Pleurothallis yucatanensis Ames & Schweinf. Bot. Mus. Leaf. Harv. Univ. 1, no. 2: 4. 1932.

Epiphytic on trees and on logs near sea level. Rare in Mexico, British Honduras and Guatemala.

Plant small, glabrous, up to 5 cm. tall; rhizome shortly repent, concealed by imbricating scarious-nervose sheaths; roots fibrous, white, glabrous, stout for the plant. Secondary stems very short, approximate, ascending, unifoliate, up to 2.5 mm. long, concealed by whitish scarious fugaceous sheaths. Leaf shortly petioled, elliptic to oblanceolate, minutely tridenticulate at the rounded to obtuse apex, fleshy-coriaceous, yellowish green, up to 1.5 cm. long including the short sulcate petiole, up to 5 mm. wide. Peduncle solitary, filiform, up to 3 cm. long, provided with a small solitary tubular sheath; raceme laxly 1- to 3-flowered. Floral

bracts loose, infundibuliform, apiculate, about 1 mm. long, shorter than the pedicels. Flowers small, delicate, yellow, with slender persistent pedicels, much exceeding the leaves. Sepals triangular-lanceolate, obtuse to acute, free, 1-nerved or obscurely 3-nerved, concave below, recurved at the apex, 2.5–4 mm. long, about 1 mm. wide near the base; lateral sepals oblique, dorsally carinate. Petals linear-triangular, acuminate, slightly oblique and a little constricted above the middle, 1-nerved, 2.3–3 mm. long, about 0.5 mm. wide below the middle. Lip bright yellow, articulate with the column-foot, somewhat arcuate in natural position with the margins of the lower half upturned; lamina elliptic-oblong in outline when spread out, somewhat dilated below the middle, broadly rounded at the apex, minutely auriculate at the base, 3-nerved, 1.4–2 mm. long, 0.5–0.8 mm. wide below the middle. Column short, slender below, broadly winged above, 1.2–1.5 mm. long, with a foot about 0.7 mm. long; apical pair of wings subquadrate with irregularly erose-denticulate margins.

This species is allied to *P. Grobyi*, but differs from that species in its petals and ecarinate, not carinate, lip. It is allied, in habit and appearance, to *P. sertularioides* but differs from that species in its racemose inflorescences and simple lip.

Izabal: Virginia, *Margaret W. Lewis* 26 (in part). Near Puerto Barrios and at La Vigia, between Bananera and Quiriguá, *Lewis* 26 (in part).

EXCLUDED AND OBSCURE SPECIES

Pleurothallis leptopetala Cogn. in Urban, Symb. Antill. 6: 693. 1910.

The two specimens cited below are sterile, but they are an identical match, vegetatively, with this West Indian and northern South American species. However, since no flowers are present, their identity can not be determined with finality. The flowers of *P. pansamalae* are almost identical with those of this species. However, the leaf difference immediately separates them. *Pleurothallis leptopetala* is briefly described as follows: Plant slender, caespitose, up to 20 cm. tall. Stems filiform, variable in size, 12.5 cm. or less long, unifoliate. Leaf linear to narrowly elliptic, erect or spreading, sessile, up to 9 cm. long. Pedicels abbreviated, several, 1-flowered. Flowers small, yellowish or rarely whitish. Dorsal sepal free, ovate. Lateral sepals united their entire length, ovate. Petals linear. Lip ovate.

Quezaltenango: On tree in damp quebrada, along old road between Finca Pirineos and Patzulín, alt. 1,200–1,400 meters, *Standley* 86908. Epiphyte on tree trunk, along Quebrada San Gerónimo, Finca Pirineos, lower south-facing slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, alt. 1,300–2,000 meters, *Steyermark* 33454.

Pleurothallis muscifera Lindl. Bot. Reg. 28: Misc. 79. 1842 (type: Guatemala, Skinner).

An examination of a drawing of the flower and a photograph of the plant in the Lindley Herbarium shows that it is very probably the same as *P. xanthophthalma*. If it were possible to examine the type of *P. muscifera* these two concepts probably would be found to be conspecific.

Pleurothallis jungermannioides Schltr. Repert. Sp. Nov. 11: 42. 1912 (type: Guatemala, in the tangled roots of *Stelis patula* Schltr. near Pansamalá, 3,800 feet, Türrckheim [under No. 698]).

It has not been possible to verify the identity of this plant. A floral analysis of the type strongly suggests the flowers of *Pleurothallis lancilabris*, except for the small size. Schlechter states that the rhizome of his plant had pseudobulbs, a character not known in the genus *Pleurothallis*.

A collection of *Pleurothallis* from the Department of San Marcos is vegetatively similar to *P. arietina* Ames, of Costa Rica, but the flowers are differently colored (according to notes, since no flowers were present with the specimen). The data are as follows: Above Finca El Porvenir, between "Todos Santos Chiquitos" and "Loma de la Paloma," south-facing slopes of Volcán Tajumulco, alt. 1,400–1,700 meters, epiphyte on tree, leaves coriaceous, olive-green above and beneath, petals thick, white with purple stripes, sepals white spotted with purple, March 8, 1940, Steyermark 37266. This may represent a new species. The flowers of *P. arietina* are yellow.

25. MALAXIS Soland. ex Sw.

Inconspicuous, terrestrial, rarely epiphytic, scapose herbs arising from a slender or pseudobulbous base. Scape bearing one to three leaves about the middle or near the base, occasionally just below the inflorescence. Inflorescence a few- to many-flowered subcorymbose, subumbellate or elongate raceme of small flowers terminating the scape. Sepals free or with the lateral sepals connate, spreading. Petals narrowly linear to filiform, often strongly coiled. Lip sessile, usually on the upper part of the flower, erect or spreading, entire or lobed above and auriculate below, concave. Column short, terete; anther terminal, erect or incumbent; pollinia four, waxy. Capsule small, ovoid.

This genus consists of about 150 species and attains its greatest development in Asia and Oceania. It is also widely distributed in this hemisphere and sparsely so in Europe. Some of the Middle American species are difficult to distinguish and pose perplexing taxonomic problems.

1. Raceme subumbellate or corymbose.
2. Lip tridentate or trilobulate at the apex.
 3. Lip with the central tooth or lobule minute, apiculate; unifoliate.
 4. Apical lateral teeth or lobules as long as the body of the lip, divaricate.
M. Steyermarkii.
 4. Apical lateral teeth or lobules never as long as the body of the lip, straight.....*M. unifolia.*
 3. Lip with the central tooth or lobule much larger than the lateral lobes; bifoliate.
 5. Lip conspicuously hastate-auriculate or semilunate at the base.
 6. Lip retrorsely semilunate at the base; sepals 7 mm. long or longer.
M. lepanthiflora.
 6. Lip sagittate-auriculate at the base; sepals less than 6 mm. long.
M. excauala.
 5. Lip without distinct auricles at the base.....*M. brachyrrhynchos.*
 2. Lip not tridentate or trilobulate at the apex.
 7. Lip orbicular or broadest above the middle, rarely orbicular-ovate, more than 3 mm. wide.
 8. Lip orbicular to orbicular-ovate, not auriculate; bifoliate.
M. Parthonii.
 8. Lip pandurate, broadest above the middle, auriculate; unifoliate.
M. pandurata.
 7. Lip ovate-triangular or orbicular-ovate with the apex thickened, less than 3 mm. wide.
 9. Lip cymbiform, with a distinct median carina within the concave-saccate portion, obtuse; bifoliate.....*M. brachyrrhynchos.*
 9. Lip not cymbiform, concave or semiorbicular-saccate, acute or acuminate; unifoliate.
 10. Leaf near the base of the scape; apex of the lip thickened and upcurved.....*M. aurea.*
 10. Leaf above the middle of the scape; apex of the lip thin, not upcurved.....*M. corymbosa.*
1. Raceme spicate, slender, cylindric, elongate, rarely short.
 11. Lip pandurate, broadest above the middle.....*M. pandurata.*
 11. Lip not pandurate, broadest below the middle.
 12. Lip 3-lobed, retrorsely lunate.
 13. Apical lobe of lip triangular-ovate to lanceolate; sepals about 4 mm. long.....*M. acianthoides.*
 13. Apical lobe of lip broad, trilobulate; sepals 7 mm. or more long.
M. lepanthiflora.
 12. Lip not distinctly 3-lobed or lunate.
 14. Lip retuse with an apicule in the sinus or trilobulate.
 15. Bifoliate; lip trilobulate at the apex with the median lobule larger than the lateral ones.....*M. brachyrrhynchos.*
 15. Unifoliate; lip retuse with an apicule in the sinus.
 16. Flowers subsessile; pedicels less than 2 mm. long.....*M. Soulei.*
 16. Flowers on slender pedicels; pedicels more than 3 mm. long.
 17. Apical lateral teeth or lobules as long as the body of the lip, divaricate.....*M. Steyermarkii.*
 17. Apical lateral teeth or lobules never as long as the body of the lip, straight.....*M. unifolia.*
 14. Lip not retuse.
 18. Bifoliate; flowers few and rather large; petals more than 4 mm. long, denticulate along the margins; lip lepidote.....*M. lepidota.*

18. Unifoliate; flowers numerous and small; petals smaller than in the preceding species, less than 3.5 mm. long; lip not lepidote.
19. Leaf blade tapering and cuneate at the base; lip suborbicular to transversely elliptic, apiculate, saccate-concave *M. carnosa*.
19. Leaf blade broadly rounded to deeply cordate at the base; lip orbicular-cordate to sagittate-triangular, not distinctly apiculate.
20. Raceme short, rarely more than 3 cm. long *M. corymbosa*.
20. Raceme more than 3.5 cm. long.
21. Lateral sepals connate nearly to their tips; leaf cordate.
M. majanthemifolia.
21. Lateral sepals free almost to the base; leaf broadly rounded to truncate at the base *M. Ehrenbergii*.

Malaxis acianthoides (Schltr.) Ames, Proc. Biol. Soc. Wash. 35: 84. 1922. *Microstylis acianthoides* Schltr. Repert. Sp. Nov. 15: 200. 1918 (type: Guatemala, Dept. Sololá, Argueta, among bushes in dense woods, August, 1875, Bernoulli & Cario 672).

Terrestrial in woods, up to 2,000 meters alt. Rare in Guatemala.

Plant slender, erect, glabrous, 8–28 cm. tall. Scape from a slender base, somewhat angular, 5–13 cm. long, provided with two sheaths at the base; sheaths loose-fitting, up to 3 cm. long. Leaf solitary, sheathing the scape below, expanded about the middle of the scape; lamina orbicular-ovate, shortly acuminate, cordate and clasping the scape at the base, minutely undulate along the margins, light green, thin-succulent, 1.5–4.5 cm. long, 1.5–4 cm. wide. Raceme slender, rather densely many-flowered, 3–8.5 cm. long. Floral bracts ovate-deltoid, acute, 1–2 mm. long. Flowers small, green, on slender pedicellate ovaries about 4 mm. long. Dorsal sepal elliptic-oblong, obtuse, 1-nerved, about 4 mm. long and 2.2 mm. wide. Lateral sepals obliquely ovate-elliptic, obtuse, somewhat dilated on the outer margins, concave, 1-nerved, about 4 mm. long, 2.2–2.8 mm. wide. Petals with a slender claw, transversely rhombic-lanceolate, very oblique, with the angles subacute, 1-nerved, about 3 mm. long, 3.5 mm. wide across the angles. Lip 3-lobed, retrorsely lunate, with a short triangular-ovate to lanceolate apical lobe, papillose-ciliate along the frontal margin, 1.75–2 mm. long, 4–5 mm. wide across the lateral lobes; lateral lobes thin, slender, linear, obtuse, falcate; apical lobe fleshy-thickened, acute to shortly acuminate. Column short, thick. Capsule cylindrical, about 3 mm. long.

This species is distinctive in that the petals are very oblique, being more or less dolabriform.

Volcán de Pacaya, Johnston & Porter (Comm. Margaret W. Lewis 199).

Malaxis aurea Ames, Sched. Orch. 5: 3. fig. 1. 1923. *Microstylis guatemalensis* Schltr. Repert. Sp. Nov. 21: 334. 1925 (type: Guatemala, grasslands, July, 1921, A. Tonduz 742). Figure 79.

Terrestrial in boggy ground of woods or in pasture lands, up to 1,400 meters. Rare in Mexico, Guatemala, Honduras and Costa Rica.

Plant slender, erect, glabrous, 10–23 cm. tall. Scape from a tumid rooting base, angled with the angles conspicuously winged, yellowish green, 9–21.5 cm. long, provided at the base with a small sheath 1–3 cm. long. Leaf solitary, sheathing the scape below, expanded near the base of the scape; lamina orbicular-ovate to elliptic-oblong, subacute to broadly rounded at the apex, yellowish green, 3.5–6.5 cm. long, 1.7–3.8 cm. wide. Raceme shortly subumbellate, many-flowered, 5–15 mm. long. Floral bracts minute, deltoid, acute, deflexed, 1–2 mm. long. Flowers orange-yellow or dark green, on filiform pedicels 7–12 mm. long. Sepals with strongly revolute margins, oblong-elliptic when spread out, obtuse, 1–3-nerved, 2.3–3.8 mm. long, about 1.2 mm. wide. Petals linear, obtuse, 1-nerved, falcate, somewhat coiled, 1.5–2.5 mm. long. Lip fleshy, orbicular-ovate when spread out, 1.5–3 mm. long, 1.3–2.3 mm. wide below the middle, laterally compressed, strongly complanate-concave, with the margins more or less inflexed, apex thickened and upcurved, apiculate-rostrate from beneath the tip, when spread out orbicular-cordate in front of the rostrate appendage, inside with three thickened ridges, the central one broader than the lateral ones. Column minute.

The flowers of this species suggest those of *Malaxis fastigiata* (Reichb. f.) O. Ktze., a Mexican species, but differ from those in that the rostrum is short and distinctly upcurved. The unifoliate habit, with the leaf near the base of the scape, also readily separates this species.

Huehuetenango: Between Santa Ana Huista and woods of Rancho Lucas, Sierra de los Cuchumatanes, *Steiermark* 51352.—Guatemala: Dry hills near Guatemala, *Tonduz* 894.

Malaxis brachyrrhynchos (Reichb. f.) Ames, Proc. Biol. Soc. Wash. 35: 84. 1922, as *brachyrrhyncha*. *Microstylis brachyrrhynchos* Reichb. f. Flora 71: 152. 1888.

Open grassy slopes in pine and hardwood forests, up to 2,700 meters. Rather common in Mexico, Guatemala, Honduras and Costa Rica.

Plant erect, glabrous, slender or rather stout, 14–59 cm. tall. Scape from a thickened pyriform pseudobulb, conspicuously angled, 13–57.5 cm. long, provided with a loose-fitting sheath at the base; sheath obtuse, 4.5–8 cm. long. Leaves two, rarely one or three, sheathing the scape below, expanded about the middle of the scape; lamina suborbicular-ovate to oblong-elliptic, obtuse to shortly acuminate at the apex, tapering or rounded at the base (rarely cordate), 4–17 cm. long, 1.8–9.5 cm. wide. Raceme subumbellate to racemose, densely many-flowered. Floral bracts minute, deltoid to narrowly subulate, acute, 1–2 mm. long. Flowers green, on slender pedicels 12–18 mm. long. Sepals with the margins strongly revolute, oblong-elliptic when spread out, obtuse, 3-nerved, 3.2–4.5 mm. long, 1.5–2 mm. wide. Petals filiform, obtuse, 3–4 mm. long. Lip fleshy, ovate-deltoid in outline, obtuse, obscurely trilobulate or broadly rounded at the apex, without distinct basal auricles, cucullate-cymbiform with a raised median carina within the concave-saccate portion, 2.5–4.2 mm. long, 1.5–3 mm. wide below the middle. Column short, less than 1 mm. long.

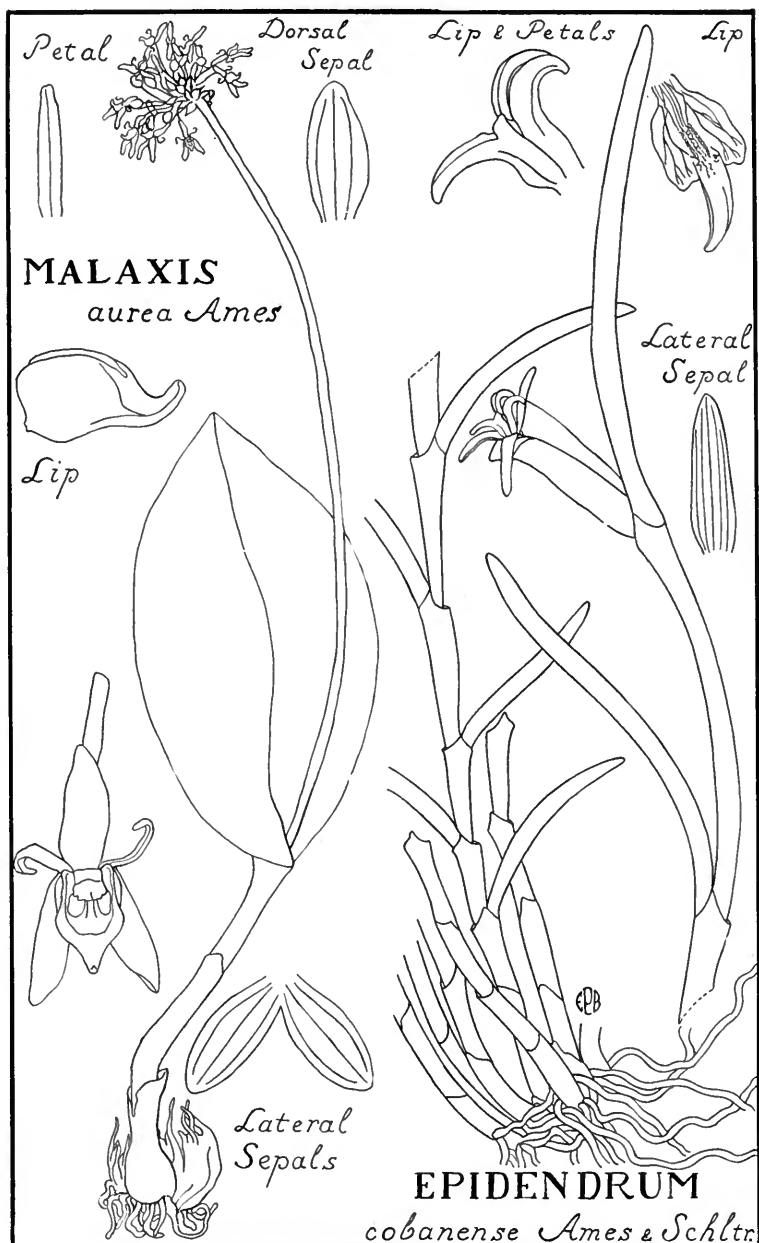


FIG. 79. *Malaxis aurea*. Flowering plant ($\times 1$); flower (bottom, left; $\times 6$); lateral sepals ($\times 6$); lip ($\times 8$); petal ($\times 8$); dorsal sepal ($\times 6$). *Epidendrum cobanense*. Flowering plant ($\times 1$); lip and petals ($\times 2$); lip ($\times 2$); lateral sepal ($\times 2$). Drawn by Eleonor B. Phillips.

This species is closely allied to *Malaxis fastigiata* (Reichb. f.) Kuntze, of Mexico, but differs from that species in that the lip is shallowly concave-cymbiform instead of being orbicular-saccate and the apical portion of the lip is broad instead of being conspicuously constricted into an acuminate deflexed rostrum as in *M. fastigiata*.

Baja Verapaz: Patal, *Türckheim* II 2305.—Chimaltenango: Chichavac, *Skutch* 543.—Guatemala: Finca Las Conchas, near Guatemala City, *Lewis* 835.—Santa Rosa: Naranjo, *Heyde & Lux* 4590.—Sololá: Volcán San Pedro, north-facing slopes towards Lago de Atitlán, above village of San Pedro, *Steyermark* 47169. Volcán Santa Clara, north-facing slopes towards Lago de Atitlán, *Steyermark* 47077.—Common in highlands of Guatemala, *Lewis* 90A.

Malaxis carnosa (HBK.) C. Schweinf. Bot. Mus. Leaf. Harv. Univ. 10: 32. 1941. *Stelis carnosa* HBK. Nov. Gen. & Sp. Pl. 1: 362. 1816. *Microstylis gracilis* Ridley, Journ. Linn. Soc. 24: 321. 1888 (type: Guatemala, Amazola and Tinula, *Lehmann* 1846). *Malaxis calycina* (Lindl.) O. Ktze. Rev. Gen. Pl. pt. 2: 673. 1891.

Open grassy hills, fields and meadows and in grass under pine trees, up to 2,800 meters alt. Rather common in Mexico, Guatemala and Costa Rica; also Peru (fide Ridley).

Plant slender or stout, erect or flexuous above, rather rigid, 1.7–5.3 dm. tall. Scape from a suborbicular pseudobulbous base, narrowly winged, 10.5–36 cm. long, provided at the base with a loose-fitting sheath 4–7 cm. long. Leaf solitary, sheathing the scape below, expanded a little below the middle of the scape; lamina conduplicate, tapering into the broad sheathing base, ovate-elliptic to elliptic-oblong, obtuse, 4.5–9.5 cm. long, 1–3.5 cm. wide. Raceme narrowly cylindrical, loosely many-flowered, 6.5–27 cm. long, 4–6 mm. in diameter. Floral bracts deltoid, acuminate, about 1 mm. long. Flowers very small, waxy yellow, on short filiform pedicellate ovaries 1.5–2 mm. long. Dorsal sepal suborbicular-ovate, obtuse, often convex, 3-nerved, 1.5–2 mm. long, 1.5–2 mm. wide. Lateral sepals ovate-elliptic to elliptic, obtuse, oblique, 3-nerved, fleshy-thickened at the apex, 1.5–2 mm. long, 1–1.2 mm. wide. Petals obliquely elliptic-lanceolate to narrowly lanceolate, narrowly obtuse to acuminate, 1-nerved, 1–1.5 mm. long, 0.4–0.8 mm. wide. Lip suborbicular to transversely elliptical, apiculate, deeply concave, with the apical margin thickened, 1–1.5 mm. long including the apicule, 1–1.5 mm. wide; apicule upcurved-suberect. Column short, thick. Capsule sessile, obliquely globose, conspicuously grooved, about 4 mm. long.

Chimaltenango: Near Tecpam, *Skutch* 475. Near Chimaltenango, *Lewis* 153.—El Progreso: Trail between Finca Piamonte east to Finca San Miguel, passing Finca Polonia, Finca Delicias, and aldea Cimientito, Sierra de las Minas, *Steyermark* 43716.—Guatemala: Chillani, *Rojas* 73; *Tonduz* 743.—Huehuetenango: Cerro Pixpíx,

above San Ildefonso Ixtahuacán, *Steyermark* 50636.—Alameda, *Johnston* 715; 1571. Camino El Sapote, *Bernoulli* 327.

Malaxis corymbosa (S. Wats.) O. Ktze. Rev. Gen. Pl. pt. 2: 673. 1891. *Microstylis corymbosa* S. Wats. Proc. Am. Acad. 18: 195. 1882–83.

Damp copses, cold ledges and in leaf mold under trees, up to 2,800 meters alt. Uncommon in Arizona, Mexico, Guatemala and Honduras.

Plant rather small, slender, glabrous, 6–30 cm. tall. Scape from a globose swollen base, broadly winged, 5–25 cm. long, provided with a loose-fitting sheath at the base; sheath greenish, 2–4.3 cm. long. Leaf solitary, sheathing the scape below, expanded mostly above the middle; lamina clasping, cordate-ovate to rarely elliptic-oblong, obtuse to acute, 2.8–10 cm. long, 1.2–5.5 cm. wide. Raceme subumbellate to shortly racemose, 1.5–5 cm. long. Floral bracts deltoid, acute, 1–2.5 mm. long. Flowers green or greenish yellow, on slender pedicels that are 6–12 mm. long. Sepals oblong-elliptic to lanceolate, subobtuse to acute, somewhat longitudinally concave, 3-nerved, dorsally thickened along the mid-nerve, 2.8–4 mm. long, 1.5–2 mm. wide; dorsal sepal recurved at the apex; lateral sepals oblique. Petals linear-filiform, obtuse, somewhat coiled, 1-nerved, 2–3 mm. long. Lip rather thin, rarely fleshy, broadly cordate-triangular, narrowly obtuse to somewhat abruptly acuminate, with a distinct auricle on each side at the base (rarely without distinct auricles), with the auricles upturned, 2–3 mm. long, 2–3 mm. wide; disk 3-nerved, shallowly concave below the middle, occasionally with a median rudimentary carina in the concave portion. Column short, about 1 mm. long.

Chimaltenango: Near Tecpam, *Skutch* 585.—Guatemala: Cerro de Nubes, *Lewis* 90B.—Quezaltenango: Near Quezaltenango, *Skutch* 792.—Sacatepéquez: Antigua, *Johnston* 1248.

Malaxis Ehrenbergii (Reichb. f.) O. Ktze. Rev. Gen. Pl. pt. 2: 673. 1891. *Microstylis Ehrenbergii* Reichb. f. *Linnaea* 22: 835. 1849. *M. minutiflora* Schltr. Bull. Herb. Boiss. 7: 540. 1899 (type: Guatemala, Dept. Huehuetenango, between Todos los Santos and Chiantla, alt. 3,000 meters, September, *Seler* 2347). Figure 32.

Terrestrial on cool rocky slopes, usually at high altitudes, up to 3,700 meters in Arizona, New Mexico, Mexico and Guatemala.

Plant slender, erect, glabrous, 15–48 cm. tall. Scape from a swollen base, terete, with inconspicuous longitudinal wings, 8.5–22 cm. long, provided at the base with a purplish sheath that is up to 6 cm. long, closely appressed. Leaf solitary, suberect, sheathing the scape below, expanded about the middle or slightly above the middle of the scape; lamina suborbicular to ovate or oblong-elliptic, obtuse, thin, succulent, 3–9.5 cm. long, 1.3–4.5 cm. wide. Raceme loosely many-flowered, exceeding the leaf, cylindrical, slender, 7.5–26 cm. long, 5–15 mm. in diameter. Floral bracts subulate, acute, 0.5–1.3 mm. long. Flowers minute,

deep maroon to green, on filiform pedicellate ovaries 2–3 mm. long. Sepals spreading, linear-ligulate to elliptic, obtuse to subacute, 1-nerved, with strongly revolute margins, 2–3 mm. long, about 1 mm. wide. Petals linear, narrowly obtuse, falcate, strongly recurved, with somewhat revolute margins, 1-nerved, about 2 mm. long, up to 0.4 mm. wide. Lip extremely variable in shape, triangular-hastate to triangular-lanceolate, hastate-auriculate at the base, acute to acuminate at the apex, concave with the basal lobules erect, 2–2.5 mm. long, 1.5–2 mm. wide; disk 3-nerved below the middle, with a fleshy callus in the center at the base. Column short, stout, about 1 mm. long. Capsule obliquely subglobose, about 5 mm. long.

Chimaltenango: Santa Elena, *Skutch* 452.—Huehuetenango: Alpine areas in vicinity of Tunimá, Sierra de los Cuchumatanes, *Steyermark* 48384. Between San Mateo Ixtatán and Santa Eulalia, Sierra de los Cuchumatanes, *Steyermark* 49897. Near Chémal, Sierra de los Cuchumatanes, *Steyermark* 50324.

Malaxis excavata (Lindl.) O. Ktze. Rev. Gen. Pl. pt. 2: 673. 1891. *Microstylis excavata* Lindl. Bot. Reg. 24: Misc. 51. 1838.

Terrestrial in wet forests, up to 2,300 meters alt. Uncommon from Mexico through Central America to northern South America.

Plant ascending or erect, glabrous, slender, conspicuously stoloniferous, 12–41.5 cm. tall. Pseudobulbs ovoid-conical, 2.5–3 cm. long, about 1 cm. in diameter near the base. Scape from a slender base, narrowly winged, 11–40 cm. long, provided with two close-fitting sheaths at the base; sheaths 2–5 cm. long. Leaves two, subopposite, sheathing the scape below, expanded about the middle of the scape; lamina ovate to lanceolate, acute to abruptly acuminate and often recurved at the apex, undulate-cripsed along the margin, 3.5–11.5 cm. long, 2.5–7.5 cm. wide. Raceme corymbose, about 1 cm. long. Floral bracts lanceolate, acuminate, 1–2 mm. long. Flowers green or greenish yellow, on long filiform pedicels 1–2.5 cm. long. Dorsal sepal triangular-ovate, obtuse to acute, 3-nerved, 3–4.5 mm. long, 1.5–3 mm. wide near the base. Lateral sepals obliquely ovate, elliptic-oblong or lanceolate, obtuse to acuminate, 3-nerved, 3–5 mm. long, 1–2 mm. wide. Petals linear, obtuse, 1-nerved, somewhat coiled, 2.5–4 mm. long, up to 0.5 mm. wide. Lip fleshy, subquadrate to triangular-ovate, 2–4 mm. long, 2.5–3.5 mm. wide across the middle, obliquely trilobulate at the apex with the central lobule longest, sagittate-auriculate at the base with the auricles deltoid to triangular-lanceolate and suberect; disk excavated in the center by a pair of rather deep elliptical depressions separated by a broad fleshy ridge and bounded in front by a fleshy 3-lobulate callus. Column short, thick.

Huehuetenango: Cerro Negro, two miles east of Las Palmas, Sierra de los Cuchumatanes, *Steyermark* 51680.

Malaxis lepanthiflora (Schltr.) Ames, Proc. Biol. Soc. Wash. 35: 84. 1922. *Microstylis lepanthiflora* Schltr. Repert. Sp. Nov. 15: 200. 1918 (type: Guatemala, Dept. Guatemala, near Guatemala, January, 1866, *Bernoulli & Cario* 509).

Terrestrial, at high elevations, up to 3,300 meters alt. Rare in Guatemala.

Plant erect, glabrous, 1.7–5 dm. tall. Scape from a slender ovoid-fusiform pseudobulb, provided with a small sheath at the base. Leaves two, subopposite, sheathing the scape below, expanded below the middle of the scape; lamina erect-spreading, thin, ovate to elliptic, shortly acuminate, rounded to cuneate at the base, 3–12 cm. long, 2–6 cm. wide. Raceme spicate, rarely subcorymbose, laxly few-flowered. Floral bracts ovate-lanceolate, acuminate, shorter than the pedicellate ovaries. Flowers rather large, erect-spreading, with pedicellate ovaries about 1 cm. long. Sepals elliptic-lanceolate, acuminate, 7–12 mm. long; lateral sepals oblique, a little narrower than the dorsal sepal. Petals spreading, revolute, oblique, linear, acute, 4–6 mm. long. Lip 2.5–5 mm. long, retrorsely semilunate at the base, constricted at the middle with the anterior half dilated to form an oval trilobulate lamina; lateral lobules merely blunt teeth; apical lobules rather large, triangular, subacute; disk with the lower half longitudinally excavate with two linear keels in the depression. Column short, thick.

El Progreso: Sierra de las Minas, hills north of Finca Piamonte, between Finca Piamonte and summit of Volcán Santa Luisa, *Steyermark* 43585.—Huehuetenango: Cerro Chiblac, between Finca San Rafael and Ixcán, Sierra de los Cuchumatanes, *Steyermark* 49159. Cerro Huitz, Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, *Steyermark* 48616.—Jalapa: Volcán Jumay, north of Jalapa, *Steyermark* 32382.—Zacapa: Cloud forest, on summit of Sierra de las Minas, in vicinity of Finca Planados, *Steyermark* 29982.

Malaxis lepidota (Finet) Ames, Proc. Biol. Soc. Wash. 35: 84. 1922. *Microstylis lepidota* Finet, Bull. Soc. Bot. Fr. 54: 531. 1907.

Wet soil in forests, dry rocky slopes, and in lava fields, up to 1,900 meters alt. Uncommon in Mexico, Guatemala and Honduras.

Plant erect, slender or rather stout, glabrous, 12.5–60 cm. tall. Scape from a subglobose pseudobulbous base, 3-angled, somewhat winged along the angles, 7.5–40 cm. long, provided at the base with two loose-fitting sheaths 3–9 cm. long. Leaves two, subopposite, sheathing the scape below, expanded below or about the middle of the scape; lamina suborbicular, oblong-elliptic or broadly lanceolate, broadly rounded to subacuminate at the apex, thin, glossy green, somewhat marginate, 5–16 cm. long, 2.5–10 cm. wide. Raceme loosely few- to many-flowered, 3–20 cm. long, up to 4 cm. in diameter. Floral bracts lanceolate, acuminate, 3–12 mm. long. Flowers dull yellow-green, almost horizontally arranged, on slender pedicels 1–1.5 cm. long. Sepals suborbicular to broadly ovate, obtuse to abruptly acute, somewhat concave, with the upper margins often undulate-crenulate, several-nerved with the nerves often branched, 5–9 mm. long, 4–6 mm. wide; lateral sepals oblique. Petals varying from rhombic-obovate to rarely linear-oblong, abruptly acute-apiculate, somewhat concave, crisped-undulate and irregularly dentate-crenulate along the margins, 3–5-nerved, 4–8 mm. long, 2–5.5 mm. wide. Lip fleshy-thickened, lepidote, sagittate to cordate-ovate, obtuse, with an obtuse auricle on each side at the base, with the margins whitish and irregularly undulate-

crisped or lightly verruculose, 3–6 mm. long, 3–5 mm. wide; disk concave on the lower half, with the upper rim of the depression forming a fleshy-thickened callus, usually with a linear callus in the depression, which is bifurcate at the base of the disk. Column short, flat. Capsule pyriform, lightly winged, about 1.5 cm. long.

Guatemala: Road from San Juan Sacatepéquez, about 36 kilometers from Guatemala City, *Lewis* 193.—Huehuetenango: Rocky slopes above La Libertad, on Cerro Pueblo Viejo, *Steyermark* 50977. Rocky dry slopes above San Ildefonso Ixtahuacán, *Steyermark* 50674.—Barranca de los Condenados, *Johnston* 1982.

Malaxis majanthemifolia Schlecht. & Cham. *Linnaea* 6: 59. 1831.

On slopes in dense forests and barrancas, occasionally epiphytic, up to 2,000 meters alt. Rather common from Mexico through Guatemala to Panama.

Plant ascending or erect, glabrous, 6.5–42 cm. tall. Scape from a slender base, lightly angled, 4.5–22 cm. long, provided at the base with a loose-fitting sheath 2.5–9 cm. long. Leaf solitary, sheathing the scape below, expanded near the base of the scape to just below the raceme; lamina cordate-ovate, obtuse to subacute, strongly clasping the scape, thin, 2.5–12 cm. long, 2–9 cm. wide. Raceme elongated, cylindrical, many-flowered, 3.5–20 cm. long, 6–15 mm. in diameter. Floral bracts deltoid to lanceolate, acute to acuminate, about 1 mm. long. Flowers small, pale or dark green, on slender filiform pedicels 2–8 mm. long. Dorsal sepal ovate-oblong to elliptic, obtuse to subacute, with the margins somewhat reflexed, 1-nerved, 2–3.5 mm. long, 1–2 mm. wide. Lateral sepals connate almost to their tips, obliquely ovate-oblong to elliptic, obtuse, with the margins more or less reflexed, 1-nerved, 1.3–2.8 mm. long, 1–1.2 mm. wide. Petals linear-lanceolate, narrowly obtuse to long-acuminate, falcate, 2–3 mm. long, about 0.3 mm. wide. Lip sagittate, cordate-ovate or ovate-triangular, narrowly obtuse to shortly acuminate, usually with a prominent auricle on each side at the base, 2–3.3 mm. long, 1.5–3 mm. wide across the basal portion; disk 3-nerved, concave and thickened on the lower median half. Column short, fleshy. Capsule ellipsoid, about 1 cm. long.

Malaxis majanthemifolia is a species of the greatest variability in size of plant and flowers. The basal auricles of the lip may vary in length from mere projections to as long as the main body of the lip.

Alta Verapaz: Cobán, *Türckheim* II 1992.—Chimaltenango: Calderas, *Johnston* 1898.—Sacatepéquez: Antigua, *Johnston* 1247.—“Guatemala:” *Lewis*.

Malaxis pandurata (Schltr.) Ames, *Proc. Biol. Soc. Wash.* 35: 84. 1922. *Microstylis pandurata* Schltr. *Repert. Sp. Nov.* 3: 77. 1906. *M. Tuerckheimii* Schltr. *Beih. Bot. Centralbl.* 36, Abt. 2:

382. 1918 (type: Guatemala, Dept. Alta Verapaz, in woods near Pansamalá, August, 1886, *H. von Türckheim* 1017).

In wet forests on logs and cliffs or terrestrial, up to 2,100 meters alt. Rare in Guatemala and Costa Rica.

Plant slender, glabrous, erect, 2-3 dm. tall. Scape from a rather slender base, narrowly winged along the prominent angles, 17.5-24.5 cm. long, provided with 1-2 sheaths at the base; sheaths 4-4.5 cm. long. Leaf solitary, sheathing the scape below, expanded below the middle; lamina ovate, shortly acuminate, subcordate at the base, deep green above, somewhat glaucous on the lower surface, 7.5-13 cm. long, 4.3-8 cm. wide. Raceme short, subumbellate or spicate, compactly many-flowered, 2.5-5 cm. long. Floral bracts lanceolate, acuminate, about 5 mm. long. Flowers green, on slender pedicels. Sepals oblong-lanceolate to lanceolate, obtuse to acute, 1-nerved, concave near the base, with margins often revolute, 4-5 mm. long, 1.5-1.8 mm. wide; lateral sepals oblique. Petals linear-filiform, obtuse, 1-nerved, sometimes dilated at the base, 4-7 mm. long. Lip spreading, subquadrate-pandurate, subtruncate-emarginate at the apex with an apicule in the sinus, more or less constricted below the middle, distinctly rotundate-auriculate on each side at the base with the upper half dilated flabellate, minutely denticulate on the margins, 4-7 mm. long, 4-7 mm. wide near the apex; disk 5-nerved with the outer nerves conspicuously branched, concave or concave-cymbiform below the middle with a slightly raised carina along the mid-nerve in the depression. Column stout, fleshy, 1.5 mm. long.

This species is easily distinguished by its subquadrate-pandurate lip.

Suchitepequez: Volcán Zunil, *Skutch* 962. Upper forested slopes of barranca by Loma Grande, above Finca El Naranjo, on Volcán Santa Clara, *Steyermark* 46845.

Malaxis Parthonii Morren, Bull. Acad. Roy. Belge 5: 485. t. 1838.

In damp or wet soil in open or dense forests, rarely partly on trees, up to 2,300 meters alt. Widespread from Mexico, through Central America and northern South America.

Plant erect, glabrous, rather stout, 14-56 cm. tall. Scape from a slightly swollen pyriform base, lightly winged, 13-55 cm. long, provided with a loose-fitting sheath at the base; sheath 3-8 cm. long. Leaves two, subopposite, sheathing the scape below, expanded mostly below the middle of the scape; lamina spreading, suborbicular-ovate to broadly elliptic-oblong, acute or shortly acuminate, broadly rounded at the base, up to 16 cm. long and 8.5 cm. wide. Raceme subumbellate, densely many-flowered, 1-2 cm. long. Floral bracts deltoid, acuminate, 1-3 mm. long. Flowers green-yellow or greenish brown, on slender pedicels 5-8 mm. long. Dorsal sepal linear-oblong to elliptic-lanceolate, obtuse, 3-nerved, with the margins often revolute, 4-6 mm. long, 1.8-3 mm. wide. Lateral sepals often somewhat united below the middle, obliquely ovate-elliptic to broadly elliptic, obtuse, with the margins somewhat revolute, 3.2-4.5 mm. long, 1.8-3 mm. wide. Petals fili-

form, obtuse to acuminate, 1-nerved, strongly coiled, 2.8–4 mm. long. Lip spreading, subreniform, orbicular or broadly ovate, abruptly obtuse or broadly rounded at the apex, often undulate along the margins, shallowly concave or depressed below the middle, several-nerved with the nerves often branched, 3–5 mm. long, 3–7.8 mm. wide, mostly wider than long. Column short, stout, about 1 mm. long.

Malaxis Parthonii is distinguished from closely allied species in Guatemala by its orbiculate type of lip.

Alta Verapaz: Cobán, *Türkheim* II 1394.—Chiquimula: Along Río Tacó, between Chiquimula and Montaña Barriol, 3–15 miles northwest of Chiquimula, *Steyermark* 30632.—Guatemala: Cerro de Nubes, *Margaret W. Lewis* 90 (in part).—Huehuetenango: Canyon tributary to Río Trapichillo, between Democracia and canyon of Chamushú, *Steyermark* 51217. Vicinity of Maxbal, about seventeen miles north of Barillas, Sierra de los Cuchumatanes, *Steyermark* 48858. Between La Libertad and Paso del Boquerón, along Río Trapichillo, *Steyermark* 51110.—Sololá: Pine woods bordering Río Bravo, in vicinity of Finca Mocá, south-facing slopes of Volcán Atitlán, *Steyermark* 48003. Trail between village of San Pedro, via San Juan, San Cristóbal Buena Vista, and northwestern slopes of Volcán Santa Clara, *Steyermark* 47316.

Malaxis Soulei L. O. Wms. Ann. Mo. Bot. Gard. 21: 343. 1934. Figure 80.

In alpine meadows and moist or dry open forests, often in pine, spruce or fir forests at high altitudes, up to 3,800 meters alt. Widespread from New Mexico and Arizona through Mexico and Central America to Panama.

Plant glabrous, slender or stout, erect or ascending, usually flexuous above, 14–50 cm. tall. Scape from a short globose pseudobulbous base, 9.5–32 cm. long, provided with a loose-fitting sheath that is marginate, obtuse or apiculate, 2–10.5 cm. long. Leaf solitary, sheathing the scape below, expanding about the middle of the scape; lamina cordate-ovate to elliptic-oblong or oblong-lanceolate, obtuse to obtuse-apiculate, dark blue-green, usually somewhat marginate, 2.5–16 cm. long, 1.3–6 cm. wide. Raceme densely many-flowered, narrowly cylindrical, 4.5–24 cm. long, 3–10 mm. in diameter; rachis minutely grooved. Floral bracts deltoid to broadly lanceolate, acute, up to 1.5 mm. long. Flowers minute, yellowish green, subsessile, on stout pedicels up to 2 mm. long. Sepals ovate-oblong to elliptic-oblong, obtuse and often minutely cucullate at the apex, 1–3-nerved, 1.5–2.8 mm. long, 0.8–1.3 mm. wide; lateral sepals oblique, slightly shorter than the dorsal sepals. Petals obliquely linear, obtuse, strongly coiled, 1-nerved, 1.3–2.2 mm. long. Lip suborbicular-ovate to triangular-ovate or subquadrate-ovate, retuse at the apex with an apicule in the sinus, mostly with a prominent obtuse auricle on each side at the base, 1.5–2.8 mm. long, 1.3–2.5 mm. wide across the base; disk 5-nerved, deeply concave. Column short, fleshy. Capsule obliquely ellipsoid, about 7 mm. long.

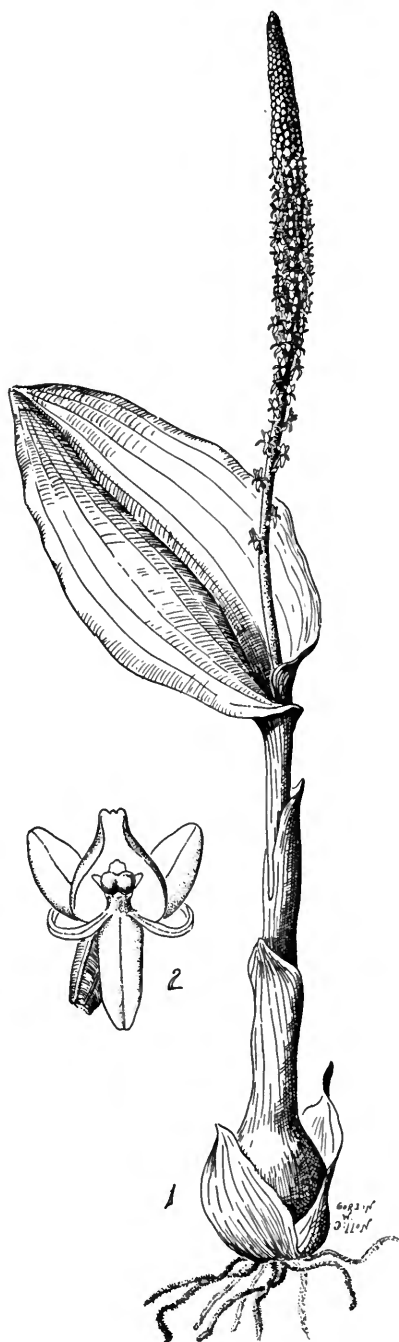


FIG. 80. *Malaxis Soulei*. 1, plant ($\times 1$); 2, flower, front view ($\times 6$). Drawn by G. W. Dillon.

This species is distinctive among the Guatemalan *Malaxis* in that the dense raceme is very narrowly cylindrical, resembling the tail of a rat. Except for the solitary leaf it resembles *M. myurus*, a Mexican species, in habit. It is superficially distinguished from *M. carnosa* in its densely-flowered raceme.

Guatemala: Above San Rafael, along road to Antigua, about seven miles from Guatemala City, *Lewis* 192.—Huehuetenango: Top of Cerro Chemalito, Sierra de los Cuchumatanes, $3\frac{1}{2}$ miles west of Santa Eulalia, *Steyermark* 49919. La Sierra (Tujimach), across river from San Juan Atitán, Sierra de los Cuchumatanes, *Steyermark* 51992.—Sololá: Volcán Atitlán, south-facing slopes, *Steyermark* 47472. Volcán Tolimán (side facing Volcán Atitlán to summit), *Steyermark* 47543.

Malaxis Steyermarkii Correll, *Lloydia* 10: 210. 1947 (type: Guatemala, Dept. Huehuetenango, Cerro Negro, two miles east of Las Palmas, Sierra de los Cuchumatanes, alt. 1,600–2,000 meters. Liquidambar-forested slopes along moist ravine, August 31, 1942, *Steyermark* 51672). Figure 81.

Found only in Guatemala.

Plant small, glabrous, erect-ascending, 7 cm. tall, provided at the base with a tubular obtuse sheath and about the middle of the stem with a solitary leaf; sheath 1.5 cm. long. Leaf cordate-ovate, abruptly subacute, clasping the stem at the base, silvery green beneath, 3 cm. long, 2.7 cm. wide. Raceme short, indeterminate, 1.5 cm. or more long. Floral bracts minute, triangular-ovate, acute, about 1 mm. long. Flowers minute, green, with filiform pedicellate ovaries that are 7.5 mm. long. Sepals spreading, with conspicuously revolute margins, 1-nerved, elliptic-oblong to narrowly ovate-elliptic, obtuse, 2 mm. long, 0.8 mm. wide. Petals strongly recurved, linear, acute, 1-nerved, 1.8 mm. long, 0.3 mm. wide. Lip with a subquadrate concave lamina, auriculate, unequally 3-lobed at the apex, about 3 mm. long including the apical lobes, 1.5 mm. wide across the lamina; mid-lobe small, apiculate; lateral lobes large, obliquely triangular-lanceolate, acute, conspicuously divaricate, about 1.5 mm. long. Column small, fleshy, about 0.5 mm. long.

The cordate-ovate leaf and unique bicornute lip, with the lateral lobes strongly divaricate, separate this species from the closely allied *M. unifolia*.

Represented from Guatemala only by the type collection.

Malaxis unifolia Michx. *Fl. Bor.-Am.* 2: 157. 1803. Figure 82.

In moist soil of woods, up to 2,300 meters alt. Widespread from Newfoundland to Florida, west to Minnesota, Illinois and

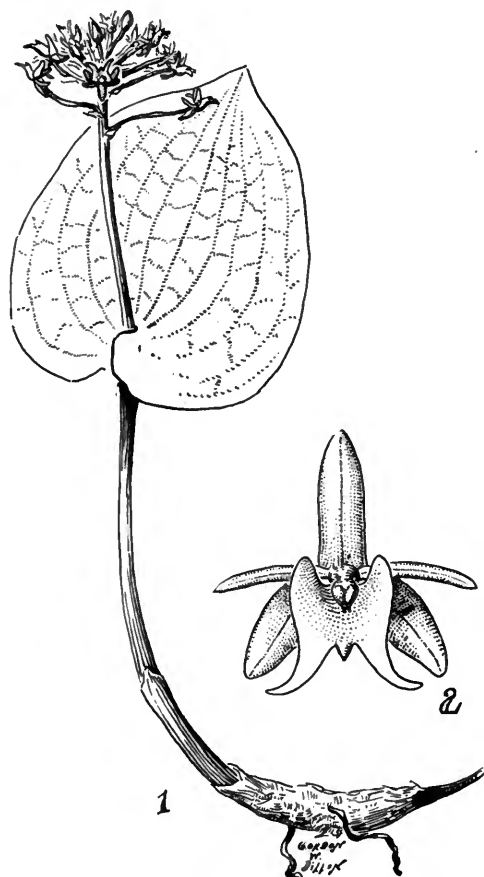


FIG. 81. *Malaxis Steyermarkii*. 1, flowering plant ($\times 1\frac{1}{2}$); 2, flower ($\times 9$). Drawn by G. W. Dillon.

Arkansas, along the Gulf Coast through Mexico to Guatemala; also Jamaica and Cuba.

Plant bright green, erect, glabrous, 6–55 cm. tall. Scape from a bulbous corm, somewhat angled and winged. Leaf solitary, sheathing the stem below, expanded near the middle of the scape; lamina sessile and clasping the stem, orbicular-ovate to ovate-lanceolate, obtuse to acute, 1–9 cm. long, 0.6–6.5 cm. wide. Raceme subcorymbose to slender-elongate, densely flowered, 1–16 cm. long, 0.7–2.5 cm. in diameter. Floral bracts minute, subulate, 1–3 mm. long. Flowers minute,

FIG. 82. *Malaxis unifolia*. 1, plants ($\times 1$); 2, flower, front view ($\times 5$); 3, lip, spread out ($\times 6$); 4, petal ($\times 7$); 5, lateral sepal ($\times 7$); 6, dorsal sepal ($\times 7$). Drawn by Blanche Ames.



green, on filiform pedicellate ovaries 3–10 mm. long. Sepals spreading, linear-oblong to oblong-elliptic, subacute, 1-nerved, with the margins often somewhat involute, 1.8–3.5 mm. long, 0.8–1.5 mm. wide. Petals narrowly linear to filiform, strongly recurved, 1.4–3 mm. long. Lip lowermost at maturity, variable in shape, cordate-deltoid, cordate-ovate, oblong-oval or obliquely oblong-quadrate, 2–4 mm. long, 1.5–3 mm. wide, cordate or auricled on each side at the base with the lobes broadly rounded to acute and often deeply notched, 3-lobulate at the apex with the two lateral lobules more or less elongate, obtuse or acute, the minute median lobule thickened and apiculate. Column minute, 0.5–1 mm. long, with two short apical lateral teeth. Capsule obliquely ovoid, 3–6 mm. long.

An additional note may be added concerning the variability of the lip of this species. The lips of individual flowers on the same raceme often differ markedly from one another. The lip of some flowers often has the basal lobes much longer than the apical lateral lobules, while that of other flowers will be the reverse, having an almost truncate base with the apical lateral lobules conspicuously elongate. The lip of some of the flowers is often noticeably constricted near the apex.

Guatemala: About seven miles from Guatemala City, roadside near San Rafael, *Lewis* 90C.

EXCLUDED SPECIES

Malaxis monophyllos (L.) Sw. Kongl. Svens. Vetens. Acad. Nya Handl. 21: 234. *pl. 3, fig. P.* 1800.

Lindley (Bentham Plantas Hartwegianas, p. 92, 1842) reported this species, as *Microstylis monophyllos* (L.) Lindl., from Guatemala: "In monte ignivomo Xetuch juxta Quezaltenango." We have seen no specimen of this species from Guatemala, and we doubt very much if this report is accurate. The typical form of *M. monophyllos* occurs on this continent only in Alaska and the Aleutian Islands, whereas its var. *brachypoda* (A. Gray) Morris & Eames is found only as far south as San Bernardino County, California.

26. *Liparis* L. C. Rich.

Inconspicuous, terrestrial or rarely epiphytic, scapose herbs arising from corms or pseudobulbs. Leaves one or more, basal, sheathing the stem. Inflorescence a lax few- to many-flowered raceme terminating the scape. Sepals mostly oblong-lanceolate, free, spreading. Petals filiform to narrowly linear. Lip entire, emarginate or 3-lobed, attached to the base of the column. Column usually elongate, strongly incurved, with narrow lateral wings above; anther terminal, operculate, incumbent; pollinia four, waxy, ovoid. Capsule ellipsoid to obovoid.

This is a rather large and complex genus of approximately two hundred species that are widely dispersed through the temperate

and warmer regions of the world, with the greatest concentration in tropical Asia and Oceania. It is painfully close to *Malaxis*.

1. Leaves two or more; lip broadest above the middle.
 2. Leaves two; lip 1 cm. or more long.....*L. arnoglossophylla*.
 2. Leaves three or more; lip less than 6 mm. long.....*L. elata*.
1. Leaf solitary; lip ovate-oval to lanceolate, not broadest above the middle.
 3. Leaf orbicular-cordate; lip lanceolate, long-acuminate.....*L. fantastica*.
 3. Leaf oblong-elliptic to linear-lanceolate.
 4. Lip greenish marked with purple, with a definite constriction above the middle, somewhat 3-lobed, orbicular-ovate to ovate-oblong, about 7 mm. long and 5.5 mm. wide.....*L. vexillifera*.
 4. Lip brownish purple to almost maroon, not constricted above the middle, broadly ovate-oval to oval-subquadrate, about 10 mm. long and 8 mm. wide.....*L. vexillifera* var. *Galeottiana*.

***Liparis arnoglossophylla* Reichb. f. ex Hemsl. in Godm. & Salvin, Biol. Centr.-Am. Bot. 3: 212. 1883.**

Terrestrial or on cliffs or rarely epiphytic in cool dense forests, up to 2,800 meters alt. Rare in Mexico, Guatemala and Costa Rica.

Plant up to 3 dm. tall, provided at the base with several whitish chartaceous sheaths. Stem lightly winged. Leaves two, basal, broadly ovate-elliptic to elliptic, obtuse to abruptly acute or shortly acuminate, apparently succulent, with the petiole sheathing the stem below, expanded just above the base of the plant, up to 14 cm. long and 7 cm. wide. Raceme laxly many-flowered, up to 12 cm. long. Floral bracts narrowly triangular-lanceolate, long-acuminate, 5–8 mm. long. Flowers green and purple, with slender pedicellate ovaries that are up to 1 cm. long. Sepals pale green, with revolute margins, narrowly lanceolate, tapering to an obtuse apex, 3-nerved, 8–13 mm. long, 2–2.5 mm. wide near the base; lateral sepals oblique. Petals pale green, 1-nerved, filiform, 8–12 mm. long, less than 1 mm. wide. Lip green with dull purplish in the center and two bands of purple just in front of the column, broadly elliptic to elliptic-obovate, auriculate, obtuse to broadly acute at the apex, 5-nerved with the lateral nerves branching, cellular-papillose on the upper margins, 1–1.4 cm. long, 5.5–9 mm. wide. Column green or yellowish, about 4.5 mm. long.

The pair of large fleshy-membranaceous leaves at once separates this species from *L. vexillifera*, to which it is allied florally. It is also found at higher elevations and usually in damper habitats than *L. vexillifera*.

Huehuetenango: Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, *Steyermark* 48573. Along trail between San Juan Atitlán and San Sebastián H., via Santa Isabel, Sierra de los Cuchumatanes, *Steyermark* 52025.

***Liparis elata* Lindl. Bot. Reg. 14: t. 1175. 1828. Figure 83.**

On decaying logs and stumps and in soil of moist forests, up to 1,300 meters alt. Widespread from southern Florida through Mexico,

Central America and the West Indies to Venezuela, Brazil and Ecuador.

Plant essentially erect, glabrous, slender or stout, 1.2–6 dm. tall. Pseudobulbs conical. Scape angled and prominently winged, suffused with madder-purple. Leaves 3–5, rarely two, sheathing the stem below, expanded near base of scape, subtended by scarious sheaths that envelop the pseudobulbs; lamina ovate to elliptic or oblong-lanceolate, broadly rounded to abruptly acuminate, plicate, 6–30 cm. long, 5.5–12 cm. wide, reduced above to minute bracts. Raceme laxly few- to many-flowered, 3–26 cm. long, 2–3 cm. in diameter. Floral bracts subulate to triangular-lanceolate, acuminate, 6–12 mm. long. Flowers small, on rather stout pedicellate ovaries that are 7–12 mm. long. Sepals greenish, streaked with madder-purple, with five prominent nerves; dorsal sepal oblong-elliptic to linear-oblong, broadly rounded to obtuse at the apex, 5–8 mm. long, 1.8–4 mm. wide; lateral sepals obliquely ovate-oblong to elliptic, obtuse to subacute, with the margins strongly revolute, 4–7 mm. long, 2–3.5 mm. wide. Petals greenish, streaked with madder-purple, linear-oblong to narrowly spatulate, with 2–3 prominent nerves, 5–7.5 mm. long, 1–2 mm. wide near the apex. Lip madder-purple, obcordate, broadly cuneate or oblong-flabellate, emarginate, occasionally with a small apicule in the sinus, strongly arcuate-decurved, obsoletely auricled on each side at the base, 4–5.5 mm. long, 3.5–5.3 mm. wide; disk with two fleshy tubercles on the basal portion, with five prominent nerves giving rise to numerous veinlets. Column stout, strongly incurved above, with shallow lateral wings and a small tooth on each side at the apex, 3.5–5 mm. long. Capsule obovoid, 1.2–1.5 cm. long, 5–6 mm. in diameter.

Alta Verapaz: Chamá, *Johnson* 902. Vicinity of Laguna Sapaalá (Chajvovuch), one mile southwest of Sibicté, *Steyermark* 44897.—Izabal: Cerro San Gil, along Río Frío and tributaries, *Steyermark* 41562.—Sololá: Pine woods bordering Río Bravo, in vicinity of Finca Mocá, south-facing slopes of Volcán Atitlán, *Steyermark* 47999.—Finca San Ignacio, near Colomba, *Lewis* 195.

Liparis fantastica Ames & C. Schweinf. Bot. Mus. Leaflet. Harv. Univ. 2: 97. 1934 (type: Guatemala, Dept. Chimaltenango, Santa Elena, July 18, 1933, *A. F. Skutch* 448). Figure 84.

Terrestrial, rarely epiphytic, in dense moist forests, up to 3,000 meters. Rare in Mexico (Chiapas) and Guatemala.

Plant slender, glabrous, up to 26 cm. tall. Scape erect or decumbent near the slightly swollen base, up to 21 cm. long, provided near the base with two loose membranaceous sheaths 1.5–5 cm. long. Leaf solitary, sheathing the scape below, expanded above the middle; lamina suborbicular-cordate, abruptly acute or shortly

FIG. 83. *Liparis elata*. 1, plant ($\times \frac{1}{4}$); 2, inflorescence ($\times 1\frac{1}{3}$); 3, flower, front view ($\times 5$); 4, flower, side view ($\times 5$); 5, petal ($\times 5$); 6, lateral sepal ($\times 5$); 7, pollinia (enlarged). Original drawing by Blanche Ames; redrawn by G. W. Dillon.



acuminate, membranaceous, nervose, spreading, up to 10.5 cm. long from the apex to the base of the auricles, 4.2–8 cm. wide. Raceme short, laxly 21-flowered or less, 1.4–5 cm. long, 2–4 cm. in diameter. Floral bracts minute, triangular, acuminate, concave, spreading. Flowers large for the plant, deep maroon, on slender pedicellate ovaries that are up to 11 mm. long. Sepals lanceolate, acuminate, reflexed and parallel to each other, with revolute margins, 3-nerved, 8.5–10.8 mm. long, 2–3 mm. wide; lateral sepals somewhat oblique. Petals strongly reflexed in natural position, filiform from a triangular base, 1-nerved, 8–9 mm. long. Lip lanceolate in outline, 7.5–9.3 mm. long, about 3.2 mm. wide near the middle when expanded, with a pair of erect semicircular more or less undulate lobules at the base, provided just in front of the lobules with two fleshy retrorse horns; central part of disk abruptly broadened and irregularly lacinate with the margins somewhat inrolled; apex long-acuminate; disk fleshy-thickened between the erect basal lobules, with a linear fleshy callus extending to about the middle. Column arcuate, 2.5–3 mm. long, dilated at the base, rather broadly winged above. Capsule ellipsoid, about 2 cm. long.

This is a most unusual *Liparis* with apparently no allies in the American tropics. In the peculiar structure of the flower, it recalls the otherwise dissimilar *Liparis angustiflora* J. J. Sm., a native of Java.

Chimaltenango: Tecpam, *Lewis* 60. Slopes of Volcán de Acatenango, above Las Calderas, *Standley* 61822.—Huehuetenango: La Sierra (Tujimach), across river from San Juan Atitlán, Sierra de los Cuchumatanes, *Steyermark* 52004.—Sololá: Volcán Santa Clara, south-facing slopes to summit, *Steyermark* 46948.

Liparis vexillifera (Llave & Lex.) Cogn. in Mart. Fl. Bras. 3, pt. 4: 289. 1895. *Cymbidium vexilliferum* Llave & Lex. Nov. Veg. Descr. 2: 11. 1825.

On grassy slopes and hillsides, open rocky woods and rarely epiphytic on trees in open woods, up to 1,350 meters alt. Widespread from Mexico to Costa Rica, the West Indies, Colombia and Bolivia.

Plant small, erect or ascending, slender, glabrous, 7.5–25 cm. tall. Scape from a small globose pseudobulb, lightly angled and winged, 4.5–13 cm. long. Leaf solitary, near the base, sheathing the scape from the pseudobulb; lamina linear-lanceolate to lanceolate, acute, somewhat conduplicate, subcoriaceous, 5–11.5 cm. long, 1.5–3 cm. wide. Raceme slender, loosely few- to many-flowered, 2–14.5 cm. long, 1–2 cm. in diameter. Floral bracts linear-lanceolate, long-acuminate, 7–9 mm. long. Flowers small, yellow-green, marked with purple, on slender pedicellate ovaries up to 1 cm. long. Dorsal sepal oblong-lanceolate, obtuse, 3-nerved, 6–10 mm. long, 2–2.5 mm. wide. Lateral sepals obliquely ovate-oblong to oblong-lanceolate, obtuse, 3-nerved, 5–8.2 mm. long, 2–3 mm. wide. Petals linear, obtuse, slightly falcate, 1-nerved, 5–9 mm. long, 0.3–1 mm. wide. Lip greenish, marked with purple, with a definite constriction above the middle, somewhat 3-lobed, orbicular-ovate to ovate-oblong, obtuse to acute, often apicu-

LIPARIS *fantastica*
Ames & Schweinf.



FIG. 84. *Liparis fantastica*. Plants ($\times 1$); 1, flower, front view ($\times 3$); 2, lip, front view, spread out ($\times 4$); 3, flower, side view ($\times 3$). Drawn by Blanche Ames.

late, 5-9 (averaging 7) mm. long, 5-7 (averaging 5.5) mm. wide; disk nervose, with two laterally placed longitudinal nerves that are profusely branched, with a small bimammillate callus at or near the base and a linear thickened keel extending almost to the apex. Column slender, conspicuously arcuate, winged on each side near the apex, 3.5-4 mm. long. Capsule ellipsoid, prominently 3-ribbed, about 1 cm. long.

Alta Verapaz: Cobán, *Türkheim* II 1395.—“Guatemala:” *Bernoulli* 290.

Liparis vexillifera* var. *Galeottiana (A. Rich. & Gal.) Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10: 79. 1942. *Malaxis Galeottiana* A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 18. 1845.

Dry granite hills, pine forests and marshlands. Apparently confined to the mainland, from Mexico, Guatemala, Honduras, Venezuela, Bolivia and Argentina.

Plant usually stout, erect or ascending, glabrous, 8-30 cm. tall. Scape from a rather large globose pseudobulb, prominently winged, 3-16 cm. long, provided at the base with a loose-fitting sheath up to 5 cm. long. Leaf solitary, near the base of the scape, sheathing the scape below; lamina oblong-elliptic to oblong-lanceolate, obtuse to acute, 6-15 cm. long, 2-5 cm. wide. Raceme showy, loosely few- to many-flowered, 3-14 cm. long, 2-4.5 cm. wide. Floral bracts linear-lanceolate to lanceolate, long-acuminate, concave, 5-18 mm. long. Flowers large for the plant, greenish or green-yellow with a purple suffusion, with slender pedicellate ovaries that are 1-1.2 cm. long. Dorsal sepal lanceolate, narrowly obtuse, 3-nerved, 8.5-13 mm. long, 2-3 mm. wide. Lateral sepals obliquely lanceolate, obtuse, 3-nerved, dorsally carinate along the mid-nerve, 7.5-11.5 mm. long, 2.2-4 mm. wide. Petals linear, obtuse, slightly falcate, 1-3-nerved, 7.5-12.5 mm. long, 0.7-1.3 mm. wide. Lip brownish purple to almost maroon, not constricted above the middle, broadly ovate-oval to oval-subquadrate, subtruncate to obtuse at the apex, often with inconspicuous auricles at the base, mostly minutely crenulate along the upper margin, 7.5-15 (averaging 10) mm. long, 6-11 (averaging 8) mm. wide; disk similar to that of the species. Column slender, arcuate, 5-6 mm. long. Capsule globose-ellipsoid, 3-ribbed, about 1 cm. long.

The variety *Galeottiana* is distinguished from typical *L. vexillifera* mainly in the size of the flowers, shape and coloration of the lip and size of the leaf. It is commonly called “oshé.”

Chimaltenango: Near Tecpam, *Skutch* 476.—Huehuetenango: La Sierra (Tujimach), across river from San Juan Atitlán, Sierra de los Cuchumatanes, *Steyermark* 51991.

27. HEXISEA Lindl.

Epiphytic herbs with few leaves and simple or branched stems. Stems terete or angular, consisting of alternately elongated swollen sections and shorter constricted sections; constricted sections giving rise to several or many scarious

sheaths. Leaves narrow, rigid, at the summit of the swollen stems. Raceme terminal, few-flowered; peduncle short, concealed by imbricated sheaths. Flowers small, orange-colored to purple. Sepals subequal, narrow, spreading; dorsal sepal free; lateral sepals more or less united at the base to form a short mentum. Petals similar to the sepals. Lip erect, united with the base of the column to form a fleshy cup, from a fleshy-thickened gibbous base, expanded above into a spreading flattened elongate lamina, sometimes obscurely 3-lobed. Column short; clinandrium broad, unequally 3-lobed; anther operculate, incumbent, semiglobose, 2-celled, with each of the cells somewhat divided; pollinia four, cereous, ovoid. Capsule small, suborbicular-elliptic.

This is a small New World genus of perhaps a half dozen species that are found mainly in Middle America and northern South America.

Hexisea bidentata Lindl. Journ. Bot. 1: 8. 1834. Figure 85.

Epiphytic on trees in forests and coffee plantations, up to 1,500 meters alt. Widespread from Mexico through Central America to Panama and northern South America.

Plant caespitose, simple or branched, up to 4.5 dm. or more tall. Stem composed of alternate elongated swollen sections and shorter conspicuously constricted sections; swollen sections composed of one or more internodes, up to 9 cm. long and 8 mm. in diameter, fusiform, longitudinally grooved; constricted sections consisting of several contracted internodes that produce scarious-fibrous imbricated sheaths at the nodes. Leaves two, at the apex of the swollen sections of the stem, sessile, opposite, linear to linear-lanceolate, obliquely tridenticulate at the obtuse apex, clasping the stem at the base, coriaceous, up to 11 cm. long and 1.2 cm. wide. Peduncle and rachis terminal, abbreviated, up to 3 cm. long, concealed by imbricated scarious sheaths and floral bracts. Flowers several, vermilion or scarlet, with slender pedicellate ovaries that scarcely exceed the floral bracts. Sepals elliptic-lanceolate, obtuse to acute, 1.2–1.9 cm. long, 3.2–5 mm. wide; lateral sepals oblique, dorsally carinate. Petals obliquely oblanceolate to narrowly elliptic, obtuse to acute, 9–13 mm. long, 2.8–3.5 mm. wide. Lip united with the base of the column and forming a cup, in natural position conspicuously arcuate and with a very fleshy transverse thickening just in front of the column, expanded into an oblong-elliptic lamina; lamina abruptly obtuse or acute at the broad sub-truncated apex, 7.5–12 mm. long, 3–4.2 mm. wide. Column short, fleshy, unequally tridentate at the dilated apex, 3–4 mm. long. Capsule obliquely sub-orbicular-elliptic, about 1 cm. long.

No specimen has been seen from Guatemala. However, since Guatemala is included in the area of distribution of the species it is included here.

28. NAGELIELLA L. O. Wms.

Epiphytic or occasionally terrestrial plants with creeping rhizomes. Stem short, pseudobulbous, clavate-thickened above, monophyllous. Leaves fleshy-coriaceous, clasping the stem or subsessile, ovate-lanceolate to linear-lanceolate.

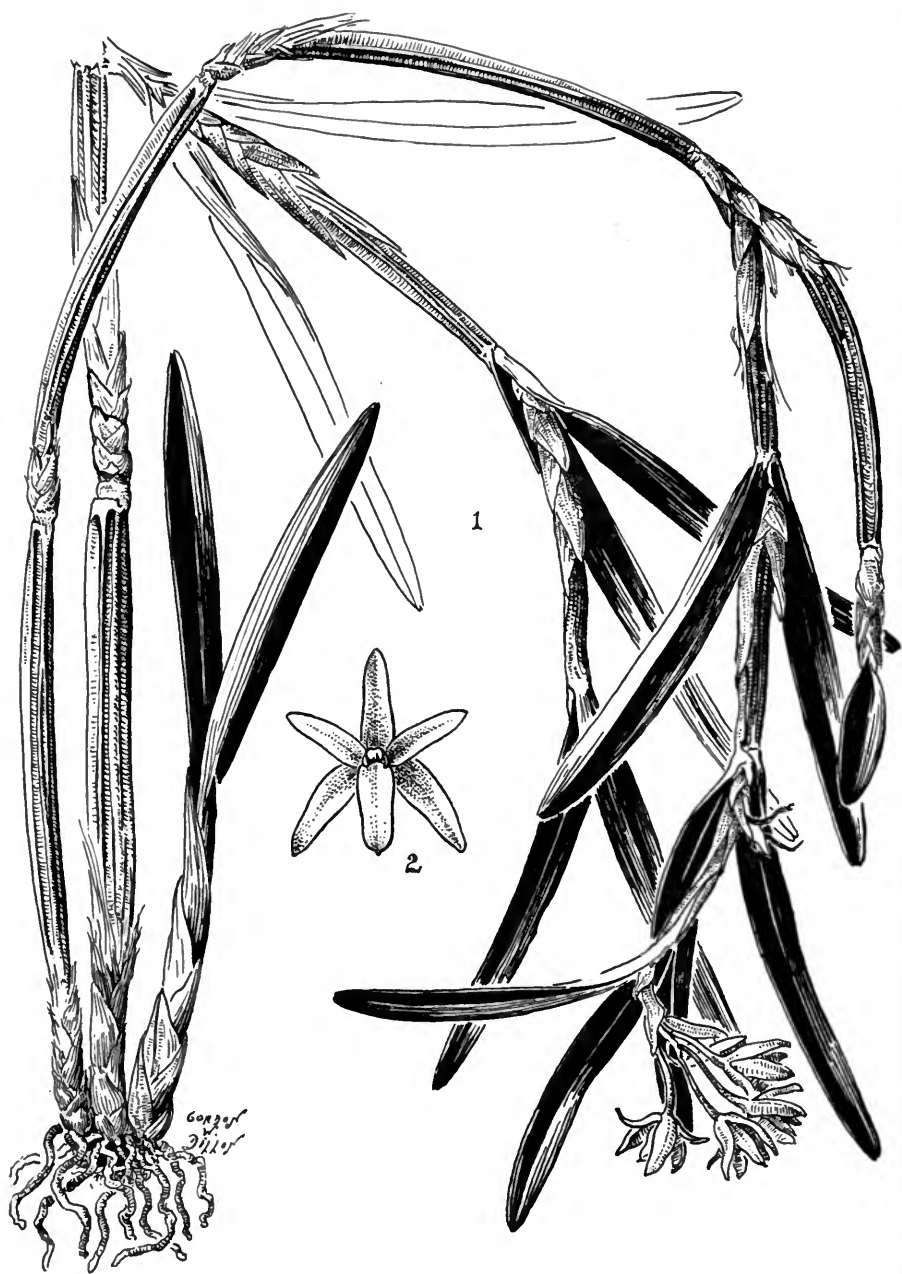


FIG. 85. *Herisea bidentata*. 1, flowering plant ($\times \frac{4}{5}$); 2, flower ($\times 1$).
 Drawn by G. W. Dillon.

Inflorescence terminal, a subumbellate raceme or paniculate raceme with short congested branches, on an elongated wiry peduncle. Flowers small, few to many. Sepals triangular-ovate to elliptic, erect, connivent, the dorsal sepal free, the lateral sepals adnate to the column foot to form a prominent or nearly obsolete mentum. Petals linear to elliptic-lanceolate. Lip more or less adnate to the column, extended below the column to form a saccate spur or spurless, constricted above or below the middle; the lamina abruptly decurved or deeply concave and enfolding the column, ovate to suborbicular, entire or obscurely 3-lobed. Column slender, with auricles on each anterior margin at the apex, prominently or only slightly arcuate; anther operculate, incumbent; pollinia four, waxy, laterally compressed. Capsule ovoid.

This genus is represented by two species, both of which are found in Guatemala. The genus is confined to Middle America.

Lip extended into a protruding sac at the base; lamina small, ovate, obtuse or retuse at the apex, less than 5 mm. wide.....*N. purpurea*.

Lip not extended into a protruding sac at the base; lamina large, suborbicular, retuse at the apex, more than 6 mm. wide.....*N. angustifolia*.

Nageliella angustifolia (Booth ex Lindl.) Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10: 80. 1942. *Hartwegia purpurea* Lindl. var. *angustifolia* Booth ex Lindl. Bot. Reg. 29: Misc. 45. 1843 (type: Guatemala, *Skinner*).

Epiphytic on trees in dry rolling hills or in damp forests, occasionally terrestrial, up to 2,100 meters alt. Widespread but not common in Guatemala.

Plant slender, erect, often growing in loose clumps, 8–32 cm. tall. Stem short, pseudobulbous, terete, clavate-thickened above, 1.5–7 cm. long. Leaf solitary, at the apex of the stem, erect, linear-lanceolate to oblong-lanceolate, obtuse to acute, thick and fleshy, sulcate, marked with deep brown, reddish or purplish spots, 2–10 cm. long, 0.7–2 cm. wide. Peduncle solitary, at the apex of the stem, stiffly erect, terete, wiry, 7–30 cm. long including rachis, provided with close-fitting brownish scarious sheaths. Flowers several, bright pinkish purple, appearing successively in 1–several short congested branches of the paniculate raceme, with slender twisted pedicellate ovaries 7–11 mm. long. Floral bracts minute, ovate, obtuse, concave, scarious, about 1 mm. long. Dorsal sepal oblong-elliptic, rounded to subacute at the apex, longitudinally concave, with the mid-nerve dorsally prominent, about 7 mm. long and 2.5–3.2 mm. wide. Lateral sepals broadly and obliquely ovate-elliptic, broadly rounded to acute at the apex, with the mid-nerve dorsally prominent, 5.5–6.5 mm. long, 3.5–4 mm. wide near the base. Petals linear to linear-lanceolate, obtuse, usually falcate, minutely denticulate along the margins, 6–7 mm. long, 1.5–2 mm. wide near the middle. Lip adnate to the base of the column for 2 mm. or less, forming no saccate spur, deeply constricted and geniculate just below the middle, the entire lip 6–9 mm. long; basal portion below the constriction running parallel to the column to form a tubular nervose sac 3–3.5 mm. long; dilated above the constriction into a thin suborbicular, obscurely 3-lobed, deeply concave lamina with crenate and more or less inrolled apical margins, retuse at the apex, 6–10.5 mm. wide when spread out. Column

deep pink, slender, strongly arcuate above the middle, with an auricle on each anterior margin at the apex. Capsule ovoid, prominently ribbed, deep reddish purple, about 1 cm. long.

Vegetatively, *Nageliella angustifolia* and *N. purpurea* are strikingly similar. The only difference is that the leaves of *N. angustifolia* are on the average narrower and thicker than those of *N. purpurea*. However, florally, the two species are quite distinct. The lip of *N. angustifolia* has no protruding saccate base as does the lip of *N. purpurea*. The lip is only slightly adnate to the column instead of being conspicuously adnate to the column, and the apical portion of the lip is larger and of a different form than that of *N. purpurea*.

Chimaltenango: Poaquil, *Seler* 2623. Chimaltenango, *Johnston* 1238.—Guatemala: Garden of Don Mariano Pacheco H., Guatemala, said to have come originally from San Antonio de Flores, Dept. Guatemala, *Steyermark* 46399.—Huehuetenango: Along road 13 km. west of Huehuetenango, near Puente de Xinaxó, *Standley* 81491.—Quiché: Between Quiché and San Pedro Jocopilas, *Standley* 62455.—Sacatepéquez: Hills of Finca Carmona, southeast of Antigua, *Standley* 63681.—Sololá: Road from Panjachel, near Lake Atitlán, *Lewis* 77.

***Nageliella purpurea* (Lindl.) L. O. Wms. Bot. Mus. Leaflet. Harv. Univ. 8: 144. 1940. *Hartwegia purpurea* Lindl. Bot. Reg. 23: sub t. 1970. 1837. Figure 86.**

Epiphytic on trees on rocky hills, up to 1,500 meters alt. Rather common in Mexico, Guatemala and Honduras.

Plant slender, erect, caespitose, 1–5.5 dm. tall. Stem pseudobulbous, twisted, clavate-thickened above, 1.5–8 cm. long. Leaf solitary, at apex of stem, erect, clasping the peduncle at the base, ovate-lanceolate to lanceolate, acute to sub-acuminate, coriaceous, usually spotted with bronze-purple, 3–12 cm. long, 0.7–3 cm. wide. Peduncle solitary at the apex of the stem, stiffly erect, terete, wiry, up to 48 cm. long including the rachis, provided with close-fitting scarious sheaths. Inflorescence a subumbellate raceme or panicle raceme with the branches congested. Floral bracts small, scarious, ovate, 1–3 mm. long. Flowers purplish red, with slender pedicellate ovaries that are 7–10 mm. long. Dorsal sepal elliptic, acute, concave-cymbiform, 7–9 mm. long, 2–4 mm. wide. Lateral sepals obliquely triangular-ovate to oblong-lanceolate, from a broad triangular base, obtuse to acute, longitudinally concave, keeled on the back, the nerves prominent, conjoined at the base to form a prominent mentum, 7–9.5 mm. long, 2.8–5 mm. wide at the base. Petals elliptic-lanceolate, obtuse to acute, slightly oblique, minutely ciliate along the margins, 6–8 mm. long, 1.2–2 mm. wide. Lip adnate to the base of the column for 2.5–4 mm., extended below or out from the column into a short subglobose sac-like spur, deeply constricted and geniculate well above the middle, the entire lip 7–11 mm. long; basal portion below the constriction running parallel

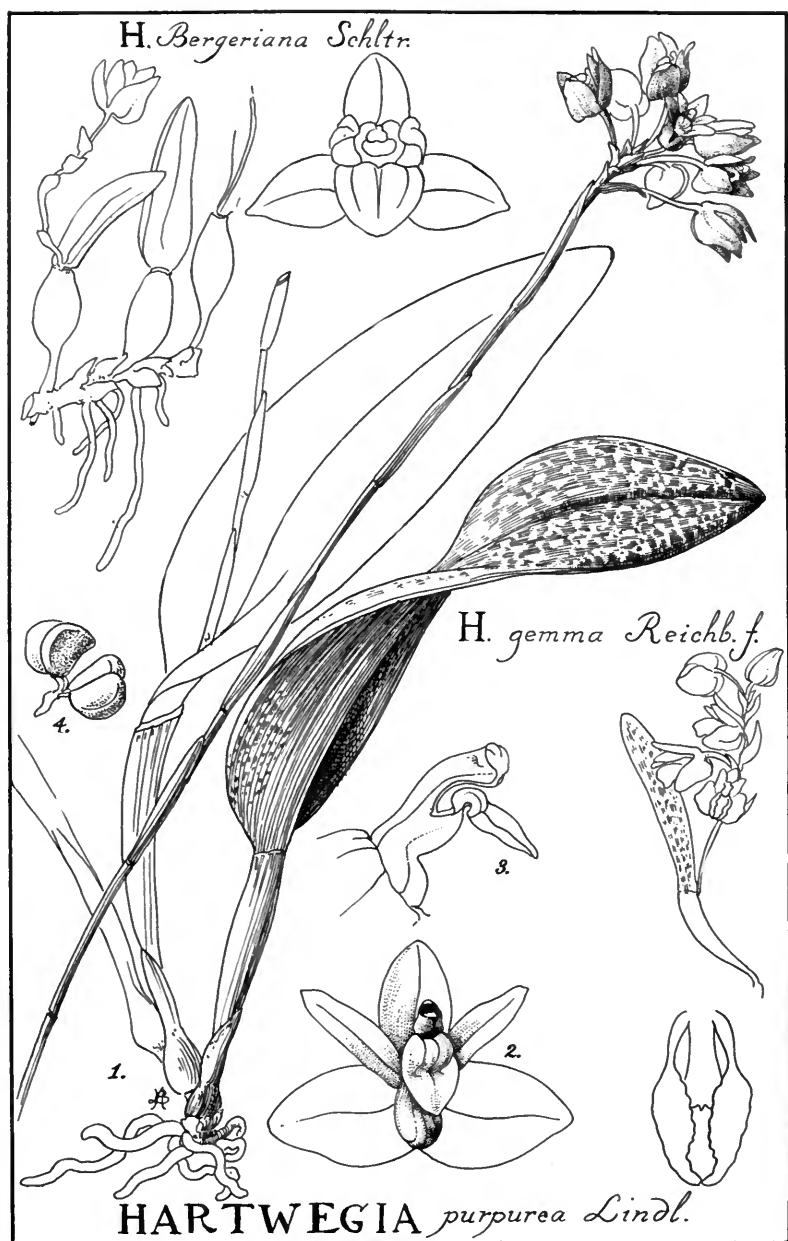


FIG. 86. *Nageliella* (*Hartwegia*) *purpurea*. 1, flowering plant ($\times 1$); 2, flower, front-side view ($\times 3$); 3, column and lip, side view ($\times 3$); 4, pollinia (greatly magnified). *N. Bergeriana* and *N. gemma* not found in Guatemala. Drawn by Blanche Ames.

to and somewhat below the column to form a tubular sac that is up to 7 mm. long; dilated above the constriction into a thin cordate-ovate or suborbicular-ovate lamina, obtuse to acute at the apex, shallowly concave, 2.5–4.5 mm. wide when spread out. Column semiterete, slender, with an auricle on each anterior margin at the apex, slightly arcuate above the middle, 6–7 mm. long. Capsule ovoid, about 1 cm. long.

(?)Baja Verapaz: North of Santa Rosa, *Standley* 69784.—Chimaltenango: Between Chimaltenango and San Martín, *Porter* 15.—Chiquimula: Between Chiquimula and La Laguna, *Steyermark* 30726.—Guatemala: Chiantla, *Smith* 2643. Fiscal, *Deam* 6084.—Huehuetenango: Río Pucal, about 14 km. south of Huehuetenango, *Standley* 82286.—Santa Rosa: Santa Rosa, *Heyde & Lux* 4621.—Zacapa: Sierra de las Minas, oak-pine woods along upper reaches of Río Sitio Nuevo, between Santa Rosalía and first waterfall, *Steyermark* 42280.

29. EPIDENDRUM L.

Plants epiphytic, rock-inhabiting or more rarely terrestrial, very small to large and robust, up to 3 meters or more tall or long, erect or creeping, with or without a conspicuous rhizome. Stems either thickened into subglobose or cylindric pseudobulbs that bear leaves only at the summit or slender and more or less leafy, simple or much branched. Leaves one to numerous, terete or flattened, varying from linear to oval, rounded to long-acuminate at the apex. Inflorescence commonly terminal, rarely lateral from the leafy stem, simple (racemose or subumbellate) to diffusely paniculate, erect or nodding, one- to many-flowered. Flowers minute to rather large. Parts of the perianth more or less spreading. Petals usually much narrower than the sepals. Lip slightly adnate to the column or more commonly adnate to the column up to the apex of the latter, simple or 3-lobed, smooth or callose. Column short to elongate, wingless or prominently winged or auricled; anther terminal, opercular, incumbent, 2-celled; pollinia four, waxy, equal, in one series with two in each anther-cell, more or less flattened. Capsule mostly ellipsoid.

This is the largest genus of New World neotropical orchids, comprising about eight hundred species. It is widely dispersed from southeastern North Carolina to western Louisiana on the Gulf Coast, through Mexico, Central America, and the West Indies to Argentina.

I. Stems with true pseudobulbs surrounded below by scarious non-leaf-bearing sheaths; leaves one or more borne at or near the summit of the pseudobulb; column wholly free from or adnate to the lip. Section *ENCYCLIUM*.

1. Lip entire or at most obscurely lobulate or somewhat bilobed.

2. Pseudobulb 1-leaved.

3. Lip linear-spatulate, broader near the apex. *E. Boothii*.

3. Lip ovate to orbicular-ovate, broader below the middle.

4. Lip 1.5 cm. or more long; leaves oblong-ligulate to lanceolate.

E. fragrans.

4. Lip 1 cm. or less long; leaves narrowly linear.....*E. subaquilum*.
2. Pseudobulb 2- or more-leaved (occasionally a poorly developed pseudobulb may have but one leaf).
5. Flower solitary.
 6. Lip ovate-lanceolate, long-acuminate.....*E. neurosum*.
 6. Lip suborbicular-ovate, apiculate.....*E. polybulbon*.
5. Flowers two or commonly more.
7. Lamina of lip noticeably longer than broad.
 8. Inflorescence abbreviated; peduncle very short or apparently wanting.
 9. Plant small, repent, rarely as much as 10 cm. tall *E. polybulbon*.
 9. Plant rather large, not noticeably repent, usually much more than 10 cm. tall.
 10. Sepals 3 cm. or more long.....*E. pentotis*.
 10. Sepals 2.5 cm. or less long.
 11. Lip rhombic or trapeziform, with a cuneate base.
E. boothianum.
 11. Lip not rhombic or trapeziform, without a cuneate base.
 12. Lip long-acuminate, auriculate at the base *E. neurosum*.
 12. Lip acute, rotundate at the base.....*E. abbreviatum*.
 8. Inflorescence not abbreviated; peduncle more or less elongate.
 13. Apex of lip rounded and retuse; disk of lip with verrucose nerves.
E. luteoroseum.
 13. Apex of lip acute to long-acuminate; disk of lip without verrucose nerves.
 14. Lip essentially pandurate-ligulate; flowers vermilion.
E. vitellinum.
 14. Lip not pandurate-ligulate; flowers not vermilion.
 15. Pseudobulb 3- to 5-leaved; inflorescence much shorter than the leaves.....*E. chondylobulbon*.
 15. Pseudobulb 2-leaved; inflorescence commonly exceeding the leaves.....*E. Brassavolae*.
7. Lamina of lip as broad as long or broader than long.
 16. Apex of lip truncate and retuse.....*E. radiatum*.
 16. Apex of lip obtuse (not broadly truncate) to acute or short-acuminate.
 17. Callus of lip trilamellate with the lateral lamellae bilobed at the base; ovary with an elongate cuniculus.....*E. collare*.
 17. Callus of lip a simple or lobed cushion or two simple lamellae; ovary without an elongate cuniculus.
 18. Lip yellow with purplish stripes; callus simple, velutinous, cushion-like.....*E. ionophlebium*.
 18. Lip dark purple with darker stripes or veins; callus consisting of two short basal yellowish keels.....*E. cochleatum*.
1. Lip 3-lobed or 3-lobulate.
19. Column with a distinct lateral auricle on each side of the clinandrium.
 20. Lamina of mid-lobe of lip much longer than broad...*E. Tuerckheimii*.
 20. Lamina of mid-lobe of lip about as broad as long or broader than long.
 21. Column adnate to the lip for one-third its length; lateral lobes of lip linear, usually slightly broader toward their tip....*E. bractescens*.
 21. Column free from the lip or adnate only at its very base; lateral lobes of lip oblong-obovate to broadly ovate.

22. Veins of the mid-lobe of lip strongly verrucose above, terminating in distinct lines of warts; lateral lobes of lip oblong-obovate.
E. alatum.
22. Veins of the mid-lobe of lip smooth or at most verruculose, not warty above; lateral lobes of lip oblong, oblong-pandurate or ovate.....*E. oncidoides.*
19. Column without a distinct auricle on each side of the clinandrium, at most denticulate or more or less winged near the summit.
23. Lip obscurely 3-lobed, rhombic or trapeziform in outline.
E. Boothianum.
23. Lip distinctly 3-lobed, not rhombic or trapeziform in outline.
24. Mid-lobe of lip acicular or linear-lanceolate.
25. Lateral lobes of lip fimbriate-ciliate.....*E. ciliare.*
25. Lateral lobes of lip entire or at most dentate.
26. Lip from base of column to tip of mid-lobe 5.5 cm. or more long; sepals and petals 5.5 cm. or more long. *E. Parkinsonianum.*
26. Lip from base of column to tip of mid-lobe 4 cm. or less long; sepals and petals less than 4 cm. long.
E. Parkinsonianum var. *falcatum.*
24. Mid-lobe of lip not acicular or linear-lanceolate.
27. Outer margins of mid-lobe of lip conspicuously dentate to fimbriate; mid-lobe with two divaricate suborbicular-obovate lobules.
E. Stamfordianum.
27. Outer margins of mid-lobe of lip not conspicuously dentate or fimbriate.
28. Mid-lobe of lip smaller than each lateral lobe or about equal to it.
29. Mid-lobe of lip with divaricate lobules; plant dwarf, less than 4 cm. tall.....*E. microcharis.*
29. Mid-lobe of lip never with divaricate lobules; plant more than 4 cm. tall.
30. Mid-lobe of lip triangular, from a markedly broad base.
E. pygmaeum.
30. Mid-lobe of lip never triangular.
31. Lateral lobes of lip oblong to pandurate-oblong, free portion longer than broad; inflorescence usually paniculate.
32. Sinus between the mid-lobe and each lateral lobe of lip extremely narrow, often concealed by the overlapping lobes; base of each lateral lobe of lip more or less cordate.....*E. Candollei.*
32. Sinus between the mid-lobe and each lateral lobe of lip broad and well defined; base of each lateral lobe of lip never cordate, but gradually narrowed.
E. selligerum.
31. Lateral lobes of lip suborbicular-quadrate, free portion about as long as broad; inflorescence usually racemose, rarely branched.....*E. ochraceum.*
28. Mid-lobe of lip considerably larger than each lateral lobe, often twice as large.
33. Pedicellate ovary hyaline-echinate; lateral lobes of lip linear to linear-spatulate, usually asymmetrically bidentate near the tip.....*E. xipheres.*
33. Pedicellate ovary not hyaline-echinate, though verruculose to muricate in some species.
34. Pseudobulb 1-leaved.

35. Lip more than 1 cm. long; mid-lobe more than 3 mm. wide.....*E. campylostaliæ*.
35. Lip less than 1 cm. long; mid-lobe less than 3 mm. wide.
E. limbatum.
34. Pseudobulb 2- or more-leaved.
36. Pseudobulb contracted into a caulescent neck (usually 4-10 cm. long) which separates the leaves from the swollen portion.....*E. varicosum*.
36. Pseudobulb not contracted into a caulescent neck, the leaves practically sessile on the swollen portion.
37. Middle tooth at the summit of the column rather broad, erect, very fleshy and quadrate or rounded-quadrate, separated from the well-defined lateral tooth on each side by a relatively narrow and deep sinus.
38. Disk of mid-lobe of lip with three longitudinal rows of prominent separate tuberculose papillae.
E. condylochilum.
38. Disk of mid-lobe of lip without three longitudinal rows of prominent separate tuberculose papillae.
E. virgatum.
37. Middle tooth at summit of column small or sometimes wanting, triangular, incurved and obtuse to acute, separated from the tooth on each side by a broad usually shallow sinus.
39. Column adnate to the lip for one-third to one-half its length.....*E. adenocarpon*.
39. Column adnate to the lip for one-fourth its length at most, usually much less.
40. Mid-lobe of lip not unguiculate, the lateral lobes separated from it by a very narrow sinus.
41. Veins or keels of the mid-lobe of lip strongly verrucose.....*E. aromaticum*.
41. Veins or keels of the mid-lobe of lip smooth or at most slightly verrucose.....*E. Candollei*.
40. Mid-lobe of lip more or less unguiculate, the lateral lobes noticeably separated from it.
42. Mid-lobe of lip less than 1.3 cm. wide; wing on each side of the column terminated in a triangular produced summit....*E. trachycarpum*.
42. Mid-lobe of lip more than 1.3 cm. wide; wing on each side of the column not terminated in a triangular produced summit.*E. atropurpureum*.
- I. Stems without true pseudobulbs, though sometimes thickened at the base (in Section BARKERIA); leaves usually several, distributed along the stem or concentrated on the upper part of the stem, not clustered at the summit, or at least showing leaf-sheaths surrounding the thickened base of the stem (in Section BARKERIA).
- II. Column usually adnate to the lip nearly its entire length (sometimes adnate only one-half its length), not developed into a wing on each side; stems never thickened.....Section EUEPIDENDRUM.
1. Lip 3-lobed or 3-lobulate.
2. Leaves terete or semiterete.
3. Pedicellate ovary concealed by two spathaceous bracts; lateral lobes of lip with a porrect rounded apex.....*E. cobanense*.
3. Pedicellate ovary exserted from the one or more subtending bracts; lateral lobes of lip without a porrect rounded apex....*E. teretifolium*.

2. Leaves flat, not terete or semiterete.
 4. Mid-lobe of lip narrowly triangular to linear, several times longer than broad.
 5. Leaves acuminate; flowers five or more.....*E. lacertinum*.
 5. Leaves obtuse or at most acute; flowers one or at most two present at one time.....*E. nocturnum*.
 4. Mid-lobe of lip not narrowly triangular to linear (in some species triangular from a broad base or not more than twice as long as broad).
 6. Lip tubular-involute, usually very fleshy and difficult to expand, its outline ovate-oblong, longer than broad.....*E. singuliflorum*.
 6. Lip not tubular-involute, usually flat.
 7. Area of mid-lobe of lip approximately twice that of either lateral lobe or even larger.
 8. Apex of mid-lobe of lip rounded or distinctly protuberant-acute.
 9. Lateral lobes of lip coarsely dentate to lacerate; inflorescence usually long-peduncled.....*E. imatophyllum*.
 9. Lateral lobes of lip not coarsely dentate or lacerate; inflorescence never long-peduncled.....*E. pansamalae*.
 8. Apex of mid-lobe of lip truncate, retuse or bilobed, in some species with an apicule in the sinus.
 10. Lateral lobes of lip lacerate or at least deeply and irregularly dentate.....*E. cristatum*.
 10. Lateral lobes of lip entire or at most crenulate-erose.
 11. Lateral lobes of lip suborbicular-quadrate, broader than long.....*E. Clowesii*.
 11. Lateral lobes of lip not suborbicular-quadrate.
 12. Upper part of the column-wing divided into four subquadrate lobules that are not more than one-third the length of the column proper; inflorescence commonly diffuse-paniculate though sometimes racemose.
 13. Base of mid-lobe of lip tricallose; flowers white to pale yellow.....*E. verrucosum*.
 13. Base of mid-lobe of lip bicallose; flowers almost white to purplish red.*E. verrucosum* var. *myrianthum*.
 12. Upper part of column-wing simple, elongate, irregularly denticulate-crenulate at its summit and as long as the column proper; inflorescence commonly racemose.
E. centropetalum.
 7. Area of mid-lobe of lip about equal to that of either lateral lobe or smaller.
 14. Ovary with a saccate vesicle at the summit....*E. physodes*.
 14. Ovary without a saccate vesicle at the summit.
 15. Inflorescence subumbellate.
 16. Mid-lobe of lip (if present) twice or more broader than long, semielliptic to reniform.....*E. difforme*.
 16. Mid-lobe of lip usually little broader than long if as broad, subquadrate to subquadrate-ovate.
E. difforme var. *firmum*.
 15. Inflorescence racemose or paniculate.
 17. Mid-lobe of lip not bilobed or retuse.
 18. Floral bracts large and conspicuous, conduplicate, equitant and prominently carinate, subequaling the flowers.....*E. nitens*.

18. Floral bracts not large and conspicuous, concave, much shorter than the flowers.
19. Lip less than 1 cm. broad; stem unbranched.
E. anceps.
19. Lip more than 1 cm. broad; stem branched.
E. incomptum.
17. Mid-lobe of lip bilobed or retuse.
20. Rachis much-thickened and sharply deflexed, very densely flowered, with approximate bracts; leaves fleshy-coriaceous. *E. pachyrachis.*
20. Rachis not much-thickened; leaves not fleshy-coriaceous.
21. Veins of lateral lobes of lip distinctly carinate-thickened; stem (not rhizome) always branched.
E. arbuscula var. *radioferens.*
21. Veins of lateral lobes of lip not noticeably carinate-thickened; stem simple or branched.
22. Leaves two to five, concentrated (but not clustered) toward the termination of the stem or branch, the lower portion of which bears only non-leaf-bearing sheaths. *E. arbuscula.*
22. Leaves several, distributed along the elongate stem.
23. Margins of lateral lobes of lip digitate, lacerate or dentate.
24. Peduncle very elongate with close scarios sheaths and with the flowers clustered in dense racemes, sometimes paniculate.
E. ibaguense.
24. Peduncle not very elongate or if so with spreading foliaceous or imbricating spathes.
25. Mid-lobe of lip with two strongly divaricate lobules.
26. Lip bearing a central carinate thickening; inflorescence frequently subtended by broad imbricating spathes. *E. cristatum.*
26. Lip bearing three parallel approximate fleshy keels; flowers greenish tinged.
E. paniculatum.
25. Mid-lobe of lip with the lobules more or less porrect, never strongly divaricate.
E. polyanthum.
23. Margins of lateral lobes of lip not digitate, lacerate or dentate (sometimes crenulate, undulate or asymmetrically bilobed).
27. Lateral lobes of lip asymmetrically bilobed.
28. Petals filiform to filiform-spatulate, less than 1 mm. wide. *E. polyanthum.*
28. Petals obovate-cuneate, more than 7 mm. wide. *E. Schweinfurthianum.*
27. Lateral lobes of lip entire or at most crenulate-undulate.
29. Spread between tips of widely divaricate lobules of mid-lobe of lip about twice or more the length of mid-lobe, which is commonly not clawed. . . . *E. paniculatum.*

29. Spread between tips of the more or less porrect lobules of mid-lobe or breadth of simple retuse mid-lobe less than twice the length of mid-lobe, usually much less.
30. Lip 1.7 cm. or more wide; raceme usually elongate and 6 cm. or more in diameter.
E. moyobambae.
30. Lip 1.6 cm. or less wide.
31. Pair of basal calli of lip absent; peduncle usually elongate. *E. anceps*.
31. Pair of basal calli of lip present; peduncle usually but not always abbreviated.
32. Pedicellate ovary more than 2.8 cm. long; inflorescence a broad rather dense nodding raceme.
E. cnemidophorum.
32. Pedicellate ovary less than 2.8 cm. long; inflorescence a narrow raceme or a compound racemose panicle.
33. Pedicellate ovary glabrous; exterior surface of lateral sepals glabrous. *E. Clowesii*.
33. Pedicellate ovary verrucose or verruculose; exterior surface of lateral sepals more or less verrucose. *E. polyanthum*.
1. Lip simple, obscurely lobulate or bilobed.
34. Lower portion of lateral margins of lip irregularly lacerate to coarsely sharp-dentate; lamina of lip with a prominent central keel extending nearly to its apex. *E. imatophyllum*.
34. Lower portion of lateral margins of lip neither lacerate nor coarsely sharp-dentate.
35. Inflorescence a lax widely spreading many-flowered (usually twenty-five or more) commonly compound panicle; lip ovate to triangular-ovate.
E. diffusum.
35. Inflorescence racemose or paniculate, if paniculate the panicle is simple.
36. Blade of leaf not articulate with the sheath (leaves not deciduous).
E. Schlechterianum.
36. Blade of leaf articulate with the sheath (leaves deciduous).
37. Ovary with a more or less semiglobose vesicle at its summit just under the lip.
38. Apex of lip subtruncate to obtuse; leaves not variable in length from top to bottom of stem.
39. Leaves triangular-lanceolate, scattered on stem; lip not strongly conduplicate. *E. physodes*.
39. Leaves elliptic to elliptic-oblong, congested (but not clustered) on upper half of stem; lip strongly conduplicate. *E. Carolii*.
38. Apex of lip acute to subacuminate; leaves variable in length from top to bottom of stem. *E. strobiliferum*.
37. Ovary without a more or less semiglobose vesicle at its summit.
40. Lip less than 6 mm. wide, with a tridentate (not tricarinate) or V-shaped callus at or near the base of the lamina.
41. Leaves very narrowly linear-lanceolate, less than 5 mm. wide, elongate, grass-like, acuminate. *E. isomerum*.
41. Leaves ligulate or linear-oblong to lanceolate or oblong-elliptic, usually much more than 5 mm. wide, obtuse or retuse.

42. Column extending up to the middle of the lamina of the lip, with a prominent falcate-oblong auricle on each side.
E. pseudoramosum.
42. Column extending little beyond the claw of the lip, shallowly and broadly winged on each side.
43. Callus tridentate or trilobulate at its apex; lip long-acuminate; sepals and petals usually acuminate; in typical material the leaves of the primary stem are much larger than those of the branches. *E. ramosum* var. *mixtum*.
43. Callus bifurcate at its base; lip obtuse to short-acuminate; sepals and petals usually obtuse to acute.
44. Flowers solitary or several clustered on separate peduncles, subtended by closely appressed imbricated bracts. *E. ramosum* var. *lanceolatum*.
44. Flowers in a short raceme, each flower subtended by a floral bract.
45. Stem slender, 4 mm. or less in diameter just below the inflorescence; leaf-sheaths and bracts not maculate; leaves commonly less than 1 cm. wide; inflorescence usually lax and rather narrow. *E. ramosum*.
45. Stem stout, commonly 5-6 mm. in diameter just below the inflorescence; leaf-sheaths and bracts usually fine-maculate; leaves commonly 1.5 cm. or more wide; inflorescence typically rather dense and broad.
E. ramosum var. *angustifolium*.
40. Lip commonly but not always more than 6 mm. wide, never with a tridentate or V-shaped callus at or near the base of the lamina.
46. Entire length of column adnate to base of lateral sepals.
E. porpar.
46. Entire length of column not adnate to base of lateral sepals.
47. Stem (not rhizome) branched.
48. Inflorescence 1-flowered. *E. repens*.
48. Inflorescence 2- or more-flowered.
49. Disk of lip bearing a single more or less lobulate or retuse callus that is usually situated well above the base.
50. Leaves oblong-elliptic, 12 mm. or more wide; apex of lip retuse. *E. viejii*.
50. Leaves linear to linear-elliptic, 7 mm. or less wide; apex of lip acute-apiculate. *E. trachythecae*.
49. Disk of lip not bearing a single more or less lobulate or retuse callus.
51. Lamina of lip 1.5 cm. or more long.
52. Lip 2.5 cm. long, rotundate at the base, with the margins minutely papillose-denticulate.
E. cerinum.
52. Lip 1.5 cm. long, cordate at the base, with the margins entire. *E. alticola*.
51. Lamina of lip less than 1.2 cm. long.
53. Disk of lip with a broad central fleshy clavate-elliptic callus that is sulcate at the base and extends to the apex. *E. Skutchii*.
53. Disk of lip without a broad central fleshy clavate-elliptic callus, bicallose at base and often with one to three carinate-thickened nerves above.
E. ledifolium.
47. Stem unbranched.

54. Floral bracts conspicuous due to their size, their largeness compared with the flowers, or their distinct spreading character.
55. Lamina of lip noticeably broader than long, reniform.
E. coriifolium.
55. Lamina of lip usually longer than broad, sometimes about as long, more or less orbicular-ovate or orbicular-cordate.
56. Lateral sepals prominently keeled at their apex; lip slightly contracted in the middle of each side.
E. nitens.
56. Lateral sepals not keeled; lip not contracted in the middle of each side. *E. rigidum*.
54. Floral bracts not conspicuous.
57. Inflorescence subumbellate. *E. difforme*.
57. Inflorescence racemose or paniculate.
58. Lip conduplicate; peduncle elongate; raceme elongate and very narrow.
59. Leaves long-attenuate, elongate-lanceolate, usually 10 cm. or more long. *E. Laucheanum*.
59. Leaves obtuse-apiculate to acute, elliptic to elliptic-oblong, less than 9 cm. long. *E. Carolii*.
58. Lip not conduplicate but convex, flat or at most somewhat concave.
60. Disk of lip ecallose; peduncle usually elongate; inflorescence proliferous when mature. . . . *E. anceps*.
60. Disk of lip callose or carinate.
61. Length of lip greater than its breadth.
62. Lip ovate, about 5.5 mm. long; leaves grass-like, long-attenuate. *E. Chloë*.
62. Lip obovate-oval, 3 cm. long; leaves not grass-like, acute. *E. sobralioides*.
61. Length of lip less than its breadth.
63. Rachis much thickened and sharply deflexed; flowers fleshy. *E. pachyrachis*.
63. Rachis slender; flowers membranaceous.
E. eustirum.
- II. Column wholly free from the lip or in some species adnate at the base (in *E. Skinneri* adnate nearly to its middle), more or less expanded into a wing on each side; stems thickened at base or fusiform-cylindric, leafy or with leaf-sheaths. Section BARKERIA.
 1. Veins of lip papillose-verruculose; base of stems distinctly fusiform-thickened. *E. chinense*.
 1. Veins of lip not papillose-verruculose; base of stems evenly thickened some distance upward or fusiform-cylindric.
 2. Inflorescence congested, subumbellate, the peduncle much abbreviated; clinandrium with two petaloid porrect triangular wings.
E. stenopetalum.
 2. Inflorescence laxly racemose, the peduncle more or less elongate; clinandrium without petaloid wings.
 3. Lip lacking true keels; sometimes the mid-nerve is fleshy-thickened toward the apex. *E. elegans*.
 3. Lip with three to five true keels.
 4. Lamina of lip oblong-oval, elliptic-lanceolate to subquadrate or suborbicular, 2 cm. or more long; keels three to five, more pro-

- nounced toward upper part of lip; column adnate to lip for one-third its length or less..... *E. Lindleyanum*.
4. Lamina of lip broadly ovate or broadly ovate-triangular, usually less than 1.5 cm. long; keels three (often with two less conspicuous intervening carinate nerves), more pronounced toward basal part of lip; column adnate to lip for nearly half its length... *E. Skinneri*.

Epidendrum abbreviatum Schltr. Repert. Sp. Nov. 3: 107. 1906. *Epidendrum prorepens* Ames, Sched. Orch. 2: 33. 1923 (type: Guatemala, Dept. Alta Verapaz, Chamá, June 15, 1920, *Harry Johnson* 234).

Epiphytic on trees and on rocks, up to 1,800 meters alt. Rather common in Guatemala, Honduras, Costa Rica and Panama.

Plant small, glabrous, 1-2 dm. tall. Rhizome creeping, elongated, rooting at intervals, 3-4 mm. in diameter. Pseudobulbs stipitate, bifoliate, fusiform or cylindrical, 3-7.5 cm. long, 4-12 mm. thick, obliquely ascending 2-3 cm. apart on the rhizome. Leaves linear to linear-oblong, obtuse, coriaceous, divergent, 7-14 cm. long, 4-15 mm. wide. Raceme short, compactly 3-6-flowered, 1-3 cm. long including the stout peduncle. Floral bracts deltoid, obtuse to acute, 2-4 mm. long. Flowers erect-spreading, greenish white, the lip marked with brown-purple, with stout pedicellate ovaries 6-9 mm. long. Dorsal sepal oblong-ligulate, acute, fleshy-thickened, 9-13.5 mm. long, 2-3 mm. wide near the middle. Lateral sepals obliquely lanceolate, carinate at the acute apex, fleshy-thickened, sulcate below the middle, 10-14 mm. long, 2-4 mm. wide. Petals obliquely oblanceolate to spatulate, acute to shortly acuminate and somewhat carinate at the apex, with a median purple stripe, 8.5-13 mm. long, 1-4 mm. wide near the apex. Lip ovate, acute, strongly concave, whitish with a few longitudinal purple stripes, fleshy, margin slightly undulate, 8.5-10 mm. long, 5-7.5 mm. wide across the middle; disk with a thickening on each side above the base, otherwise ecallose. Column 5-6 mm. long, fleshy, with a triangular erect lobule on each side at the summit and a posterior elongated linear tooth that is erect and 1 mm. long in a line parallel to the axis of the column. Capsule strongly 3-angled, ovoid, about 2 cm. long.

Represented from Guatemala only by the type collection of *E. prorepens*.

Epidendrum adenocarpon La Llave & Lex. Nov. Veg. Descr. 2 (Orch. Opusc.) 24. 1825; Lindl. in Benth. Pl. Hartweg. 92. 1842 (as "*adenocarpum*"). *Epidendrum papillosum* Bateman ex Lindl. in Bot. Reg. 24: Misc. 7. 1838; Hooker in Bot. Mag. 65: t. 3631. 1838 (type: Guatemala, *Skinner*).

On trees, often cacti, in rather dry open country. Uncommon from Mexico to Nicaragua.

Plant erect, up to 8.5 dm. tall. Pseudobulbs obliquely ovoid-conical, glazed, 2-3-leaved, 2.5-7 cm. long, up to 3 cm. in diameter near the base, enveloped in whitish scarios fibrous sheaths when young. Leaves linear-elongate, narrowly obtuse to acute, coriaceous, mostly conduplicate-ensiform, 15-40 cm. long, 6-15

mm. wide. Inflorescence a loose many-flowered panicle, up to 8 dm. long including the long reddish brown peduncle; peduncle and branches of the panicle provided with close-fitting tubular bracts 4–25 mm. long. Floral bracts minute, deltoid, acute, 2–3 mm. long. Flowers colorful, with stout tuberculate-roughened pedicellate ovaries 1.5–2 cm. long. Sepals yellowish green with reddish brown shading and nerves, elliptic-oblongate, obtuse-apiculate to subacute, mostly papillose-thickened at the apex, 1.3–1.8 cm. long, 3.5–5 mm. wide above the middle; lateral sepals oblique. Petals obliquely oblongate to spatulate, broadly rounded-apiculate to subacute at the apex with the upper margins thin and undulate-creased, 1.3–1.8 cm. long, 3–5 mm. wide near the apex. Lip white with three lavender-pink stripes on the center of the disk, adnate to the lower half of the column, deeply 3-lobed, 1.2–1.6 cm. long to base of column, often minutely auriculate at the base at point of adnation to the column; lateral lobes variable, obliquely oblong-obovate to triangular-ovate, broadly rounded to narrowly obtuse at the apex, 1.6–5 mm. long to base of sinus, 2–3 mm. wide; mid-lobe separated from the lateral lobes by a short broad isthmus, suborbicular-flabellate to broadly obreniform, deeply retuse at the apex, often shallowly 4-lobulate above, with the margin irregularly undulate-plicate, nervose with the main nerves wavy-thickened, 5–11 mm. wide across the middle; disk with an elevated elliptic sulcate callus between the lateral lobes, with the callus extended into three tapering keels to above the middle of the mid-lobe. Column clavate, tinged with orange, somewhat 3-lobulate at the apex, with a small auricle on each side near the apex. Capsule ellipsoid, chocolate-brown, profusely tuberculose-roughened, 1.5–2 cm. long.

Guatemala: Garden of Don Mariano Pacheco H. (originally from Dept. Santa Rosa), Guatemala, *Steyermark* 46404. El Rancho, *Maxon* 3772; *Deam* 6249B. At mile 136.12 on main line I.R.C.A., *Lewis* 121.

Epidendrum alatum Batem. Orch. Mex. et Guatem. t. 18. 1840; Lindl. Bot. Reg. 33: t. 53. 1847 (type: Guatemala, *Rucker*). *E. calocheilum* Hook. Bot. Mag. 68: t. 3898. 1841 (type: Guatemala, *Skinner*). *E. longipetalum* Lindl. & Paxton, Paxton's Flow. Gard. 1: 149. t. 30. 1850–51 (type: Guatemala). *E. formosum* Klotz. Allg. Gartenzeit. 21: 201. 1853 (type: Guatemala, *Warszewicz*). *E. ambiguum* Lindl. Fol. Orch. (*Epidendrum*) 18. 1853 (type: Guatemala, *Rucker*). *Encyclia alata* (Batem.) Schltr. Orchideen 207. 1914. *E. ambigua* (Lindl.) Schltr. Orchideen 208. 1914. *E. belizensis* (Reichb. f.) Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 471. 1918.

Epiphytic on trees in open forests, occasionally terrestrial in soil pockets, up to 300 meters alt. Common from Mexico to Nicaragua.

Plant usually large, robust, 2.5–11 dm. tall. Pseudobulbs obpyriform, 3.5–12.5 cm. long, when young concealed by fugaceous membranaceous sheaths. Leaves two or several, on short tubular petioles at apex of pseudobulbs, linear-lanceolate, obtuse to subacute, coriaceous, glabrous, dorsally keeled, conduplicate below the middle, 7.5–50 cm. long, 0.8–4.5 cm. wide. Inflorescence a loose raceme or compound panicle, greatly exceeding the leaves, up to 10.5 dm. long including

the peduncle; peduncle and rachis provided with short scarious bracts 1.6 cm. long, rough. Floral bracts orbicular-ovate, deeply concave, 3-4 mm. long. Flowers yellowish green marked with purple, with slender pedicellate ovaries 1.5-3 cm. long. Sepals oblanceolate to subspatulate, obtuse to subacute, with the margins slightly reflexed, weakly carinate at the apex, 1.8-3 cm. long, 4-8 mm. wide. Petals obliquely spatulate, obtuse to broadly rounded at the apex, 1.7-2.9 cm. long, 3-7 mm. wide near the apex. Lip deeply 3-lobed, with a rather wide sinus separating the lateral lobes from the mid-lobe, 1.4-2.5 cm. long to the base of the column, united with the base of the column; lateral lobes oblong-obovate, broadly rounded at the apex, upcurved along the sides of the column, 7-13 mm. long to the base of the sinus, 3.5-7 mm. wide across the apex; mid-lobe orbicular-obovate, retuse at the apex, undulate-cripsed along the margin, 8-15 mm. long, 9-20 mm. wide, with purple raised nerves that pass into broken verrucose terminations; base of lateral lobes marked by a fleshy-thickened oval sulcate callus about 1 cm. long and 3 mm. wide near the tridentate apex. Column stout, 1-1.3 cm. long, about 4 mm. wide near the apex, provided with an auricle on each side at the apex, yellow-green speckled with red.

This species varies considerably in the size of the flowers and in the shape of the lateral lobes of the lip.

Izabal: Near Puerto Barrios, *Standley* 72580; 73171. Los Andes district, near Entre Rios, *Lewis* 137.—Petén: San Andres, *Lundell* 3130.—Eastern portions of Vera Paz and Chiquimula, 1885, *Watson*.

Epidendrum alticola Ames & Correll, Bot. Mus. Leaf. Harv. Univ. 10, no. 4: 80. *pl.* 8. 1942 (type: Guatemala, Chimaltenango, quite abundant at altitude of 8,000 feet near Calderas on Volcán de Acatenango, May 29, 1939, *J. R. Johnston* 1472). Figure 87.

Epiphytic, at high elevations. Apparently endemic to Guatemala.

Plant erect-ascending, branched, large, 4.5 dm. tall. Stem terete, wiry, about 5 mm. in diameter, concealed by the imbricated scarious leaf-sheaths. Leaves two, at the summit of the main stem and branches, subopposite, oblong-elliptic, obtuse to subacute, articulate with the leaf-sheaths, 8-11.5 cm. long, 2-2.5 cm. wide, each pair of leaves subtended by two scarious sheaths, the upper sheath long-acuminate. Raceme at the apex of the main stem and branches, from between the two leaves, recurved-pendent, 12.5 cm. long including the short peduncle, 6 cm. in diameter. Floral bracts linear-lanceolate, acuminate, scarious, up to 2.3 cm. long. Flowers rather large, fleshy-thickened, with slender pedicellate ovaries that are about 2 cm. long. Sepals and petals cream-color or light tan. Dorsal sepal oblong-oblanceolate or occasionally oblong-elliptic, narrowly obtuse-apiculate at the apex, 1.7 cm. long, 6 mm. wide. Lateral sepals oblique, ovate-elliptic or occasionally oblong-elliptic, acute, prominently keeled along the back with the keel excurrent and toothed along the margin, 1.8 cm. long, 6.5 mm. wide. Petals oblique, spatulate-oblanceolate, acute, minutely ciliate along the margins, 1.7 cm. long, 5 mm. wide. Lip adnate to the column; lamina suborbicular-cordate, retuse at the apex, strongly cordate at the base, waxy white, 1.5 cm. long, 1.8 cm. wide; disk prominently veined, with three keels in the center, the lateral keels much-thickened near the base of the lip and scarcely extending to

EPIDENDRUM

alticola

Ames & Correll

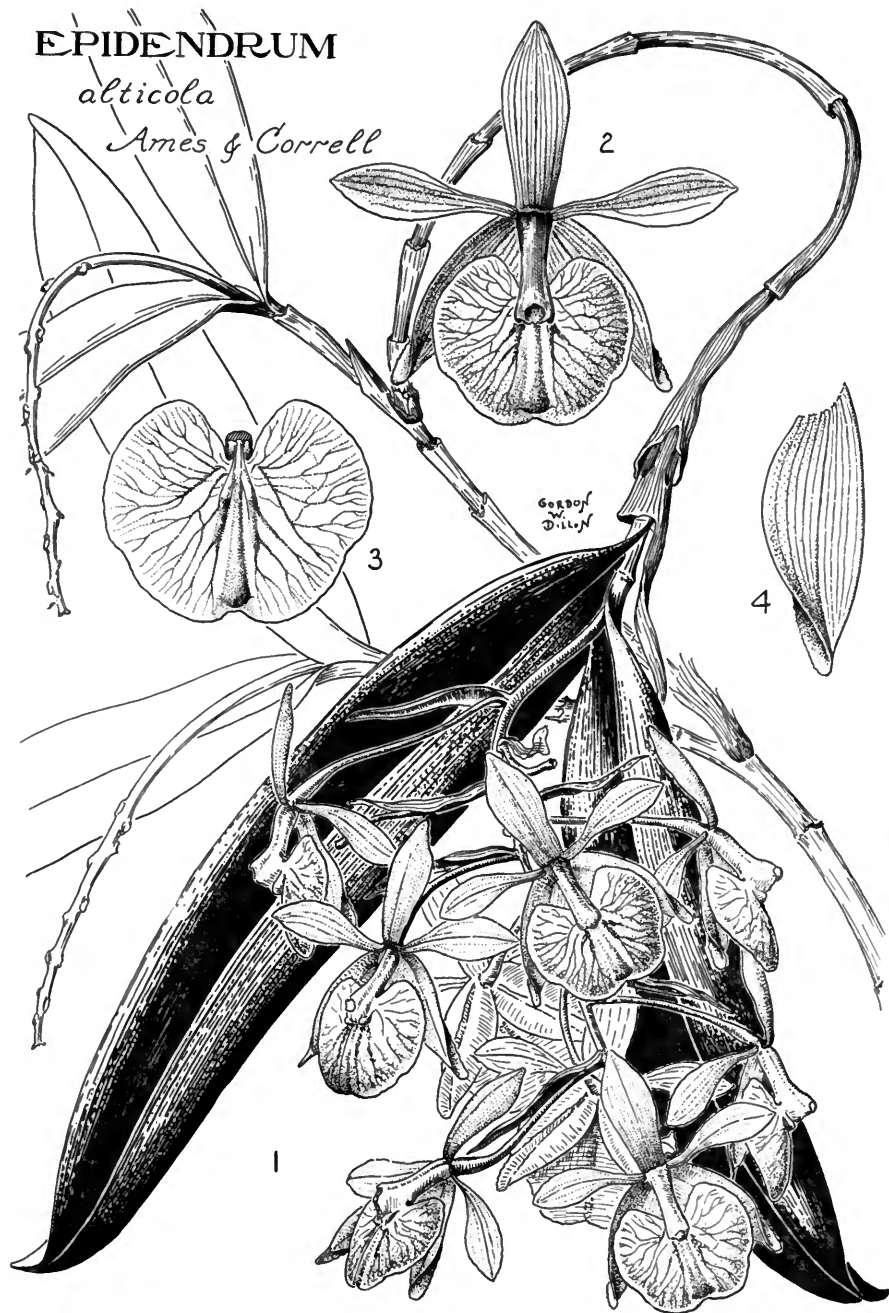


FIG. 87. *Epidendrum alticola*. 1, terminal portion of plant ($\times 1$); 2, flower ($\times 1\frac{1}{2}$); 3, lip, from above ($\times 2$); 4, lateral sepal, from above ($\times 2$). Drawn by G. W. Dillon.

the middle of the lip, the central keel extending to the sinus at the apex and conspicuously broadened and enlarged at the apex. Column clavate, large, 9 mm. long.

This species is allied to *E. arbuscula*, but it differs from that species primarily in its simple instead of 3-lobed lip.

Represented from Guatemala only by the type collection.

Epidendrum anceps Jacq. Select. Stirp. Am. 224, t. 138. 1763. Figure 88.

Epiphytic on trees in damp forests, up to 2,000 meters alt. Widespread and common in southern Florida, Mexico through Central America to Panama, throughout the West Indies and northern South America.

Plant erect, leafy, glabrous, often stout, up to 10 dm. tall. Stem compressed, concealed by tubular sheaths. Leaves distichous, linear-elliptic to oblong or broadly elliptic, rounded or obtuse to acute-apiculate, often broadest above the middle, coriaceous and somewhat rigid, articulated at the base to the stem-sheaths, occasionally tinged with purple, 5–20 cm. long, up to 4.5 cm. wide. Inflorescence a compact subcapitate raceme or few-branched panicle, terminating a commonly elongate peduncle enveloped by long scarious tubular bracts. Floral bracts small, ovate to lanceolate, acute or acuminate, up to 6 mm. long. Flowers small, fleshy, light greenish brown to dull red or tawny yellow, with slender pedicellate ovaries 8–16 mm. long. Sepals obovate to broadly oblong-elliptic or ovate-elliptic, subobtusate to somewhat acuminate at the apex, strongly 3-nerved, 4.5–9.5 mm. long, 3.5–4 mm. wide above the middle; lateral sepals oblique. Petals linear-oblong to spatulate, subacute to acute or truncate at the apex, somewhat oblique, 1-nerved, 5–8.5 mm. long, up to 1.5 mm. wide near the apex. Lip adnate to the column almost to its apex, up to 1.1 cm. long from the apex to the base of the column; lamina spreading from the apex of the column, cordate-reniform to cordate-ovate, more or less shallowly 3-lobed, up to 5.5 mm. long and 8 mm. wide across lateral lobes; lateral lobes broadly rounded to subquadrate; mid-lobe short, usually transversely oblong, with a truncate-retuse apex, usually with an apicule in the sinus; disk with a thickened ridge in the middle but without calli. Column dilated upward, sigmoid, lavender at the truncate tip, 4–5 mm. long. Capsule ovoid, about 1.5 cm. long and 1 cm. in diameter.

This species varies considerably in its inflorescence and in its flowers. The inflorescence is usually long-pedunculate, rarely short-pedunculate, and may be racemose or almost subcapitate when young, but becomes branched by proliferation as it develops. The flowers vary in size, in having the lip nearly simple to noticeably 3-lobed and in having the apex of the lip or mid-lobe rounded to retuse or bilobulate.

Alta Verapaz: Chamá, *Johnson* 212.—Izabal: Los Andes District, Entre Rios, *Lewis* 50.—Suchitepequez: Volcán Santa Clara, between

Finca El Naranjo and upper slopes, *Steiermark* 46749.—“Guatemala.” *Lewis* 38.

Epidendrum arbuscula Lindl. in Benth. Pl. Hartweg. 93. 1842 (as “*arbusculum*”). *Epidendrum Nubium* Reichb. f. Beitr. Orch. Centr.-Am. 81. 1866 (type: Guatemala, Las Nubes, January 10, 1857, *Wendland* 332).

Terrestrial or epiphytic on trees, in open lands and forests, up to 3,000 meters alt. Uncommon in Mexico, Guatemala and Honduras.

Plant stout, branched, occasionally loosely scandent, up to 2 meters tall. Stem concealed by whitish membranaceous tubular sheaths, sometimes with adventitious roots at the nodes, up to 1 cm. in diameter. Leaves several, clustered and imbricate at the summit of each branch, spreading, oblong-elliptic, ovate-lanceolate or elliptic-lanceolate, obtuse to acute, occasionally retuse, up to 16 cm. long, 2–5 cm. wide. Raceme terminating the branches, loosely many-flowered, pendent, occasionally with short side-branches, up to 20 cm. long including the short peduncle, up to 10 cm. in diameter; peduncle subtended by a tubular acuminate scarious sheath up to 2.5 cm. long. Floral bracts spreading or recurved, lanceolate, acuminate, up to 13 mm. long. Flowers variously colored, rust-red to yellowish green, with slender pedicellate ovaries up to 3 cm. long. Dorsal sepal oblong-obovate to elliptic-ob lanceolate, obtuse to acute, often apiculate, 8–17 mm. long, 3–4.5 mm. wide above the middle. Lateral sepals obliquely elliptic-lanceolate, acuminate, with a conspicuous dorsal keel above the middle extending as an acuminate apex, about as long and wide as the dorsal sepal. Petals obliquely oblanceolate-spatulate, obtuse to acute, 11–18 mm. long, 2–3.5 mm. wide near the apex. Lip adnate to the column to its apex, 1–2 cm. long from the apex to the base of the column; lamina curved downward, 3-lobed, up to 11 mm. long and 14 mm. across the lateral lobes, cordate-suborbicular in outline; lateral lobes semi-cordate-ovate; mid-lobe mostly separated from the lateral lobes by a short isthmus, subtruncate, deeply retuse-bilobulate to obreniform; disk with two fleshy calli in the center at the base of the lamina, with three fleshy parallel ridges extending from the calli to near the base of the sinus of the mid-lobe. Column dilated upward, truncate, 7–12 mm. long. Capsule obovoid, up to 4 cm. long.

Chimaltenango: Volcán Acatenango, *Hunnewell* 14671. San Martín, *Johnston* 1466.—Huehuetenango: Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, *Steiermark* 48653. Above San Juan Ixcay, Sierra de los Cuchumatanes, *Steiermark* 50024.—Quezaltenango: Volcán Santa María, *Nelson* 3698. Above Santa María, on the road to Quezaltenango, *Maxon & Hay* 3610.—Sacatepéquez: San Lucas, *Smith* 2244. Volcán Fuego, *Smith* 2635. San Mateo, *Johnston* 1419.—San Marcos: Río Vega, near

FIG. 88. *Epidendrum anceps*. Plant ($\times 1$); 1, flower, spread out ($\times 3$); 2, lip, column, and dorsal sepal ($\times 3$). Drawn by Blanche Ames.



San Rafael and Guatemala-Mexico boundary, *Steyermark* 36235; 36357. Road to Salvador, common throughout highlands of Guatemala, *Margaret W. Lewis* 56. Along road between San Sebastián at Km. 21 and Km. 8, 8-18 miles northwest of San Marcos, *Steyermark* 35748. Along Quebrada Canjulá, between Sibinal and Canjulá, Volcán Tacaná, *Steyermark* 36018. Between town of Tajumulco and Tecutla, slopes of Volcán Tajumulco, *Steyermark* 36843.—Sololá: Volcán Atitlán, south-facing slopes, *Steyermark* 47388.—Suchitepequez: Slopes of Volcán Zunil, in vicinity of Finca Montecristo, southeast of Santa María de Jesús, *Steyermark* 36256.

***Epidendrum arbuscula* Lindl. var. *radioferens* Ames, Hubbard & Schweinfurth, Bot. Mus. Leaf. Harv. Univ. 3: 62. 1935.**

Rare in Mexico and Guatemala.

Variety *radioferens* differs from the typical form mainly in having the radiating veins of the lip carinate-thickened. The flowers are usually larger than those of typical *E. arbuscula*.

Chimaltenango: Calderas, *Porter* 8. San Martín, *Johnston* 1609.—Quiché: Sacabajá, *Heyde & Lux* 3509.—San Marcos: South and west of town of Tajumulco, slopes of Volcán Tajumulco, *Steyermark* 36551.

***Epidendrum aromaticum* Batem. Orch. Mex. et Guatem., t. 10. 1838 (type: Guatemala, *Skinner*). *Epidendrum incumbens* Lindl. Bot. Reg. 26: Misc. 45. 1840 (type: Guatemala, *Skinner*). *Encyclia aromatica* (Batem.) Schltr. Orchideen 208. 1914.**

Epiphytic on oaks and other trees in forests, up to 1,600 meters alt. Uncommon in Mexico and Guatemala.

Plant stout, glabrous, 2.8-9 dm. tall. Pseudobulbs conical to nearly globular, often dark purplish brown, 2.5-6.5 cm. long, 3.5-5 cm. in diameter near base, when young provided with fugaceous scarious sheaths. Leaves 1-2 from the apex of the pseudobulbs, linear-ligulate, obtuse to subacute, dorsally keeled, conduplicate at the base, often dark purplish brown, 15-28 cm. long, 2-4 cm. wide. Inflorescence a compound panicle, erect, up to 8.3 dm. long including the peduncle; peduncle provided with close-fitting scarious bracts 4-16 mm. long. Floral bracts minute, deltoid, acute, deeply concave, 1.5-3 mm. long. Flowers whitish or pale yellow marked with deep brownish red, with slender pedicellate ovaries 1.3-2 cm. long. Sepals oblanceolate to elliptic-oblanceolate, obtuse to slightly carinate-mucronate at the apex, 1.1-2 cm. long, 3-5 mm. wide above the middle; lateral sepals somewhat falcate. Petals obliquely obovate to spatulate, obtuse to broadly rounded at the apex, somewhat recurved, 1.2-2 cm. long, 4.5-8 mm. wide near the apex. Lip veined with brownish red, deeply 3-lobed, with a very narrow sinus separating the lateral lobes from the mid-lobe, 1-1.5 cm. long to the base of the column, united with the base of the column; lateral lobes lanceolate to oblong,

narrowly obtuse, upcurved along the sides of the column, 5-7 mm. long to the base of the sinus, 2-3 mm. wide; mid-lobe suborbicular, with strongly undulate margins, 6-7.5 mm. long, 8-9 mm. wide, with the nerves thickened and verrucose; base of lateral lobes marked by a narrow fleshy sulcate callus 3-5 mm. long, 1.5-2 mm. wide. Column arcuate, tinged with reddish purple, 6-7 mm. long, 2 mm. wide at the base, slightly expanded but not auricled at the apex.

Escuintla: Escuintla, *Johnston* 1422.—Guatemala: Near Guatemala City, *Lewis* 84. Guatemala City market, *Cockerell*.—Chimaltenango: San Martín, *Johnston* 1580.—Santa Rosa: Chiapas, *Heyde & Lux* 4624.—“Guatemala:” *Simms*. “Growing on oak trees,” *Deam* 6073. El Rancho, *Maxon & Hay* 3772.

Epidendrum atropurpureum Willd. Sp. Pl. 4: 115. 1805. *Epidendrum macrochilum* Hook. var. *roseum* Batem. Orch. Mex. et Guatem. t. 17. 1839 (type: Guatemala, *Skinner*). *Epidendrum longipetalum* Godefroy-Lebeuf, Orchidoph. 12: 257. 1892 (type: Guatemala). *Encyclia atropurpurea* (Willd.) Schltr. Orchideen 208, fig. 49. 1914. Figure 89.

Epiphytic on trees and in low thick scrub, usually at low elevations, up to 900 meters alt. Widespread from Mexico to Panama and northern South America.

Plant stout, robust, 3-7.5 dm. tall. Pseudobulbs conical to cylindrical, 3-10 cm. long, up to 5 cm. in diameter. Leaves two, arising from the summit of the pseudobulb, linear-lanceolate, obtuse to acute, coriaceous, 15-40 cm. long, 2-3.5 cm. wide. Raceme large, showy, up to 6.5 cm. long including the peduncle; peduncle provided with tight scarious sheaths 6-10 mm. long. Floral bracts stiff, membranaceous, cuspidate, about 5 mm. long. Flowers very showy with the lip grading in color from almost pure white to deep purple, with slender pedicellate ovaries 2-4 cm. long. Sepals dark purplish green or brownish, oblanceolate, apiculate, 2.3-3.8 cm. long, 7.5-14 mm. wide above the middle; lateral sepals somewhat oblique. Petals spatulate, apiculate, 2.5-3.5 cm. long, 9-15 mm. wide near the apex. Lip deeply 3-lobed, 3-5 (rarely 6) cm. long to the base of the column, united with the base of the column, with a rather wide sinus separating the lateral lobes from the mid-lobe; lateral lobes oblong, narrowly obtuse, strongly nervose, suberect and embracing the column, 1-1.3 cm. long to the base of the sinus, 5-6 mm. wide; mid-lobe flabellate-obcordate to suborbicular-obovate, deeply retuse at the apex, somewhat undulate along the margins, submembranaceous, concave below the middle, with the main nerves raised and thickened, 1.8-4.5 cm. wide; base of the lateral lobes marked by a flattish elliptic shallowly sulcate callus up to 12 mm. long and 7 mm. wide. Column broad, arcuate, not auricled, 1.2-1.8 cm. long. Capsule obpyriform, about 4 cm. long and 2 cm. in diameter.

This species is the largest-flowered and doubtless the most attractive *Epidendrum* that grows in Guatemala.

Escuintla: Escuintla, *Smith* 2255. Cuyuta, *Smith* 2257. Along or near Río Michatoya, southeast of Escuintla, *Standley* 89019;



FIG. 89. *Epidendrum atropurpureum*. Plant ($\times \frac{1}{2}$). Drawn by Dorothy O. Allen.

89066.—Guatemala: Market, Guatemala City, *Johnston* 1783. Garden of Don Mariano Pacheco H., said to have come originally from Santa Rosa, *Steyermark* 46384.—Jutiapa: Plains and swampy ground along railroad, between Agua Blanca and Amatillo, *Steyermark* 30432.—San Marcos: Cafetal above Rodeo, *Steyermark* 37935. Río Cabus, near Malacatán, *Standley* 68846.—Suchitepequez: Near Santo Domingo, south of Mazatenango, *Standley* 88880.—“Common in coastal regions.” *Margaret W. Lewis* 88.

Epidendrum Boothianum Lindl. Bot. Reg. 24: Misc. 5. 1838. Figure 90.

Epiphytic on trees in forests at low elevations. Rare in southern Florida, Mexico, British Honduras, Bahama Islands and Cuba.

Plant glabrous, consisting of short thick pseudobulbs, which bear at their summit one to three leaves and a flowering branch in the center, up to 3 dm. tall; rootstock a short rhizome that gives rise to slender flexuous whitish roots. Pseudobulbs suborbicular, laterally compressed, somewhat inclined, smooth and glossy, yellow-green, subtended by several short fibrous sheaths, 2.5–3 cm. long, 1–2.5 cm. wide. Leaves one to three, oblanceolate, obtuse to acute, thin, rigid, somewhat twisted, keeled on the back and recurved at the apex, articulate with the leaf-sheath, 7–17 cm. long, 1–2.5 cm. wide above the middle. Racemes laxly few-flowered, borne on slender peduncles that are subtended by slender linear-oblong conduplicate foliaceous sheaths; peduncle up to 25 cm. long. Flowers as many as eight, small but showy, with slender pedicellate ovaries that are up to 1.7 cm. long. Floral bracts minute, subulate, less than 2 mm. long. Sepals and petals yellow with reddish brown to magenta-purple irregular blotches. Sepals broadly to narrowly oblanceolate, acute to subacuminate, with the margins slightly revolute, 1–1.4 cm. long, 3–3.5 mm. wide; lateral sepals slightly oblique. Petals linear-oblanceolate, obtuse to acute, 1–1.3 cm. long, 1–2 mm. wide near the apex. Lip greenish yellow and white, occasionally marked with magenta, free from the column except at the base, subentire or obscurely 3-lobed, rhombic to trapeziform, with the lobes or angles obtuse and with the lateral angles strongly deflexed, about 1 cm. long and 7 mm. wide; disk with a white three-pointed callus under the column, with a bulbous-thickened termination of the centrally extended callus at the apex of the mid-lobe. Column greenish at the base, with purplish brown blotches, whitish above, strongly longitudinally grooved on each side, 6–7 mm. long. Capsule ovoid, conspicuously 3-winged, tan-colored and shining, pendent, 2–3 cm. long, 1.5–2 cm. in diameter.

No specimen has been seen from Guatemala. However, on the basis of its occurrence in Mexico and British Honduras and probable occurrence in Guatemala the species is included here.

Epidendrum Boothii (Lindl.) L. O. Wms. in Woods. & Seib. Ann. Mo. Bot. Gard. 26: 282. 1939. *Maxillaria Boothii* Lindl. Bot. Reg. 24: Misc. 52. 1838 (type: Guatemala, *Skinner*). *Dinema*



FIG. 90. *Epidendrum Boothianum*. Plant ($\times 1$). Drawn by Blanche Ames.

paleacea Lindl. Bot. Reg. 26: Misc. 51. 1840. (type: Guatemala, Bateman). *Epidendrum auritum* Lindl. Bot. Reg. 29: Misc. 4. 1843 (type: Guatemala, Skinner). *Epidendrum paleaceum* (Lindl.) Reichb. f. Beitr. Orch. Centr.-Am. 80. 1866.

Epiphytic on trees in dense tropical forests, up to 1,350 meters alt. Widespread from Mexico to Panama; also Cuba and Dutch Guiana (fide Cogniaux).

Plant small, glabrous, up to 3 dm. tall. Rhizome creeping, concealed when young by small scarious imbricating scales. Pseudobulbs shortly stipitate, 1-2-leaved, ellipsoid-cylindrical, somewhat compressed, 2.5-6 cm. long, obliquely ascending 2-3 cm. apart on the rhizome, when young covered by imbricating fugaceous sheaths. Leaves bright green, smooth and shining, linear to narrowly lanceolate, obtuse, thin and rigid, 6-25 cm. long, 8-15 mm. wide. Raceme loosely few-flowered, 5-15 cm. long including the slender somewhat compressed peduncle. Floral bracts light brown, scarious, lanceolate, conduplicate, acuminate, up to 3 cm. long. Flowers greenish white or yellowish white, fragrant, with slender pedicellate ovaries that are 1.5-2.5 cm. long and covered with dark brown scurvy glandular-pubesence. Sepals and petals strongly recurved and fleshy-thickened at the apex. Sepals lanceolate, acuminate, dorsally carinate along the mid-nerve, with the margins somewhat involute at the apex, 12-22 mm. long, 2.3-5 mm. wide; lateral sepals oblique. Petals elliptic-lanceolate, acuminate, slightly oblique, 11-15 mm. long, 2.5-4.5 mm. wide near the middle. Lip strongly arcuate below the middle in natural position, linear-spatulate when spread out, rounded at the apex, minutely serrulate along the thin whitish margins, prominently carinate on the lower surface with the carina extending as a sharp apicule at the apex, 9-11 mm. long, 3-4 mm. wide near the apex; disk provided with a pair of linear deep yellow intramarginal calli on the lower part, with the calli often sulcate. Column arcuate, 7-8 mm. long, about 4 mm. wide near the apex. Capsule obliquely ellipsoid, about 2.5 cm. long.

Alta Verapaz: Cubilgüitz, *Türkheim* 7779; II 124. Chamá, *Johnson* 458.—Chimaltenango: San Martín, *Johnston* 1591.—Huehuetenango: Along Río Amelco, Sierra de los Cuchumatanes below Finca San Rafael, *Steyermark* 49653.—Izabal: *Lewis* 9. Between Milla 49.5 and ridge six miles from Izabal, Montaña del Mico, *Steyermark* 38527. Between Virginia and Lago Izabal, Montaña del Mico, *Steyermark* 38729.—Quiché: Sacabajá, *Heyde & Lux* 3505.—San Marcos: Río Ixpal, below Rodeo, *Standley* 68746.—Santa Rosa: Santa Rosa, *Heyde & Lux* 4614.—Suchitepequez: Slopes of Volcán Zunil in vicinity of Finca Montecristo, southeast of Santa María de Jesús, *Steyermark* 35213.—“Guatemala:” cult. from Guatemala, 1888, *Reasoner*; *Marston Bates* 12; *Schmidt*.—Sold in market in Guatemala City, *Lewis* 78.

Epidendrum bractescens Lindl. Bot. Reg. 26: Misc. 58. 1840; Ames, Hubbard & Schweinfurth, Bot. Mus. Leafl. Harv. Univ. 3:

63. 1935. *Epidendrum aciculare* Batem. ex Lindl. Bot. Reg. 27: Misc. 46. 1841.

Epiphytic on trees in humid forests, up to 1,000 meters alt. Uncommon in Mexico, British Honduras, Guatemala, Honduras and the Bahamas.

Plant slender, glabrous, 1.2–3.7 dm. tall. Pseudobulbs conical, green, finely rugose, bifoliate, 1.5–3.5 cm. long, 8–15 mm. in diameter, enveloped by scarious whitish evanescent sheaths when young. Leaves linear to linear-lanceolate, obtuse to subacute, somewhat conduplicate-ensiform, glossy, rigid, 8–27 cm. long, 2.5–7 mm. wide. Inflorescence a simple or paniculate raceme, 5–15- or more-flowered, 1.3–3.5 dm. long including the slender peduncle; peduncle provided with close-fitting tubular scarious acuminate sheaths 3–10 mm. long. Floral bracts small, 2–3 mm. long, ovate-cucullate, acute, scarious. Flowers showy, with slender pedicellate ovaries 1–2.5 cm. long. Sepals green-yellow with reddish brown nerves to brick red, linear-lanceolate to elliptic-lanceolate, acuminate, with the apex often suboblique and recurved, 1.6–3.1 cm. long, 3–4.2 mm. wide above the middle; lateral sepals oblique and subfalcate. Petals obliquely narrowly oblanceolate, acuminate, 1.6–2.8 mm. long, 2.5–4 mm. wide near the apex. Lip with its base united to the base of the column, deeply 3-lobed, 1.5–2.3 cm. long; lateral lobes deep magenta, linear-oblong, obtuse to subacute, porrect to clasp the column, 7–9 mm. long to base of sinus, 1.2–2 mm. wide; mid-lobe yellowish white with numerous purplish nerves, separated from the lateral lobes by a prominent isthmus about 4 mm. long and 3 mm. wide with two narrow submarginal calli running its entire length, suborbicular-obovate to broadly flabellate, retuse to somewhat apiculate at the apex, irregularly undulate-crenulate along the margins, 8–15 mm. wide. Column slightly incurved, tridentate at the apex, with a small auricle on each side near the summit, dark green or yellowish with reddish spots, 7.5–11 mm. long. Capsule ellipsoid, tapering at both ends, about 2.5 cm. long.

Alta Verapaz: Forest bordering savanna on south side of Cerro Chinajá, between Sachaj and Sacacac, *Steyermark* 45162. Cerro Chinajá, between Finca Yalpemech and Chinajá, above source of Río San Diego, *Steyermark* 45633.—Izabal: Between Milla 49.5 and ridge six miles from Izabal, Montaña del Mico, *Steyermark* 38526. Los Andes District, near Entre Rios, *Lewis* 45. Near Puerto Barrios, *Standley* 73096. Quiriguá, *Lewis* 46.—Petén: La Libertad, *Lundell* 2274. Sábana Zizha, La Libertad, *Lundell* 2711.—Eastern portions of Verapaz and Chiquimula: *Watson*.

***Epidendrum Brassavolae* Reichb. f. Bot. Zeit. 10: 729. 1852 (as "*Brasavolae*").**

Epiphytic on trees in forests, up to 2,400 meters alt. Uncommon from Mexico to Panama.

Plant stout, glabrous, up to 6 dm. tall. Pseudobulbs from large stout rhizomes, somewhat fusiform-cylindrical or pyriform-elongate, compressed, bifoliate, 3–20 cm. long, enveloped by large scarious evanescent sheaths when young. Leaves

oblong-elliptic to oblong-lanceolate, obtuse to subacute, coriaceous, 12–26 cm. long, 2.5–4.5 cm. wide. Raceme showy, 6–9-flowered, 1–5.5 dm. long including the stout peduncle, enclosed at the base in a large brownish compressed spathaceous sheath 5–20 cm. long; peduncle provided with small scarious ovate-cucullate apiculate bracts up to 8 mm. long. Floral bracts small, triangular-ovate, acute, scarious, 3–4.5 mm. long. Flowers rather large, showy, with stout pedicellate ovaries 2.5–3.2 cm. long. Sepals and petals spreading, linear-lanceolate, long-acuminate, deep yellowish brown or rarely greenish, coriaceous, reflexed above the middle; sepals 4.2–5.5 cm. long, 3–5.5 mm. wide near the base; petals often filiform-attenuate above the middle, falcate, 4–5 cm. long, 2–3 mm. wide below the middle. Lip with a long linear-oblong claw, entire, 3.5–5 cm. long including the claw; lamina ovate-lanceolate to elliptic-oblong, somewhat cuneate at the base, acuminate at the apex, 1–1.5 cm. wide near the base; disk with a furcate callus on the claw, which gives way to a central keel extending the entire length of the lamina. Column slightly arcuate, dilated above, mottled and spotted with purple, about 1.3 cm. long, conspicuously 3-toothed at the apex; lateral teeth stout, triangular-semilunate; central tooth spatulate with the margins serrulate.

Alta Verapaz: Cobán, *Johnson* 735; *Lewis* 163.

Epidendrum campylostalix Reichb. f. Bot. Zeit. 10: 730. 1852.

Epiphytic on trees in forests, up to 1,800 meters alt. Rare in Guatemala, Costa Rica and Panama.

Plant rather stout, short, up to 40 cm. tall. Pseudobulbs ovoid to ellipsoid, strongly compressed, glaucous-green when young, unifoliate, 3.5–10.5 cm. long, 3–4 cm. wide near the base, subtended and partly enveloped by several lanceolate acuminate membranaceous sheaths that are fugaceous with age. Leaf oblong to elliptic, obtuse to subacute, coriaceous, dark green above, very glaucous on the lower surface, 9–30 cm. long, 2.5–8 cm. wide. Inflorescence a loosely flowered raceme or panicle with several branches, 10–38 cm. long including the peduncle, enveloped at the base in a membranaceous spathe 3–6 cm. long; peduncle provided with several lanceolate bracts up to 2 cm. long. Floral bracts lanceolate, acuminate, scarious, 5–25 mm. long. Flowers somewhat nodding and spreading, showy, with slender pedicels 7–12 mm. long; ovary sharply 3-angled. Sepals and petals similar, narrowly lanceolate, acuminate, glaucous and grayish green on the outer surface, dull wine-colored within, 1.2–2.5 cm. long, 1.5–3.5 mm. wide below the middle; petals slightly shorter and narrower than the sepals. Lip obscurely or deeply 3-lobed, from a long narrow claw, united with the column at the base, pure white with reddish spots near the base, 1.2–2 cm. long; lateral lobes short and rounded or oblong and obtuse with a deep sinus separating them from the mid-lobe, up to 3 mm. long to the base of the sinus, 1–3 mm. wide; mid-lobe more or less orbicular, broadly rounded or subapiculate at the apex, 4.5–6 mm. wide, occasionally separated from the lateral lobes by a broad isthmus; disk with a fleshy callus on the claw just below the lateral lobes giving rise to three small carinae that extend partly into the mid-lobe. Column about 9 mm. long, green and reddish purple marked with red spots, 3-lobulate at the apex. Capsule conspicuously 3-winged, ovoid, about 2.5 cm. long.

Guatemala (fide Summerhayes; fide Schlechter, Beih. Bot. Centralbl. 36, Abt. 2: 459. 1918).

Epidendrum Candollei Lindl. Bot. Reg. 25: Misc. 55. 1839.

Epiphytic on trees in open forests and on coffee trees in plantations, up to 1,700 meters alt. Found only in Mexico and Guatemala.

Plant large, coarse. Pseudobulb globose to ovoid, up to 8 cm. long and 3.5 cm. in diameter, concealed by several chartaceous-fibrous imbricated sheaths. Leaves two or three at the apex of the pseudobulb, ligulate to narrowly lanceolate, obtuse, coriaceous, up to 35 cm. long and 4 cm. wide. Panicle laxly many-flowered; peduncle from the apex of the pseudobulb, stout, provided with several small clasping acute bracts that are about 1 cm. long. Floral bracts minute, ovate, obtuse, concave, about 2 mm. long. Flowers with slender pedicellate ovaries that are up to 2.5 cm. long, fragrant. Sepals and petals yellowish green. Sepals oblanceolate to elliptic-oblanceolate, obtuse to subacute, 1.2–1.8 cm. long, 3.5–5 mm. wide above the middle; lateral sepals oblique. Petals obliquely spatulate or oblanceolate, rounded and obliquely subapiculate at the apex, 1.2–1.7 cm. long, 4.5–7 mm. wide near the apex. Lip white or yellowish with dull purple streaks, barely attached to the base of the column, rhombic-obovate to broadly cuneate-obovate in outline, 3-lobed below the middle with inconspicuous sinuses, venose, 1–1.6 cm. long, 1–1.5 cm. wide across the lateral lobes when spread out; lateral lobes elliptic, obtuse, free for as much as 6 mm., overlapping the mid-lobe, somewhat cordate at the base, in natural position upcurved to embrace the column; mid-lobe suborbicular to suborbicular-flabellate, rounded to shortly acuminate at the apex, pleated on the margins, with the veins raised into small fleshy lamellae that are irregularly broken and papillose; disk with an elliptic-obovate sulcate callus between the lateral lobes, the callus up to 6.5 mm. long. Column arcuate, dorsally keeled with the keel extended at the apex as an apicule, ventrally sulcate, about 6 mm. long.

Guatemala: Garden of Don Mariano Pacheco H., Guatemala, "said to have come originally from San Antonio de Flores in Dept. Guatemala," *Steyermark* 46383a.

Epidendrum Carolii Schltr. Repert. Sp. Nov. Beih. 19: 35, 117. 1923.

Epiphytic on trees and on rocks in forests, up to 2,000 meters alt. Found in Mexico, Guatemala, Costa Rica and Panama.

Plant small, caespitose, usually pendent, from a slender stalked base, up to 4.5 dm. tall; roots coarse, fleshy, simple, white, glabrous. Stem claviform, compressed and sharply carinate, concealed by scarious tubular sheaths, up to 9 cm. long. Leaves two or more, aggregated at the summit of the stem, elliptic to elliptic-oblong, obtuse-apiculate to acute, clasping the stem at the base, rigidly coriaceous, up to 8 cm. long and 2 cm. wide. Peduncle slender, ancipitous, somewhat fractiflex, nearly concealed by long compressed clasping sheaths. Raceme slender, simple or sometimes branched, few-flowered. Floral bracts lanceolate, acuminate, about 5 mm. long. Flowers small, greenish brown or purplish brown with a yellowish lip, with short stout pedicellate ovaries that are about 5 mm. long. Sepals

elliptic to elliptic-lanceolate, obtuse to acute, 3-nerved, 5–6 mm. long, 1.5–3 mm. wide; lateral sepals oblique, concave. Petals obliquely elliptic or linear, obtuse, 1-nerved, with the margins more or less minutely erose, 4.5–5 mm. long, 1–2 mm. wide. Lip fleshy, cordate-ovate, conduplicate and rounded to obtuse at the apex, with the sides upcurved in natural position to envelop the column above, 3.5–5 mm. long, 4.5–5 mm. wide when spread out; disk with a fleshy hump in the middle. Column about 2 mm. long, pale green with purplish striations on the dorsal side. Capsule suborbicular-ellipsoid, up to 2 cm. long, erect.

Chiquimula: Near Concepción de las Minas, *Margaret W. Lewis* 130.

Epidendrum centropetalum Reichb. f. Bot. Zeit. 10: 732. 1852. *Epidendrum aberrans* Schltr. in Fedde, Repert. Sp. Nov. 15: 206. 1918 (type: Guatemala, December, 1875, *Bernoulli & Cario* 456).

Terrestrial or epiphytic, in moist forests, up to 2,400 meters alt. Uncommon in Guatemala, Honduras, Costa Rica and Panama.

Plant reed-like, erect, occasionally branched above, up to 7.5 dm. tall, in sparse clumps. Stem leafy above the middle, concealed by leaf-sheaths that are rugose-verrucose; sheaths up to 3 cm. long. Leaves distichous, spreading, ligulate-lanceolate, narrowly obtuse to acuminate, glabrous, clasping the stem at the base, subcoriaceous to membranous, up to 6 cm. long and 1.7 cm. wide. Raceme loosely few-flowered, erect, up to 10 cm. long including the peduncle, rarely branched. Floral bracts deltoid, acuminate, 3–5 mm. long. Flowers small, erect-spreading, glabrous, variously colored dull pale red or dark pink to yellowish green, occasionally brilliant rose-purple, with slender pedicellate ovaries that are up to 1.5 cm. long. Sepals oblong-elliptic, obtuse to acute-apiculate, longitudinally concave, dorsally carinate above the middle, 8–10 mm. long, 2.5–3 mm. wide; lateral sepals oblique. Petals narrowly and obliquely oblanceolate-spatulate, obtuse to subacute, somewhat dorsally carinate near the apex, 8–9 mm. long, 1.5–2.3 mm. wide near the apex. Lip adnate to lower part of column, deeply 3-lobed, the main body sigmoid in outline, up to 10 mm. long to base of column; lateral lobes oblong, falcate, more or less retuse at the apex, upcurved along side of column, about 3 mm. long and 1.2 mm. wide; mid-lobe separated from the lateral lobes by a short narrow isthmus, deeply and prominently bilobulate with an apical mucro usually in the sinus, with the lobules about equal in length to the lateral lobes and more or less antrorse, always strongly divaricate, up to 8 mm. wide across the lobules when they are spread out; disk with a pair of short narrow yellow coalescent calli between the lateral lobes. Column abruptly recurved about the middle, conduplicate-sulcate, crenate at the apex, 7–8 mm. long, about 2 mm. wide when spread out, reddish over lower half, upper half white with two minute red spots on the anterior side of the apex. Capsule obliquely ellipsoidal, about 2 cm. long.

Chiquimula: Slopes of Montaña Norte to El Jutal, on Cerro Brujo, southeast of Concepción de las Minas, *Steyermark* 31003.—Guatemala: Volcán de Pacaya, *Johnston & Porter* (*Lewis* 202). Volcán de Pacaya, above Las Calderas, *Standley* 58439.—Jutiapa:

Volcán Suchitán, northwest of Asunción Mita, *Steiermark* 31924.—
Sacatepéquez: Antigua, *Johnston* 1314.

Epidendrum cerinum Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 402. 1918 (type: Guatemala, Cobán, June, 1913, *Türckheim* 4179).

Epiphytic on trees, up to 1,550 meters alt. Rare in Guatemala.

Plant erect, about 40 cm. tall. Stem leafy, somewhat branched, concealed by close-fitting leaf sheaths, about 3 mm. in diameter. Leaves erect-spreading, oblong-ligulate, acute, 7–11 cm. long, 1.6–2 cm. wide. Inflorescence terminal, short, laxly few-flowered, on a short peduncle. Floral bracts erect-spreading, lanceolate, acuminate, shorter than the pedicellate ovaries. Flowers large, erect-spreading. Sepals erect-spreading, narrowly lanceolate, acuminate, glabrous, 2.4 cm. long; lateral sepals oblique, the lower margin somewhat dilated below the middle. Petals linear-ligulate, acute to acuminate, subfalcate-ascending, a little shorter than the sepals. Lip with a ligulate claw 7 mm. long, adnate to the column; lamina broadly ovate, apiculate, rotundate at the base, minutely papillose-denticulate along the margins, 2.5 cm. long, about 2 cm. wide below the middle when spread out; disk with two parallel keels extending and tapering from the base of the lamina to the apex. Column thick, about 7 mm. long, dilated upward, with a pair of triangular-rhombic auricles on the anterior surface at apex. Pedicellate ovary about 1.3 cm. long.

Represented from Guatemala only by the type collection.

Epidendrum chinense (Lindl.) Ames, Sched. Orch. 7: 4. 1924. *Broughtonia chinensis* Lindl. in Hook. Lond. Journ. 1: 492. 1842 (type: Guatemala, *Hinds*, fide Reichb. f.). *Epidendrum strophinx* Reichb. f. *Linnaea* 41: 78. 1876 (type: Guatemala, *Hort. Schiller*).

Epiphytic on trees in open or damp forests, or on dry brushy hills, up to 1,600 meters alt. Rather common from Mexico through Guatemala, El Salvador and Honduras to Costa Rica.

Plant slender, erect or erect-ascending, densely caespitose, from a dense mat of large coarse roots, mostly less than 40 cm. tall, rarely up to 70 cm. tall. Stem fusiform, usually defoliated at time of flowering, 2.5–15 cm. long, 3.5–10 mm. in diameter, more or less concealed by the whitish scarious leaf-sheaths. Leaves (when present) linear to oblong-lanceolate, acute to acuminate, articulate and early deciduous, up to 14 cm. long and 3.2 cm. wide below the middle. Inflorescence variable, one-flowered or a simple or compound raceme terminating an elongated slender peduncle; raceme laxly few- to many-flowered, up to 11 cm. long, the rachis usually reddish brown; peduncle concealed by long tubular scarious closely appressed sheaths that are fugaceous. Floral bracts and bracts subtending the floral branches narrowly triangular-lanceolate, acute to acuminate, scarious, up to 10 mm. long. Flowers 4–9 mm. apart, rather small and showy, with filiform pedicellate ovaries 1.5–2 cm. long. Sepals spreading, narrowly elliptic to elliptic-lanceolate, narrowly obtuse to acute at the slightly thickened and recurved apex, the margins involute especially at the apex, cream-white or pinkish, 8–15 mm. long, 1.5–3 mm. wide; lateral sepals oblique. Petals spreading, linear-elliptic to

linear-lanceolate, subobtuse to shortly acuminate, slightly oblique, 8–14 mm. long, 2–3.5 mm. wide. Lip simple, rhombic-ovate to elliptic-obovate, broadly rounded to short-acute at the apex, pale yellow with purplish or brownish red markings, the margins upcurved-involute around the column, 7–16 mm. long, 5.5–10.5 mm. wide; disk with a sulcate plate-like callus at the base, provided with three longitudinal nerves in the center with the lateral nerves giving off lateral branches, all of the nerves more or less verruculose. Column short, crenate at the apex, 3–4 mm. long. Capsule obovoid-ellipsoidal, about 2 cm. long.

Alta Verapaz: Along Río Polochic, near Pancajché, *Standley* 91926.—Guatemala: Fiscal, *Johnston* 1683. Near Fiscal, *Standley* 80352.—Quezaltenango: Coatepeque, *Lewis* 49 (in part).—San Marcos: Palo Gordo, *Morton* 425.—Santa Rosa: Near Los Esclavos Bridge, road to Salvador, *Lewis* 49 (in part).—Zacapa: Gualán, *Deam* 212.

Epidendrum Chloe Reichb. f. Bonpl. 4: 327. 1856 (type: Guatemala, 1885, *Skinner*). *Epidendrum culmiforme* Schltr. in Fedde, Repert. Sp. Nov. 10: 485. 1912 (type: Guatemala, in Pansamalá, February, 1887, *Türkheim* 804).

Epiphytic on trees, usually at high elevations, up to 3,300 meters alt. Rare in Guatemala and Honduras.

Plant slender, erect, grass-like, up to 40 cm. tall, glabrous. Stem leafy above, less than 2 mm. in diameter, concealed by long membranaceous tubular sheaths that become fibrous with age. Leaves erect-spreading, linear, acuminate, up to 13 cm. long and 5 mm. wide. Raceme densely few-flowered, up to 7 cm. long including the short peduncle. Floral bracts filiform-lanceolate, acuminate-attenuate, up to 7 mm. long. Flowers bronze or reddish green, erect-spreading, with slender pedicellate ovaries that are about 1.5 cm. long. Sepals elliptic-lanceolate, apiculate, dorsally carinate, with the margins reflexed, denticulate on the upper margin, 8–13 mm. long, 2–2.5 mm. wide; lateral sepals oblique. Petals obliquely linear to linear-oblongate, obtuse to subacute, minutely denticulate along the somewhat reflexed margins, 8–12 mm. long, 1–1.5 mm. wide. Lip with a linear claw about 5 mm. long, adnate to the column; lamina decurved, ovate, obtuse to subacute, often broadly cuneate at the base, minutely and irregularly denticulate along the margins, 5–6 mm. long, 4–5.2 mm. wide; disk tricarinate, the lateral keels shorter than the center one. Column dilated toward the apex, somewhat undulate-crenate along the apical margin, 4.5–7 mm. long. Capsule ellipsoid, about 2 cm. long and 1 cm. in diameter.

Alta Verapaz: Cobán, *Türkheim* 2489.—El Progreso: Sierra de las Minas, hills between Finca Piamonte and slopes southeast of Finca Piamonte, *Steyermark* 43407. Sierra de las Minas, cloud forest, hills north of Finca Piamonte, between Piamonte and summit of Volcán Santa Luisa, *Steyermark* 43489.—Suchitepequez: Volcán Zunil, *Skutch* 941; 956. Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46748.—Zacapa: Bordering

Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29885.

Epidendrum chondylobulbon A. Rich. & Gal. Ann. Sci. Nat. sér. 3, 3: 20. 1845.

Epiphytic on trees in humid forests, up to 2,000 meters alt. Found only in Mexico and Guatemala.

Plant from a thick abbreviated rhizome, up to about 5 dm. tall. Pseudobulb fusiform, compressed, from a short stalk, subtended by several imbricated clasping sheaths, up to 15 cm. long and 1.8 cm. wide. Leaves three to five at the apex of the pseudobulb, linear to narrowly linear-lanceolate, obtuse, subcoriaceous, up to 35 cm. long and 2 cm. wide. Peduncle from the apex of the pseudobulb, concealed by one or more spathaceous sheaths that are up to 11 cm. long; raceme few-flowered. Floral bracts linear-lanceolate, acuminate, about 1 cm. long. Flowers yellowish with purple radiating stripes on the lip, with stout pedicellate ovaries that are up to 2.5 cm. long. Sepals and petals spreading. Sepals lanceolate, long-acuminate, 2.5–3.7 cm. long, 3.5–6 mm. wide below the middle; lateral sepals slightly oblique and shorter than the dorsal sepal. Petals lanceolate, acuminate, 2–3 cm. long, 4–5 mm. wide. Lip with a short claw, cordate-ovate, abruptly long-acuminate, concave below with the lateral margins upcurved, 1.2–1.8 cm. long, about 8 mm. wide across the base; disk with a flat fleshy callus in the center near the base. Column 5–6 mm. long, bilobulate at the apex with the dorsal keel terminating in an apicule between the lobes. Capsule large, about 4 cm. long, prominently 3-angled with the angles somewhat winged.

This species is closely allied to *E. radiatum*. However, the differently shaped floral segments readily separate them.

Baja Verapaz: Rocky hills near and above Santa Rosa, *Standley* 91254.—Huehuetenango: Northwest of Cuilco, two-thirds of the way up Cerro Chiquihuil above Carrizal, *Steyermark* 50822. Between Las Palmas and Chaculá, Sierra de los Cuchumatanes, *Steyermark* 51762.

Epidendrum ciliare L. Syst. Nat. ed. 10: 1246. 1759. Figure 91.

Commonly on rocks, also epiphytic on trees in forests, up to 2,000 meters alt. Widespread and quite common from Mexico to Panama, throughout the West Indies and northern South America.

Plant coarse, stout, caespitose, 2–6 dm. tall. Pseudobulbs stipitate, fusiform or cylindrical, arising from a creeping rhizome, somewhat compressed, articulate, 1–2-leaved, 5–16 cm. long, up to 2 cm. wide, when young covered by membranaceous imbricated fugaceous sheaths. Leaves elliptic-oblong, obtuse, rarely with a cusp at the apex, coriaceous and rigid, glossy, 8–28 cm. long, 2.5–8 cm. wide. Raceme loosely few-flowered, often somewhat fractiflex, up to 25 cm. long including the peduncle; peduncle concealed by rather large imbricating, somewhat maculate conduplicate sheaths 4–6 cm. long. Floral bracts large, membranaceous, complanate, yellow-green, often maculate, rarely viscid, 3.5–6.5 cm. long. Flowers

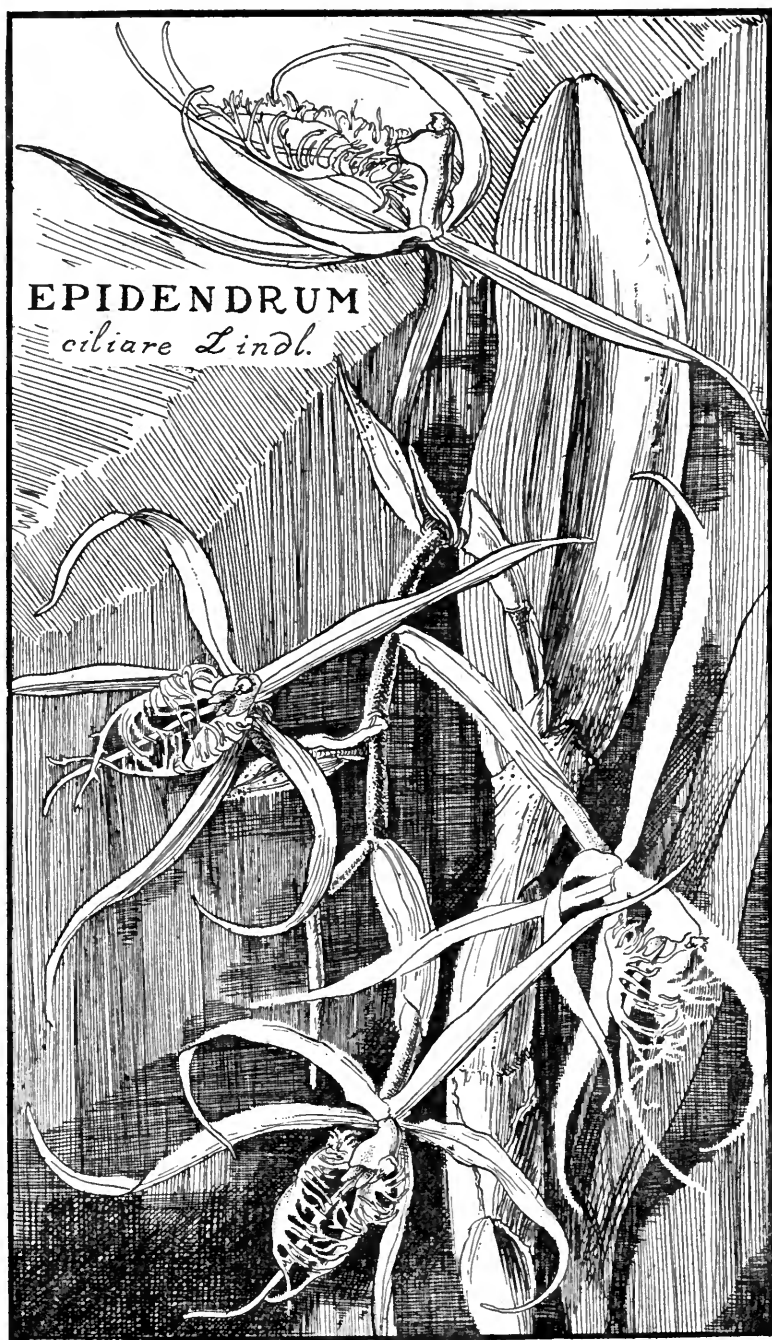


FIG. 91. *Epidendrum ciliare*. Plant ($\times 1$). Drawn by Blanche Ames.

white, large, disposed alternately and complanately on the raceme, with slender somewhat arcuate pedicellate ovaries that are 5–8 cm. long. Sepals linear-lanceolate, long-acuminate, with the margins strongly reflexed, pale green, yellowish or rarely purplish, 4–9 cm. long, 4–7 mm. wide below the middle. Petals narrowly elliptic-lanceolate, long-acuminate to filiform above the middle, antrorsely curved inward, similar in color to the sepals, 4–8 cm. long, 4–5 mm. wide near the middle. Lip adnate to the lower half of the column, white, deeply 3-lobed, with a deeply sulcate claw 5–8 mm. long; lateral lobes semicordate in outline, falcate, porrect, entire on the inner margin, deeply and irregularly lacerate-fringed on the outer margin, 1.7–4 cm. long, 3–4 mm. wide; mid-lobe filiform, needle-like, rigid, rarely linear-lanceolate and long-acuminate with the margins serrulate, 2.5–6 cm. long, about 1 mm. wide at the base; disk with 2 erect flap-like keels extending from the base of the claw to the base of the mid-lobe, then with a linear keel extending the greater length of the mid-lobe. Column 1.7–2.3 cm. long, dilated and strongly arcuate above, coarsely and irregularly denticulate at the apex, with an obtuse angle on each side near the summit. Capsule fusiform, 4–6 cm. long.

Chimaltenango: San Martín, *Johnston* 1243. Between Chimaltenango and San Martín, *Porter* 4.—Guatemala: In canyon, *Deam* 6095. Guatemala–Virginia, *Spinden*. Road to Morán, *Lewis* 63; 1939; *Ignacio Aguilar* 262; 407.—Huehuetenango: Above canyon of Paso del Boquerón, along Río Trapichillo, below La Libertad, *Steyermark* 51203. Between San Rafael and Barillas, Sierra de los Cucumatanes, *Steyermark* 49691. Distr. Nentón, *Seler* 2315.—Jalapa: Mountains about Chagüite, northwest of Jalapa, *Standley* 77491.—Santa Rosa: Santa Rosa, *Heyde & Lux* 3486.

The following specimens are in fruit but probably represent this species: Guatemala: Near Fiscal, *Standley* 80398.—Huehuetenango: Northwest of Malacatancito, at Km. 8 of the highway from Huehuetenango, *Standley* 82225.—Jalapa: Brushy oak slopes of Cerro Alcoba, east of Jalapa, *Standley* 77196.

Epidendrum Clowesii Batem. ex Lindl. Bot. Reg. 30: Misc. 16. 1844 (type: Guatemala, *Bateman*). *Epidendrum flavovirens* Reichb. f. Beitr. Orch. Centr.-Am. 85. 1866, non Regel (type: Guatemala, Las Nubes, *Wendland* 321). *Epidendrum chlorops* Reichb. f. Gard. Chron. n. s. 14: 524. 1880. *Epidendrum piestocaulos* Schltr. in Fedde, Repert. Sp. Nov. 15: 207. 1918 (type: Guatemala, Las Cruces, Costa Grande, *Bernoulli & Cario* 648).

Epiphytic on trees in humid oak forests, up to 2,100 meters alt. Rather common in Mexico, Guatemala and El Salvador.

Plant erect, caespitose, glabrous, up to 6 dm. tall. Stem mostly stout, terete below, somewhat compressed above, concealed by the scarious tubular leaf-sheaths. Leaves sessile, articulate, erect-spreading, oblong-elliptic to linear-lanceolate, subobtusate to acuminate, largest near the inflorescence, somewhat

coriaceous, up to 15 cm. long and 4.5 cm. wide. Inflorescence a simple or rarely compound raceme, loosely many-flowered, the individual racemes up to 6.5 cm. in diameter; peduncle short or elongate, usually concealed by a series of long narrow conduplicate bracts up to 2.5 cm. long. Floral bracts ovate to lanceolate, acute to acuminate, 2–6 mm. long. Flowers yellowish white, small, with slender smooth pedicellate ovaries that are up to 1.5 cm. long. Sepals elliptic to oblong-spatulate, obtuse to mucronate at the apex, with prominent veins, otherwise smooth, weakly keeled on the back near the apex, 8–13 mm. long, 3–4 mm. wide; lateral sepals somewhat oblique. Petals linear to narrowly spatulate, obtuse, 8–10 mm. long, less than 1.5 mm. wide near the apex. Lip white, adnate to the column, 1–1.5 cm. long including the column, distinctly 3-lobed, 6–10 mm. wide across the lateral lobes when spread out; lateral lobes suborbicular-quadrate, with the margins more or less undulate-crenate, about 3 mm. long and 3.5 mm. wide; mid-lobe oblong-quadrate, bifurcate at the apex, 3–4 mm. long, 2–3.5 mm. wide; disk prominently venose, with the central keel extending from between the short lateral calli at the apex of the column to the sinus at the apex of the mid-lobe. Column dilated at the apex, somewhat arcuate, green near the base, fading to white above, about 6 mm. long.

This species is closely allied to *E. polyanthum*, which perhaps should be considered only varietally different. The most obvious difference in the two species is that *E. Clowesii* has smooth sepals and pedicellate ovaries, whereas those of *E. polyanthum* are verrucose. The specimen reported from Guatemala as *E. porphyreum* Lindl. ex Hook. (a native of Ecuador) by Hemsley in Godman and Salvin, Biol. Centr.-Am. Bot. 3: 238. 1883, is in reality this species.

Chimaltenango: Region of Las Calderas, *Standley* 57838.—Quezaltenango: Slopes of Volcán de Zunil, at and above Aguas Amargas, *Standley* 65454.—Retalhuleu: Retalhuleu, *Kellerman* 6036.—Santa Rosa: Naranjo, *Heyde & Lux* 4272. Estanzuela, *Heyde & Lux* 4275. Near bridge over Los Esclavos River, *Lewis* 89.—Zacapa: Oak-pine woods along upper reaches of Río Sitio Nuevo, between Santa Rosalía and first waterfall, *Steyermark* 42255.—“Guatemala:” *Heyde & Lux* 270; 273.

***Epidendrum cnemidophorum* Lindl.** Fol. Orch. Epid. 53. 1853 (type: Guatemala, *Skinner*). *Epidendrum affine* Reichb. f. Bonpl. 4: 327. 1856 (type: Guatemala, *Skinner*). *Epidendrum macrobotryum* Lindl. ex Reichb. f. Bonpl. 4: 327. 1856 (type: Guatemala, August 16, 1854, *Skinner*). *Encyclia affinis* (Reichb. f.) Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 471. 1918.

Terrestrial or epiphytic on trees, up to 1,800 meters alt. Rare in Guatemala, Honduras, Nicaragua and Costa Rica.

Plant robust, growing in clumps, up to 18 dm. tall. Stem stout, leafy, up to 3 cm. thick. Leaves lanceolate, acuminate or sometimes acute, dark green,

glossy, up to 30 cm. long and 5 cm. wide. Inflorescence a many-flowered simple or compound arcuate raceme, about 15 cm. long; peduncle concealed by long, sheathing, imbricating pale green spathes. Floral bracts lanceolate, acuminate, canaliculate, scarious, 9–13 mm. long. Flowers rose-purple, fleshy, with whitish pedicellate ovaries that are up to 5 cm. long. Sepals oblong-elliptic to oblong-oblancheolate, obtuse, fleshy, white on the outer surface, yellow mottled with reddish brown within, 1.3–2 cm. long, 5–7 mm. wide when spread out; dorsal sepal somewhat canaliculate. Petals linear to obliquely linear-spatulate, obtuse to acute, fleshy, 1.5–2 cm. long, 1–5 mm. wide near the apex. Lip adnate to the column, 3-lobed, fleshy, creamy white with a rosy tint, 1.5–2 cm. long from apex to base of column, 1–1.6 cm. wide across the lateral lobes when spread out; lateral lobes dolabriform or suborbicular, with the margins entire or somewhat undulate, 6–8 mm. long, 4–7 mm. wide; mid-lobe cuneate, 4–7 mm. long, deeply cleft into two linear to quadrate obtuse lobules that are strongly divergent, the lobules up to 7 mm. long to the sinus; disk prominently venose, with two short fleshy calli at the base, with a thickened central keel extending from between the basal calli to the sinus at the apex of the mid-lobe. Column strongly arcuate, clavate, about 1.2 cm. long.

This is a variable species in regard to the size, number and shape of the large imbricating spathes subtending the inflorescence, in the density of the inflorescence and in the shape of the lateral lobes and the mid-lobe of the lip.

Alta Verapaz: Pansamalá, *Türkheim* 1143.—San Marcos: Above Finca El Porvenir, between “Todos Santos Chiquitos” and “Loma de la Paloma,” south-facing slopes of Volcán Tajumulco, *Steyermark* 37259.—Suchitepequez: Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46622.—“Guatemala:” *Skinner*.

Epidendrum cobanense Ames & Schltr. Sched. Orch. 5: 27. *fig. 1*. 1923 (type: Guatemala, Alta Verapaz, Cobán, May, 1908, *Türkheim* II 1612). Figure 79.

Epiphytic on trees and on rocks in humid forests, up to 2,400 meters alt. Uncommon in Mexico, Guatemala and Honduras.

Plant caespitose, erect-ascending, up to 40 cm. tall. Stem simple, slender, about 3.5 mm. thick, concealed by tubular leaf-sheaths that become brown and scarious with progressive defoliation. Leaves several to many, articulated to the tubular sheaths, distichous, obliquely ascending, somewhat recurved, semiterete, fleshy, 3–9 cm. long, up to 6 mm. in diameter, the uppermost leaf subtending the spathaceous bracts of the inflorescence. Inflorescence a solitary flower at the summit of each stem. Flowers fleshy-succulent, olive-green to orange-yellow, or brownish, with stout pedicellate ovaries that are 1.5–2 cm. long, the ovaries completely concealed by two ample spathe-like scarious imbricating bracts that are up to 3 cm. long and sessile in the axil of the uppermost leaf. Sepals fleshy, ligulate-oblong, obtuse to acute, with the margins more or less revolute, often weakly keeled on the back near the apex, 1–1.4 cm. long, 3–4 mm. wide. Petals fleshy-

thickened, narrowly oblong-elliptic, acute, sharply reflexed at the tip, somewhat triangular in cross section above the middle, 1–1.2 cm. long, 2.5–3 mm. wide. Lip distinctly 3-lobed, up to 1.3 cm. long; lateral lobes rounded or obtuse in front, incurved-erect, closely appressed to the column, thinner than the mid-lobe, up to 6.5 mm. long; mid-lobe subterete or obscurely quadrangular, tapering to the acute apex, sharply deflexed or decurved, up to 6.5 mm. long and 2 mm. wide, rugose when dry; disk somewhat concave, callose beneath the column. Column fleshy, 4–5 mm. long.

In general aspect this species suggests *Epidendrum teretifolium*, from which it differs conspicuously in the structure of the lip and in the size of the bracts of the inflorescence.

Alta Verapaz: Samác, *Johnson* 321. Tactic, *Johnston* 1832.—Huehuetenango: Cerro Huitz, between Mimanhuitz and Yulhuitz, Sierra de los Cuchumatanes, *Steyermark* 48620.—Quezaltenango: Between Quebrada Chicharro and Montaña Chicharro, slopes of Volcán Santa María, *Steyermark* 34346.—San Marcos: Above Finca El Porvenir, up Cerro de Mono, slopes of Volcán Tajumulco, *Steyermark* 37369.—Zacapa: Sierra de las Minas, along Rillito del Volcán de Monos, Volcán de Monos, *Steyermark* 42398. Sierra de las Minas, upper slopes, along Río Repollal to summit of mountain, *Steyermark* 42525.—Road to Mataquesuintla, about twenty miles from Guatemala, *Margaret W. Lewis* 112.

***Epidendrum cochleatum* L. Sp. Pl. ed. 2: 1351. 1763, excl. Sloane synonym. Figure 92 (var. triandrum).**

Epiphytic on trees in dense forests, usually at low elevations, up to 1,900 meters alt. Widespread and common from Mexico to Panama, throughout the West Indies and northern South America.

Plant glabrous, stout, 0.8–5.8 dm. tall. Pseudobulbs more or less stipitate, ovoid or cylindrical-elliptic, greatly compressed, bearing 1–3 leaves at the summit, 3.5–21 cm. long, 2.5–3.5 cm. wide, clothed by scarious fugaceous sheaths when young. Leaves oblong-lanceolate to linear-lanceolate, acute to shortly acuminate, 10–46 cm. long, 1.3–6 cm. wide. Inflorescence a loosely few-flowered raceme or rarely panicle with several branches, up to 45 cm. long including the peduncle; peduncle subtended at the base by 1–2 spathaceous sheaths that are up to 10 cm. long, provided with lanceolate bracts above. Floral bracts triangular-lanceolate, acute to acuminate, concave, membranaceous, 5–11 mm. long. Flowers showy, with rather stout pedicellate ovaries that are 1–4 cm. long. Sepals and petals greenish white or greenish yellow, with purplish blotches near the base, linear-lanceolate, acuminate-attenuate, twisted and strongly reflexed, somewhat triangular-thickened at the apex; sepals 2.8–7 cm. long, 4–7 mm. wide near the base; petals 2.3–5.5 cm. long, 3–5 mm. wide near the base. Lip spreading from the middle of the column, entire, deep purple with the basal central portion whitish, with conspicuous radiating purple veins, broadly orbicular-cordate, cochleate (shape similar to one valve of a clam shell), deeply concave, with a mucro at the apex and



FIG. 92. *Epidendrum cochleatum* var. *triandrum*. Plant ($\times \frac{2}{3}$); 1, column, front view, to show the three anthers ($\times 2$); 2, cross section of capsule ($\times 1$); 3, fruits ($\times 1$). This plant has three anthers instead of one; otherwise, it is the same as the typical form. Drawn by Blanche Ames.

with the margins somewhat undulate, 1.2–2.3 cm. long, 1.5–3 cm. wide; disk with two yellowish calli at the base. Column flecked with purple below, greenish yellow or whitish above, short, stout, somewhat dilated above, 3-toothed at the apex, 6–10 mm. long. Capsule yellowish brown, ellipsoid to obovoid, recurved, pendent, 3-angled, with the angles broadly winged, 2–4 cm. long.

Alta Verapaz: Chajrax, *Türckheim* 1380. Cubilgüitz, *Türckheim* 7679. Chamá, *Johnson* 424. Finca Volcán, Ixté, *Wilson* 236. Finca Transvaal, *Wilson* 311.—Guatemala: Fiscal, *Deam* 6094. Guatemala–Virginia, *Spinden*. Guatemala Market, *Johnston* 1479.—Huehuetenango: Pueblo Viejo Quen Santo, *Seler* 2328. Rocky slopes above La Libertad, on Cerro Pueblo Viejo, *Steyermark* 51006.—Izabal: Los Andes district, near Entre Rios, *Margaret W. Lewis* 143. Vicinity of Quiriguá, *Standley* 24461. Jungle between Escobas and waterfall, across bay from Puerto Barrios, *Steyermark* 39850. Between Dartmouth and Morales towards Lago Izabal, Montaña del Mico, *Steyermark* 39076. Along Río Frío, Cerro San Gil, *Steyermark* 39970.—Petén: Tikal, *Bartlett* 12588. La Libertad, *Lundell* 2577. La Libertad, Chicbul, *Lundell* 2623. La Libertad and vicinity, *M. Aguilar* 334.—Quezaltenango: San Carlos, *Tonduz* 182.—Zacapa: Sierra de las Minas, between Santa Rosalía de Mármol and San Lorenzo, *Steyermark* 43143.

Epidendrum collare Lindl. Bot. Reg. 29: Misc. 60. 1843 (type: Guatemala, *Hartweg*).

Probably an epiphyte. Rare in Guatemala.

Stem fusiform-elongate, 3-leaved, stout and deeply furrowed, 45 cm. long. Leaves spreading, coriaceous, canaliculate. Raceme loosely few-flowered, the rachis 5 cm. long. Floral bracts triangular-subulate, acute, about 3 mm. long. Flowers white, changing to yellow and brown with age, with slender pedicellate ovaries about 3 cm. long. Sepals elliptic-lanceolate, obtuse to acute, undulate, about 2 cm. long and 5 mm. wide. Petals linear-lanceolate, obtuse to acute, undulate, about 1.6 cm. long and 2.5 mm. wide. Lip entire, ovate, obtuse to truncate-retuse at the apex, undulate, decurved above the middle, about 2.8 cm. long and 1.3 cm. wide; disk trilamellate at the base with the lateral yellowish lamellae bilobed. Column prominently cuniculate, about 1 cm. long; clinandrium margin elevated and standing up like a collar, denticulate along the apical margin.

Represented from Guatemala only by the type collection.

Epidendrum condylochilum Lehm. & Kränzl. in Engl. Bot. Jahrb. 26: 459. 1899. *Epidendrum Deamii* Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 402. 1918 (type: Guatemala, growing on rocks in ravine, Fiscal, June 6, 1909, *Deam* 6198). *Epidendrum tessellatum* Batem. ex Lindl. Bot. Reg. 24: Misc. 7. 1838, non Roxb. (type:

Guatemala, *Skinner*). *Encyclia tessellata* (Batem.) Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 474. 1918.

On trees and rocks in humid forest or on rocks and cactus trees in sunny locations, up to 1,650 meters alt. Rather common from Guatemala to Panama; also Colombia and Venezuela.

Plant rather slender, light green, glabrous, up to 9 dm. tall. Rhizomes slender, covered by somewhat imbricated whitish scarios sheaths when young. Pseudobulbs stipitate, obliquely fusiform, ovoid or ellipsoid, compressed, 2-3-leaved, 2.5-7 cm. long, covered by thin scarios fugaceous sheaths when young. Leaves linear-lanceolate, acute or acuminate, 7.5-30 cm. long, 8-20 mm. wide. Inflorescence a simple or compound raceme with several branches, loosely few- to many-flowered, 5-85 cm. long including the peduncle; peduncle provided with close-fitting lanceolate scarios bracts. Floral bracts ovate to lanceolate, long-acuminate, concave, 3-5 mm. long. Flowers rather small, with slender pedicellate ovaries 1.2-1.6 cm. long. Sepals and petals greenish yellow on the outside, brown inside with darker streaks of the same color, which gives to them a tessellated appearance, dorsally carinate along the main nerves, fleshy-thickened at the apex and mucronate; sepals oblong to elliptic-ob lanceolate, broadest above the middle, obtuse-mucronate, 3-5-nerved, 10.5-13 mm. long, 2.5-4 mm. wide above the middle; petals oblique, ob lanceolate or spatulate, obtuse-mucronate, 3-nerved, 9.5-11 mm. long, about 3 mm. wide near the apex. Lip adnate to the base of the column, obovate in outline, shallowly or deeply 3-lobed, pale yellow with purplish streaks, 9-11 mm. long from the base of the column; lateral lobes subquadrate to obliquely triangular-ovate, obtuse to acute, 1-2.5 mm. long to base of sinus, 1-2 mm. wide; mid-lobe suborbicular to oblong-quadrate, retuse at the apex, undulate-plicate along the margin, 4.5-6 mm. wide; disk thickened along the center below, and between the lateral lobes a spongy-thickened pubescent callus which disintegrates into numerous mammillate calli on the mid-lobe. Column reddish brown on the dorsal surface, yellowish beneath, 4-6 mm. long, 3-lobulate at the apex. Capsule ovoid, broadly 3-winged, 2.5-3 cm. long.

Alta Verapaz: Tukurú, *Johnson* 1004. Pila-pec, Finca Los Alpes, *Wilson* 322. Near Tukurú, *Standley* 70694. Tactic, *Johnston* 1821a. Along Río Polochic, near Pancajché, *Standley* 91915.—Guatemala: Near Agua Calientes, *Deam* 6118.—Huehuetenango: Between La Libertad and Paso del Boquerón, along Río Trapichillo, *Steyermark* 51109.—Jutiapa: Quebrada above Ovejero, on road between Monjas (Dept. Jalapa) and El Progreso, *Standley* 77620.—Zacapa: Zacapa Desert, *Spinden*.—Near San Juan Sacatepéquez, *Lewis* 38.

Epidendrum coriifolium Lindl. Journ. Hort. Soc. London 6: 218, fig. 1851.

Epiphytic on trees in humid forests, sometimes on rocks and stumps, up to 2,700 meters alt. Widespread and rather common

from Mexico and Guatemala, southward along the mountains to Peru.

Plant stiffly erect or ascending, coarse, often growing in large dense clumps, up to 5.5 dm. tall. Stem mostly stout, complanate, leafy above, provided below with several large compressed sheaths. Leaves erect-spreading, oblong-elliptic to linear-oblong, obtuse and obliquely retuse at the apex, stiff and coriaceous, heavily carinate, articulate, up to 26 cm. long and 5 cm. wide. Raceme spicate, up to 25 cm. long, more or less fractiflex; peduncle concealed by large imbricating closely appressed sheathing bracts. Floral bracts similar to those enveloping the peduncle, ovate-cucullate to lanceolate-cucullate, distichous, narrowly obtuse, strongly conduplicate, rigid-coriaceous, with hyaline scarious margins, sometimes closely imbricate, in other cases rather lax, deep green spotted with red, up to 5 cm. long and 3 mm. wide near the base when spread out. Flowers fleshy, greenish or variously tinged reddish or purplish, with stout pedicellate ovaries 1.5–2 cm. long. Dorsal sepal lanceolate, somewhat concave, often cucullate near the tip below the acute-rostriform apex, 1–2.2 cm. long, less than 6 mm. wide. Lateral sepals obliquely ovate to ovate-lanceolate or narrowly elliptic, acute, usually with a prominent serrulate keel on the back at the apex, 1–2.4 cm. long, mostly less than 1.1 cm. wide. Petals obliquely linear to linear-oblancoate, subobtuse to subacuminate, 1–1.8 cm. long, 1.5–3.5 mm. wide. Lip adnate to the column; lamina strongly convex, cordate-reniform, retuse with an apicule in the sinus, margin entire or finely denticulate, auriculate at the base, 1–1.7 cm. long, 1.2–2.6 cm. wide; disk traversed longitudinally in the center by a fleshy keel terminating in the apicule of the sinus. Column fleshy, stout, 8–12 mm. long. Capsule green, obliquely ellipsoid, about 4 cm. long.

This species is extremely variable in the size of the flowers and spathaceous bracts of the inflorescence.

Guatemala: Garden of Don Mariano Pacheco H., from Sanarate, *Steyermark* 46389.—Huehuetenango: Soloma, *Skutch* 1042. Aguacatán, *Skutch* 1917. Southwest of Malacatancito, *Standley* 62639. Huehuetenango, *Johnston* 1409. Cerro Cananán, between Nucapuxlac and Cananán, Sierra de los Cuchumatanes, *Steyermark* 49019.

Epidendrum cristatum Ruiz & Pavon, Syst. Veg. 243. 1798.
Epidendrum raniferum Lindl. Gen. & Sp. Orch. Pl. 109. 1831.

Terrestrial or epiphytic on trees in dense tropical forests, open pinelands or rocky slopes, up to 2,000 meters alt. Widespread but not particularly common in Mexico, Guatemala and Honduras, and in the northern part of South America.

Plant coarse, erect, up to 24 dm. tall, often growing in dense clumps. Stem leafy above, up to 1.3 cm. in diameter, concealed by the membranaceous to coriaceous leaf-sheaths. Leaves erect-spreading, distichous, narrowly oblong-elliptic to elliptic-lanceolate, obtuse to shortly acuminate, articulate, coriaceous, 10–26 cm. long, 1.5–5 cm. wide. Inflorescence a simple raceme or several simple racemes at the summit of the stem, subsessile or long-pedunculate, the raceme or racemes recurved-pendent, up to 60 cm. long including the peduncle. Peduncle mostly

provided with few to many distichous closely imbricated spathaceous sheaths; sheaths conduplicate, strongly keeled along the back, narrowly obtuse, membranaceous, with hyaline margins. Floral bracts ovate-cucullate to ovate-lanceolate, acute, 4–10 mm. long. Flowers yellowish or greenish, striped or spotted with purple or lavender, with slender pedicellate ovaries that are up to 7 cm. long. Sepals oblong-elliptic to elliptic-lanceolate, obtuse to subacute, spreading, more or less convex, 1.5–2.8 cm. long, 4–8 mm. wide. Petals spreading, linear or linear-oblong to somewhat spatulate, obtuse or mucronate at the apex, more or less falcate, 1.3–2.6 cm. long, 1.2–5 mm. wide near the apex. Lip adnate to the column; lamina deflexed, irregularly and often somewhat obscurely 3-lobed, 1–1.5 cm. long, 1–1.7 cm. or more wide across the lateral lobes; lateral lobes more or less semiorbicular, coarsely eroded to deeply lacerate-fringed along the margins, occasionally somewhat bilobulate or represented by several numerous slender linear filaments from an obscure plate; mid-lobe mostly separated from the lateral lobes by a slender somewhat cuneate isthmus, bilobulate at the apex with the lobules strongly divaricate and with an apicule in the sinus; disk with a pair of short fleshy porrect calli at the base (or apparently one sulcate callus), with a central keel extending from the base to the sinus at the apex. Column clavate, truncate at the thickened apex, arcuate above the middle, 1–1.5 cm. long.

The lip is very variable in its outline and in the degree that it is lobed or incised. The number and size of the spathe-like sheaths subtending the inflorescence is also decidedly variable, or the sheaths may even be wanting.

Alta Verapaz: Chamá, *Johnson* 423.—Izabal: Near Puerto Barrios, *Lewis* 7. Los Andes District, near Entre Rios, *Lewis* 52. Shores of Lago Izabal, opposite San Felipe, between San Felipe and mouth of Río Juan Vicente, *Steyermark* 39687.—Suchitepequez: Volcán Santa Clara, between Finca El Naranjo and upper slopes, *Steyermark* 46622.

Epidendrum difforme Jacq. Enum. Pl. Carib. 29. 1760, and Select. Stirp. Am. 223, t. 136. 1763; ampl. Ames, Hubbard & Schweinfurth, Bot. Mus. Leaf. Harv. Univ. 2: 53. 1934. Figure 93.

Epiphytic on trees, up to 3,000 meters alt. Widespread and common in southern Florida, from Mexico through Central America to Panama, throughout the West Indies and in northern South America.

Plant ascending, 6–47 cm. tall, glabrous, caespitose. Stem leafy, often more or less flexuous, entirely concealed by the persistent flaring leaf-sheaths. Leaves distichous, variable in shape, ovate-elliptic to oblong-lanceolate, rounded to somewhat obtuse-retuse at the apex, rigid and coriaceous, 1.3–11 cm. long, up to 3.5 cm.

FIG. 93. *Epidendrum difforme*. Plant, in fruit ($\times 1$); flower, front view ($\times 1\frac{1}{3}$). Drawn by Blanche Ames.



wide. Inflorescence terminal, 1-several-flowered, subumbellate to umbellate. Floral bracts scarious, semitranslucent, lanceolate, acute to acuminate, 7-15 mm. long. Flowers very variable in size, pale green or whitish, with slender pedicellate ovaries up to 4 cm. long. Dorsal sepal variable in shape, lanceolate to oblong-obovate, subobtuse to short-acuminate at the apex, 1.1-3.4 cm. long, 3.8-8 mm. wide. Lateral sepals somewhat obliquely oblong-lanceolate to obovate, obtuse to short-acuminate at the apex, 1.1-3.2 cm. long, 4.5-9 mm. wide. Petals filiform to oblanceolate, obtuse to rarely acuminate, 1-3 cm. long, 0.8-7 mm. wide. Lip adnate to the column to its apex and spreading from the column; lamina nearly simple to trilobulate, transversely subquadrate to reniform or transversely oval in general outline, 7-18 mm. long, 1-3.4 cm. wide; mid-lobe wanting or obscure to well developed, when developed usually transversely oblong to semi-elliptic, entire to crenate or bilobed, retuse, truncate or apiculate at the apex; disk with two basal erect calli and more or less thickened nerves. Column dilated above, 7-10 mm. long. Capsule ellipsoid, up to 4.5 cm. long.

This species is extremely variable, particularly in the size and shape of the lip. Several varieties that do not occur in Guatemala have been segregated from it. It is commonly called "María Izabel" and "flora garbanzo."

Alta Verapaz: Cubilgüitz, *Türkheim* 7782. Chipok-Cobán, *Johnson* 612. Chamá, *Johnson* 914. Near Cobán, *Standley* 69433. Along Río Frío, about 8 km. below Tactic, *Standley* 90839.—Chimaltenango: Near Calderas, *Porter*.—Chiquimula: Cerro Brujo, in vicinity of Río Negro, below Montaña Montenegro, near village of Brujo, *Steyermark* 30958.—Guatemala: Near Finca La Aurora, *I. Aguilar* 190. Road to Mataquescuintla, about twenty miles from Guatemala, *Margaret W. Lewis* 55.—Huehuetenango: Near Finca Soledad, near Finca San Rafael, ten miles southeast of Barillas, Sierra de los Cuchumatanes, *Steyermark* 49129. Between La Libertad and Paso del Boquerón, along Río Trapichillo, *Steyermark* 51114.—Izabal: Along trail beginning from mile 33.23 between Dartmouth and Morales towards Lago Izabal, Montaña del Mico, *Steyermark* 39034. Seashore around Punta Palma, across bay from Puerto Barrios, *Steyermark* 39803. Los Andes district, near Entre Rios, *Margaret W. Lewis* 55B.—Jutiapa: Los Llanitos, near San José Acatempa, *Standley* 60605.—Quezaltenango: Slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, along great barranca between Finca Pirineos and San Juan Patzulín, *Steyermark* 33668.—Quiché: Sacabajá, *Heyde & Lux* 3507.—"Guatemala": 1860, *Hayes*.—Eastern portions of Vera Paz and Chiquimula, *Watson*.

Epidendrum difforme* var. *firmum (Reichb. f.) Ames, Hubbard & Schweinfurth, Bot. Mus. Leaf. Harv. Univ. 2: 55. 1934.

Variety *firmum* is distinguished from the typical form by having the mid-lobe of the lip at most a little broader than long and subquadrate. It is separated from several other varieties of *E. difforme*, not represented in Guatemala, by the truncate, retuse or somewhat bilobed apex of the mid-lobe of the lip. The leaves in typical var. *firmum* are often narrower than in the typical form of the species, but they are not constant in this respect.

Also found in Costa Rica.

"Guatemala:" *Bernoulli* 330.

Epidendrum diffusum Sw. Prodr. Veg. Ind. Occ. 121. 1788.
Seraphyta diffusa (Sw.) Pfitzer ex Fawc. & Rendle, Fl. Jam. 1: 81. 1910.

Epiphytic on trees or on rocks in forests and coffee plantations, up to 1,600 meters alt. Widespread in Mexico and Guatemala, Cuba, Jamaica, Colombia, Dutch Guiana and Brazil.

Plant graceful, glabrous, erect-spreading, more or less reddish throughout when dry, up to 9 dm. tall. Stem flexuous, compressed, concealed by the leaf-sheaths, provided with several scarious closely appressed tubular fugaceous sheaths at the base. Leaves on the upper part of the stem, broadly elliptic to oblong-elliptic, broadly rounded to obtuse at the apex, coriaceous, distichous, 2.5–8 cm. long, 1–4 cm. wide. Inflorescence a diffuse many-branched panicle, 1–4 dm. long. Floral bracts minute, deltoid, acute, 1–2 mm. long. Flowers small, numerous, transparent greenish yellow or reddish yellow, when dry reddish brown, with filiform pedicellate ovaries about 5 mm. long. Sepals spreading, lanceolate, acute to subacuminate, 3-nerved, 6–9 mm. long, 1.3–2.3 mm. wide; lateral sepals oblique. Petals spreading, filiform, prominently 1-nerved, 5–8 mm. long, much less than 1 mm. wide. Lip connate with the column to form a cup; lamina spreading, cordate-ovate, apiculate to acuminate at the apex, 4–7 mm. long, 3–5 mm. wide; disk with a short 3-pronged callus at the base in front of the column. Column thick, tubular, dilated and several-lobulate at the apex, up to 4 mm. long. Capsule ovoid to ellipsoidal, reddish brown, 1–1.8 cm. long.

This species is interesting in that the entire plant turns more or less reddish when dried. It is variable in the height of the plant and in the size of the inflorescence.

Huehuetenango: Chaculá, *Seler* 2320. Between Ixcán and Finca San Rafael, Sierra de los Cuchumatanes, *Steyermark* 49686.—Izabal: Río Dulce, *Lewis* 4. Río Dulce, between Livingston and six miles up river, *Steyermark* 39403.

Epidendrum elegans (Knowles & Westc.) Reichb. f. in Walp. Ann. 6: 374. 1862. *Barkeria elegans* Knowles & Westc. Fl. Cab. 2: 7. t. [49]. 1838.

Epiphytic on trees in dry mixed forests, up to 1,500 meters alt. Rare in Mexico and Guatemala.

Plant erect-ascending, caespitose, up to 6.5 dm. tall. Stem rather slender, fusiform-thickened, leafy, subtended by several scarious sheaths, concealed by the leaf-sheaths, up to 25 cm. long. Leaves coriaceous, linear-lanceolate to elliptic-lanceolate, acute to acuminate, up to 11 cm. long and 2.5 cm. wide. Peduncle slender, elongate, concealed by tubular scarious spotted sheaths, supporting a laxly few-flowered raceme. Floral bracts scarious, oblong-lanceolate, acute, about 1 cm. long. Flowers rather large and showy, with slender pedicellate ovaries that are up to 3 cm. long. Sepals and petals mallow-pink. Sepals elliptic to oblong-elliptic, obtuse to acute, 2-3.5 cm. long, 8-12 mm. wide; lateral sepals slightly oblique, longer than the dorsal sepal. Petals with a slender claw, obliquely oval, broadly rounded to subacute at the apex, 2-3.2 cm. long, 1.2-1.9 cm. wide. Lip white with a large purple blotch in front, broadly obovate-elliptic to oval when spread out, broadly rounded and usually apiculate at the apex, 2.2-2.8 cm. long, 1.5-2 cm. wide; disk with an oblong callus, about 1 cm. long, in the center at the base, the callus terminating in three short keels. Column large, broadly and roundly winged on each side, dorsally keeled, somewhat tridentate at the apex, 1.5-1.8 cm. long, about 1 cm. wide across the wings when spread out.

This is one of the most attractive *Epidendrums* in Guatemala.

Near Santa Rosa, January, 1885, *Klaboch*.

Epidendrum eustirum Ames, Hubbard & Schweinfurth, Bot. Mus. Leaf. Harv. Univ. 3: 70. 1935.

Epiphytic on trees, up to 1,200 meters alt. Rare in Mexico and Guatemala.

Plant slender, erect, 1-4.5 dm. tall. Stem slender, terete, leafy above, concealed by maculate scarious closely appressed sheaths. Leaves 3-5, clustered at top of stem, lanceolate, acute-apiculate, subcoriaceous, 4-10.5 cm. long, 0.7-2 cm. wide. Raceme terminal, subumbellate, short, nodding, few- to many-flowered, up to 7 cm. long; peduncle short, at most 2 cm. long. Floral bracts long-setaceous to narrowly lanceolate, maculate, up to 2 cm. long. Flowers crowded, greenish, with pedicellate ovaries about 1 cm. long. Sepals elliptic-lanceolate to lanceolate or occasionally oblong-oblancheolate, acute, 8-11 mm. long, 2-3.5 mm. wide; lateral sepals oblique, strongly keeled on the back above the middle. Petals linear to oblanceolate, acute, usually finely denticulate along the margins, 7-9 mm. long, 1-3.8 mm. wide. Lip adnate to the column; lamina orbicular-cordate to suborbicular-reniform, broadly rounded, truncate or somewhat retuse at the apex, often apiculate, with the margins mostly undulate-denticulate, 5-7 mm. long, 6-9 mm. wide; disk venose, with two widely separated calli at the base, concave on the lower half, with the rim of the concave portion fleshy-thickened, the callus-thickening a dusky drab color. Column dilated above, 3-4 mm. long. Capsule obliquely ovoid to ellipsoidal, 1-1.5 cm. long.

This species is quite variable in the form of its floral segments. However, the inflorescence is quite characteristic, resembling *Tropidia polystachya* somewhat in habit.

Alta Verapaz: Tukurú, *Johnson* 1003; 45; 92.

***Epidendrum fragrans* Sw. Prodr. Veg. Ind. Occ. 123. 1788.**

Epiphytic on trees, up to 1,500 meters alt. Widespread and rather common from Mexico to Panama, throughout the West Indies and northern South America.

Plant glabrous, stout, up to 4 dm. tall. Pseudobulbs variable, obliquely ellipsoid to narrowly cylindrical, monophyllous, somewhat compressed, subtended and enveloped especially when young by membranaceous scarious sheaths, 4.5–11 cm. long. Leaves exceeding the inflorescence, oblong-ligulate to linear-lanceolate, obtuse to acute, coriaceous, 9–31 cm. long, 1.2–4.8 cm. wide. Raceme short, stout, loosely few-flowered, 5–17 cm. long including the peduncle, subtended at the base by 2–several conduplicate sheaths about 5 cm. long. Floral bracts triangular-lanceolate, acuminate, 5–7 mm. long. Flowers white marked with purple, fragrant, subcoriaceous, with stout pedicellate ovaries 1.2–2 cm. long. Sepals elliptic-lanceolate to narrowly lanceolate, acuminate, yellowish white, 1.5–3.5 cm. long, 4–6 mm. wide. Petals broadly elliptic-lanceolate, acuminate, 2–3 cm. long, 5–11 mm. wide at the middle, oblique. Lip orbicular-ovate, abruptly acuminate, concave, adnate to the lower part of the column, yellow suffused or striped with livid purple, 1.5–2.4 cm. long, 0.9–1.7 cm. wide across the middle; disk prominently nervose, with a pair of small calli at the base, the calli narrowly keeled and parallel below and mammillate-thickened above. Column clavate, trilobulate at the apex, 6.5–8 mm. long. Capsule obovoid, strongly 3-angled with wings on the angles, 3–4 cm. long.

Santa Rosa: Santa Rosa, *Heyde & Lux* 3499.

***Epidendrum ibaguense* HBK. Nov. Gen. & Sp. Pl. 1: 352. 1816; C. Schweinf. Bot. Mus. Leaf. Harv. Univ. 11: 229. 1944.**
Epidendrum radicans Pavon ex Lindl. Gen. & Sp. Orch. Pl. 104. 1831. *Epidendrum rhizophorum* Batem. ex Lindl. Bot. Reg. 24: Misc. 8. 1838 (type: Guatemala, *Skinner*). *Epidendrum pratense* Reichb. f. Beitr. Orch. Centr.-Am. 84. 1866 (type: Guatemala, *Wendland* 271).

Terrestrial in open weedy soil, on rocks or rarely epiphytic, in humid forests and on brushy banks, often growing rampant in dense masses, up to 1,800 meters alt. Rather common from Mexico through Central America to Panama and South America.

Plant subscandent, prostrate or climbing and twining in masses, said to be as much as 10 meters in length, mostly about 10 dm. in length. Stem simple or branched, terete, vine-like, leafy, usually profusely rooting at the nodes, about 5 mm. in diameter, concealed by brownish or reddish coriaceous sheaths 1.5–2.5 cm. long. Leaves articulate, ovate-oblong, linear-lanceolate or oblong-elliptic, broadly rounded to obtuse and more or less obliquely retuse at the apex, distichous, clasping the stem at the base, coriaceous, often marginate with a finely erose bony margin, 4–10 cm. long, 0.8–4 cm. wide below the middle. Inflorescence mostly a simple densely flowered raceme supported by a long peduncle; raceme up to 15 cm. long; peduncle elongated, up to 45 cm. long, almost concealed by

whitish-scarious tubular acuminate sheaths. Floral bracts triangular-ovate to triangular-lanceolate, acute to long-acuminate, up to 2.5 cm. long. Flowers showy, very variable in color, mostly orange, red and yellow, scarlet, vermilion or orange-red, with slender pedicellate ovaries 2–4 cm. long. Sepals spreading, obovate to oblong-elliptic, obtuse to shortly acuminate at the apex, often dorsally carinate and recurved at the apex, 1–2.2 cm. long, 4–7.5 mm. wide; lateral sepals oblique. Petals elliptic-obovate to elliptic-oblong, somewhat oblique, narrowly obtuse to acute at the apex, more or less minutely undulate-crenate along the margins, 1.2–1.8 cm. long, 6–8 mm. wide. Lip adnate to the column; lamina deeply and unequally 3-lobed, 8–15 mm. long, 1.1–1.7 cm. wide across the lateral lobes; lateral lobes semicordate to semiorbicular, irregularly cut-toothed or fringed along the margin, especially above; mid-lobe usually separated from the lateral lobes by a distinct broad isthmus, cuneate to cuneate-flabellate, shallowly retuse to deeply bilobulate at the apex, with an apicule in the sinus, up to 8 mm. long including the isthmus, up to 10 mm. wide across the apical lobules, the widely divergent lobules up to 6 mm. long and 2 mm. wide and irregularly cut-toothed or fringed at the apex, the isthmus up to 4 mm. wide; disk with two short rounded flap-like calli at the base, with a thin or thick erect keel extending along the center from the base to about the middle of the mid-lobe. Column strongly arcuate, clavate, 0.8–1.5 cm. long. Capsule obliquely ellipsoid, 2.5–4 cm. long.

This species is quite variable in the size of the flowers, in the dentation of the lateral lobes of the lip and in the size and shape of the leaves. In Guatemala, this species is often called "rancho viejo," "flora candelaria peñasco," or "boca de fuego."

Alta Verapaz: Cobán, *Türkheim* 4001. Cobán to Samac, *J. García Sálas* 1460. Mountain slopes above Finca Seamay, *Wilson* 208. Near Cobán, *Standley* 69133. Finca Socuyó, northeast of Carchá, *Standley* 70242. Finca Samac, northwest of Cobán, *Standley* 89688. Vicinity of Laguna Sapalá (Chajvovuch), one mile southwest of Sibicté, *Steyermark* 44905. Vicinity of Cobán, *Standley* 92716. Between Cobán and Finca Chimoté, near Rubeltein, *Steyermark* 44166. Cobán, *Hunnewell* 17116.—Baja Verapaz: Rocky hills near and above Santa Rosa, in pine-oak forest, *Standley* 91239.—Chiquimula: Montaña Nonojá, 3–5 miles east of Camotán, *Steyermark* 31686.—Guatemala: Near San Felipe, also Las Cañas road to Antigua, *Margaret W. Lewis* 111. Antigua to Guatemala City, *Porter* 34.—Quezaltenango: Santa María de Jesús, *Skutch* 891. Near Zunil, *Standley* 66620. Near Calahuaché, *Standley* 67069. Between Finca Pirineos and Finca Soledad, slopes of Volcán Santa María, between Santa María de Jesús and Calahuaché, *Steyermark* 33600. Along old road between Finca Pirineos and Patzulín, *Standley* 86871.—Sacatepéquez: Between San Rafael and Antigua, *Porter* 7. Antigua, *Johnston* 1314.—San Marcos: Finca El Porvenir, Volcán Tajumulco, *Steyermark* 52325.—Santa Rosa: Santa Rosa, *Heyde & Lux* 3491.—Sololá: Pine woods bordering Río Bravo, in vicinity of

Finca Mocá, south-facing slopes of Volcán Atitlán, *Steyermark* 47961.—Suchitepequez: Finca Mocá, *Muenschner* 12448. Finca Mocá, *Hunnewell* 14670.—Eastern portion of Vera Paz and Chiquimula, 1885, *Watson* 418a.—“Guatemala:” *Bates* 2; *Swan*.

Epidendrum imatophyllum Lindl. Gen. & Sp. Orch. Pl. 106. 1831.

Epiphytic on trees in dense, often swampy, forests, often growing in the nests of ants on trees, up to 1,000 meters alt. Widespread from Mexico, through Central America to Brazil and Peru.

Plant usually large and rather coarse, erect, growing in clumps, 2.5–20 dm. tall. Roots numerous, fibrous, much branched, matted. Stem slender or stout, leafy, concealed by subcoriaceous yellow-green often purple-spotted leaf-sheaths. Leaves erect-spreading, distichous, ligulate, linear-oblong to linear-lanceolate, obtuse, coriaceous, up to 20 cm. long and 3.5 cm. wide. Inflorescence terminal, a simple or several-branched raceme, densely many-flowered, up to 15 cm. long; peduncle rather short, mostly less than 10 cm. long, provided with 2–several scarious long-acuminate tubular sheaths. Floral bracts triangular-lanceolate, long-acuminate, scarious, up to 1 cm. long. Flowers light lavender to deep purple, showy, with slender pedicellate ovaries 2–3 cm. long. Sepals narrowly elliptic to oblong-lanceolate, acute to acuminate, 1.2–2.2 cm. long, 3.5–5 mm. wide; lateral sepals conspicuously oblique. Petals with a slender claw, obliquely elliptic, acute to acuminate, the margins entire to undulate-serrulate, 1.3–2 cm. long, 6–9 mm. wide. Lip adnate to the column; lamina spreading, oblong-entire to more or less 3-lobed in outline, apiculate at the apex, 6–10 mm. long, 3–8 mm. wide; lateral lobes with the margins subentire to deeply and irregularly lacerate-fringed; apical lobe somewhat orbicular-quadrangle, with the margins mostly entire; disk with two falcate suberect flattened calli at the base and a median keel extending from the base to about the middle. Column clavellate, somewhat recurved, about 1 cm. long, with a small fleshy denticulate lobe on each side at the apex. Capsule ovoid, about 3 cm. long.

The lip is variable in the degree of laciniation and ranges from practically simple to very distinctly 3-lobed.

Alta Verapaz: Cubilgüitz, *Türkheim* 7677; II 70. Finca Mocca, *Johnson* 167. Vicinity of Río Dolores, near Dolores, one-half mile northeast of Cubilgüitz, *Steyermark* 44851.—Izabal: Boca del Polochic, *J. D. Smith* 1584. Near Puerto Barrios, *Schmidt*. Swamps of Salomón Creek, $\frac{1}{2}$ –1 mile south of Bananera, *Steyermark* 38961. Bay of Santo Tomás, between Escobas and Santo Tomás, *Steyermark* 39352.—Petén: Monte Santa Teresa, *Lundell* 2670. Vaxactun, *Bartlett* 12322; 12669.—Eastern portion of Vera Paz and Chiquimula, *Watson* 85. Common in coastal region, *Lewis* 167.

Epidendrum incomptum Reichb. f. Bot. Zeit. 10: 733. 1852. Figure 94.

Epiphytic on trees, up to 1,950 meters alt. Rare in Mexico, Guatemala, Costa Rica and Panama.

Plant much-branched, up to 5.5 dm. tall, with 2-several approximate alternate leaves on the upper part of each branch. Stem rather stout, concealed by conspicuous sheaths; floriferous branches about 3.5 cm. long. Leaves oblong-elliptic to obovate-elliptic, obtuse to acute, 4.5-12.5 cm. long, 2.5-5.5 cm. wide. Racemes terminal, laxly few- to many-flowered, often pendent, up to 15 cm. long including the short peduncle. Floral bracts lanceolate, long-acuminate, up to 1 cm. long. Flowers succulent, green, often coppery-tinged, with stout pedicellate ovaries about 1.5 cm. long. Dorsal sepal oblong-elliptic to lanceolate, narrowly obtuse to acute, 1.2-1.7 cm. long, about 4.5 mm. wide near the middle. Lateral sepals acinaciform, acuminate, 1.3-1.8 cm. long, 3-6 mm. wide about the middle. Petals linear-ob lanceolate to narrowly spatulate, obtuse to acute, falcate, 11.5-16.5 mm. long, 1.5-2 mm. wide. Lip adnate to the column, faintly purple-tinged; lamina about equally 3-lobed, 6-10 mm. long, 1.3-1.7 cm. wide across the lateral lobes; lateral lobes ovate, rounded to subobtuse, divaricate; mid-lobe triangular to subquadrate, nearly truncate to acute, sharply deflexed at the apex; disk ecalloso or more or less verruculose on the mid-nerve. Column 9-11 mm. long, clavate, thickened above.

Alta Verapaz: Cobán, 1862, *Godman & Salvin* 410.

Epidendrum ionophlebium Reichb. f. Beitr. Orch. Centr.-Am. 103. 1866.

Epiphytic on trees in open woods, up to 1,000 meters alt. Rather common from Mexico to Panama.

Plant stout, glabrous, up to 4 dm. tall. Pseudobulbs ovoid to fusiform-cylindrical, compressed, bifoliate, 3-8 cm. long, 2-3 cm. wide near the base, subtended by whitish scarious sheaths when young. Leaves erect-spreading, ligulate, narrowly obtuse, coriaceous, 11-35 cm. long, 1.5-4 cm. wide about the middle. Raceme short, stout, 2-7-flowered, 3-12 cm. long including the peduncle; peduncle provided with several short inflated bracts, subtended at base by a conduplicate brownish sheath up to 3 cm. long. Floral bracts deltoid, acuminate, 4-6 mm. long. Flowers greenish yellow with the lip purplish-striate, fragrant, subcoriaceous, with rather stout pedicellate ovaries 2-2.5 cm. long. Sepals oblong-lanceolate, acute to acuminate, 1.5-2.5 cm. long, 3.5-8 mm. wide at the middle; lateral sepals oblique. Petals obliquely elliptic-lanceolate, acuminate, 1.5-2.5 cm. long, 5-8.5 mm. wide at the middle. Lip adnate to the lower part of the column, suborbicular-reniform to orbicular-subcordate, subtruncate to shortly acuminate at the apex, subcordate-truncate at the base, cochleate-concave, 1-2.3 cm. long to base of column, 1-2 cm. wide across the middle; disk conspicuously nervose, with a downy-pubescent oblong-quadrate callus on the lower third beneath the column. Column stout, trilobulate at the apex, with the lateral lobules falcate, dorsally strongly carinate, 7-11 mm. long. Capsule thick, obovoid-ellipsoid, with three prominent angles, about 5 cm. long.

This species is closely allied to *Epidendrum fragrans* from which it is distinguished mainly by being bifoliate instead of unifoliate



EPIDENDRUM

incomptum

Reichb. f.

FIG. 94. *Epidendrum incomptum*. Plant ($\times \frac{3}{4}$); 1, flower, front view ($\times 1\frac{1}{2}$). 2, lip and column, side view ($\times 2$). Drawn by Blanche Ames.

and in having a subquadrate pubescent callus instead of a glabrous callus on the lip.

Alta Verapaz: Finca Transvaal, *Wilson* 312.—Guatemala: Garden of Don Mariano Pacheco H., said to have come originally from Dept. Escuintla, *Steyermark* 46394.—Quezaltenango: Jardin de San Carlos Miramar, *Tonduz & Rojas* 181.—“Guatemala:” *Lewis* 39.

Epidendrum isomerum Schltr. Repert. Sp. Nov. 2: 132. 1906 (type: Guatemala, Alta Verapaz, Cubilgüitz, August, 1904, *H. von Türckheim* II 167).

Epiphytic on trees in wet forests at low altitudes, up to 600 meters alt. Uncommon from Mexico to Panama.

Plant slender, ramose, often pendulous in dense clumps from trees. Stem slender, wiry, cord-like, terete, about 3 mm. in diameter, as much as 10 dm. long, concealed by membranaceous fugaceous sheaths. Leaves distichous, erect-ascending, rigid, coriaceous, linear to triangular-lanceolate, acuminate-attenuate, 4.5–10 cm. long, 3–4 mm. wide. Flowers whitish green or greenish yellow, solitary at the apex of the branches, sessile, with rather stout pedicellate ovaries, about 8 mm. long, which are concealed by two subtending opposite scale-like bracts; bracts up to 9 mm. long, scarious, reddish brown. Sepals membranaceous or subcoriaceous, rigid, triangular-lanceolate, acuminate-attenuate, occasionally tinged with purple, about 12.5 mm. long, 1.5–2 mm. wide near the base; lateral sepals somewhat oblique on the lower portion. Petals narrowly linear, acutish, somewhat falcate, membranaceous to subcoriaceous, rigid, 12–14 mm. long, 0.5–1.2 mm. wide. Lip adnate to the column; lamina fleshy-coriaceous, triangular-lanceolate, acute to acuminate, rigid, canaliculate, recurved above the middle, about 9 mm. long and 2 mm. wide near the base; disk with a linear sulcate callus on the basal half, the callus almost bifid on the lower half. Column subcylindrical, about 5 mm. long. Capsule bright tan-colored, polished, shiny, ovoid, about 2 cm. long.

Alta Verapaz: Cubilgüitz, *Türckheim* 7781. On tree at Dolores, between Cubilgüitz and Samanzana, *Steyermark* 45098. South of Cubilgüitz, *Steyermark* 44492.—Izabal: Entre Rios to Quiriguá, near Puerto Barrios, *Lewis* 8. Between Virginia and Lago Izabal, Montaña del Mico, *Steyermark* 38718. Along Río Tamejá, Cerro San Gil, *Steyermark* 41762. Cerro San Gil, along Río Bonita, *Steyermark* 41705. Along railroad, between Puerto Barrios and Milla 7, *Steyermark* 42054. Along Río Frío, *Steyermark* 39956.—Petén: Sabana San Francisco, La Libertad, *Lundell* 2539.

Epidendrum lacertinum Lindl. Bot. Reg. 27: Misc. 53. 1841. (type: Guatemala, *Bateman*). ?*Epidendrum indusiatum* Klotzsch, Allg. Gartenz. 22: 177. 1854 (fide Reichb. f.) (type: Guatemala, *Warszewicz*).

Epiphytic, up to 2,700 meters alt. Very rare in Mexico and Guatemala.

Plant hanging from tree branches, up to 24 dm. long, much-branched, rather coarse. Stem cylindrical, often fusiform-thickened, concealed by membranous fugaceous sheaths; new growth branches concealed by tubular obtuse sheaths. Leaves several, crowded at the apex of the branches, oblong-elliptic to elliptic-lanceolate, acuminate, grass-green, subcoriaceous, up to 20 cm. long and 3.5 cm. wide. Racemes at the summit of the branches pendent or rigidly descending, loosely few- to many-flowered, up to 12 cm. long including the short peduncle. Floral bracts triangular-lanceolate, long-acuminate, cucullate below, about 12 mm. long. Flowers rather showy, yellowish green and white, with long slender spreading pedicellate ovaries up to 7 cm. long. Sepals linear-lanceolate, acuminate-attenuate, 2.2–4.5 cm. long, 2.5–5 mm. wide near the base; lateral sepals somewhat oblique. Petals linear, acuminate-attenuate, 2–4 cm. long, about 3 mm. wide. Lip at first white, turning yellow with age, adnate to the column; lamina 3-lobed, 1.7–2.5 cm. long; mid-lobe linear-lanceolate, long-acuminate, 1.3–2 cm. long, about 2 mm. wide near the base; lateral basal lobes triangular-oblong, obtuse to subacute, divaricate, 3.5–5.5 mm. long to the sinus, 1.5–2 mm. wide; disk with two erect flap-like calli at the base and a keel extending along the center from the base almost to the apex. Column arcuate, clavate, 1.2–1.5 cm. long.

It is quite probable that this species should be placed in the section *Encyclium*, but for the present it is retained in the section *Eupidendrum*.

Chimaltenango: Yepocapa, *Johnston* 1418.—San Marcos: Above Finca El Porvenir, along Río Cabús to within two miles of Cueva de las Palomas, south-facing slopes of Volcán Tajumulco, *Steyermark* 37958.

Epidendrum Laucheanum [Rolfe] ex Bonhof, *Gartenfl.* 41: 183. 1892, nomen; Rolfe, *Kew Bull.* 62. 1893.

Terrestrial or epiphytic on trees, up to 2,500 meters alt. Widespread and rather common in Guatemala, Honduras, Costa Rica and Colombia.

Plant slender, weak, sparsely caespitose, up to 10 dm. or more tall. Stem simple, slender, erect, elongated, concealed by scarious tubular leaf-sheaths. Leaves linear-lanceolate to narrowly lanceolate, acuminate, erect-spreading to almost horizontal, coriaceous, rigid, conduplicate below, up to 19 cm. long and 2 cm. wide. Inflorescence a simple terminal few- to many-flowered arcuate-pendent elongated raceme, up to 5 dm. or more long including the peduncle, 1–1.5 cm. in diameter, the rachis somewhat flattened; peduncle compressed, enclosed at the base by several conduplicate imbricated bracts that are up to 12 cm. long. Floral bracts minute, rigid, ovate to lanceolate, acute to acuminate, 1–5 mm. long. Flowers thinnish to extraordinarily fleshy-thickened, waxy, pinkish brown, purple or purplish green, about 1 cm. apart, with rather stout reddish brown pedicellate ovaries 5–7 mm. long. Sepals oblong-elliptic to obovate, broadly obtuse to acute, concave, fleshy-thickened, sometimes weakly keeled and mucro-

nate, 6-13 mm. long, 2.5-5.5 mm. wide; lateral sepals oblique. Petals reflexed, obliquely linear to linear-spatulate, broadly obtuse to subacute, fleshy, carinate along the middle on the outer surface, often somewhat triangular in cross section above the middle, margins entire to ciliate, 5-11 mm. long, up to 1.5 mm. wide. Lip fleshy, adnate to the column; lamina plicate, when spread out suborbicular-ovate to broadly cordate, obtuse to subtruncate and retuse at the apex, with the entire to minutely undulate margins strongly upcurved along the sides of the column, 2.5-5.5 mm. long, 3.2-8.5 mm. wide when spread out; disk with a fleshy-thickened ridge in the center extending to near the apex. Column stout, with a tooth on each side at the apex, up to 5.5 mm. long. Capsule ellipsoidal, about 2.5 cm. long when fully mature.

This species is very variable in the size of the flowers and in the texture of the floral segments.

Alta Verapaz: Cobán, *Türkheim* 2478. Mountains along road between Tactic and the divide on the road to Tamahú, in wet forest, *Standley* 91486; 91499.—Jutiapa: Volcán Suchitán, northwest of Asunción Mita, *Steyermark* 31899.—Base of Volcán Pacaya, *Porter* 62.—Road to Mataquesuintla, about eighteen miles from Guatemala City, *Lewis* 128.

Epidendrum ledifolium A. Rich. & Gal. *Comptes Rend. Acad. Sci. Par.* 18: 506, 509, 512. 1844, nomen; in *Ann. Sci. Nat. sér. 3*, 3: 21. 1845. *Epidendrum lucidum* Schltr. *Repert. Sp. Nov.* 15: 206. 1918 (type: Guatemala, *Bernoulli & Cario* 458).

Terrestrial, on rocks or epiphytic on trees in open fields, up to 2,000 meters alt. Rather common in Mexico, rare in Guatemala.

Plant erect-ascending, much-branched, up to 6 dm. tall. Stem cylindrical, about 3 mm. thick, concealed when young by tubular scarious sheaths, the sheaths often reddish. Leaves 2-4 at the apex of the numerous branches and branchlets, erect-spreading, shining, linear to linear-lanceolate, obtuse to acute or subacuminate, up to 14 cm. long and 1.7 cm. wide. Racemes at the apex of the branches, loosely few-flowered, up to 7 cm. long including the short peduncle. Floral bracts triangular-lanceolate to linear-lanceolate, acuminate, scarious, up to 10 mm. long. Flowers small, yellow-green or ivory white, often marked with purple, fragrant of hyacinth, with slender pedicellate ovaries about 1 cm. long. Sepals linear-elliptic, oblong-elliptic or oblong-spatulate, narrowly obtuse to subacuminate, 7-16 mm. long, 2-3 mm. wide; lateral sepals oblique with a prominent winged keel on the back, apiculate. Petals obliquely linear to oblanceolate-spatulate, narrowly obtuse to acute, 7-12 mm. long, 1-2 mm. wide. Lip adnate to the column; lamina reniform, suborbicular-cordate or triangular-cordate, rarely obscurely 3-lobed, truncate-apiculate to acute-apiculate at the apex, with the margins entire to irregularly undulate-crenulate, 4.5-9 mm. long, 5-9 mm. wide across the basal portion; disk bicallose at the base, with 1-3 thickened median nerves. Column short, 4-8.5 mm. long. Capsule cylindrical-ellipsoidal, somewhat 3-angled, about 2 cm. long.

The flowers of this species are quite variable as to size.

Chiquimula: Montaña Nonojá, 3-5 miles east of Camotán, *Steyermark* 31688.

Epidendrum limbatum Lindl. Bot. Reg. 29: Misc. 69. 1843 (type: Guatemala, *Skinner*). *Epidendrum glaucum* (Knowles & Westc.) Lindl. Bot. Reg. 26: Misc. 29. 1840, non Sw.

Epiphytic on trees in open forests or on bluffs, up to 2,100 meters alt. Rare in Mexico, Guatemala and Honduras.

Plant slender, glaucous, 2-6 dm. tall. Pseudobulbs ovoid to globose, somewhat compressed, unifoliate, 2-5 cm. long, subtended by brown imbricating membranaceous sheaths that are up to 5 cm. long. Leaf elliptic-lanceolate, acute, 6-25 cm. long, 1.7-3 cm. wide. Inflorescence a raceme or drooping panicle with numerous flowers on the lateral branches, which are up to 15 cm. long; peduncle long, slender, subtended by a yellowish conduplicate sheath 3-4.5 cm. long. Floral bracts lanceolate, acuminate, 2.5-4 mm. long. Flowers greenish or yellowish, suffused and marked with lavender and purple, with slender pedicels 4-5 mm. long. Sepals elliptic to obovate, acute, concave, 6-8 mm. long, 2.5-4 mm. wide. Petals elliptic-oblancheolate, subacute, 5-6 mm. long, 2-3 mm. wide above the middle. Lip adnate to base of column, linear-oblong below, 3-lobed at the apex, somewhat upcurved and cymbiform, 5-7 mm. long, about 2 mm. wide across the lower linear portion; lateral lobes suborbicular to subquadrate, erect, about 1.5 mm. long and 1 mm. wide; mid-lobe semiorbicular, strongly deflexed and curved backward, obtuse, about 2 mm. long and 2 mm. wide; disk with a deeply sulcate callus extending from near the base to between the lateral lobes where it is terminated by a fleshy thickening. Column stout, 3-lobulate at the apex, 4-5 mm. long. Capsule ellipsoid, broadly 3-angled with wings along the angles, deep green, about 2 cm. long.

Baja Verapaz: Near Santa Rosa, *Türckheim* 1299.—Zacapa: Sierra de las Minas, along Rillito del Volcan de Monos, Volcán de Monos, *Steyermark* 42371.—“Bought in the market of Guatemala:” *Hayes*.

Epidendrum Lindleyanum (Batem.) Reichb. f. in Walp. Ann. 6: 375. 1862. *Barkeria spectabilis* Batem. ex Lindl. Bot. Reg. 28: Misc. 43. 1842 (type: Guatemala, *Skinner*). *Barkeria cyclotella* Reichb. f. Gard. Chron. n.s. 13: 72. fig. 15. 1880. Figure 95.

Epiphytic on trees and bushes or on rocks and cliffs usually in dry country, up to 3,500 meters alt. In Mexico, Guatemala, Honduras and Costa Rica.

Plant erect or erect-ascending, caespitose, up to 9 dm. tall, usually much smaller. Stem fusiform-cylindrical, 4-15 cm. long, about 6 mm. in diameter, concealed by the whitish scarious leaf-sheaths. Leaves articulate, distichous, linear-lanceolate, ovate, oblong-elliptic or oblong-lanceolate, acute to acuminate, subcoriaceous, spreading-recurved, 4-15 cm. long, 1.5-4 cm. wide, often with purple striations. Inflorescence a loosely few- to many-flowered raceme terminat-



FIG. 95. *Epidendrum Lindleyanum*. Flowering plant ($\times \frac{1}{2}$). Drawn by Dorothy O. Allen.

ing an elongated peduncle. Floral bracts linear-lanceolate, acuminate, scarious, up to 3.5 cm. long and 5 mm. wide. Flowers large, showy, variously colored, from almost white to deep purple, nodding, with slender pedicellate ovaries 2-3 cm. long. Sepals elliptic to linear-lanceolate, subobtuse to long-acuminate, spreading, 1.8-3.7 cm. long, 5-10 mm. wide. Petals with a short claw, suborbicular-ovate, elliptic, ovate-lanceolate or elliptic-lanceolate, obtuse to acuminate, with the margins more or less undulate, concave below, 1.5-3.7 cm. long, 7-20 mm. wide at the widest point. Lip often spotted with reddish purple, variously shaped, suborbicular-ovate, ovate-lanceolate, elliptic-lanceolate or oblong-quadrate, retuse to apiculate at the apex, with the margins undulate and occasionally suberrate, 1.8-3.5 cm. long, 1-2.5 cm. wide; disk with 3-5 keels along the central portion, the keels more pronounced toward the upper part of the lamina. Column appressed against the lip, 1.2-1.7 cm. long. Capsule fusiform-ellipsoidal, about 3 cm. long.

This species is variable in the color and size of the flowers. The lip varies considerably in shape even in the same inflorescence. The variations intergrade too strongly to warrant separate varieties.

Guatemala: Purchased from Indian in Mixco, *Lewis* 99. Garden of Don Mariano Pacheco H., Guatemala, said to have come originally from Chocoyes, Dept. Sololá, *Steyermark* 46386.—Huehuetenango: Colotenango, *Shannon* 462.—Quiché: Santa Cruz Quiché, *Lehmann* 1505.—“Guatemala:” *Bernoulli* 367; *Bates* 11.

Epidendrum luteoroseum A. Rich. & Gal. *Comptes Rend. Acad. Sci. Par.* 18: 512. 1844, nomen; in *Ann. Sci. Nat. sér.* 3, 3: 19. 1845 (as “*luteo-roseum*”). *Epidendrum seriatum* Lindl. *Fol. Orch. Epid.* 59. 1853.

Epiphytic on trees in open forest, up to 1,200 meters alt. Uncommon in Mexico, Guatemala, El Salvador and Honduras.

Plant slender, erect, glabrous, 1.5-4 dm. tall. Pseudobulbs ovoid-elongate, 1.5-4 cm. long, 3-4-leaved, enveloped in scarious fibrous sheaths when young. Leaves narrowly linear, acute to shortly acuminate, occasionally conduplicate-ensiform, 6-28 cm. long, 4-9 mm. wide. Inflorescence a lax many-flowered panicle, up to 35 cm. long including the slender peduncle; peduncle and rachis provided with yellowish scarious acuminate bracts 0.7-2.5 cm. long. Floral bracts triangular-ovate, acute, deeply concave, scarious, 2-3 mm. long. Flowers rose-yellow or yellowish brown, small, with slender pedicellate ovaries 1.5-2.3 cm. long. Sepals narrowly elliptic to elliptic-oblongate, acute to shortly acuminate, 9-12 mm. long, 2-2.2 mm. wide above the middle; lateral sepals oblique. Petals obliquely filiform-spatulate, obtuse to abruptly subacute, 9-12 mm. long, about 2 mm. wide near the apex. Lip adnate to lower half of column, from a slender tapering base, obcordate-flabellate to obovate, retuse, 8-12 mm. long to base of column, 3.5-5 mm. wide across the apex; disk traversed by five wavy verrucose raised nerves that arise from two plate-like calli below. Column purplish, with obliquely ascending auricles at the apex, about 5 mm. long. Capsule ellipsoid-fusiform, about 1.2 cm. long.

Alta Verapaz: Cobán, *Johnston* 1824.—Guatemala: Fiscal, *Deam* 6083.—San Marcos: Finca El Porvenir, on Potrero Matasán along Río Cabús, Volcán Tajumulco, *Steyermark* 37609.—Santa Rosa: Chiapas, *Heyde & Lux* 4636.

Epidendrum microcharis Reichb. f. *Gard. Chron.* 1246. 1870 (type: Guatemala, ex *Hort. W. W. Saunders*).

Epiphytic on trees, up to 2,700 meters alt. Rare in Guatemala.

Plant small, crowded, creeping, less than 4 cm. tall. Pseudobulbs ovoid-pyriform, obliquely ascending, bifoliate, 1.5–2 cm. long, enveloped when young by inflated scarious brown sheaths 1–2 cm. long. Leaves linear-ligulate, obtuse, spreading horizontally or somewhat recurved, often purplish on the lower surface, dorsally carinate along the mid-rib, 2–3.5 cm. long, 3–6 mm. wide. Inflorescence a fascicle of several flowers at apex of pseudobulb. Floral bracts triangular-lanceolate, acuminate, about 4 mm. long. Flowers small, yellowish with many purplish dots or greenish tinged lilac, with slender pedicellate ovaries 1.4–1.6 cm. long. Dorsal sepal elliptic, widest above the middle, fleshy-thickened at the sub-acute-apiculate apex, 3-nerved, about 7 mm. long and 3 mm. wide. Lateral sepals obliquely elliptic, aristate to long-caudate at the apex, 3-nerved, 8.5–10.5 mm. long including the elongate fleshy caudae, about 2.5 mm. wide. Petals obliquely linear-oblancoate, acute-apiculate and thickened at the apex, concave above the middle, with the margins erose, 1-nerved, 6–6.5 mm. long, about 1.5 mm. wide near the apex. Lip adnate to the lower half of the column, 3-lobed, orbicular-cordate in outline, with the margins irregularly erose-laciniate, 5–7 mm. long to point of adnation with the column, 6–8 mm. wide across the broad lateral lobes when spread out, the short broad claw concave-cymbiform; lateral lobes semi-cordate; mid-lobe bilobulate, with a wide deep sinus separating the linear spreading lobules; disk with a linear fleshy callus along the center above the middle, the callus thickened at the apex and extended as a fleshy apicule in the sinus of the apical lobe.

Chimaltenango: Osuna, *Johnston* 1417.—Totoncapán: Near Totoncapán, Valle de la Desolación, *Lewis* 209.

Epidendrum moyobambae Kränzl. *Repert. Sp. Nov.* 1: 185. 1905; C. Schweinf. *Bot. Mus. Leaflet. Harv. Univ.* 11: 238. 1944. *Epidendrum subpatens* Schltr. in *Repert. Sp. Nov. Beih.* 17: 40. 1922.

Epiphytic in swamps or wet woods, up to 1,800 meters alt. Rare in Guatemala, Costa Rica and Panama.

Plant usually pendent, or ascending, up to 60 cm. tall, rather stout. Stem leafy, up to 8 mm. in diameter, concealed by the leaf-sheaths. Leaves distichous, oblong-elliptic, elliptic-lanceolate or linear-lanceolate, obtuse to acute, coriaceous, articulate, 7–15 cm. long, 1.5–4 cm. wide, the margins often erose-serrulate. Raceme terminal, up to 40 cm. long, usually pendent, loosely 10–35-flowered, clothed at the base with several closely appressed sheaths, the rachis slender and often fractiflex. Floral bracts small, triangular-ovate, sharply acute, scale-like,

2-5 mm. long. Flowers rather large, fleshy, brownish green and white, with pedicellate ovaries that are 1.5-2.5 cm. long. Sepals elliptic-oblongate, elliptic-spatulate or spatulate, obtuse to acute, often somewhat apiculate, 1.7-2.3 cm. long, 4-7.5 mm. wide; lateral sepals more or less falcate. Petals linear-oblongate to spatulate, obtuse to subacute, somewhat oblique, 1.7-2.1 cm. long, 2.5-5.5 mm. wide near the apex. Lip adnate to the column; lamina deeply 3-lobed, 1.5-2 cm. long, 1.7-2.8 cm. wide across the lateral lobes; lateral lobes semiorbicular to obliquely dolabriform, rounded to semicordate at the base, the margins often undulate-crenate, 1.2-1.5 cm. long, 9-10 mm. wide; mid-lobe bilobulate, about 8 mm. long, the lobules oblong-divaricate, obtuse, about 6 mm. long and 5 mm. wide; disk with a pair of calli in front of the column, the median nerve thickened and extending as a keel from the base to the mid-lobe, with a shorter raised nerve on each side of the central keel. Column thickened, clavate, 1.2-1.5 cm. long.

Hemsley and Cogniaux both followed Lindley in referring Skinner's collection from Guatemala to *Epidendrum patens* Sw. This collection is referable to *E. moyobambae*. *Epidendrum patens* apparently does not occur in Guatemala.

"Guatemala:" Skinner.

Epidendrum neurosum Ames, Sched. Orch. 1: 17. 1922 (type: Guatemala, Alta Verapaz, Finca Mocca, Johnson 141).

Epiphytic on trees in open forests, up to 1,200 meters alt. Rare in Guatemala, Honduras and Costa Rica.

Plant ascending, glabrous, slender or stout, 1.3-3 dm. tall. Pseudobulbs stipitate, fusiform-cylindrical, compressed, obliquely ascending, bifoliate, 3.5-9.5 cm. long, 6-8 mm. thick near the middle. Leaves linear-ligulate, narrowly obtuse, coriaceous, dorsally carinate along the mid-rib, 9-19 cm. long, 8-10 mm. wide. Raceme short, 1- or 2-flowered; peduncle up to 3 cm. long, enveloped by 2-3 large scarious spathaceous bracts that are up to 4 cm. long. Floral bracts triangular-lanceolate, acuminate, hyaline, scarious, about 3 mm. long. Flowers white, fleshy, the lip striped with lavender, faintly odorous, with stout pedicellate ovaries 1-1.5 cm. long. Sepals linear-lanceolate, acuminate, with the mid-nerve prominent beneath, 1.5-2.5 cm. long, 2.5-4 mm. wide; lateral sepals slightly oblique. Petals narrowly elliptic-lanceolate, acute to shortly acuminate, 1.4-2.2 cm. long, 3-5 mm. wide near the middle. Lip simple, adnate to the lower half of the column, ovate, acute to long-acuminate, mostly auriculate at the base, prominently nervose with the nerves lavender or purplish, 1.3-2 cm. long to base of column, 5.5-8.5 mm. wide near the middle; disk with a pair of linear falcate calli under the column, the calli about 2-3 mm. long. Column fleshy, trilobulate at the apex, 5-6 mm. long.

This species is closely allied to *Epidendrum abbreviatum*, but has larger flowers and differently shaped perianth-segments.

Represented from Guatemala only by the type collection.

Epidendrum nitens Reichb. f. Beitr. Orch. Centr.-Am. 82. 1866 (type: Guatemala, Las Nubes, Wendland 324). *Epidendrum*

Johannis Schltr. in *Repert. Sp. Nov.* 16: 444. 1920 (type: Guatemala, Alta Verapaz, Panzal, October, 1912, *Türckheim* 3889).

Epiphytic in moist or cloud forests, up to 1,800 meters alt. Uncommon in Mexico, Guatemala and Costa Rica.

Plant mostly short and stout, coarse, erect, 9–38 cm. tall. Stem concealed by tubular compressed obtuse subcoriaceous sheaths. Leaves distichous, equitant, erect-spreading, usually 2–several at the summit of the stem, firm, somewhat rigid, linear-oblong, obtuse and retuse at the apex, up to 15 cm. long, 1.2–2.5 cm. wide. Raceme erect, spicate, coarse, relatively few-flowered, 4–14 cm. long. Floral bracts large, conspicuous, equitant and more or less imbricate, conduplicate, orbicular-ovate when spread out, obtuse, 1–1.8 cm. long, up to 1.5 cm. wide at base when spread out. Flowers sessile or essentially so, scarcely exceeding the bracts, green, withering yellow-green, fleshy-coriaceous. Dorsal sepal lanceolate to linear-elliptic, acute to acuminate, cymbiform-canaliculate, prominently ribbed, coriaceous, 9–13 mm. long, about 2 mm. wide. Lateral sepals obliquely oblong-lanceolate, acute, coriaceous, prominently ribbed, strongly keeled at the apex with the keel minutely serrulate, with an intramarginal keel on the inner surface on the lower margin, 9–12 mm. long, 3.5–4 mm. wide. Petals linear, falcate, obtuse, coriaceous, 1-nerved, 8–11 mm. long, less than 1 mm. wide. Lip adnate to the column; lamina conduplicate, arcuate-decurved above the middle in natural position, coriaceous, when spread out triangular-cordate to subcordate-quadrate, broadly truncate to acute at the apex, 4–8 mm. long, 4–7 mm. wide across the base; disk bicallose at the base, with a thickened keel in the center extending from the base and excurrent at the apex. Column short, thick, bilobed at the apex, 4–6 mm. long.

In general appearance this species resembles *E. coriifolium*, but it differs from that species in floral characters.

Alta Verapaz: Cobán, *Baron Rudolphe de Schauensee*. Vicinity of Cubilgüitz, 1½–2 miles south of Cubilgüitz, *Steyermark* 44470.—Baja Verapaz: Rocky hills near and above Santa Rosa, in pine-oak forest, *Standley* 91269.—Chiquimula: Montaña Nonojá, 3–5 miles east of Camotán, *Steyermark* 31677.—Izabal: Cerro San Gil, uppermost ridges and summit, *Steyermark* 41966.—“Guatemala:” *Lewis* 36a.

Epidendrum nocturnum Jacq. *Enum. Pl. Carib.* 29. 1760, and *Select. Stirp. Am.* 225, t. 139. 1763. Figure 96.

Epiphytic on trees and on rocks (rarely terrestrial) in dry or moist forests, usually at low altitudes, up to 2,000 meters alt. Wide-spread and common in southern Florida, from Mexico through Central America to Panama, throughout the West Indies and in all of northern South America.

Plant erect, slender to stoutish, caespitose, up to 10 dm. tall. Stem leafy, terete below, compressed above, up to 1.5 cm. wide, concealed by subcoriaceous



FIG. 96. *Epidendrum nocturnum*. Flowering and fruiting plants ($\times 1$).
Drawn by Blanche Ames.

sheaths that are scarious, leafless and evanescent below and leaf-bearing above. Leaves distichous, oval-elliptic to linear-elliptic or rarely lanceolate, broadly rounded to subacute at the apex, occasionally emarginate, articulated to close sheaths at the base, coriaceous, 7–18 cm. long, 1–7 cm. wide. Inflorescence terminal, a very compact (often branched) raceme of 4–5 or rarely more flowers. Floral bracts ovate or ovate-lanceolate, cucullate, acute, with hyaline margins, 4–9 mm. long. Flowers large, showy, more or less nodding, with slender pedicellate ovaries 4.5–17 cm. long. Sepals greenish white, linear-lanceolate, acuminate-attenuate, somewhat twisted above, 3.6–9 cm. long, 3–8.5 mm. wide. Petals whitish, filiform, 3.5–8.5 cm. long, 2–3 mm. wide. Lip white, adnate to the column; disk deeply and unevenly 3-lobed; lateral lobes directed forward, semioval, semi-ovate or obliquely ovate-lanceolate, semicordate at the base, obtuse to acuminate-attenuate at the apex, with the margins entire to rarely denticulate, 1.2–3.8 cm. long, 4–10 mm. wide below the middle; mid-lobe linear-filiform, setaceous and long attenuate, 2.2–5.7 cm. long, up to 3 mm. wide near the base; disk with two elongate parallel lamellae extending from the base of the lip to the base of the mid-lobe. Column somewhat dilated above, entire to dentate at the apex, 1.5–2.5 cm. long. Capsule ellipsoidal-fusiform, 3–5.5 cm. long, 1.5–2 cm. in diameter.

This is a variable species in the size of the plant and flowers, and in the shape of the lateral lobes of the lip. The flowers are somewhat similar in appearance to those of *E. ciliare* (section *Encyclium*). However, the lateral lobes of the lip of *E. ciliare* are deeply fimbriate while those of *E. nocturnum* are nearly always entire.

Alta Verapaz: Chamá, *Johnson* 251. Vicinity of Cubilgüitz, 1½–2 miles south of Cubilgüitz, *Steyermark* 44469.—Izabal: Puerto Barrios, *Deam* 6022. Quiriguá, *Porter* 27. Bay of Santo Tomás, between Escobas and Santo Tomás, *Steyermark* 39349. Puerto Barrios, *Margaret W. Lewis* 9; 10. Cerro San Gil, along Río Bonita, *Steyermark* 41744. Cerro San Gil, El Golfete de Río Dulce, Cayo Piedra, *Steyermark* 41750.—Zacapa: Sierra de las Minas, along Rillito del Volcán de Monos, Volcán de Monos, *Steyermark* 42334.—Eastern portions of Vera Paz and Chiquimula: *Watson* 101a; 453b.

***Epidendrum ochraceum* Lindl. Bot. Reg. 24: Misc. 14. t. 26. 1838 (type: Guatemala, *Skinner*). *Epidendrum papyrifera* Schltr. Bull. Herb. Boiss. 7: 543. 1899. *Encyclia panthera* (Reichb. f.) Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 473. 1918.**

Epiphytic on trees in forests, swamps and dry open woods, up to 3,500 meters alt. Common from Mexico to Costa Rica.

Plant slender, glabrous, ascending, 7–35 cm. tall. Pseudobulbs obliquely ascending at intervals of about 1 cm., narrowly ovoid-cylindrical, elongated, 2–9.5 cm. long, 5–10 mm. in diameter below the middle, 2–3-leaved, enveloped by whitish scarious sheaths when young. Leaves narrowly linear to linear-ligulate, narrowly obtuse to acute, subcoriaceous, 5–27 cm. long, 3–15 mm. wide. Raceme simple or rarely branched, rather densely many-flowered, mostly exceeding the leaves,

up to 26 cm. long including the slender peduncle; peduncle provided with several minute deltoid acuminate bracts, subtended at the base by a scarious spathaceous sheath about 4 cm. long. Floral bracts ovate-lanceolate, acuminate, concave below the middle, 3–7 mm. long, up to 2 mm. wide. Flowers brown-yellow or greenish, small, fleshy-thickened, with rather stout pedicellate ovaries 4–8 mm. long. Sepals oblong-elliptic, broadly rounded to subacute at the apex, shallowly cymbiform, dorsally carinate along the mid-rib, 4–12 mm. long, 2–3.2 mm. wide. Petals obliquely oblanceolate, obtuse to subacute at the apex, 4–10 mm. long, 1–2 mm. wide near the apex, usually with the margins minutely ciliolate or fimbriate. Lip adnate to the base of the column, 3-lobed, 4–13 mm. long to the base of the column, 4.5–12 mm. wide across the lateral lobes when spread out; lateral lobes suborbicular-quadrangle, about as wide as long, upcurved; mid-lobe oblong-quadrangle, truncate to retuse at the apex, with the margins undulate-crested; disk with a linear sulcate callus in the center, the callus extending above the lateral lobes, and disintegrating as mammillate processes on the mid-lobe. Column stout, purple outside, trilobulate at the apex, with the lobules acuminate, 3.5–5 mm. long.

This species is extremely variable in the size of the plant and flowers.

Alta Verapaz: Cobán, *Türkheim* II 1237. Cobán, *Johnson* 291; 296. Cobán, *Muenschner* 12548. Near Cobán, *Standley* 69255. Region of Cocolá, northeast of Carchá, *Standley* 70320. Along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 89836; 90076; 90721. Large swamp east of Tactic, *Standley* 92532. Large swamp just east of Tactic, *Steyermark* 44018. Along Río Polochic, above Tamahú, *Standley* 92048. Along Río Frío, about 8 km. below Tactic, *Standley* 90841; 90828.—Baja Verapaz: North of Santa Rosa, *Standley* 69870. Rocky hills near and above Santa Rosa, in pine-oak forest, *Standley* 91247. Along margin of the big swamp below Pantín, *Standley* 91006. Below Patal, *Standley* 91168.—Chimaltenango: *Johnston* 1199. Volcán Acatenango, *Hunnewell* 14666. Along road from Chimaltenango to San Martín, *Standley* 57902. Along Río Guacalate, southeast of Chimaltenango, *Standley* 81075. Region of Los Positos, above Las Calderas, *Standley* 80293. Calderas, *Porter* 6.—Chiquimula: Volcán Quezaltepeque, 3–4 miles northeast of Quetzaltepeque, *Steyermark* 31520. Upper slopes of Montaña Tajurán, in vicinity of El Barriol, *Steyermark* 30840.—Guatemala: Pinula, near Guatemala, 1860, *Hayes*. On road to Salvador, about four miles from Guatemala City, *Margaret W. Lewis* 57. Slopes of Volcán de Pacaya, between San Francisco Sales and the base of the active cone, *Standley* 80765.—Huehuetenango: Río Pucal, about 14 km. south of Huehuetenango, *Standley* 82377.—Jalapa: Volcán Jumay, north of Jalapa, *Steyermark* 32391.—Quezaltenango: Volcán Santa María, Santa María de Jesús, *Steyermark*

33921. Above Santa María de Jesús, *Standley* 87165.—Quiché: Nebaj, *Skutch* 1737.—Sacatepéquez: Hills of Finca Carmona, south-east of Antigua, *Standley* 63682.—San Marcos: Finca El Porvenir, along Río Cabús above Potrero Matasán, Volcán Tajumulco, *Steyermark* 37613.—Sololá: Trail between village of San Pedro, via San Juan, San Cristóbal, Buena Vista, and northwestern slopes of Volcán Santa Clara, *Steyermark* 47303.—Zacapa: Quebrada Alejandría, summit of Sierra de las Minas, vicinity of Finca Alejandría, *Steyermark* 29916. Sierra de las Minas, upper slopes, along Río Repollal to summit of mountain, *Steyermark* 42486.—“Guatemala.” *Bernoulli* 275.

Epidendrum oncidioides Lindl. Bot. Reg. 19: t. 1623. 1833; ampl. Ames, Hubbard & Schweinfurth, Bot. Mus. Leaflet. Harv. Univ. 3: 101. 1935. *Epidendrum guatemalense* Klotzsch, Allg. Gartenz. 20: 250. 1852 (type: Guatemala, *Hort. Allardt*).

Epiphytic on trees in rather dry country, up to 700 meters alt. Widespread from Mexico to Honduras, Trinidad and northern South America.

Plant up to a meter tall. Pseudobulbs ovoid, slender-pyriform or cylindric, up to about 10 cm. long, invested by imbricating fibrous scarious sheaths, 2-3-leaved. Leaves linear-ligulate to oblong-linear, obtuse to acute, coriaceous, more or less conduplicate below, up to 60 cm. long and 4.8 cm. wide. Inflorescence surpassing the leaves, loosely panicleate or rarely almost simple, with relatively short spreading branches. Flowers medium-sized, spreading, with smooth to verruculose pedicellate ovaries. Dorsal sepal elliptic-lanceolate to oblanceolate, acute to subacute, 14-17 mm. long, 5-6.2 mm. wide. Lateral sepals elliptic-lanceolate to oblanceolate, oblique, acute to shortly acuminate, dorsally carinate near the apex, 14-18 mm. long, 5-6.5 mm. wide. Petals with a narrow claw, elliptic-spatulate, obovate-spatulate or round-spatulate, rounded-apiculate to shortly acuminate at the apex, 13-17 mm. long, 6-8 mm. wide near the apex. Lip almost free from the column, deeply 3-lobed, 13.1-15 mm. long to base of column; lateral lobes erect and clasping the column in natural position, obliquely oblong, oblong-pandurate to ovate when spread out, broadly rounded to obtuse at the apex, 5.6-8.9 mm. long on the interior margin; mid-lobe separated from the lateral lobes by a short distinct sinus, rarely suborbicular-ovate, suborbicular to transversely oval, acute to broadly rounded or slightly retuse and apiculate at the apex, subcordate to rounded and somewhat cuneate at the base, anterior margin plicate, veins smooth or rarely verruculose, 6-7.3 mm. long, 6.2-9.8 mm. wide; disk with two fleshy ridges making a fovea on the isthmus and extending into fleshy radiating lines on the mid-lobe, with the central line sometimes prominently carinate-thickened. Column stout, gently reflexed at about the middle, with prominent incurved rounded auricles at the apex, 7.2-8.5 mm. long.

This species is extremely polymorphic and is represented by several varieties in Middle and South America.

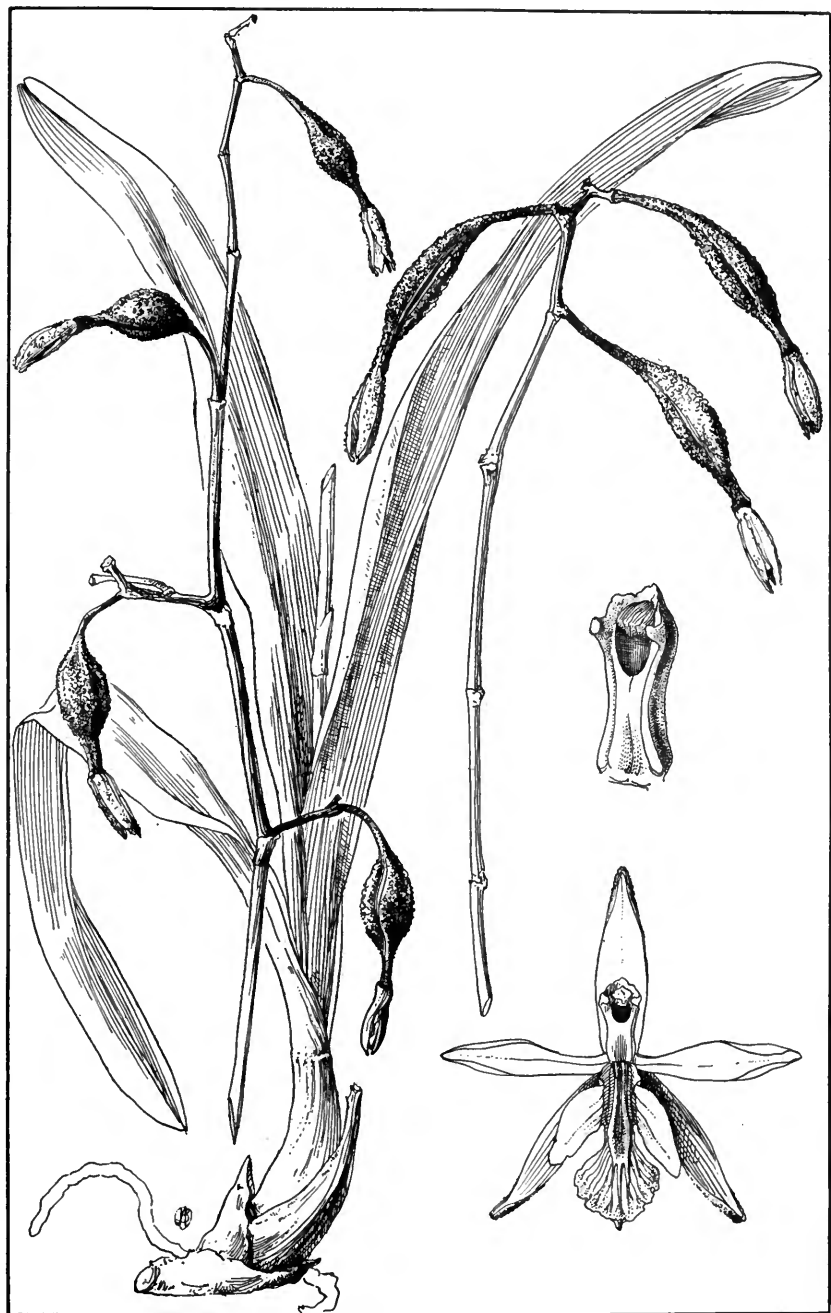


FIG. 97. *Epidendrum oncidoides* var. *gravidum*. Upper right, raceme from type specimen ($\times \frac{3}{4}$); center right, column, front view ($\times 4$); lower right, flower, spread out ($\times 1\frac{1}{2}$); left, plant ($\times \frac{3}{4}$). Drawn by Blanche Ames.

The following collection is in fruit but probably represents this species: Zacapa: Sierra de las Minas, on rocks, oak-pine woods along upper reaches of Río Sitio Nuevo, between Santa Rosalía and first waterfall, *Steyermark* 42224.

Epidendrum oncidoides* var. *gravidum (Lindl.) Ames, Hubbard & Schweinfurth (Bot. Mus. Leaf. Harv. Univ. 3: 104. 1935). Figure 97.

Occurs in Mexico, south to Panama.

Differs from the typical form in usually being smaller in all its parts; mid-lobe of lip triangular-lanceolate to oblong, with the veins of the mid-lobe verruculose.

Although no specimens of this variety have been seen from Guatemala, it is included here since that country is within its area of distribution.

Epidendrum pachyrachis Ames, Sched. Orch. 2: 32. January, 1923 (type: Guatemala, Izabal, Jocoló, April 10, 1920, *Johnson* 305).

Epiphytic on trees in forests, at low altitudes. Rare in Guatemala and Costa Rica.

Plant rather slender, erect, up to 8 dm. tall. Stem rigid, concealed by tubular leaf-sheaths. Leaves erect-spreading, elliptic-lanceolate to narrowly lanceolate, acute, distichous, fleshy-coriaceous, lucid, 4-7 cm. long, up to 1.7 cm. wide. Raceme terminal, short, rigidly deflexed, subtended by several sheathing rigid bracts, up to 6 cm. long including the short peduncle; rachis much thickened, about 3 mm. thick. Floral bracts triangular-lanceolate to linear-lanceolate, acuminate, rigid, thick, 5-6 mm. long. Flowers very fleshy, subsessile, erect-spreading. Sepals elliptic to elliptic-lanceolate, acute to acuminate, somewhat concave, 7-8 mm. long, 3.5-4.5 mm. wide. Petals erect-spreading, narrowly lanceolate, acute or acuminate, a little dilated about the middle, 3-5-nerved, about 7 mm. long and 1.75 mm. wide. Lip adnate to the column; lamina fleshy, transversely elliptical to subreniform, somewhat subcordate at the base, irregularly lobulate along the apical margin, obtuse, deeply retuse and sharply apiculate in the sinus at the apex, 5.5-7 mm. long, 10-11 mm. wide; disk bicallose at the base, traversed longitudinally by three approximate conspicuous somewhat bullate ridges. Column stout, dilated above, 3.5-4 mm. long.

Represented from Guatemala only by the type collection.

Epidendrum paniculatum Ruiz & Pavon, Syst. Veg. 243. 1798; ampl. Ames, Hubbard & Schweinfurth, Bot. Mus. Leaf. Harv. Univ. 2: 67. 1934. *Epidendrum floribundum* HBK. Nov. Gen. & Sp. 1: 353 (quarto ed.), 283 (folio ed.), t. 86. 1816.

Terrestrial or epiphytic on trees in wet tropical forests, up to 2,000 meters alt. Widespread and quite common from Mexico through Central America to Panama and northern South America.

Plant caespitose, variable in height and stoutness, up to 1.4 meters tall including the inflorescence. Stem simple, erect, rather slender to stout, up to 2 cm. in diameter, concealed by leaf-sheaths. Leaves elliptic-ovate to linear-lanceolate, acute to long-acuminate, submembranaceous to subcoriaceous, often purplish on the lower surface, 4–25 cm. long, 0.5–6.8 cm. wide. Inflorescence terminal, usually greatly exceeding the leaves, rarely shorter than the leaves, ranging from a simple few-flowered raceme to a compound panicle; common peduncle variable in length and diameter, from almost wanting up to 18 cm. long, with or without a subtending spathe; spathe (when present) up to 9 cm. long and 1.4 cm. wide; bracts of the inflorescence variable, usually lanceolate and acuminate, up to 7 cm. long and 6.5 mm. wide. Floral bracts small, ovate to lanceolate, acute to acuminate. Flowers very variable in size, green-white to rose-purple, usually with the sepals reflexed and the petals spreading or reflexed. Dorsal sepal oblong-oblancoate, cuneate-spatulate or narrowly elliptic, subacute to acuminate-acute at the apex, greenish brown to greenish white, 8.2–16 mm. long, 2–3.5 mm. wide. Lateral sepals oblong-lanceolate, oblong-spatulate or rarely oblong-elliptic, subacute to acuminate-acute at the apex, often concave especially toward the tip, which is commonly somewhat thickened and subcarinate, smooth or roughened on the outer surface, 8.2–16 mm. long, 2.5–4.5 mm. wide. Petals filiform, narrowly oblanceolate or oblong-spatulate, obtuse to acute at the apex, the apical margins sometimes minutely denticulate, 8–14.5 mm. long, 0.3–2 mm. wide. Lip adnate to the column; lamina ranging from nearly simple to 3- or 4-lobed, in general outline transversely subrectangular to subrotund or subquadrate, 4–9 mm. long, 5.8–12 mm. wide; lateral lobes very variable, being shallowly dolabriform, dolabriform, obliquely rhombic-dolabriform, obliquely triangular-ovate, obliquely ovate, obliquely oval or subrectangular, the posterior margin or angle usually rounded to form a more or less cordate base, the anterior margin or angle porrect or at right angles to the median axis, often with a small upright lobule at its outer edge; mid-lobe ranging from broadly truncate-cuneate to long-bilobulate, truncate, retuse or protuberant and often apiculate at the apex; lobules of mid-lobe very variable in shape and degree of divergence, ranging in shape from acinaciform through linear or falcately linear-oblong to narrowly triangular or else to oblong, spatulate-oblong or narrowly rectangular, the degree of divergence being from V-shaped to right-angled with the median axis or to somewhat retrorsely-recurved, 3–8 mm. long; disk with two basal more or less lamellate calli and three more or less developed approximate parallel ridges of which the central one extends upon the mid-lobe and in some instances reaches the apicule. Column clavate-dilated from a slender tubular shank, often somewhat arcuate. Capsule ellipsoidal, 2–3 cm. long.

This species is one of the most variable of all the *Epidendrums* found in Central America. The flowers, particularly as to the lip, are extremely polymorphic.

Alta Verapaz: Cobán, *Türkheim* 7780; II 1337. Samác, *Johnson* 269. Chamá, *Johnson* 419. Chamá to Cobán, *Johnson* 555. Río Frío, *Johnson* 726. Above Finca Los Alpes, *Wilson* 353. Near Cobán, *Standley* 70022. Finca Socuyó, northeast of Carchá, *Standley* 70228. Above Tamahú, *Standley* 70959. Cobán, *Lewis* 223. Tactic, *Johnston* 1861. Río Tzimajil, near Cobán, bought from a peddler,

Standley 90271. Vicinity of Cubilgüitz, *Steiermark* 44405.—Chiquimula: Montaña Nonojá, 3–5 miles east of Camotán, *Steiermark* 31704.—Escuintla: South slope of Volcán de Fuego, *Standley* 64528.—Huehuetenango: Between Ixcán and Finca San Rafael, Sierra de los Cuchumatanes, *Steiermark* 49408.—Quiché: Finca San Francisco, Cotzal, *Skutch* 1848. Nebaj, *Skutch* 1738.—Sololá: Barranca of "La Presa," lower south-facing slopes of Volcán Atitlán, *Steiermark* 47622.

Epidendrum pansamalae Schltr. Repert. Sp. Nov. 10: 485. 1912 (type: Guatemala, Pansamalá, September, 1886, *Türkheim* 1062).

Epiphytic on trees in open forests, up to 1,575 meters alt. Very rare in Guatemala and Costa Rica.

Plant erect to spreading, 3–10 dm. tall. Stem terete, slender, about 3.5 mm. in diameter, concealed by purple-spotted leaf-sheaths. Leaves spreading, narrowly lanceolate, acute to subacuminate, rather thin, 5–10.5 cm. long, 6.5–11 mm. wide. Raceme short and densely few- to many-flowered, simple, rarely compound, on a short peduncle. Floral bracts lanceolate, acuminate, about 5 mm. long. Flowers erect-spreading, pale phlox-pink to rose-purple, with slender pedicellate ovaries that are about 2 cm. long. Dorsal sepal oblong-elliptic to ligulate-lanceolate, acute to acuminate at the somewhat dorsally carinate apex, 1.2–1.4 cm. long, 3.2–4 mm. wide. Lateral sepals obliquely oblong-elliptic to elliptic-lanceolate, acute-apiculate to obliquely acuminate and strongly recurved at the carinate-thickened apex, with the dorsal keel somewhat minutely serrulate. Petals linear to oblanceolate, acute, with the margins often minutely erose, somewhat oblique. Lip adnate to the column; lamina deeply 3-lobed, 6.5–7 mm. long, 8–10 mm. wide across the lateral lobes; lateral lobes divergent, obliquely oblong, obliquely obtuse or truncate and irregularly toothed at the apex, about 4 mm. long and 1.5 mm. wide; mid-lobe transversely oblong to transversely semielliptic, the lateral margins subcrenate, apiculate to abruptly subacuminate at the apex, 4–5 mm. long, 6.8–10 mm. wide; disk with an approximate pair of short porrect calli at the base, the calli abruptly truncate and denticulate at the apex, somewhat thickened along the central portion. Column cylindrical, keeled on the back, serrulate-ciliate at the bilobulate apex, 7–9 mm. long.

This species is closely allied to *E. centropetalum*, of which it may eventually prove to be only a variety.

Represented from Guatemala only by the type collection.

Epidendrum Parkinsonianum Hook. Bot. Mag. 67: t. 3778. 1840.

Epiphytic on trees and on rocks in oak-pine forests at high elevations, up to 2,000 meters or more alt. Uncommon from Mexico to Panama.

Plant large, pendent, branching, glabrous, up to 2 meters tall. Pseudobulbs curved-ascending, slender, terete, 1-several-leaved, 6-10 cm. long, concealed by translucent sheaths; sheaths scarious, tubular, growing from nodes 1.5-2 cm. apart, lanceolate, acuminate, imbricate, up to 15 cm. long and 3 cm. wide. Leaves linear-lanceolate to narrowly lanceolate, acute to long-acuminate, fleshy-coriaceous, flaccid, conduplicate, dark green, often tinged with purple, 2-5 dm. long, 1-3.5 cm. wide, up to 2.5 cm. thick. Floral bracts short, ovate-lanceolate, acuminate, scarious, 7-15 mm. long. Flowers large, showy, fragrant, 1-3, subfasciculate on a short peduncle up to 1.5 cm. long, subtended by the uppermost sheath of the pseudobulb, with stout curved pedicellate ovaries 10-14 cm. long. Sepals spreading, linear-lanceolate to lanceolate, long-acuminate, pale yellowish green, often mauve or purplish bronze on the outer surface, with revolute margins, 5.6-8.5 cm. long, 1.1-1.7 cm. wide near the middle; lateral sepals subfalcate. Petals spreading, mostly white or yellowish, linear-lanceolate, long-acuminate, falcate, 5.5-8 cm. long, 6-9 mm. wide. Lip adnate to the column to above the middle, deeply 3-lobed, white or yellowish orange, 5.5-8 cm. long to the base of the column from the tip of the mid-lobe; lateral lobes semicordate to semiovate, obtuse to subacute, mostly somewhat irregularly undulate-sinuate on the outer margin above the middle, 2.5-4 cm. long, 1.5-1.8 cm. wide near the base; mid-lobe linear, acuminate, 3.5-5.5 cm. long, 2-4 mm. wide near the base; disk with two erect-spreading flap-like obtuse keels just in front of the column. Column arcuate, dilated upward, 2.5-3 cm. long. Capsule fusiform-cylindrical, conspicuously 3-ridged, 7-13 cm. long, 1-2 cm. in diameter.

Chimaltenango: *Johnston* 1241.—Chiquimula: Río Grande (Río Concepción) on Socorro Mountain, above Finca San José, southeast of Concepción de las Minas, *Steyermark* 31114.—Guatemala: Mixco, *Margaret W. Lewis* 91. Garden of Don Mariano Pacheco H., from barrancas north of Guatemala, *Steyermark* 46393.—Huehuetenango: Aguacatán road, ten kilometers east of Huehuetenango, *Standley* 82162.—Quezaltenango: Volcán Santa María, *Steyermark* 33923 (probably).—San Marcos: Vicinity of town of Tajumulco, north-western slopes of Volcán Tajumulco, *Steyermark* 36926.—Zacapa: Sierra de las Minas, between Loma El Picacho and Cerro de Monos, *Steyermark* 42762.—“Guatemala:” 1866, *Bernoulli* 356 (in part).

***Epidendrum Parkinsonianum* Hook. var. *falcatum* (Lindl.) Ames, Hubbard & Schweinfurth, Bot. Mus. Leaflet. Harv. Univ. 3: 74. 1935.**

The variety differs from the typical form mainly in its smaller flowers. The lip is 3.5-4 cm. long, the sepals are 3.5-4 cm. long and the petals about 3.25 cm. long.

Guatemala: Arrazola, *Heyde & Lux* 4604.—Quiché: *Lehmann* 1570.—“Guatemala:” *Bernoulli* 356 (in part).

***Epidendrum pentotis* Reichb. f. *Linnaea* 41: 81. 1876. *Epidendrum fragrans* Sw. var. *megalanthum* Lindl. Journ. Hort. Soc.**

London 4: 223. 1849 (type: Guatemala, *Skinner*). *Epidendrum Beyrodtianum* Schltr. Orchis, 9: 49. t. 4, figs. 14-21. 1915 (type: Guatemala, *Hort. Beyrodt*).

Epiphytic on trees in humid forests, up to 1,700 meters alt. Uncommon in Mexico, Guatemala, El Salvador, Honduras and Brazil.

Plant erect or ascending, up to 5.5 dm. tall. Pseudobulbs narrowly cylindrical to fusiform-cylindrical, elongated, somewhat compressed, bifoliate, rarely one-leaved, 10-27 cm. long, 6-15 mm. in diameter, subtended by several brown scarious inflated acute sheaths up to 12 cm. long. Leaves linear-elliptic to lanceolate, narrowly obtuse to acuminate, coriaceous, 13-30 cm. long, 1.3-3.3 cm. wide. Peduncle short, 3-7 cm. long, 2-3-flowered, the lower part surrounded by several brown scarious tubular sheaths up to 6.5 cm. long. Floral bracts triangular-lanceolate, acuminate, scarious, 5-7 mm. long. Flowers rather large, showy, with stout roughly granulose-tuberculate pedicellate ovaries 1.3-2.3 cm. long. Sepals pale greenish yellow, oblong-lanceolate, shortly acuminate, 3-6 cm. long, 4.5-8 mm. wide. Petals pale greenish yellow, elliptic-lanceolate, shortly acuminate, 2.5-4 cm. long, 7.5-10 mm. wide. Lip adnate to the column for half its length, triangular-ovate to subcordate-ovate, abruptly acuminate, sagittate or triangular-auriculate at the base with the auricles prominently incurved, deeply concave, 1.8-2.4 cm. long to the base of the column from the tip of the acuminate apex, 1.2-1.5 cm. wide near the base; disk nervose with the nerves purple, with an oblong-thickened sulcate callus in the center at the base, the callus occasionally composed of two short parallel keels. Column 8-10 mm. long, trilobulate at the apex, purple-spotted, dorsally carinate. Capsule obpyriform to suborbicular-ellipsoid, strongly winged, rust-brown in color, up to 5.5 cm. long when mature.

Guatemala: Garden of Don Mariano Pacheco H., said to have come originally from Mataquescuintla, Dept. Santa Rosa, *Steyermark* 46387.—Santa Rosa: Santa Rosa, *Heyde & Lux* 3499.—Suchitepequez: Slopes of Volcán Zunil, in vicinity of Finca Montecristo, southeast of Santa María de Jesús, *Steyermark* 35212.—“Common throughout highlands:” *Lewis* 107.

The following collection is in fruit but probably represents this species: Huehuetenango: Puente El Aguilar, just east of San Sebastián, *Standley* 82809.

***Epidendrum physodes* Reichb. f. Gard. Chron. 289. 1873.**

Epiphytic on trees in forests, usually at low altitudes, up to 1,900 meters alt. Rare in Mexico, Guatemala and Costa Rica.

Plant slender, low, up to 3 dm. tall. Stem terete, slender, 1.5-2 mm. in diameter, concealed by the short tubular compressed leaf-sheaths. Leaves scattered along the stem, distichous, articulate, triangular-lanceolate, acute to subacuminate at the apex, sometimes minutely bilobed with a mucro in the sinus, fleshy-coriaceous, somewhat dilated at the base and clasping the stem, 1.5-6.5 cm. long, 6-11 mm. wide near the base. Inflorescence composed of one or more delicate fractiflex few-flowered branches, which are supported by an elongated slender filiform

peduncle; peduncle up to 20 cm. long, provided with numerous long tubular acuminate scarious bracts 1.5–2 cm. long, which disintegrate into fibers with age. Floral bracts ovate-cucullate, acute, 1–3 mm. long. Flowers pale greenish white, whitish brown or pinkish, with pedicellate ovaries that are about 6 mm. long. Ovary with a more or less semiglobose vesicle at its summit just under the lip, about 2 mm. in diameter. Sepals oblong-elliptic, acute to subapiculate, dorsally keeled especially at the apex, recurved, 5–8.5 mm. long, 2–4 mm. wide; lateral sepals oblique, slightly united at the base. Petals linear-lanceolate to almost filiform, acute, 1-nerved, 5–8 mm. long, about 0.5 mm. wide. Lip adnate to the column, fleshy; lamina tubular in natural position, when spread out transversely elliptic, suborbicular-obovate or obovate-flabellate, truncate-mucronate at the apex, 2.5–6 mm. long, 4–6.5 mm. wide; disk with two fleshy-tumid calli at the base, thickened along the central portion. Column thickened, clavate, entire to toothed at the truncate apex, 3–4 mm. long.

This species is distinctive in that the ovary has a more or less semiglobose vesicle at its summit. The elongated, almost filiform peduncle is also quite distinctive.

Alta Verapaz: Cubilgüitz, *Türckheim* II 472 (8295). Along Río Icvolay, north and northwest of Finca Cubilgüitz to Quebrada Diablo, *Steyermark* 44722.—Izabal: Río Juyamá, southeast of Cheyenne, about fifteen miles southwest of Bananera, *Steyermark* 39164. Los Andes District, Entre Rios, *Lewis* 138. Cerro San Gil, along Río Bonita, *Steyermark* 41742.

Epidendrum polyanthum Lindl. Gen. & Sp. Orch. Pl. 106. 1831. *Epidendrum bisetum* Lindl. Bot. Reg. 27: Misc. 68. 1841 (type: Guatemala, *Hort. Loddiges*). *Epidendrum colorans* Klotzsch, Allg. Gartenz. 19: 250. 1851 (fide Reichenbach, Cogniaux et al.) (type: Guatemala, *Warscewicz*). *Epidendrum verrucipes* Schltr. in Repert. Sp. Nov. 15: 208. 1918 (type: Guatemala, July, 1866, *Bernoulli & Cario* 470).

Terrestrial or epiphytic on trees in open country, thickets, or open or dense humid forests, up to 2,700 meters alt. Widespread and rather common from Mexico through Central America to Panama, Venezuela and Brazil.

Plant erect, slender, 3–12 dm. tall. Stem smooth, leafy, 5–6 mm. in diameter, concealed by the membranaceous leaf-sheaths. Leaves articulate to the leaf-sheaths, erect-spreading, linear to elliptic-lanceolate or rarely oblong-elliptic, subobtuse to long-acuminate, up to 22 cm. long and 5.5 cm. wide. Inflorescence a simple or compound many-flowered raceme, up to 40 cm. long, the main rachis provided with long whitish coriaceous fugaceous sheaths; individual branches of the inflorescence as much as 15 cm. long, the racemes 3–4 cm. in diameter, subtended by several tubular scarious sheaths up to 1.5 cm. long, the rachis often verruculose-papillose. Floral bracts ovate-cucullate, acute, scarious, 1–4 mm. long. Flowers variable in color, yellow-white, orange-yellow, greenish yellow, brownish

yellow or reddish, with slender verruculose papillose pedicellate ovaries that are 5–15 mm. long. Sepals mostly strongly ribbed along the nerves, more or less verruculose-papillose on the outer surface; dorsal sepal obovate-elliptic to elliptic-oblancheolate, rounded to obtuse at the apex, occasionally somewhat apiculate, 7–16 mm. long, 1.2–3.5 mm. wide above the middle; lateral sepals obliquely obovate to obliquely elliptic-obovate, obtuse to subacute at the apex, 7–16 mm. long, 1.8–5 mm. wide above the middle. Petals filiform to filiform-spatulate, 7–12 mm. long, less than 0.5 mm. wide. Lip adnate to the column; lamina deeply and irregularly 3-lobed, 6–8 mm. long, 7–9 mm. wide across the lateral lobes; lateral lobes extremely variable, auriform, dolabriform, obreniform, obliquely crescent-shaped or obliquely bilobulate with the lobules widely divergent, 1.5–3.5 mm. long, 3.5–5 mm. wide; mid-lobe of lip oblong-quadrate to oblong-cuneate, almost truncate to deeply forcipate-bilobed at the apex, 3–6 mm. long, 2–3 mm. wide near the apex; disk with two thickened mammillate calli at the base in front of the column, with three keels along the center, the middle keel extending to about the middle of the mid-lobe, the lateral keels shorter. Column clavate, arcuate, 6–8 mm. long. Capsule ovoid, 1–3 cm. long, smooth or more or less muricate.

This species constitutes a polymorphic alliance, with the components intergrading too strongly to warrant the recognition of separate species. The lateral lobes of the lip show a wide range in shape and in the degree of simplicity or lobing. The species is very closely allied to *E. Clowesii* and ultimately may prove to be conspecific with that species. However, the sepals and pedicellate ovaries of *E. polyanthum* are more or less verruculose-papillose, while those of *E. Clowesii* are smooth.

Alta Verapaz: Cubilgüitz, *Türkheim* 8007; 8008. Chamá, *Johnson* 236; 255; 885. Finca Los Alpes, *Wilson* 355. Vicinity of Cobán, brought from nearby mountains by peddler, *Standley* 89923.—Chimaltenango: Chichavac, *Skutch* 678. Pacaya, *Johnston* 1359. Volcán de Pacaya, *Johnston & Porter* (com. *Lewis* 203).—Chiquimula: Volcán Ipala, near Amatillo, *Steyermark* 30534.—Guatemala: In garden of Don Mariano Pacheco H., said to have come originally from Palencia, Dept. Guatemala, *Steyermark* 46395; 39866.—Huehuetenango: In cafetal along Río Amelco, Sierra de los Cuchumatanes, below Finca San Rafael, *Steyermark* 49678. Quen Santo, *Seler* 2314. Between Barillas and Cerro Victoria, Sierra de los Cuchumatanes, *Steyermark* 49706.—Izabal: Vicinity of Quiriguá, *Standley* 24471.—Quezaltenango: Volcán Atitlán, *Skutch* 1523; *Vaught* 2666. Densely forested damp white sand quebrada, El Pocito, south of San Martín Chile Verde, on road to Colomba, *Standley* 84952.

Epidendrum polybulbon Sw. Prodr. Veg. Ind. Occ. 124. 1788.
Dinema polybulbon (Sw.) Lindl. Gen. & Sp. Orch. Pl. 111. 1831.

On trees and rocks in humid forests, up to 3,200 meters alt. Widespread from Mexico to Honduras, also Cuba and Jamaica.

Plant small, creeping, up to 11 cm. tall, glabrous. Rhizome slender, elongate, concealed by short brown fibrous-scarious imbricating sheaths. Pseudobulbs erect-ascending at intervals of 1.5–3 cm. on the rhizome, ovoid to cylindrical-ellipsoid, pale green, bifoliate, 1.2–3 cm. long, 4–8 mm. in diameter. Leaves ovate-elliptic to narrowly elliptic-oblong, obtuse-emarginate, coriaceous, shiny green, conduplicate at the base, 0.8–8 cm. long, 3–11 mm. wide. Flowers one, rarely two, fasciculate, large for the plant, sweet-scented, with slender pedicellate ovaries; pedicellate ovaries tinged with red, 1.5–2 cm. long, subtended at the base by two brown scarious tubular involucre bracts 7–10 mm. long. Sepals linear-lanceolate to narrowly elliptic-lanceolate, recurved at the thickened sharply acuminate apex, dorsally carinate along the mid-nerve, greenish yellow with a brown infusion or with reddish streaks below the middle, 8.5–18 mm. long, 1.5–3 mm. wide about the middle; lateral sepals oblique. Petals similar in color to the sepals, linear to linear-oblong, acute-subapiculate at the thickened recurved apex, falcate, 8–16 mm. long, 1–2.5 mm. wide. Lip yellowish white, with the short broad claw adnate to the base of the column, 8–17 mm. long to the base of the column from the apex of the lip; claw 4 mm. or more long and 2 mm. wide, fleshy-thickened on the upper surface; lamina dilated, suborbicular-ovate to cordate-triangular, apiculate at the broadly rounded apex, undulate-crenulate along the margins, 5–12 mm. wide. Column somewhat dorsally flattened, with narrow white wings extending along the entire length and protruding at the apex as two sharp hornlike projections about 1.5 mm. long, acutely angled on each side at the apex, dorsal side deep purple, about 6 mm. long and 1.5 mm. wide; capsule obliquely ovoid or ellipsoid, 1.2–2 cm. long.

Although this species is variable in the size of the plant and flowers, it is most variable in the shape of the leaves, which range from ovate-elliptic to narrowly elliptic-oblong.

Baja Verapaz: Santa Rosa, *Türkheim* II 2191. North of Santa Rosa, *Standley* 69867. Rocky hills near and above Santa Rosa, in pine-oak forest, *Standley* 91248.—Chiquimula: Río Grande (Río Concepción), on Socorro Mountain, above Finca San José, south-east of Concepción de las Minas, *Steyermark* 31139.—El Progreso: Sierra de las Minas, between Calera and summit of Volcán Siglo, *Steyermark* 43121.—Guatemala: In the market of Guatemala, 1860, *Hayes*. Guatemala Market, *Johnston* 1651. Fiscal, *Deam* 6166. In basket of orchids obtained from Mixco, *Margaret W. Lewis* 96.—Quezaltenango: Uppermost ridge of Volcán Santo Tomás, *Steyermark* 34782.—Santa Rosa: Zamorora, *Heyde & Lux* 4599.—Totonicapam: Pacajá, region of Desconsuelo, mountains above Totonicapam, *Standley* 84564.—Zacapa: Along Río Lima, Sierra de las Minas, between Río Hondo and summit of mountain at Finca Alejandría, *Steyermark* 29634. Sierra de las Minas, oak-pine woods along upper

reaches of Río Sitio Nuevo, between Santa Rosalía and first waterfall, *Steyermark* 42271.

***Epidendrum porpax* Reichb. f. Bonpl. 3: 220. 1855 (non 1865).**

Epiphytic on trees in pine or oak forests, up to 2,000 meters alt. Uncommon but widespread from Mexico through Central America to Panama and in Venezuela and Peru.

Plant very small, decumbent, much-branched, up to 8 cm. long including the flower. Stem erect-ascending, often fractiflex, clothed especially below the middle with brownish scarious broadly infundibuliform sheaths about 5 mm. long. Leaves three or more, fleshy-coriaceous, elliptic, mucronate or obliquely retuse at the apex, spreading, distichous, purplish green, 1.2–3 cm. long, 4–9 mm. wide. Flowers large for the plant, essentially sessile, pungent, with a disagreeable odor, solitary (rarely two) at the apex of the stem, with slender elongate pedicellate ovaries that are 1.5–2.5 cm. long, the segments translucent. Pedicellate ovary subtended by a scarious compressed apiculate sheath 8–12 mm. long. Sepals and petals light purplish green. Dorsal sepal oblong-elliptic, obtuse, 9–14 mm. long, 3.5–5 mm. wide. Lateral sepals triangular to ovate-triangular, oblique, subobtusate to acute, decurrent on the column and almost hidden behind the large lip, 11–15 mm. long, 4–5 mm. wide near the base. Petals obliquely linear to filiform, 10–15 mm. long, less than 1.5 mm. wide. Lip adnate to the column; lamina porrect, red-brown with a greenish margin, suborbicular-cordate, subreniform, to somewhat obcordate, more or less retuse at the apex, mostly cordate at the base, with the margins ciliate, 8–13 mm. long, 9–14 mm. wide; disk with a pair of fleshy calli at the base, thickened along the middle on the lower part. Column green, dilated above, 4–7 mm. long. Capsule obliquely ellipsoid, 1.5–2.5 cm. long.

Baja Verapaz: Sierra de las Minas, El Rancho, *Kellerman* 7033.—Zacapa: Sierra de las Minas, along Río Rillito del Volcán de Monos, Volcán de Monos, *Steyermark* 42392.

***Epidendrum pseudoramosum* Schltr. Repert. Sp. Nov. 10: 361. 1912 (type: Guatemala, Alta Verapaz, near Cobán, September, 1907, *Turckheim* II 1951).**

Epiphytic on trees and on stumps in open or dense forests, up to 1,500 meters alt. Uncommon in Guatemala, Honduras and Costa Rica.

Plant spreading, much-branched, up to 50 cm. tall (or long). Stem flexuose, terete, concealed by whitish membranaceous sheaths. Leaves erect-spreading, linear-ligulate, obtuse and obliquely retuse at the apex, dorsally carinate, 6.5–12.5 cm. long, 4.5–12 mm. wide; leaf-sheaths more or less rugose. Inflorescence a spike terminating the branches, shortly pedunculate, laxly few-flowered, up to 5.5 cm. long including the peduncle; rachis mostly fractiflex. Floral bracts very conspicuous, tubular-spathaceous, yellowish membranaceous, obtuse to acute, the apical margins often hyaline, up to 12 mm. long. Flowers erect-spreading to suberect, greenish white, fleshy-coriaceous, barely exceeding the bracts. Sepals

ovate-oblong to oblong-elliptic, obtuse, somewhat concave, 5–6 mm. long, about 2 mm. wide; lateral sepals oblique. Petals linear, obtuse, 4.5–5 mm. long, about 1 mm. wide. Lip adnate to the column; lamina broadly triangular-ovate to broadly cordate-ovate, rounded to obtuse at the apex, the basal angles or auricles obtuse, the margins somewhat upcurved, 3–4 mm. long, 3–4 mm. wide; disk with a small sulcate tridentate callus on the lower part, with a thickened keel along the center extending almost to the apex. Column white, short, 3–3.5 mm. long, extending up to the middle of the lamina of the lip, with a prominent falcate-oblong auricle on each side at the apex.

Alta Verapaz: Cobán, *Türkheim* 2461a. Chamá to Cobán, *Johnson* 900.—Chiquimula: Volcán Ipala, near Amatillo, *Steyermark* 37544.—Quezaltenango: Slopes of Volcán Santa María, between Finca Pirineos and Los Positos, between Santa María de Jesús and Calahuaché, *Steyermark* 33782.

Epidendrum pygmaeum Hook. Bot. Mag. 60: t. 3233. 1833. *Hormidium tripterum* (Brongn.) Cogn. in Mart. Fl. Bras. 3, pt. 5: 29. 1898. *Hormidium pseudopygmaeum* Finet, Bull. Herb. Boiss. 7: 121, t. 3. 1899. Figure 98.

In humid forests on trees and rocks, up to 1,800 meters alt. Widespread from southern Florida, through Middle America and the West Indies to Brazil, Bolivia and Peru.

Plant glabrous, consisting of a creeping branched rhizome that gives rise to numerous remote ascending or erect pseudobulbs. Rhizome concealed by inflated imbricate brown scarios sheaths. Pseudobulbs slender, ellipsoid, fusiform, cylindric, bifoliate, rarely 3-leaved, 2.5–10 cm. long, subtended by one or more brownish sheaths that are ovate, acute or acuminate-cuspidate, scarios and 1.5–4.5 cm. long. Leaves subopposite, erect-spreading, oval to linear, obtuse to acute or cuspidate, coriaceous, 1.5–14 cm. long, 8–20 mm. wide. Peduncle abbreviated, occasionally fractiflex, up to 3 cm. long, subtended by scarios sheaths that are up to 2 cm. long. Floral bracts small, broadly ovate, acute, 3–5 mm. long, scarios. Flowers small, one or several, with pedicellate ovaries up to 1.7 cm. long. Sepals spreading, greenish or brownish green, often tinged with lavender, thick and fleshy, longitudinally triangular at the apex; dorsal sepal elliptic to oblong-lanceolate, acuminate, 5–11 mm. long, 1.5–4 mm. wide near the base; lateral sepals ovate-lanceolate to oblong-lanceolate, acuminate, oblique, dorsally carinate, shortly connate at the base, 5–12 mm. long, 1.7–4 mm. wide. Petals similar to the sepals in color, often whitish at the base, linear, abruptly acute to acuminate, thickened at the apex, 4–9 mm. long, 2 mm. or less wide. Lip adnate to the lower half of the column to form a cup, white with a purple blotch at the base of the mid-lobe, 3-lobed, with the central portion sulcate, 2.5–8.8 mm. long to the base of the column from the apex of the mid-lobe, 3.2–8 mm. wide across the lateral lobes when spread out; lateral lobes oblong-oval to suborbicular, with the margins finely erose, upcurved, 1.5–3 mm. long, about 2 mm. wide; mid-lobe minute, triangular, apiculate, 1–3 mm. long. Column 2–5 mm. long, trilobulate at the apex. Capsule ellipsoid, broadly 3-angled and winged along the angles, 1–2 cm. long.

This is an extremely variable species as to the size of the plant and flowers.

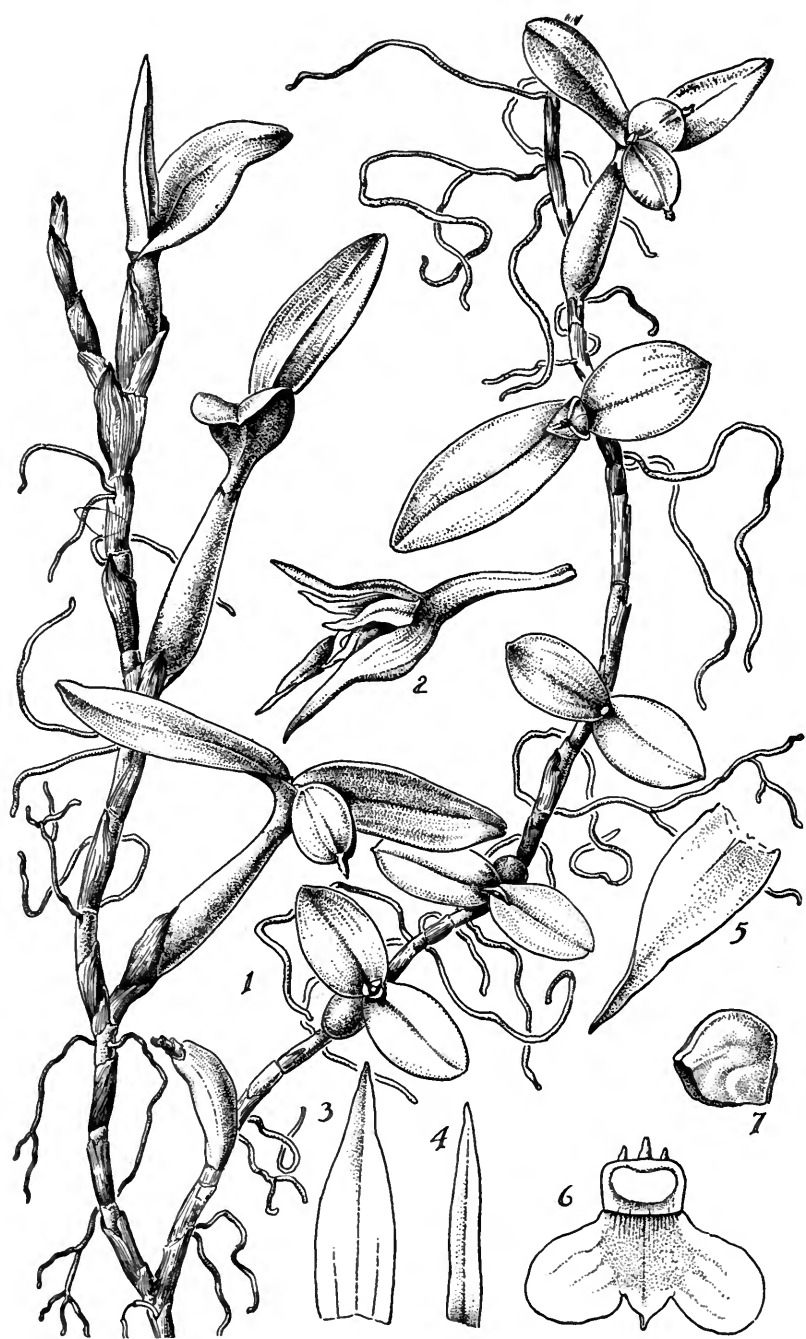
Alta Verapaz: Río Cobán, *Johnson* 737.—Izabal: Los Andes district, near Entre Rios, *Margaret W. Lewis* 181. Between Bananera and "La Presa" in Montaña del Mico, *Steyermark* 39207.—Zacapa: Middle and upper south-facing slopes of Volcán Gemelos, *Steyermark* 43262. Between Loma El Picacho and Cerro de Monos, *Steyermark* 42823.—Near Hacienda San José del Arco, east of Comitán, very humid forests on shore of Lake Montebello, Long. $91^{\circ} 45'$, Lat. $16^{\circ} 05'$, *Otto Nagel* 4478. This collection is cited because it was obtained somewhere on the boundary which separates the State of Chiapas, Mexico, from the Department of Huehuetenango, Guatemala. Lake Montebello is shown in Guatemala on some maps and in Mexico on others.

***Epidendrum radiatum* Lindl.** Bot. Reg. 27: Misc. 58. 1841. Figure 99.

On trees and rocks in dense or open forests, up to 1,200 meters alt. Rather common from Mexico to Costa Rica, also Venezuela.

Plant stout, glabrous, 12–40 cm. tall. Pseudobulbs stipitate, obliquely ovoid-ellipsoid to narrowly fusiform, compressed, strongly ribbed, 2–3-leaved, 4–13 cm. long, 2–3 cm. wide. Leaves linear-ligulate to linear-lanceolate, obtuse to acuminate, coriaceous, 11–35 cm. long, 1.2–3.2 cm. wide. Raceme few- to many-flowered, 7–24 cm. long including the peduncle; peduncle stout, provided with several short scarious bracts 3–10 mm. long. Floral bracts ovate-cucullate, acute, 3–5 mm. long. Flowers showy, pale greenish white or yellowish green, the lip striate with purple, fragrant, with stout pedicellate ovaries 1.5–3 cm. long. Sepals oblong-elliptic to elliptic-lanceolate, obtuse to acute, occasionally apiculate, weakly keeled along the back at the apex, 1.3–2.2 cm. long, 5–7.5 mm. wide about the middle; lateral sepals slightly oblique. Petals obliquely elliptic-obovate to sub-orbicular-spatulate, obtuse to acute, erose-crested along the margins, 1.3–2.3 cm. long, 7–13 mm. wide above the middle. Lip adnate to the lower part of the column, broadly cordate-ovate to transversely elliptic-suborbicular, more or less retuse with an apicule in the sinus, distinctly auriculate at the base with the auricles incurved, deeply cochleate, undulate-crenate along the margins, 1–1.5 cm. long, 1.5–2.3 cm. wide; disk nervose, with the nerves purple, with a fleshy oblong-quadrate pubescent callus on the lower half, the callus about 4 mm. long and 2 mm. wide, trilobulate above and the crest adorned with a V-shaped ridge toward the base. Column stout, trilobulate at the apex, with the mid-lobule erose-lacini-

FIG. 98. *Epidendrum pygmaeum*. 1, fruiting plant ($\times \frac{2}{3}$); 2, flower, side view ($\times 3$); 3, dorsal sepal ($\times 4$); 4, petal ($\times 4$); 5, lateral sepal ($\times 4$); 6, lip and column, front view, lip spread out ($\times 4$); 7, anther cap (enlarged). Original drawing by Blanche Ames; redrawn by G. W. Dillon.



ate, dorsally carinate, greenish with purple spots at the base, 8–11 mm. long. Capsule ellipsoid, strongly 3-angled and winged on the angles, 4–4.5 cm. long.

Amatitlán: Villa Nueva, *Heyde & Lux* 4609.—Chimaltenango: Chimaltenango, *Johnston* 1308.—Guatemala: Fiscal, *Deam* 6072.—Petén: La Libertad and vicinity, *M. Aguilar* 249.—Santa Rosa: Santa Rosa, *Heyde & Lux* 3500.—“Guatemala:” universal, *Lewis* 39.

Epidendrum ramosum Jacq. Enum. Pl. Carib. 29. 1760, and Select. Stirp. Am. 221. t. 132. 1763; ampl. Ames, Hubbard & Schweinfurth, Bot. Mus. Leaf. Harv. Univ. 2: 45. 1934.

Epiphytic on trees in forests, often hanging from trees like vines, also on rocks, up to 2,000 meters alt. Rather common and widespread from Mexico through Central America to Panama, throughout the West Indies and in northern South America.

Plant variable in habit, upright, pendulous or somewhat creeping, simple to much-branched, often growing in dense colonies, up to 9 dm. tall. Stems slender and often flexuous to stiff and rather stout, up to 4 mm. in diameter just below the inflorescence, concealed by the subcoriaceous unspotted leaf-sheaths, often rooting above when creeping or decumbent; branches variable in length and number. Leaves more or less coriaceous, linear-ligulate, lanceolate or oblong-elliptic, obliquely retuse at the rounded to obtuse apex, 1–12 cm. long, 2–14 mm. wide. Inflorescence terminal at the end of the main stem and branches, 2- to several-flowered; rachis slender, often fractiflex. Floral bracts variable in size and texture, more or less conspicuous, tubular-conduplicate, rounded-obtuse to subacute at the apex, unspotted, 0.5–1.7 cm. long, up to 1.2 cm. wide when spread out. Flowers creamy white, yellow-green, greenish white, often tinged with dark red or bronze, variable in size and texture, usually somewhat coriaceous. Sepals elliptic-oblong to lanceolate, subacute to acute, more or less carinate at the apex on the exterior surface and rarely dentate at the apex, 4.5–13 mm. long, 1.5–3 mm. wide; lateral sepals slightly oblique. Petals linear to linear-spatulate, rounded-obtuse to acute, 4.5–13 mm. long, 0.2–2.3 mm. wide. Lip adnate to the column; lamina simple to occasionally subtrilobulate, ovate to triangular-ovate or ovate-lanceolate, rounded to acuminate at the apex, cordate or subcordate at the base, 4–9 mm. long, 2–5 mm. wide near the base; disk with a callus on the lower part. The callus is variable in the distance that it extends down the disk; a sulcate callus is usually truncate at the apex with a slender keel extending to near the apex and is also usually distinctly bifurcate at the base. The callus is occasionally somewhat trilobulate at the apex, thus approaching var. *mixtum*. Column stout, extending slightly beyond the cordate base of the lamina of the lip, its apex truncate to dorsally excavated, with or without two divergent dorsal terminal teeth.

This is an extremely polymorphic species, which forms an alliance composed of the above species and its three varieties treated below.

Alta Verapaz: Cobán, *Johnson* 732. Wet forest near Tactic, above the bridge across Río Frío, *Standley* 90476. Lowland forest

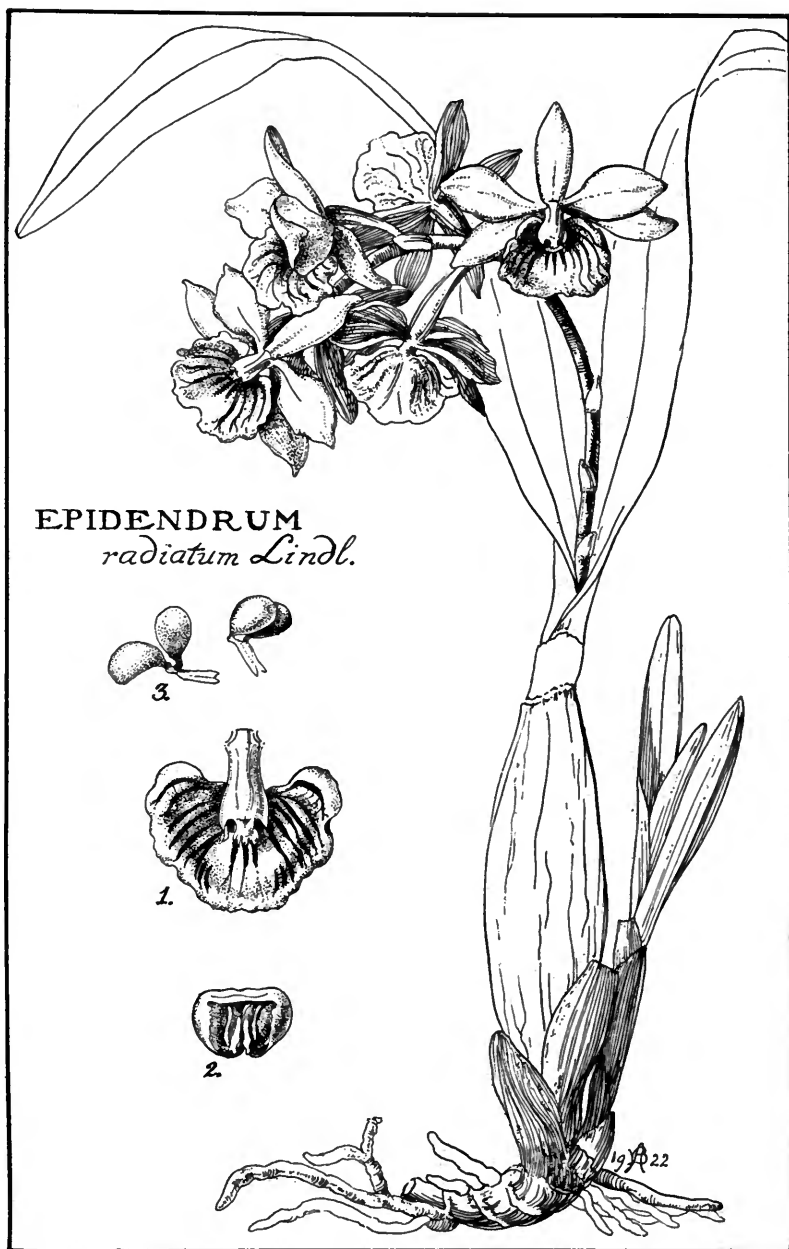


FIG. 99. *Epidendrum radiatum*. Flowering plant ($\times 1$); 1, lip and column ($\times 1\frac{1}{2}$); 2, anther (greatly enlarged); 3, pollinia (greatly enlarged). Drawn by Blanche Ames.

in valley, "pantano," $2\frac{1}{2}$ miles west of Cubilgüitz, *Steyermark* 44332. Along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 89928; 89945.—Chimaltenango: Lower and middle southwestern slopes of Volcán Fuego, above Finca Montevideo, along Barranca Espinazo and tributary of Río Pantaleón, *Steyermark* 52096.—Chiquimula: Slopes of Montaña Tajurán, vicinity of El Barriol, *Steyermark* 30778.—Guatemala: Road to Mataquescuintla, about eighteen miles from Guatemala City, *Margaret W. Lewis* 134.—Quezaltenango: Palmar, *Skutch* 1423. Lower south-facing slopes of Volcán Santa María, between Finca Pirineos and Los Positos, between Santa María de Jesús and Calahuaché, *Steyermark* 33782.—San Marcos: Between Finca El Porvenir to "Número 6," lower south-facing slopes of Volcán Tajumulco, *Steyermark* 37120.—Sololá: Pine woods bordering Río Bravo, in vicinity of Finca Mocá, south-facing slopes of Volcán Atitlán, *Steyermark* 47955.—Suchitepequez: Slopes of Volcán Zunil, in vicinity of Finca Montecristo, southeast of Santa María de Jesús, *Steyermark* 35238.

Epidendrum ramosum* var. *angustifolium (Cogn.) L. O. Wms. Ann. Mo. Bot. Gard. 28: 422. 1941. *Epidendrum ramosum* var. *imbricatum* (Lindl.) Ames, Hubbard & Schweinfurth, Bot. Mus. Leaflet. Harv. Univ. 2: 47. 1934.

Habitat similar to that of the typical form, up to 3,200 meters alt. Uncommon in Guatemala, Costa Rica, Cuba, Jamaica, Hispaniola (Dominican Republic) and Brazil.

Plant usually stout and branched, up to 2 meters tall. Stem erect or more or less recumbent, stout, commonly 5–6 mm. in diameter just below the inflorescence. Leaf-sheaths finely maculate in the extreme development. Leaves often larger than in the species. Inflorescence several-flowered, usually stiffly erect, a distichous lax or compact spicate raceme. Floral bracts usually large, often spathaceous, mostly finely maculate and imbricated, strongly conduplicate and carinate, distichous, 1.5–3 cm. long, elliptic-oval to broadly ovate when spread out. Flowers and floral segments similar to but often larger than those of the typical form. Sepals and petals obtuse to acute or occasionally acuminate. Disk of the lip normally with a callus similar to that of the typical form, but rarely with the apex somewhat trilobulate as in var. *mixtum*.

Variety *angustifolium* intergrades strongly with the typical form of the species and separation is at times difficult. Characters that make for its separation when grouped or even alone, if they are extreme, are the thicker stems, the presence of a fine maculation on the leaf-sheaths and bracts, the more imbricated and conduplicate bracts (which are also apt to be more conspicuous), the tendency

toward broader and larger leaves, and the rather dense head-like inflorescences in the more extreme form.

Alta Verapaz: Chamá, *Johnson* 267.—Guatemala: Volcán de Pacaya, above Las Calderas, *Standley* 58490.—Izabal: Los Andes district, near Entre Ríos, *Lewis* 142.—Jalapa: Montaña Miramundo, near Miramundo, *Steyermark* 32831.—Zacapa: Sierra de las Minas, middle and upper south-facing slopes of Volcán Gemelos, *Steyermark* 43285.

Epidendrum ramosum* var. *lanceolatum Griseb. Fl. Brit. West Ind. 614. 1864.

Epiphytic on trees at low elevations. Widespread but uncommon in Guatemala, Honduras, Panama and Cuba.

Variety *lanceolatum* differs from the typical form of the species (and its other varieties) mainly in the type of inflorescence and the somewhat larger flowers. The flowers, instead of being borne in a raceme as in the other segregates of this species, are borne singly or several in a cluster at the apex of the short lateral branches. Each flower is subtended by several to many closely appressed imbricated bracts and, if clustered, the flowers are borne on separate peduncles. The leaves are usually longer than those of the typical form.

According to *Steyermark*, this plant is commonly called “ak-bakal-chan” in Guatemala.

Alta Verapaz: Chamá, *Johnson* 267. Along Río Ixvolay between Río Apia and Río Soctelá, 8–10 miles northwest of Cubilgüitz, *Steyermark* 45081.

Epidendrum ramosum* Jacq. var. *mixtum (Schltr.) Ames, Hubbard & Schweinfurth, Bot. Mus. Leaflet. Harv. Univ. 2: 49. 1934. *Epidendrum mixtum* Schltr. Repert. Sp. Nov. 10: 294. 1912 (type: Guatemala, Alta Verapaz, near Cobán, December, 1907, *Türckheim* II 1868).

Habitat similar to that of the species; commonly found on pine trees in open forests. Uncommon in Mexico, Guatemala and Honduras.

Plant very variable, up to 10 dm. tall, nearly simple to heavily branched. Stem slender to stout, sometimes flexuous. Leaves similar to but often larger than in the typical form, mostly of two distinct sizes; the main stem leaves usually much larger than those of the branches. Inflorescence terminal on the main stem or on the short branches, usually drooping, racemose, several-flowered. Floral bracts similar to those of the typical form. Flowers similar to the typical form of the species, the segments acuminate at the apex, the sepals more or less dorsally carinate at the apex with the keel often dentate. Disk of the lamina of the lip with a callus that is tridentate or trilobulate at its apex.

Variety *mixtum* is separable from the typical form by having the apex of the callus tridentate or trilobulate and by the more acuminate apices of the floral segments, especially of the lip. In the extreme form the very long leaves of the main stems are also diagnostic. It differs from var. *angustifolium* in the acuminate apices of the perianth-segments and in the usually drooping inflorescences.

Alta Verapaz: Cobán, *Türkheim* 4170; II 1868; II 2086. Cobán, Cemetery Calvario, *Johnson* 552.—Chiquimula: Volcán Quezaltepeque, 3–4 miles northeast of Quezaltepeque, *Steyermark* 31445.—Quiché: Cerro Putul, “Zona Reyna,” *Skutch* 1830.

Epidendrum repens Cogn. in Repert. Sp. Nov. 7: 122. 1909.

Epiphytic on trees, usually in very humid regions, up to 2,100 meters alt. Widespread but not particularly common from Mexico through Central America to Panama, in the West Indies and in Venezuela.

Plant pendent, distichously much-branched, entwined, 3 dm. or more in length; branches mostly fractiflex. Stem slender, more or less fractiflex, about 1 mm. in diameter, many-leaved, concealed by the leaf-sheaths. Leaves small, numerous, spreading articulate, oblong-elliptic to occasionally elliptic-lanceolate, obtuse and usually obliquely retuse at the apex, coriaceous, 0.8–3.2 cm. long, 3.5–6 mm. wide. Flowers solitary at the apex of the branches, sessile, leathery, subtended by 2–3 close-fitting bracts. Bracts distichous, overlapping, broadly ovate, obtuse to somewhat acute, scarious especially along the margins, more or less conduplicate and keeled on the back, 5–7 mm. long. Sepals oblong-elliptic to broadly lanceolate, subobtuse to shortly acuminate, more or less carinate on the back at the apex, nervose, longitudinally concave, 7–8 mm. long, about 2 mm. wide; lateral sepals somewhat oblique. Petals linear, obtuse to acute, slightly oblique, 7–8 mm. long, less than 1 mm. wide. Lip adnate to the column; lamina entire, triangular-ovate to ovate-cordate or subhastate-triangular, acute, nervose, concave with the margins upcurved, 4–4.5 mm. long, 3–4.5 mm. wide at the base when spread out; disk ecallose or with the central nerve fleshy-thickened above the middle. Column short, thick, 2.5–3 mm. long. Capsule ovoid, glossy, chocolate-colored, about 1 cm. long.

In habit this species sometimes resembles *E. strobiliferum*, with which it has been confused.

Alta Verapaz: Tactic, *Johnston* 1831. Cobán, *Muenschner* 12542.—San Marcos: Finca El Porvenir along Río Chopal, slopes of Volcán Tajumulco, *Steyermark* 37523. Between Finca La Patria and “Todos Santos Grande,” Volcán Tajumulco, *Steyermark* 37699.—Purchased at the Christmas market in Guatemala City, probably found around Guatemala City, *Lewis* 187.

Epidendrum rigidum Jacq. Enum. Pl. Carib. 29. 1760, and Select. Stirp. Am. 222, t. 134. 1763. Figure 100.

Epiphytic on trees in dense tropical forests, open forests and in cypress areas, up to 1,400 meters alt. Widespread and quite common from Florida and Mexico, through Central America to Panama, throughout the West Indies and northern South America.

Plant consisting of a creeping and often branched compressed rhizome that gives rise to scattered erect or ascending stems; stems entirely concealed by the leaf-sheaths, up to 3 dm. tall. Leaves distichous, articulate, oblong-elliptic to linear-oblong, obtuse and usually obliquely retuse at the apex, coriaceous, 2.5–12.5 cm. long, 6–22 mm. wide. Inflorescence a slender rigid spicate raceme of few or many scattered flowers, up to 15 cm. long including the short peduncle. Floral bracts green or brownish, with scarious hyaline margins, distichous and equitant, concave-conduplicate with a prominent keel on the back, membranaceous, ovate to broadly triangular when spread out, subobtuse to acuminate, concealing the ovaries and often most of the flowers, 9–25 mm. long, 7–10 mm. wide at the base when spread out. Flowers inconspicuous, green or yellowish green, sessile, the segments leathery. Sepals ovate, ovate-oblong to oblong-elliptic, obtuse to subacute, 4.5–10 mm. long, 2.5–4 mm. wide; lateral sepals oblique. Petals linear to linear-oblong, obtuse, more or less denticulate on the margins, 4–9 mm. long, 1–2.5 mm. wide near the apex. Lip adnate to the column; lamina broadly cordate-ovate to suborbicular, obtuse and occasionally retuse at the apex, the margins usually crenulate-denticulate, 2.5–6 mm. long, 3–5.5 mm. wide; disk with a pair of small calli at the base. Column short, stout, 2–3 mm. long, dentate at the apex. Capsule ellipsoid, 1–2 cm. long.

Alta Verapaz: Tukurú, *Türkheim* 2434. Gogolo, *Johnson* 1281. Along Río Polochic, near Pancajché, *Standley* 91855.—Chimaltenango: San Martín, *Johnston* 1246.—Huehuetenango: Between Ixcán and Río Ixcán, Sierra de los Cuchumatanes, *Steyermark* 49293.—Izabal: Puerto Barrios, *Deam* 6021. Vicinity of Quiriguá, *Standley* 24474. Shores of Lago Izabal, on side opposite San Felipe, between Punta dos Reales and Punta de Lechuga, *Steyermark* 39626. Los Andes district, *Margaret W. Lewis* 36.—Petén: La Libertad, *Lundell* 3526. Cerro Ceibal (Sierra Mojada, Chorro Ceibal, or Cerro San Martín), between mouth of Río Santa Monica and mouth of Río San Martín, on left side of Río Cancuen (going down-stream), *Steyermark* 46094.

Epidendrum Schlechterianum Ames, Sched. Orch. 7: 9. *fig. 1*. 1924. Figure 101.

Terrestrial, on boulders or epiphytic on trees in open or dense humid forests, up to 1,100 meters alt. Uncommon from Mexico through Central America, Trinidad and northern South America.

Plant short, erect, densely caespitose or matted, often much-branched, up to 6.5 cm. tall including the flowers. Stem densely leaved, completely enveloped by the imbricated leaf-sheaths. Leaves non-articulate, approximate, distichous, conspicuously equitant, widely spreading, ovate-oblong to oblong-elliptic or linear-oblong, obtuse and obliquely retuse and apiculate at the apex, very fleshy, convex, 1–3.2 cm. long, 3–7 mm. wide when expanded, with reddish or hyaline margins, sharply carinate on the back; leaf-sheaths dilated at the apex. Flowers usually two (rarely solitary) at the apex of the stem, large for the plant, sessile, erect, variously colored, usually yellow-green, reddish green, bronze-green, green with a pink infusion or pale pink-purple. Sepals 8.8–20 mm. long, 3.2–5 mm. wide, usually strongly keeled along the back at the apex, with the keel of the lateral ones more or less denticulate, the margins mostly denticulate-ciliate; dorsal sepal ovate-lanceolate to elliptic-oblong, subobtuse to shortly acuminate, often apiculate; lateral sepals very oblique, decurrent on the column along its posterior margin, ovate-lanceolate, acute to acuminate, strongly wing-keeled. Petals oblong-lanceolate to linear-lanceolate, acute to acuminate, obliquely inserted on the column, minutely denticulate-ciliate on the margins, 6–18 mm. long, 2–3 mm. wide. Lip adnate to the column; lamina more or less reniform to suborbicular-cordate, abruptly and sharply apiculate, fleshy, lightly undulate along the thin and minutely erose-ciliate upcurved margins, 4.5–9 mm. long, 5–11.6 mm. wide when spread out; disk often thickened along the central portion. Column lightly curved, with short obliquely rounded to oblong-obtuse lateral lobes at the apex, with the retuse center denticulate to lacerate, 5–6.6 mm. long. Capsule triangularly spherical, compressed, about 1 cm. long, covered with dark red flecks.

This short fleshy plant superficially resembles many species of *Sedum*. Its thickly imbricated and dilated leaf-bases and leaf-sheaths give to the stem a much-thickened appearance.

Petén: Oneida-Chickasaw connection about station 363, *Lewis* 30.

Epidendrum Schweinfurthianum Correll, Am. Orch. Soc. Bull. 16: 456. *pl.* 1947 (type: Guatemala, Dept. Zacapa, Sierra de las Minas, terrestrial, upper slopes, along Río Repollal to summit of mountain, alt. 2,100–2,400 meters, January 12–13, 1942, *Steyermark* 42521). Figure 102.

Apparently endemic to Guatemala.

Plant caespitose, up to 6.5 dm. tall; stems slender, leafy, simple or branched above. Leaves narrowly elliptic-lanceolate, obtuse-apiculate to acute, subcoriaceous, rigid, up to 11 cm. long and 1.8 cm. wide; leaf-sheaths purplish rugose or verrucose. Raceme terminal, sometimes two, few-flowered, up to 10 cm. long, subtended by several chartaceous sheaths. Floral bracts ovate-lanceolate to elliptic-lanceolate, acute, up to 1 cm. long. Flowers with slender orchid-colored pedicellate ovaries that are up to 3 cm. long. Sepals and petals deep orchid-

FIG. 100. *Epidendrum rigidum*. 1, plant ($\times 1$); 2, lip and column, front-side view ($\times 5$); 3, flower, side view ($\times 3$); 4, anther (enlarged). Drawn by Blanche Ames.





FIG. 101. *Epidendrum Schlechterianum*. Plant ($\times 1$); upper left, lip, column, and petal, side view ($\times 1\frac{1}{2}$); upper right, lateral sepal, from above ($\times 1\frac{1}{2}$). Drawn by Blanche Ames.

color on the outer surface, rufous-brown within. Sepals fleshy-thickened, elliptic to elliptic-obovate, thickened and conspicuously cucullate at the broadly obtuse apex, 1.1–1.2 cm. long, 6–7 mm. wide; lateral sepals only slightly oblique. Petals thinner than the sepals, obovate-cuneate, dilated on each side above the middle, with the upper posterior margin more or less lobulate, concave on the upper portion, broadly rounded to truncate at the apex, 1.1–1.3 cm. long, 8.5–10.5 mm. wide near the apex. Lip adnate to the column to near its apex, deeply 3-lobed, 1.4–1.5 cm. long, 1.6–1.8 cm. wide across the lateral lobes; lateral lobes unequally bilobulate, with the posterior lobule obcordate and irregularly crenulate on the rounded apex, with the anterior lobule ovate and obtuse; mid-lobe deeply bilobulate with

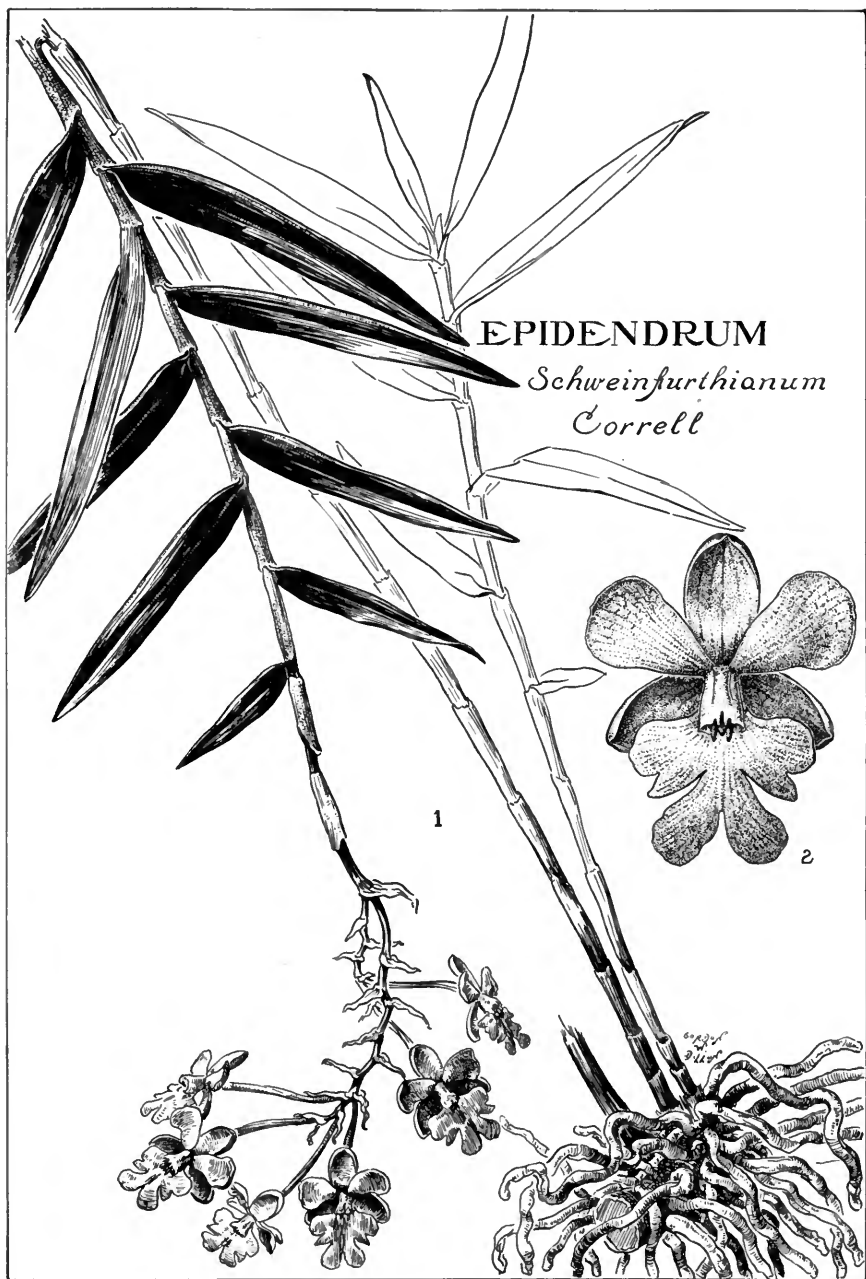


FIG. 102. *Epidendrum Schweinfurthianum*. 1, plant ($\times \frac{1}{2}$); 2, flower ($\times 1\frac{1}{2}$).
Drawn by G. W. Dillon.

the lobules divergent, broadly cuneate in outline, with the lobules obovate and crenulate or sometimes lobulate at the broadly rounded apex; disk with the nerves slightly raised and thickened, with an oblong sulcate callus just in front of the column and a narrow fleshy ridge extending from the callus to the sinus of the mid-lobe; callus 1.8 mm. wide, terminating in two short lateral fleshy nipples with a smaller point in the sinus. Column orchid-colored, 6 mm. long, dilated at the more or less bilobed apex; lobes with undulate-crenate margins and a narrow lobule on the posterior side, adorned on the inner surface with a fleshy oblique ridge near the sinus of the narrow lobule.

This species is allied to *E. exasperatum* Reichb. f., a Costa Rican species, and *E. Schumannianum* Schltr., from Costa Rica and Panama. It differs from *E. exasperatum* primarily in its smooth, not roughened, sepals, larger and differently shaped petals, differently shaped lip and complete lack of lateral inflorescences, which are characteristic of *E. exasperatum*. It differs from *E. Schumannianum* mainly in its narrower, more attenuate leaves, differently shaped lateral lobes of the lip and differently shaped callus.

This species is represented from Guatemala only by the type collection.

Epidendrum selligerum Batem. ex Lindl. Bot. Reg. 24: Misc. 40. 1838 (type: Guatemala, *Skinner*). *Epidendrum diotum* Lindl. Bot. Reg. 29: Misc. 65. 1843 (type: Guatemala, *Hartweg*). *Encyclia selligera* (Batem.) Schltr. Orchideen 211. 1914. *Encyclia diota* (Lindl.) Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 472. 1918.

Epiphytic on trees in open or heavy woods, up to 1,500 meters alt. Uncommon in Mexico, Guatemala and Honduras.

Plant rather stout, glabrous, up to 12 dm. tall. Pseudobulbs ovoid, glazed, 4–10 cm. long, 2–5 cm. in diameter, 1–2-leaved. Leaves linear-ligulate, obtuse to acute, mostly conduplicate, 14–40 cm. long, 1.3–4.5 cm. wide. Inflorescence a loosely flowered panicle, up to 11 dm. long including the peduncle; peduncle stout, provided with light brown scarious bracts up to 2.5 cm. long; branches of panicle subtended by scarious ovate-cucullate bracts up to 6 mm. long. Floral bracts ovate-cucullate, acute, 2–4 mm. long. Flowers showy, fragrant, with slender pedicellate ovaries about 1.5 cm. long. Sepals elliptic-oblong to elliptic-oblancoate, subobtusate to acute or apiculate, somewhat thickened and dorsally carinate at the apex, concave above the middle, green-brown or yellow suffused with brown, 1.4–2 cm. long, 4–7 mm. wide above the middle; lateral sepals oblique. Petals broadly obovate to spatulate, broadly rounded and slightly apiculate at the apex, same color as the sepals, the margins somewhat undulate-crenate, 1.3–2 cm. long, 4–9 mm. wide near the apex. Lip adnate to base of column, deeply 3-lobed, white or yellowish with purple veins, 1–2 cm. long from apex to base of column; lateral lobes variable, obliquely oblong to triangular-oblong, broadly rounded or narrowly obtuse at the apex, porrect, occasionally constricted about the middle or tapering above the middle, up to 10 mm. long to base of sinus, 6–7 mm. wide near base;

mid-lobe separated from the lateral lobes by a short isthmus, suborbicular-obovate to ovate-subquadrate, subtruncate to subacute at the apex, rarely slightly retuse, with the conspicuously undulate-cripsed margins somewhat upturned, 5.5–9 mm. wide, usually smaller than the lateral lobes; disk with an elliptic sulcate callus extending from near the base along the isthmus to the lower part of the mid-lobe. Column semiterete, slightly arcuate, not winged, white with lavender veins. Capsule ellipsoid, about 3.5 cm. long.

This species is closely allied to several species of *Epidendrum* found in Guatemala, particularly *E. alatum*. It is distinguished from that species in that the column is not winged or auricled on each side at the apex.

Chimaltenango: Johnston 1198.—“Guatemala:” Bates 8.

Epidendrum singuliflorum Schltr. Repert. Sp. Nov. 10: 484. 1912 (type: Guatemala, epiphytic on a tree in Pansamalá, August, 1886, *Türckheim* 1096).

Epiphytic on trees, up to 1,200 meters alt. Very rare in Guatemala.

Plant much-branched, up to 40 cm. long, pendent. Stem terete, about 3 mm. in diameter, concealed by the imbricated leaf-sheaths. Leaves spreading, ligulate, obtuse and retuse at the apex, coriaceous, 1.5–2.3 cm. long, 5–7 mm. wide. Flowers apparently solitary at the apex of the branches, erect, subtended by imbricated scarious bracts. Sepals linear-ligulate to lanceolate, acute, 1.2 cm. long; lateral sepals somewhat oblique. Petals linear, acute, a little shorter than the sepals. Lip tubular-involute, adnate to the column for about 2.5 mm.; lamina ovate-oblong, narrowly obtuse, rotundate at the base, obscurely trilobulate above the middle, 7.5 mm. long, 5 mm. wide across the middle; disk with a pair of short keels at the base which become confluent above and extend to the apex as a solitary keel. Column short, thick, unequally 5-lobulate at the apex, 4 mm. long.

Represented from Guatemala only by the type collection.

Epidendrum Skinneri Batem. ex Lindl. Bot. Reg. 22: t. 1881. 1836 (type: Guatemala, *Skinner*). *Barkeria Skinneri* var. *major* Paxton, Mag. Bot. 15: 1, t. 1849. *Epidendrum Fuchsii* Regel, Ind. Sem. Hort. Turic. 4. 1850; in Schweiz. Zeitschr. Gartenb. 9: 202, t. 1851 (type: Guatemala, *Hort. Fuchs*). *Epidendrum Skinneri* [var.] *superbum* Warner, Select Orch. Pl. 1: t. 38-text. 1862–65 (type: Guatemala, *Skinner* ex Hort. Veitch).

Epiphytic on trees, up to 1,900 meters alt. Uncommon in Guatemala.

Plant slender, erect or erect-ascending, loosely caespitose, up to 50 cm. tall. Stem fusiform-cylindrical, 5–14 cm. long, 4–5 mm. in diameter, concealed by the scarious leaf-sheaths. Leaves several, elliptic to elliptic-lanceolate, acute to

acuminate, dorsally keeled, distichous, fleshy, 2.5–15 cm. long, 1–2 cm. wide. Inflorescence a few- to many-flowered simple or rarely compound raceme up to 15 cm. long, terminating a slender elongated peduncle; peduncle concealed by long imbricated scarious sheaths. Floral bracts triangular-ovate to triangular-lanceolate, acuminate, scarious, up to 1.5 cm. long. Flowers lilac-purple, rose-purple or red-magenta, showy, with slender reddish pedicellate ovaries 2–2.5 cm. long. Sepals spreading, elliptic to elliptic-lanceolate, acute to acuminate or apiculate, sometimes carinate on the back toward the apex, 1.5–2.2 cm. long, 3.5–8 mm. wide. Petals broadly elliptic to ovate, acute to shortly acuminate, spreading, 1.3–2 cm. long, 6–10 mm. wide. Lip adnate to the column for about 3 mm.; lamina broadly ovate to broadly elliptic, obtuse, abruptly acute or shortly acuminate, 1.3–1.8 cm. long, 7–15 mm. wide; disk with three central yellowish keels, which are more thickened and higher near base of disk. Column somewhat clavate, 6–8 mm. long.

This very attractive plant is known in Guatemala as “Flor de San Francisco” and “La Aurora.”

Alta Verapaz: Cobán, *Johnston* 1395.—Amatitlán: Amatitlán, *Jesús Morales R.* 1163.—Guatemala: *Aguilar* 143. Mixco, *Sála* 1471. Pamplona golf course, *Lewis* 135. Bought in market, Guatemala, *Standley* 57847.—Jalapa: On tree in quebrada, mountains along the road between Jalapa and San Pedro Pinula, *Standley* 77064. Vicinity of Jalapa, bought from a peddler, *Standley* 76776.—Jutiapa: Los Llanitos, near San José Acatempa, *Standley* 60590.—Santa Rosa: Casillas, *Heyde & Lux* 4276.

Epidendrum Skutchii Ames, Hubbard & Schweinfurth, Bot. Mus. Leaf. Harv. Univ. 4: 1, t. 1936 (type: Guatemala, Dept. Quiché, Nebaj, November 19, 1934, *Skutch* 1715). Figure 103.

Epiphytic on trees, up to 1,800 meters alt. Very rare in Guatemala.

Plant tall, much-branched, “bushy,” up to 12 dm. tall. Stem slender, woody, leafless below, concealed by close whitish tubular sheaths. Leaves 2–4, clustered near the ends of the branches, linear to linear-lanceolate, long-attenuate with an acute apex, subcoriaceous, up to 16.5 cm. long and 7 mm. wide. Inflorescence racemose, few-flowered, shorter than the leaves, lax to nodding; peduncle longer than the rachis, very slender, adorned below the middle with a single scarious linear-lanceolate bract; rachis abbreviated, fractiflex. Floral bracts inconspicuous, narrowly triangular-lanceolate, acuminate, membranaceous, about 5 mm. long. Flowers greenish yellow, intricately marked with dull red, with slender pedicellate ovaries that are about 1 cm. long. Sepals and petals spreading and strongly revolute, with prominent nerves. Dorsal sepal elliptic-oblancheolate to oblanceolate, obtuse, sometimes with a dorsal mucro at the apex, 10.5–12 mm. long, 3.5–4.2 mm. wide. Lateral sepals elliptic-lanceolate to lanceolate-oval, dorsally carinate at the apex and usually apiculate, somewhat oblique, 11.3–11.8 mm. long, 4.1–5.4 mm. wide. Petals oblong-oblancheolate to oblanceolate, acute to rounded and slightly retuse at the apex, 11–12 mm. long, 3.2–4.6 mm. wide. Lip adnate to

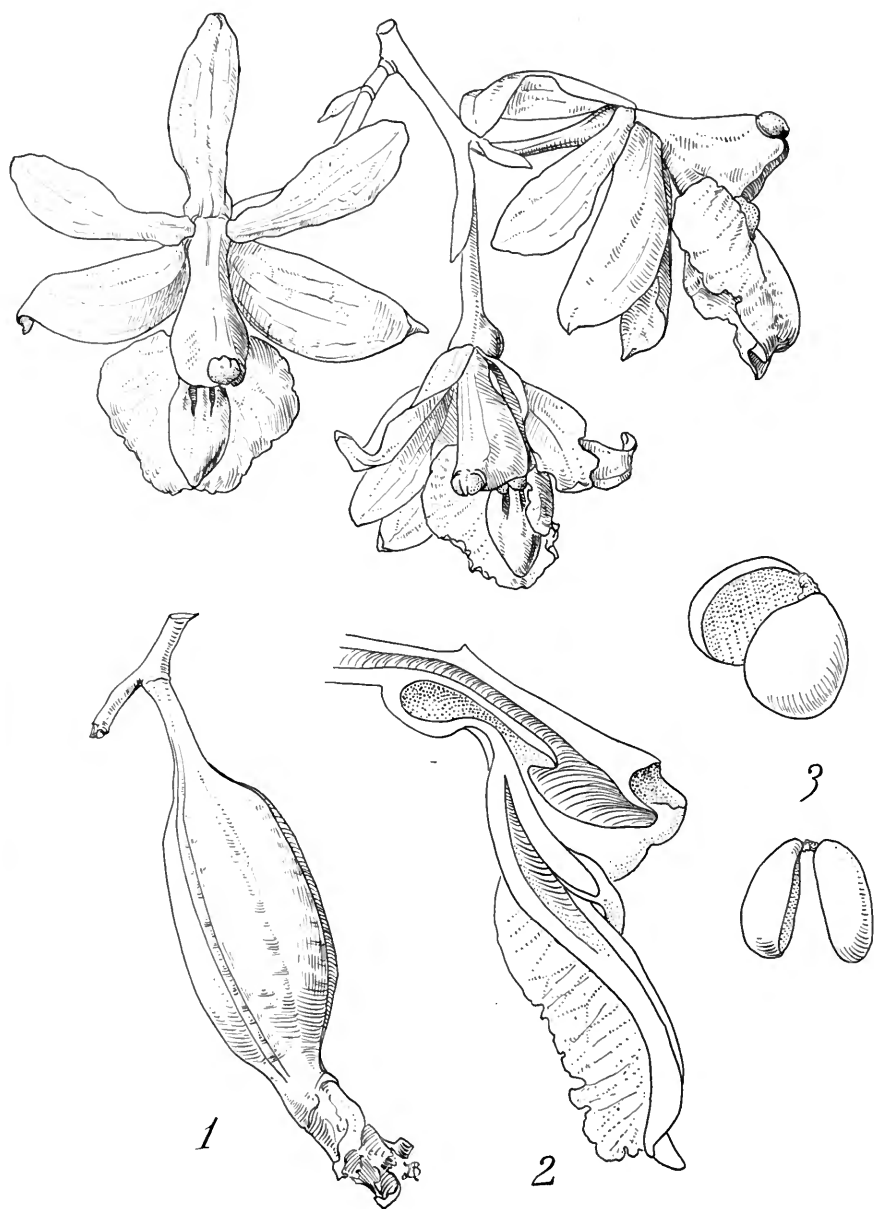


FIG. 103. *Epidendrum Skutchii*. Top, floral cluster ($\times 2\frac{1}{2}$); 1, fruit ($\times 2\frac{1}{2}$); 2, longitudinal section of lip, column, and ovary to show vesicle (about $\times 5$); 3, pollinia (much enlarged). Drawn by Blanche Ames.

the column; lamina triangular-ovate in general outline, somewhat contracted above the middle on each side causing the lip to appear slightly trilobulate, cordate at the base, retuse at the apex, with irregularly crenulate margins above the middle, 8.1–11.2 mm. long from base of auricles to tip of lobules, 9.5–13 mm. wide below the middle; disk with a prominent central fleshy broadly clavate-elliptic callus, which is deeply bisulcate at the base and extends to the apex of the lip. Column strongly dilated above, with an oblique retrorse tooth on either side of the apex, about 7 mm. long. Ovary with a more or less distinct vesicle at its summit under the lip.

Represented from Guatemala only by the type collection.

Epidendrum sobralioides Ames & Correll, Amer. Orch. Soc. Bull. 12: 60. *pl.* 2. 1943 (type: Guatemala, Dept. Zacapa, Sierra de las Minas, between Loma El Picacho and Cerro de Monos, at 2,000–2,600 meters altitude, epiphyte on tree on top of ridge at base of ridge leading to Cerro de Monos, January 16, 1942, *Steyermark* 42764). Figure 104.

Epiphyte, up to 2,600 meters alt. Apparently endemic to Guatemala.

Plant caespitose, 4 dm. tall. Stem slender, leafy, concealed by the purplish leaf-sheaths. Leaves ascending, linear-lanceolate, acute, coriaceous, dark green tinged with purple, up to 11 cm. long and 1 cm. wide. Inflorescence terminal, a short few-flowered raceme; peduncle and rachis about 3 cm. long. Floral bracts linear-lanceolate, long-acuminate, up to 1.8 cm. long. Flowers large for the genus, brown-yellow, marked with purple and olive-green, the scarcely spreading segments fleshy-subcoriaceous; pedicellate ovary brown-purple, lucid, arcuate, about 2 cm. long. Sepals and petals brown-yellow striped with dull purple. Sepals dorsally carinate, 3 cm. long, 8.5–9 mm. wide; dorsal sepal elliptic-lanceolate, obtuse and dorsally apiculate at the apex; lateral sepals oblong-lanceolate, subacute and dorsally apiculate at the apex, oblique, somewhat sigmoid. Petals from a broad cuneate more or less distinct claw, rather abruptly dilated into an obliquely ovate lamina, acute, slightly concave, 3 cm. long, 1.5 cm. wide at the widest point. Lip brown-yellow striped with dull purple, marked from base to tip with a longitudinal olive-green stripe in the center, obovate-oval, subentire, with the margins upcurved in natural position, about 3 cm. long, 2.1 cm. wide above the middle; apex broadly rounded and inconspicuously trilobulate, the middle lobule broad and minutely apiculate, the smaller lateral lobules semi-orbicular; disk provided with a thickened median line and with a pair of short keels just in front of the column. Column short, fleshy, 5 mm. long, attached to the lip for its entire length.

This is one of the largest-flowered species of *Epidendrum* found in Guatemala. Except for the narrower leaves, it is almost identical in habit with some of the small-flowered species of *Sobralia*. *Epidendrum sobralioides* is most closely allied to the extremely rare *E. Warscewiczii* Reichb. f., an obscure Panamanian species. However, the differently shaped and peculiarly lobulate lip readily separates it

EPIDENDRUM

sobralioides

Ames & Correll

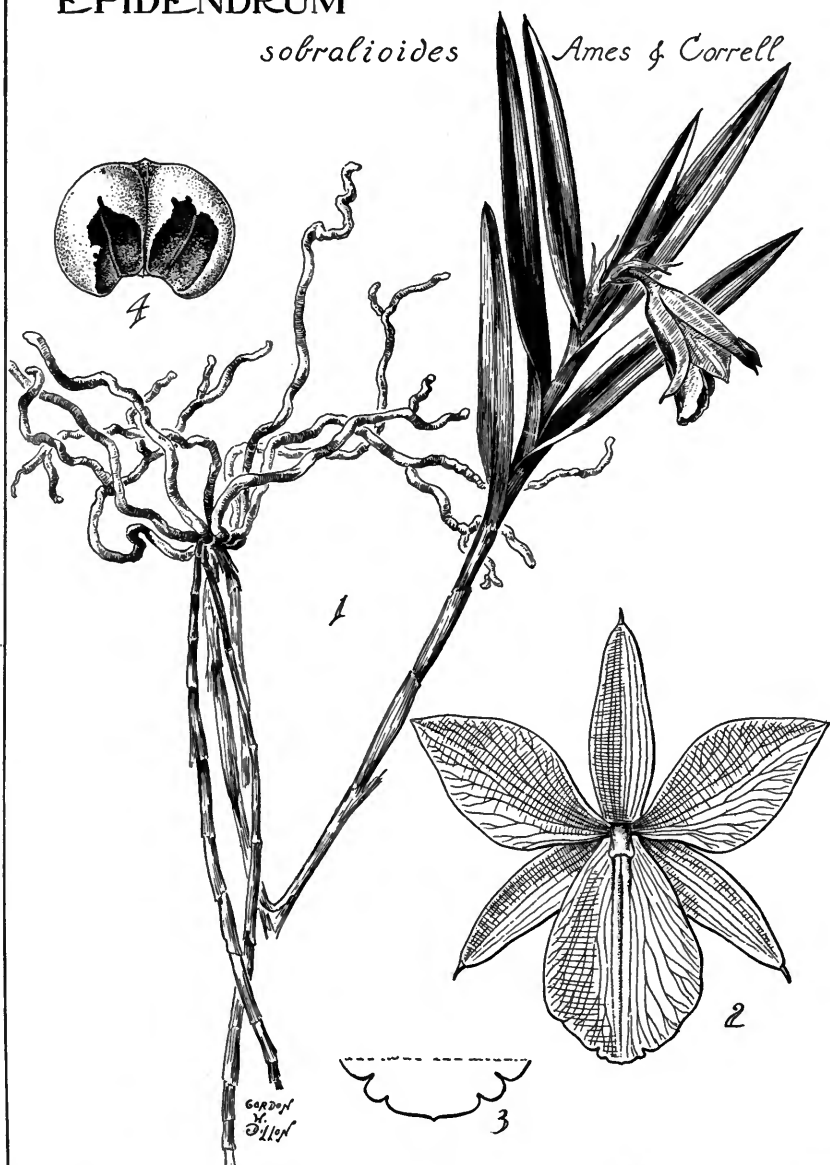


FIG. 104. *Epidendrum sobralioides*. 1, plant ($\times \frac{1}{2}$); 2, flower, spread out ($\times 1$); 3, outline of apex of lip, showing lobes ($\times 3$); 4, anther, from below ($\times 10$). Drawn by G. W. Dillon.

from that species. The pedicellate ovary of *E. sobralioides* is also apparently much shorter than that of *E. Warscewiczii*.

Represented from Guatemala only by the type collection.

Epidendrum Stamfordianum Batem. Orch. Mex. et Guatem. t. 11. 1838 (type: Guatemala, *Skinner*). *Epidendrum Stamfordianum* var. *parviflorum* Regel, Ind. Sem. Hort. Petrop. 19. 1856, and Ann. Sci. Nat. sér. 4, 6: 374. 1856 (type: Guatemala). Figure 105.

Epiphytic on trees in open forests and coffee plantations, up to 600 meters alt. Rather common from Mexico to Panama, also Colombia and Venezuela.

Plants stout, glabrous, up to 8 dm. tall. Pseudobulbs stipitate, slender, fusiform, tapering below into a long jointed stalk, obliquely ascending, up to 25 cm. long and 2 cm. in diameter, 2-4-leaved, when young concealed by large membranous pale brown sheaths. Leaves linear-oblong to oblong-elliptic, obtuse, coriaceous, 13-24 cm. long, 3-6.5 cm. wide. Peduncle lateral, arising from base of pseudobulbs, provided with scariosus imbricating or distant sheaths up to 5 cm. long. Inflorescence a many-flowered raceme or panicle, up to 6 dm. long including the peduncle; branches of the inflorescence subtended by lanceolate long-acuminate scariosus bracts up to 5.5 cm. long. Floral bracts variable in length, linear-lanceolate, long-acuminate, scariosus, the lowermost up to 3.5 cm. long. Flowers showy, greenish yellow, spotted with red, fragrant, with slender pedicellate ovaries up to 3 cm. long. Sepals spreading, elliptic-lanceolate to elliptic-oblancheolate, acute to acuminate, 1.5-2.5 cm. long, 5-6 mm. wide about the middle; lateral sepals somewhat falcate. Petals linear to linear-oblancheolate, acute to acuminate, crenulate-crisped along the margins, 1.4-2.4 cm. long, 2-3 mm. wide above the middle. Lip united with the column for about two-thirds its length, deeply 3-lobed, 1.5-2 cm. long from the apex to the base of the column, up to 2.5 cm. wide across the lateral lobes when spread out; lateral lobes obliquely oblong to obovate, recurved, broadly rounded at the apex, minutely erose-crisped along the margins, 5-8 mm. wide; mid-lobe separated from the lateral lobes by a narrow isthmus, from a cuneate base, broadly flabellate, bilobulate, deeply emarginate, with the margins lacinate or shortly fimbriate, 10-15 mm. wide; disk with a pair of prominent somewhat united calli at the base, with a thickened keel extending along the center from between the basal calli to about the middle of the mid-lobe. Column clavate, arcuate below the middle, tinged with red at the lobulate apex, 7-10 mm. long. Capsule obovoid, 2-3 cm. long.

This is the only species of *Epidendrum* in Guatemala whose inflorescence is normally borne on a non-pseudobulbous, non-leaf-bearing shoot that rises from the base of the 2-4-leaved pseudobulb. It is a somewhat variable species often cultivated in northern greenhouses. The leaves vary in shape and the flowers in size and color. The shape of the lip also varies.

Alta Verapaz: South of Cubilgüitz, *Steyermark* 44569.—Izabal: Virginia, *Spinden*.—Petén: La Libertad and vicinity, *M. Aguilar H.*

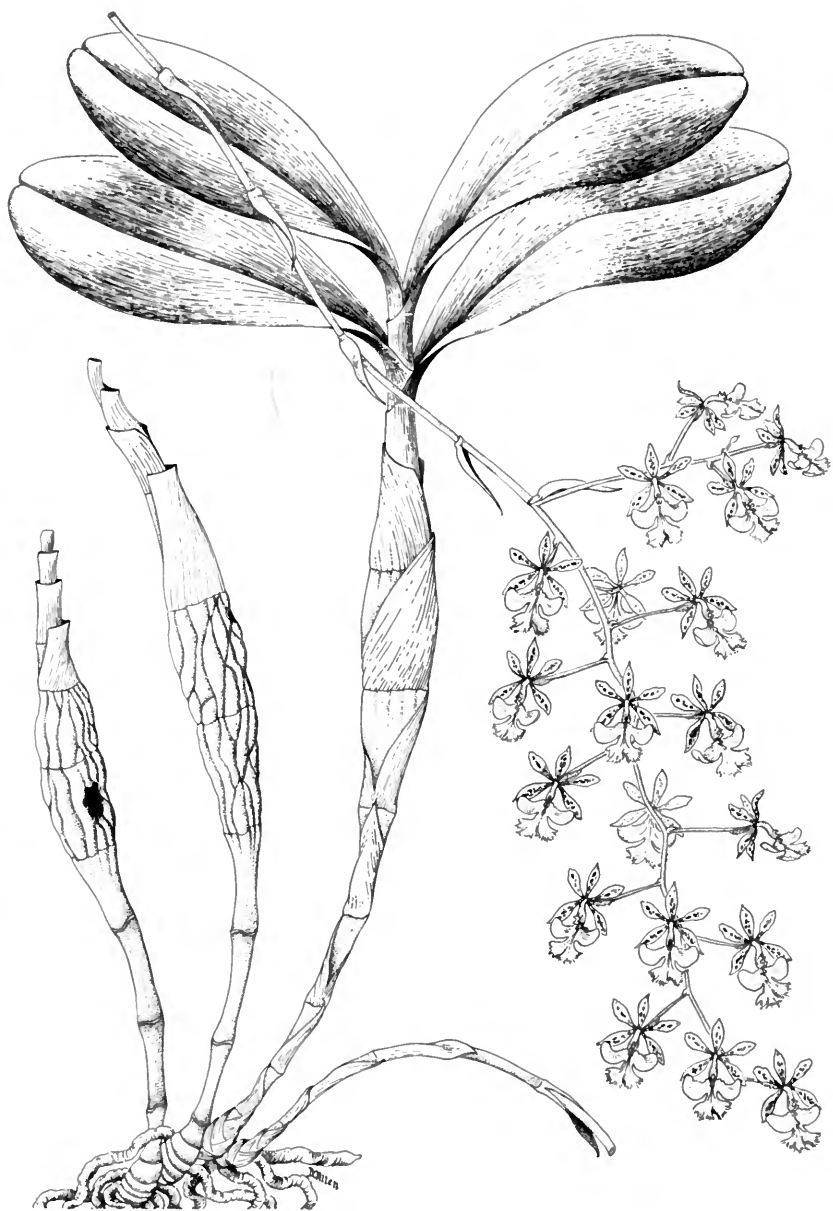


FIG. 105. *Epidendrum Stamfordianum*. Flowering plant ($\times \frac{2}{5}$). Drawn by Dorothy O. Allen.

462.—Quezaltenango: Colomba, *Skutch* 1990.—“Guatemala:” *Lewis* 177.

***Epidendrum stenopetalum* Hook. Bot. Mag. 62: t. 3410. 1835.**

Epiphytic on trees in wet or swampy forests at low altitudes, up to 600 meters alt. Widespread but not particularly common from Mexico through Central America to Panama, Jamaica, Trinidad and northern South America.

Plant erect or erect-ascending, caespitose, 1.2–4 dm. tall. Stem fleshy-thickened, tapering above and below, flexuose, striated, up to 35 cm. long and 7 mm. in diameter. Leaves distichous, erect-spreading, linear-oblong to linear-lanceolate, obtuse and obliquely retuse at the apex, coriaceous, articulate, 4–12.5 cm. long, 5–12 mm. wide. Inflorescence an abbreviated few-flowered corymbose raceme at the summit of the stem; peduncle and rachis mostly less than 2 cm. long, the peduncle provided with short scarious imbricated bracts. Floral bracts ovate-cucullate, acute, scarious, 3–4 mm. long. Flowers suberect, rather showy, rose-violet, with slender pedicellate ovaries up to 3 cm. long. Sepals spreading, ovate-lanceolate, oblong-elliptic or narrowly lanceolate, acute to acuminate, more or less dorsally carinate at the recurved apex, 1–1.7 cm. long, 3–4 mm. wide; lateral sepals oblique. Petals spreading, elliptic-ovate to broadly elliptic, shortly acuminate, 1.3–1.8 cm. long, 6.5–8 mm. wide. Lip spreading, cuneate-obovate, broadly rounded to obtuse or apiculate at the apex, entire or with minute lateral lobules on each side below the middle, 1–1.8 cm. long, 9–10 mm. wide above the middle; disk with a square, yellowish white, somewhat tuberculated callus at the base. Column short, 5–6 mm. long, provided with a thickened ovate-obtuse recurved wing on each side at the apex, with a short tooth on the lower side of each wing, keeled on the back. Capsule ellipsoidal-cylindrical, more or less 3-angled, 2–2.5 cm. long.

The large wing-like lobes terminating the column are unusual in *Epidendrum*.

Petén: La Libertad, *Lundell* 2323.

***Epidendrum strobiliferum* Reichb. f. Nederl. Kruidk. Arch. 4: 333 (reprint p. 18). 1858. Figure 106.**

Epiphytic on trees in open or wet forests and thickets, usually at low altitudes, up to 600 meters alt. Widespread but not particularly common in southern Florida, Mexico, through Central America to Panama, throughout the West Indies and in northern South America.

FIG. 106. *Epidendrum strobiliferum*. 1, plant ($\times 1$); 2, inflorescence ($\times 4$); 3, dorsal sepal ($\times 6$); 4, petal ($\times 6$); 5, lateral sepal ($\times 6$); 6, lip ($\times 6$); 7, column and upper part of ovary, side view ($\times 10$); 8, column, front-ventral view ($\times 10$); 9, anther (enlarged); 10, pollinia (much enlarged). Original drawing by Blanche Ames; redrawn by G. W. Dillon.



Plant commonly much-branched (sometimes simple when young), leafy, caespitose, small, pendent to erect-ascending, up to 23 cm. tall. Stem somewhat terete below, compressed above, often fractiflex, concealed by the greenish or purplish leaf-sheaths. Leaves distichous, widely spreading, rigid, coriaceous, elliptic to elliptic-lanceolate or linear-lanceolate, obtuse or retuse at the apex, articulate, 1-4.5 cm. long, 3-10 mm. wide. Inflorescence composed of short compact few-flowered racemes at the summit of the branches, up to 3.5 cm. long. Floral bracts broadly ovate-cucullate, acute, distichous, more or less imbricate, scarious, strongly ribbed, with erose-hyaline margins, often purplish brown, 4-9 mm. long. Flowers green, white or yellowish white, occasionally marked with reddish lines, sessile, the segments subcoriaceous and strongly nervose. Dorsal sepal oblong to elliptic-lanceolate, obtuse to acute, 3.5-4 (rarely up to 5.5) mm. long, 1.2-1.4 mm. wide. Lateral sepals obliquely ovate-oblong to oblong-lanceolate, subobtuse to acute, carinate near the apex, about 4 (rarely up to 5.3) mm. long, 1.8-2 mm. wide. Petals linear-spatulate to linear-oblanceolate, subacute to acute, 3.5-4 (rarely up to 5.2) mm. long, about 0.5 mm. wide above the middle. Lip adnate to the column; lamina ovate-cordate to triangular-cordate, acute to subacuminate, concave, 3-4 mm. long, 2.5-3 mm. wide; disk with two small lamellae at the base, nervose. Column stout, about 1.5 mm. long, somewhat dilated above in front, with a conspicuous triangular tooth on each side and two smaller teeth at the retuse center of the apex. Ovary with a small vesicle at the summit beneath the lip and lateral sepals. Capsule ovoid-ellipsoid, 6-9 mm. long, with the dehiscing ribs broad with scarious wings.

Alta Verapaz: Chamá, *Johnson* 861.—Izabal: Near Virginia, *Lewis* 15.—Petén: Sábana San Francisco, La Libertad, *Lundell* 2142. La Libertad, *Lundell* 2597.—Eastern portions of Vera Paz and Chiquimula, *Watson* 101.

Epidendrum subaquilum Lindl. Bot. Reg. 32: sub t. 64. 1846 (type: Mexico or Guatemala, *Warner*).

Epiphytic on trees, up to 500 meters alt. Rare in Mexico or Guatemala and Jamaica.

Plant slender, 2-3 dm. tall. Pseudobulbs ovoid-pyriform, unifoliate, clustered, about 2.5 cm. long and 1 cm. in diameter, provided with several scarious fugaceous sheaths. Leaves linear-ligulate, obtuse, 8-19 cm. long, 3.5-6 mm. wide. Inflorescence a slender loosely flowered panicle, up to 28 cm. long including the peduncle; peduncle provided with small distant adpressed triangular obtuse to acute bracts up to 6 mm. long. Floral bracts smaller than the bracts of the peduncle, spreading, subulate. Flowers greenish yellow, striped with purple or reddish brown, with slender pedicellate ovaries 4-10 mm. long. Sepals 3-nerved, linear-lanceolate to elliptic-oblanceolate, somewhat acute, 8-10 mm. long, about 2 mm. wide; lateral sepals oblique. Petals 1-nerved, linear, acute, 7-9 mm. long, mostly less than 1 mm. wide. Lip entire, adnate to base of column, with a rather broad longitudinally concave claw, broadly ovate above the claw when spread out, the margins upcurved so as to embrace the column, up to 10 mm. long from the apex to the base of the column, about 4 mm. wide across the lamina; disk with a fleshy-thickened, somewhat sulcate callus at the base of the lamina, with the callus continuing as three

keels to near the apex where they are noticeably thickened. Column slightly clavellate, somewhat bilobulate and crenulate at the apex, 4–6 mm. long. Capsule ellipsoid, about 1 cm. long.

Represented from Guatemala(?) only by Warner's collection of the type.

***Epidendrum teretifolium* Sw. Prodr. Veg. Ind. Occ. 121. 1788.**

Terrestrial or epiphytic on trees and shrubs in humid forests or brushy hillsides, up to 2,000 meters alt. Widespread and rather common from Mexico through Central America to Panama, in the West Indies and Venezuela.

Plant slender, erect-ascending, usually densely caespitose, 8–30 cm. long including the flower. Stem terete below, somewhat compressed above, leafy, concealed by the leaf-sheaths. Leaves distichous, erect-spreading, gently recurved, more or less terete, fleshy, rigid, articulate, 1.5–5 cm. long, 1.5–2 mm. in diameter. Flowers usually solitary at the apex of a slender compressed peduncle, erect to suberect, sessile, yellowish green, the segments fleshy-thickened, subtended at the base by one or two linear-foliateous bracts 1.2–3 cm. long; stout pedicellate ovary subtended by two or more compressed overlapping obtuse scarious sheaths up to 9 mm. long. Peduncle up to 8 cm. long, provided with about four short spathaceous bracts at the base. Sepals narrowly lanceolate, acute to subacuminate at the more or less fleshy-thickened apex, canaliculate, 8–12 mm. long, 1.2–2 mm. wide; lateral sepals oblique, often somewhat sigmoid and keeled on the back at the apex. Petals linear-oblongate, rounded-obtuse to narrowly obtuse at the thickened apex, dorsally carinate, 5.5–7 mm. long, 1–1.5 mm. wide. Lip adnate to the basal portion of the column; lamina oval-elliptic and deeply concave on the lower half with the margins upturned and surrounding the column, the semiterete apical portion fleshy-thickened and 3–4-angled, 5.5–8 mm. long, about 2 mm. wide across the lower half when spread out, the apical slender portion often gently arcuate-recurved; disk with one to three small lamellae on the lower concave portion. Column semiterete, two-winged at the apex, 4–5 mm. long. Capsule ellipsoid, somewhat three-angled, 1–2 cm. long.

The lip of this species is quite distinctive because of the fleshy-thickened apical point. In cross section the apical portion would appear diamond-shaped. The short slender leaves are fleshy and almost terete.

Alta Verapaz: Cobán, *Johnson* 606. Along Río Carchá, between Cobán and San Pedro Carchá, *Standley* 89822.

***Epidendrum trachycarpum* Lindl. in Benth. Bot. Voyage Sulph. 172. 1846; ampl. Ames, Sched. Orch. 4: 50, t. 3. 1923. Figure 107.**

Epiphytic on trees in dry forests, up to 1,000 meters alt. Extremely rare in Mexico and Guatemala.

Plant erect-ascending, rather slender, about 6 dm. tall. Pseudobulbs pyriform, elongate, about 8 cm. long and 2 cm. in diameter near the base, provided with basal fugaceous sheaths, trifoliate. Leaves linear-ligulate, tapering to the acute apex, 24 cm. or more long, about 1 cm. wide. Inflorescence a few-flowered simple or several-branched raceme at the summit of the elongated peduncle. Floral bracts nearly obsolete, scale-like. Flowers fleshy, with stout verruculose pedicellate ovaries that are about 1.5 cm. long. Sepals elliptic-oblong, obtuse to subacute, narrowed toward the base, somewhat dorsally carinate at the apex, about 1.8 cm. long, 7-8 mm. wide near the middle; lateral sepals oblique. Petals spatulate or oblanceolate, obtuse to subacute, the margins undulate-crisped, 1.7-1.9 cm. long, 5-7 mm. wide above the middle. Lip about 2 cm. long, deeply 3-lobed; lateral lobes much shorter and smaller than the mid-lobe, obliquely ovate-triangular, narrowly obtuse, about 3 mm. long on the inner margin to the sinus, about 2 mm. wide at the base; mid-lobe including the isthmus about 1.1 cm. long, 1.1-1.2 cm. wide, rotundate, emarginate, the margins undulate and somewhat crenate; disk heavily veined, with a very fleshy oblong sulcate callus extending beyond the base of the middle lobe; callus rounded in front, abruptly decurrent at the apex into three raised carinate nerves, about 8 mm. long and 4 mm. wide. Column very fleshy, produced on each side into a broad triangular acute wing but not auriculate, 8-10 mm. long. Capsule ellipsoid, about 3 cm. long.

The prominent callus and large middle lobe of the lip, in combination with conspicuously smaller lateral lobes, give to the flowers of this species an aspect that is unusual in the genus.

Guatemala: Epiphytic in silvis siccis in utraque ripa fluvii Rio Grande, 1,000 meters, *Lehmann* 1316 (fide Kränzlin in Engler, Bot. Jahrb. 26: 502. 1899).

Epidendrum trachythece Schltr. Repert. Sp. Nov. 3: 249. 1907.

Epiphytic on trees, up to 2,400 meters alt. Rare in Guatemala and Panama, rather common in Costa Rica.

Plant erect-ascending, caespitose, much-branched, 10-30 cm. tall. Stem slender, leafy, about 2 mm. in diameter, concealed by densely rugose-tuberculose leaf-sheaths. Leaves small, erect-spreading, linear to linear-elliptic, conspicuously retuse at the apex, coriaceous, 1.2-6 cm. long, 3-7 mm. wide. Racemes short, up to 1 cm. long, at apex of branches, few-flowered, the rachis somewhat fractiflex. Floral bracts suborbicular-cucullate, obtuse, scarious, 3-5 mm. long. Flowers greenish or pale reddish green, fleshy, with pedicellate ovaries that are about as long as the bracts. Sepals 3-3.5 mm. long, 1.8-2.5 mm. wide; dorsal sepal ovate-oblong to oblong-elliptic, acute, concave; lateral sepals suborbicular-ovate, acute-apiculate, dorsally carinate above the middle. Petals obliquely linear-ligulate, obtuse, strongly incurved, 3-3.5 mm. long, about 0.5 mm. wide. Lip adnate to the column; lamina with the sides strongly upturned, scoop-shaped, when spread out subreniform or transversely elliptic and prominently acute-apiculate, 1.5-3 mm. long, 2-4 mm. wide when spread out; disk with a pair of depressed flap-like calli in the middle or near the base. Column short, stout, about 1.5 mm. long. Capsule obliquely ellipsoid, strongly 3-angled, 5-7 mm. long.



FIG. 107. *Epidendrum trachycarpum*. 1, raceme, from type ($\times \frac{3}{5}$); 2, pseudobulbs and leaves, from type ($\times \frac{3}{5}$); 3, lip and column, from flower of type ($\times 1\frac{1}{4}$). *E. Lankesteri* is a Costa Rican species. Drawn by Blanche Ames.

Guatemala: Volcán de Pacaya, above Las Calderas, *Standley* 58465. Slopes of Volcán de Pacaya, between San Francisco Sales and the base of the active cone, *Standley* 80770.—Zacapa: Sierra de las Minas, between Loma El Picacho and Cerro de Monos, *Steyermark* 42827.

Epidendrum Tuerckheimii (Schltr.) Ames, Hubbard & Schweinfurth, Bot. Mus. Leaflet. Harv. Univ. 3: 75. 1935. *Encyclia Tuerckheimii* Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 410. 1918 (type: Guatemala, Alta Verapaz, Cobán, July, 1912, *Türckheim* 2456).

Epiphytic on trees in open mountain forests or on plains, up to 1,350 meters alt. Very rare in Guatemala and Honduras.

Plant rather stout, 4–8 dm. tall. Pseudobulbs ovoid, bifoliate, 3.5–5 cm. long, up to 2.5 cm. in diameter. Leaves erect-spreading, linear-lanceolate, obtuse to acute, glabrous, coriaceous, 15–40 cm. long, 1.7–3.5 cm. wide. Inflorescence an erect laxly many-flowered panicle, up to 7.5 dm. long including the peduncle; peduncle and rachis tuberculose, provided with short scale-like bracts up to 1 cm. long. Floral bracts deltoid-cucullate, apiculate, scarious, about 3 mm. long. Flowers erect-spreading, yellow brown or bronze, on stout glandular-tuberculate pedicels. Sepals spreading, fleshy, narrowly lanceolate to elliptic-lanceolate, acute to acuminate, somewhat dorsally carinate near the apex, with the margins slightly revolute, 2.3–2.6 cm. long, 4–5 mm. wide near the middle; lateral sepals oblique. Petals obliquely elliptic-lanceolate, acute to acuminate, 2.2–2.5 cm. long, about 4 mm. wide near the middle. Lip adnate to the base of the column, with a short claw, deeply 3-lobed on the lower fourth, 1.8–2.2 cm. long from apex to base of column, about 1 cm. wide across the lateral lobes when spread out, dorsally carinate along the mid-nerve; lateral lobes obliquely oblanceolate, falcate, upcurved, obtuse to subtruncate and occasionally crenate at the apex, about 7 mm. long to the base of the sinus and 2.5 mm. wide near the apex; mid-lobe separated from the lateral lobes by an oblong isthmus, the lamina oblong-elliptic to ovate-lanceolate, acute to acuminate, with the margins undulate-crested, the lamina about 1 cm. long and 6 mm. wide; disk with a somewhat concave-sulcate callus on the isthmus, the callus extending as three broken keels to about the middle of the mid-lobe, with the lateral nerves somewhat wavy-keeled. Column semiterete, clavellate, curved, somewhat toothed at the apex, with short obtuse auricles on each side near the apex, stained and spotted with purple, 8–10 mm. long. Capsule ovoid, densely glandular-tuberculate, 2–3 cm. long.

This species is easily distinguished by its densely glandular-tuberculate pedicels and capsule. The following collections are in fruit but probably represent this species: Alta Verapaz: Epiphyte on tree, large swamp east of Tactic, alt. 1,300 meters, *Steyermark* 44003.—Jutiapa: Between Agua Blanca and Amatillo, *Steyermark* 30432.

Epidendrum varicosum Batem. ex Lindl. Bot. Reg. 24: Misc. 30. 1838 (type: Guatemala, *Skinner*). *Epidendrum quadratum* Klotzsch, Allg. Gartenz. 18: 402. 1850 (fide Lindley) (type: Guatemala, *Warszewicz*). *Encyclia varicosa* (Batem.) Schltr. Beih. Bot. Centralbl. 36, Abt. 2: 474. 1918.

Terrestrial or on rocks and occasionally epiphytic in open woods, usually at high altitudes, up to 3,000 meters alt. Rather common from Mexico to Panama.

Plant slender, erect-ascending, glabrous, up to 8.5 dm. tall. Pseudobulbs ovoid-fusiform at the base, mostly extended as a long neck above, 3.5–17.5 cm. long, up to 3 cm. in diameter near the base, 2–3-leaved, enveloped below by 1–several evanescent scarious sheaths. Leaves oblong-elliptic, elliptic-lanceolate or ligulate-lanceolate, subobtuse to acuminate, coriaceous to thick-membranaceous, up to 33 cm. long, 1.5–4.5 cm. wide. Raceme loosely few- to many-flowered, 4–70 cm. long including the slender peduncle; peduncle enveloped at base by a scarious tubular sheath up to 11.5 cm. long. Floral bracts triangular-lanceolate, acuminate, 2–6 mm. long. Flowers fragrant, with long slender pedicellate ovaries up to 4 cm. long. Sepals elliptic to elliptic-ovate, obtuse-apiculate to acute, with the margins somewhat revolute, greenish brown, 8–18 mm. long, 3–5.5 mm. wide above the middle; lateral sepals oblique. Petals greenish brown, obovate-spatulate to oblanceolate, obtuse, with the margins somewhat undulate and revolute, 9–16 mm. long, 3–7 mm. wide near the apex. Lip yellowish white, often purple-spotted, adnate to base of column, with a broad prominent claw, deeply 3-lobed, 8–15 mm. long from apex to base of column; lateral lobes 1.5–4 mm. long, 1–2 mm. wide, obliquely oblong or triangular-lanceolate, obtuse to subacute, often strongly recurved; mid-lobe separated from the lateral lobes by a broad short isthmus, obreniform or bilobulate, deeply emarginate, 6–12 mm. wide; disk tuberculate-warty especially on the upper part, provided with a fleshy-thickened puberulent callus between the lateral lobes and on the isthmus. Column stout, 3-lobulate at the apex, 5–8 mm. long, usually purple-blotched. Capsule ellipsoid, strongly 3-angled with the angles winged, 2–5 cm. long.

This species is extremely variable in the length of the caulescent neck of the pseudobulb, in the development of the tubercles or warts on the lip, in the size and shape of the lateral lobes of the lip, and in the size and shape of the leaves.

Alta Verapaz: Vicinity of Cobán, *Standley* 92187; 89922.—Amatitlán: Pacaya, *Johnston* 1386.—Baja Verapaz: Between Salamá and Purulhá, *Cook* 239.—Chimaltenango: Santa Elena, *Skutch* 211. Chichavac, *Skutch* 748. Chichoy Pass, *Hunnewell* 14669. Chimaltenango, *Johnston* 631; 1239. Slopes of Volcán de Acatenango, above Las Calderas, *Standley* 61985. Tecpam, *Johnston* 1852.—El Progreso: Between Calera and summit of Volcán Siglo, *Steyermark* 43103.—Guatemala: Near San Rafael, *Lewis* 98. San Rafael, *Porter* 11. From Antigua to Guatemala City, *Porter* 36; *I. Aguilar* 363.—Huehuetenango: Cerro Cananá, between Nucapuxlac and

Cananá, Sierra de los Cuchumatanes, *Steiermark* 49041. Damp woods around summit, La Sierra (Tujimach), across river from San Juan Atitlán, Sierra de los Cuchumatanes, *Steiermark* 52005.—Quezaltenango: Near Quezaltenango, *Skutch* 803.—Quiché: Nebaj, *Skutch* 1694.—San Marcos: Six miles south and west of town of Tajumulco, northwestern slopes of Volcán Tajumulco, *Steiermark* 36628. Along Quebrada Canjulá, between Sibinal and Canjulá, Volcán Tacaná, *Steiermark* 36021. South and west of town of Tajumulco, northwestern slopes of Volcán Tajumulco, *Steiermark* 36564.—Sololá: Volcán Atitlán, south-facing slopes, *Steiermark* 47461. Volcán Santa Clara, south-facing slopes to summit, *Steiermark* 46992; 46917; 46915.—Zacapa: Sierra de las Minas, upper slopes, along Río Repollal to summit of mountain, *Steiermark* 42577a; 42520. Sierra de las Minas, between Loma El Picacho and Cerro de Monos, *Steiermark* 42804.

***Epidendrum verrucosum* Sw. Nov. Act. Ups. 6: 68. 1799.**

Terrestrial on grassy slopes in open mountain forests, on open rocky banks and in thickets and deep forests, occasionally on tree buttresses, up to 2,000 meters alt. Rather common and widespread in Mexico, Guatemala, Honduras, Jamaica and Colombia.

Plant erect, robust, up to 1.5 meters tall. Stem reedy, stout, up to 1 cm. in diameter, concealed by the leaf-sheaths, leafy above; leaf-sheaths more or less covered with black or brown rough spots or reticulations. Leaves narrowly lanceolate to oblong-lanceolate, acuminate, distichous, subcoriaceous, erect-ascending, often curved upward, 8–23 cm. long, 1–4 cm. wide below the middle. Inflorescence mostly a compound panicle, rarely a simple raceme, many-flowered, showy, somewhat pyramidal in outline, up to 40 cm. long; primary branches up to 25 cm. long, branches and branchlets subtended by usually large scarious or foliaceous lanceolate bracts up to 6 cm. long. Peduncle short, provided with several scarious clasping sheaths up to 5 cm. long. Floral bracts triangular-lanceolate to linear-lanceolate, acuminate, up to 1 cm. long. Flowers white, with slender pedicellate ovaries that are 1.5–2.5 cm. long. Sepals conspicuously spreading, oblong-elliptic to elliptic-obovate, obtuse to subacute, usually more or less thickened at the apex and terminated by a short somewhat tuberculose apicule, concave, 6–10 mm. long, 1.8–3.5 mm. wide; lateral sepals oblique. Petals obliquely oblanceolate to linear-spatulate, obtuse to subacute, 5–9.5 mm. long, 1–3 mm. wide near the apex. Lip adnate to the lower part of the column; lamina deeply 3-lobed, appearing 4-lobed, with the apical lobe deeply bilobed, 8–13 mm. long; lateral basal lobes obliquely oblong, semielliptic to subquadrate or almost flabellate, obtuse to truncate and irregularly erose or crenulate at the apex, strongly divaricate, 3.5–7 mm. long to the sinus, 1.5–2.5 mm. wide; mid-lobe tapering as a narrowly linear or cuneate isthmus to the deeply bilobed apex with a mucro in the sinus, with the lobules strongly divaricate, cuneate to broadly subquadrate-flabellate and with the truncate apex erose to sublacinate, each lobule 3–6 mm.

long to the sinus and 2-5 mm. wide at the apex; disk more or less papillose, with a linear-sulcate yellow callus at the base, the callus about 3.5 mm. long and more or less 3-lobulate at the apex, thickened along the central portion from the base to the sinus of the mid-lobe. Column short, somewhat tubular, dilated above and split into four subquadrate lobes at the apex, 4-5 mm. long. Capsule ovoid, about 2 cm. long.

The inflorescence of this species is variable, ranging from a compound panicle to a simple raceme.

Alta Verapaz: Cobán, *Türkheim* II 1999.—Chiquimula: Montaña Nonojá, 3-5 miles east of Camotán, *Steyermark* 31678.—Huehuetenango: Between San Andrés and San Marcos, Sierra de los Cuchumatanes, *Steyermark* 51839. Cerro Victoria, across river from Finca San Rafael, Sierra de los Cuchumatanes, *Steyermark* 49611.—Quiché: Nebaj, *Skutch* 1770.—San Marcos: Above Finca El Porvenir, between Loma de la Paloma and "Todos Santos Chiquitos," slopes of Volcán Tajumulco, *Steyermark* 37988.

***Epidendrum verrucosum* Sw. var. *myrianthum* (Lindl.) Ames & Correll, Bot. Mus. Leaflet. Harv. Univ. 10: 82. 1942. *Epidendrum myrianthum* Lindl. Fol. Orch. Epid. 59. 1853.**

Found in the same type of habitat as the typical form. Rare in Mexico, Guatemala and Honduras.

Variety *myrianthum* is identical in habit with typical *E. verrucosum* and, except for color, the flowers are also identical in appearance. Instead of being constantly white as in the typical form of the species, the color of the flowers of var. *myrianthum* varies from almost pure white to a deep ruby-red or purplish red. They also have a lilac odor. But the character that best separates var. *myrianthum* from the typical form is the callus on the lip. The callus of var. *myrianthum* is two-lobed at the apex instead of being three-lobed as in *E. verrucosum*. The callus has the appearance of being composed of two distinct short linear keels. Variety *myrianthum* is closely related to *E. centropetalum* Reichb. f.

Chiquimula: Río Grande (Río Concepción), on Socorro Mountain, above Finca San José, southeast of Concepción de las Minas, *Steyermark* 31141.—Santa Rosa: Volcán Jumaytepeque, *Heyde & Lux* 3852.—"Guatemala:" 1855, *Skinner* 134; 1940, *Margaret W. Lewis*.

***Epidendrum viejii* Reichb. f. Bonpl. 3: 220. 1855 (as "*viejii*").**

Epiphytic on trees in swamps, about 1,450 meters alt. Extremely rare in Guatemala and Nicaragua.

Plant rather slender, branched, 50 cm. or more tall. Stem terete, 3-5 mm. in diameter, concealed by the leaf-sheaths. Leaves oblong-elliptic to elliptic-lanceolate, obtuse to subacute, coriaceous, at the summit of the stem and branches, up to 8 cm. long and 2.3 cm. wide. Raceme terminal, short, recurved-pendent,

provided with 1-2 bracts at the base, about 4 cm. long including the abbreviated peduncle. Floral bracts lanceolate, up to 1 cm. long. Flowers small, with slender pedicellate ovaries about 8 mm. long. Dorsal sepal oblong-elliptic, obtuse, longitudinally concave, ecarinate, about 8.5 mm. long and 3.5 mm. wide. Lateral sepals obliquely oblong-elliptic, acute, shallowly cymbiform, with a deep prominent membranaceous keel on the back, which is irregularly dentate, about 10 mm. long including the excurrent keel and 4 mm. wide. Petals elliptic-obovate, narrowly obtuse to acute, slightly oblique, concave above the middle, about 7.5 mm. long, 3-3.8 mm. wide. Lip adnate to the column; lamina cordate-suborbicular, retuse at the apex, about 6 mm. long and 7.5 mm. wide, with the lateral margins somewhat upcurved; disk with a broad concave-sulcate callus in the central portion, with the lateral and apical margins of the callus raised free as fleshy tubercles. Column short, stout, 3-4 mm. long. Capsule ellipsoid, 1.5-2 cm. long.

Alta Verapaz: Large swamp east of Tactic, *Standley* 92524.—
"Guatemala." 1855, *Skinner* 54.

Epidendrum virgatum Lindl. in Hook. Journ. Bot. 3: 83. 1840. *Encyclia virgata* (Lindl.) Schltr. Orchideen 212. 1914. *Epidendrum ichthyphyllum* Ames, Sched. Orch. 2: 28. 1923 (type: Guatemala, Alta Verapaz, Cobán, May, 1907, *H. von Türckheim* II 1797).

Terrestrial and occasionally on trees in mountain forests, up to 2,200 meters alt. Rather common in Mexico, Guatemala and Honduras.

Plant usually large, stout, up to 14 dm. tall. Pseudobulbs ovoid-pyriform, 4-8 cm. long, up to 3.5 cm. in diameter, provided at base with several membranaceous fugaceous sheaths, usually 2-3-leaved. Leaves elliptic-lanceolate to ligulate, obtuse to shortly acuminate, up to 60 cm. long, 2-6 cm. wide. Inflorescence a loosely many-flowered panicle, up to 13 dm. long including the peduncle; branches of the panicle obliquely ascending, subtended by triangular-lanceolate concave acute bracts about 1.5 cm. long. Floral bracts triangular-lanceolate, acuminate, scarious, up to 12 mm. long. Flowers numerous, with smooth slender pedicellate ovaries about 2 cm. long. Sepals fleshy-thickened, elliptic-lanceolate to narrowly oblanceolate, obtuse to acute at the somewhat thickened apex, reddish brown or greenish brown, 10-17.5 mm. long, 2.5-4 mm. wide; lateral sepals oblique. Petals variable, same color as the sepals, linear to spatulate, obtuse to acute, fleshy, 9-15 mm. long, 1-3 mm. wide. Lip adnate to the base of the column, deeply and unequally 3-lobed, fleshy, yellowish white, usually spotted with purplish dots, 9-15 mm. long from the apex to the base of the column; lateral lobes obliquely oblong to obovate, broadly rounded to narrowly obtuse at the apex, recurved-divaricate, 2-3.5 mm. long, 2.5 mm. or less wide; mid-lobe separated from the lateral lobes by a short broad isthmus, suborbicular, ovate-elliptic to triangular-ovate, subtruncate to acute at the apex, 4-8 mm. wide; disk with a large cushion-like callus between the lateral lobes, with three keels extending from the callus to above the middle of the mid-lobe. Column 5-7 mm. long, rather stout, trilobulate at the apex. Capsule ellipsoid, strongly 3-angled, 2-3 cm. long.

The shapes of the mid-lobe and the side lobes of the lip are quite variable and the sinus between them is also variable even in flowers

of the same inflorescence. In some forms the sinus or isthmus is almost lacking, in others it is quite elongated. The shape and length of the leaves also vary. In Mexico, the Indians are said to eat the raw pseudobulbs of this species.

Alta Verapaz: Cobán, *Türkheim* 54. Large swamp east of Tactic, *Standley* 92326; 92352.—Huehuetenango: Pine-wooded slopes, along Río Selegua, opposite San Sebastián, *Steyermark* 50484.

The following specimen is in fruit but probably represents this species: Zacapa: Sierra de las Minas, upper slopes, along Río Repollal to summit of mountain, *Steyermark* 42520.

***Epidendrum vitellinum* Lindl. Gen. & Sp. Orch. Pl. 97. 1831.**

Epiphytic on trees in open pine-oak forests or in humid woods, up to 2,600 meters alt. Uncommon in Mexico, Guatemala and Costa Rica(?).

Plants up to 5 dm. tall. Pseudobulbs ovoid-conical, compressed, 2-3-leaved, 2-6 cm. long, provided with several scarious fugaceous sheaths at the base. Leaves linear-lanceolate to oblong-ligulate, obtuse to acute, coriaceous, subglaucous, up to 30 cm. long and 5 cm. wide. Inflorescence a loosely flowered raceme or panicle, up to 45 cm. long including the slender peduncle; peduncle provided with a rather large complanate tubular sheath at the base, which is up to 11 cm. long and with triangular bracts above. Floral bracts triangular-lanceolate, acute to acuminate, sulcate, 4-7 mm. long. Flowers showy, orange-colored or deep scarlet, rather large, with stout pedicellate ovaries about 1.5 cm. long. Sepals elliptic-lanceolate to lanceolate, acute to acuminate, dorsally carinate along the mid-nerve, recurved above the middle, 1.5-2.3 cm. long, 4-8 mm. wide; lateral sepals somewhat oblique. Petals broadly elliptic to elliptic-oblong, acute, with minutely undulate-cripsed margins, 1.5-2 cm. long, 4-12 mm. wide. Lip adnate to the base of the column, entire, fleshy, pandurate-ligulate or linear-oblong to oblong-elliptic, acute, somewhat dilated above the middle, with the upper margins somewhat reflexed, dorsally carinate along the middle below, 1-1.5 cm. long, 3-5 mm. wide near the apex; disk with a fleshy callus about the middle, extended above into 1-3 short keels, concave-sulcate below the callus. Column stout, trilobulate at the apex, 7-8 mm. long. Capsule obliquely ellipsoid, strongly 3-angled, 2-3 cm. long.

This species is quite variable in size and color of the flowers.

Alta Verapaz: *Lewis* 189.—Guatemala: Garden of Don Mariano Pacheco H., said to have come originally from Las Nubes, Dept. Guatemala, *Steyermark* 46383.—Zacapa: Sierra de las Minas, between Cerro de Monos and upper slopes of Monte Virgen, *Steyermark* 42844.—“Guatemala.” 1913 (in Herb. Ames).

***Epidendrum xipheres* Reichb. f. Fl. des Serres sér. 1. 9: 98. 1853-54.**

Epiphytic on trees in dense forests, up to 1,000 meters alt. Uncommon in Mexico, Guatemala, Honduras and possibly Peru.

Plant very slender, caespitose, up to 4 dm. tall. Pseudobulbs small, ovoid, 1.5–3 cm. long, up to 1 cm. in diameter, surrounded by scarious sheaths that disintegrate into fibers with age, unifoliate. Leaf narrowly linear, conduplicate-ensiform, subacute, up to 26 cm. long and 4 mm. wide. Inflorescence a loosely few-flowered raceme or panicle, up to 36 cm. long including the peduncle; peduncle provided with triangular-lanceolate bracts. Floral bracts deltoid, acute, 1–4 mm. long. Flowers small, spreading, with slender, densely hyaline-echinate pedicellate ovaries that are 5–15 mm. long. Sepals elliptic-lanceolate, acute to acuminate, reddish brown with yellow or greenish lavender, 1–1.4 cm. long, 2–3 mm. wide; lateral sepals oblique. Petals linear-oblancoolate, obtuse to acute, same color as the sepals, 1–1.4 cm. long, 1–1.5 mm. wide above the middle. Lip adnate to the lower part of the column, deeply and unequally 3-lobed, 9–13 mm. long from the apex to the base of the column, dingy yellow with fine lavender stripes; lateral lobes linear-filiform to linear-spatulate, obtuse or obliquely bifurcate at the apex, strongly falcate-divaricate, 4–5 mm. long, mostly less than 1 mm. wide; mid-lobe separated from the lateral lobes by a short cuneate isthmus, the lamina varying from subreniform to triangular-ovate, subobtusely to acute, the margins somewhat undulate-crenulate, 5–10 mm. wide; disk with the main nerves of the mid-lobe carinate-thickened, with a fleshy sulcate puberulent callus on the upper part of the isthmus, the callus extending as three keels to about the middle of the mid-lobe. Column fleshy, short, greenish lavender, trilobulate at the apex, not auricled, 5–7 mm. long. Capsule ellipsoid, densely hyaline-echinate, about 1.5 cm. long.

This species is vegetatively and florally similar to *E. bractescens*, but is at once separable from that species by the non-auriculate column and by the hyaline-echinate pedicel and ovary.

Guatemala: Guatemala market, *Johnston* 1981.—Zacapa: Sierra de las Minas, along trail above Río Hondo, *Steyermark* 29575.—“Guatemala:” (Herb. Reichenbach).

EXCLUDED SPECIES

Epidendrum barkerioli Reichb. f. Gard. Chron. n. s. 22: 616. 1884, in synonym. Schlechter (Beih. Bot. Centralbl. 36, Abt. 2: 469. 1918) questionably includes this Mexican species (as *Barkeria barkerioli* Reichb. f.) as from Guatemala. However, we have seen no specimen from Guatemala.

Epidendrum glumaceum Lindl. as mentioned by Cogniaux in Martius, Fl. Bras. 3, pt. 5: 88. 1898. Cogniaux cites this species from Guatemala (*Bernoulli* 362). There is also a citation of a questionable variety of this species (Bull. Herb. Boiss. 7: 542. 1899) as follows: Huehuetenango, near Chaculá, *Seler* 2327. We are confident that the above are not referable to *E. glumaceum*, which is a native of Brazil and Ecuador.

Epidendrum nutans Sw. as mentioned by Cogniaux in Urban, Symb. Antill. 6: 528. 1910. Cogniaux cites this species as occurring in Guatemala. However, we have seen no material referable to this species, and we consider Cogniaux's citation open to question.

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60. Leaves not articulated, i.e. marcescent, equitant, closely approximate; stems elongate and epseudobulbose (Subtribe LOCKHARTIEAE).....83. *Lockhartia*.



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