LAELIAS OF MEXICO

Federico Halbinger
and
Miguel Soto

Herbario AMO

Mexico has about 1200 different orchid species. Located between latitudes 15° and 32° north, Mexico is basically a tropical country, but because of the mountainous topography, the climates range from humid tropical on the narrow coastal plains of the south to cold temperate on the high mountains of the north and to alpine in the snow-capped volcanoes.

No other group of Mexican orchids is as typical, so widely cultivated or admired as the members of the genus *Laelia*. Mexican Laelias are ubiquitous in all the mountain regions with mild winters, and a couple of species have conquered the hot tropical lowlands.

Mexican Laelias have been cultivated for centuries by Mexican people and have been exported in great quantities to other countries, where they have gained a favorite place in collections.

Federico Halbinger and Miguel Soto have studied the Laelias for many years, including extensive field studies and many visits to the different herbaria of the world that maintain collections of Mexican orchids. In this book they present information from their own collecting trips, studies of herbarium specimens, their experience in cultivation, and information published by other authors.

All the species and subspecies are superbly illustrated with high-quality line drawings. There are distribution maps, based on confirmed records for each species, and the 94 color photographs cover the variation known for each species.

Mexico has a big population with a very high rate of growth; the environmental impact of this population is very severe, and many forests have been devastated or are facing conservation problems. Mexican Laelias depend on the preservation of these forests, and every effort should be made to preserve this remarkable and beautiful heritage.

This comprehensive book is intended to serve as an up-to-date reference to these wonderful orchids. In particular, it is hoped that the Laelias will become more widely appreciated, and that a conservationist approach can be sown in the mind of orchid growers.

LAELIAS OF MEXICO

Federico Halbinger and Miguel Soto

Illustrations by Rolando Jiménez,
Ricardo Peláez and Roberto González Tamayo

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1997

To my wife Olly, my son Gerardo, and my daughter Brigitte

Federico Halbinger

To my sister Velia Soto

Miguel Soto

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PRESENTATION

Tough Mexican Laelias would appear to be well known, and they have been widely cultivated in Mexico and abroad for nearly two centuries, there has never been any thorough treatment of the genus. Most of the papers published have been based on the traditional use of the nomenclature, scant knowledge of the natural distribution of the species, and little or no reference to the type herbarium specimens of each and every published name. This book is an expansion of an earlier version published by the first author in Spanish in 1993, as well as various contributions published separately by the second. It includes considerable additional material not previously available, let alone all of it brought together in one monograph.

This work brings together the ample experience of two Mexican orchidists. The first author is a serious amateur who has collected *Laelia* throughout the country, searching every possible locality and then growing the plants and flowering them for years in his garden and greenhouse. He has photographed them and presented them at orchid shows, thus sharing his findings with the orchid community both national and international. His previous work on *Barkeria* and what used to be known as the Mexican Odontoglossums, *Rhynchostele*, *Cuitlauzina*, and *Dignathe*, has also greatly contributed to the knowledge of biodiversity.

The second author, a profesional botanist, has also collected extensively throughout the country, and in addition had the rare opportunity to travel extensively to visit and work in the major herbaria in the United States and Europe, where he has been able to work with historical collections and type specimens, thus obtaining first-hand knowledge of what the original descriptions are based on. In the past, few people had the opportunity to see plants both in the wild and in cultivation as well as mounted as dry herbarium specimens. It was thus difficult to identify one with the other. The author's previous work on Mexican orchids is well-known, including his interest in conservation. He recently published, together with Gerardo Salazar, a revision of the genus *Lepanthes* in Mexico, duplicating the number of known species of this fascinating genus for this country.

The combination of experience and information brings new light to this typically Mexican genus of plants, highly regarded for its horticultural features, well-suited for cultivation in gardens and parks at middle to higher elevations throughout Mexico. The taxonomy of the group has been clarified, with a clear understanding of the distribution of the species. Light has also been shed on the various subspecies and forms which are recognized and compared, a subject which has been greatly discussed in the past. Thus it is now possible to identify plants in horticulture and in the field correctly and easily by both general botanist and amateurs alike.

In addition, the highly informative and artistic illustrations prepared by Rolando Jiménez, Roberto González Tamayo, and Ricardo Peláez, add a new dimension to such monographic studies, as all species and subspecies are so well illustrated from live plants. The color photographs, aside from adding color, give the reader an idea of the variety of forms and colors, many plants having been awarded for unique features by

the Asociación Mexicana de Orquideología.

Once more, this work highlights the importance and possibilities of collaboration between serious amateurs and professional botanists, sharing information, participating together in field trips, growing plants until they flower and for several years thereafter to see how plants can be differentiated or not under the same cultural conditions; preparing photographs, illustrations and comparing notes on fragrances. It is this open collaboration which has permitted and promoted the development of the understanding of orchid diversity in Mexico in the past 25 years.

From a conservation point of view, Mexican Laelias illustrate the threats and possibilities of horticulture in conservation; some species and forms are known only from cultivated sources in villages. These plants have constitued a source of sustainable marginal income for the local inhabitants who care them on trees in their backyards, selling them as cut flowers for the local seasonal markets, and as vegetative divisions for tourist and amateur growers alike. Had they not had these marginal commercial possibilities, who knows if they would have survived. Though the sale of cut flowers of *Laelia speciosa* has eliminated several populations and threatened others, it points to an opportunity in finding formulae that may ensure the survival of the species through sustainable use. This is probably one of the greatest challenges for the orchid and conservation community, including the government agencies in charge of ensuring the maintenance of biodiversity. Few other genera offer the possibilities of the combination of showy flowers, easy culture and mostly simple, vegetative artificial propagation under natural conditions.

This book is an important contribution which combines art through photography and line drawings with taxonomy which is often heavy and arid. It also contributes with ethnographic information on the traditional uses and names of orchids. We hope to see more publications of this type made available to a wide international public and the local botanist and enthusiasts.

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ABSTRACT

A revision of the Mexican species of the genus *Laelia* is presented. Eleven species and one subspecies are recognized, namely *Laelia albida*, *L. anceps* (with subspecies *anceps* and *dawsonii*), *L. aurea*, *L. autumnalis*, *L. crawshayana*, *L. eyermaniana*, *L. furfuracea*, *L. gouldiana*, *L. rubescens*, *L. speciosa*, and *L. superbiens*. Additionally, several forms are recognized within some species. The first part of the book includes data on uses, morphology, classification, phylogeny, ecology, cultivation, and conservation of the Mexican Laelias. A generic description and a key for the identification of the species is also provided. The species treatment includes data on the nomenclature, the typification, common names, morphological description, etymology, history, recognition, distribution, habitat, accessible localities, flowering time, variation, hybrids (natural and artificial), conservation status, specimens examined, and references. Each species and subspecies is illustrated with a line drawing and several color pictures. Finally, a brief discussion on the natural hybrids is presented and illustrated.

RESUMEN

Se presenta una revisión de las especies mexicanas del género *Laelia*. Se reconocen once especies y una subespecie a saber, *Laelia albida*, *L. anceps* (con las subespecies *anceps* y *dawsonii*), *L. aurea*, *L. autumnalis*, *L. crawshayana*, *L. eyermaniana*, *L. furfuracea*, *L. gouldiana*, *L. rubescens*, *L. speciosa* y *L. superbiens*. Además se reconocen algunas formas dentro de algunas especies. La primera parte del libro incluye datos y discusiones sobre el uso, morfología, clasificación, filogenia, ecología, cultivo y conservación de las Laelias mexicanas. Se presenta también una descripción genérica y una guía de identificación. El tratamiento individual de las especies incluye información sobre la nomenclatura, la tipificación, nombres comunes, descripción morfológica, etimología, historia, reconocimiento, distribución, hábitat, localidades accesibles, época de floración, variación, híbridación artificial y natural, estado de conservación, especímenes examinados y referencias bibliográficas. Cada especie y subespecie está ilustrada con un dibujo y varias fotografías. Se presenta al final una sección sobre híbridos naturales, también ilustrada.

FOREWORD

The Laelias are undoubtedly the most outstanding and loved orchids of Mexico. They have delighted Mexican natives and foreigners for centuries.

Personally, we have also appreciated the Laelias for many years, and we consider ourselves lucky to have observed all these plants in their native habitats and along their distribution range. We have obtained many clones of each species and this has permitted us to understand better the old literature and museum specimens.

As no updated information on the Laelias was available, we considered it would be interesting to present our latest point of view, and in 1993 we published an earlier book in Spanish, on that occasion with Federico Halbinger as author, and Miguel Soto as the editor.

The good acceptance and reviews of the book "Laelias de México", published in October, 1993, as the commemorative publication of the 5th Latin American Orchid Meeting in Xalapa, Veracruz, Mexico, and comments of friends have encouraged us to present here an expanded English version of that book, with the addition of a discussion of the evolutionary relationships of the plants treated here, the inclusion of descriptions, nomenclatural data, and lists of specimens examined.

Miguel Soto has studied extensively the collections of Mexican orchids in national and foreign herbaria, which has permitted a better understanding of the distribution of the taxa, and also helped to clear up some nomenclatural problems. This information, we believe, completes the panorama of the Mexican Laelias. The first book was more oriented to show the horticultural importance of these Mexican orchids, including the variation of each taxon. In this book we have attempted to complete the botanical treatment.

The authors would like to thank Mary and Ed Greenwood, Eric Hágsater, Gerardo Salazar, and Fernando Chiang for their helpful advice and comments on the text.

We would like to thank Jorge Lamas Walz particularly for his support and collaboration, and for his company in the field on many trips in search of Laelias, and in addition for his discussions and accurate observations.

Especial recognition to Rolando Jiménez, Ricardo Peláez and Roberto González Tamayo for the extraordinarily fine drawings that enhance this book.

We are also indebted to Eric Hágsater, Patrick Monney, Ed Greenwood, Jorge Lamas, Ernesto Aguirre, Noble Bashor, Paul Catling, and Rolando Jiménez for the loan of color photographs. Juan Celorio provided information about the hybrids of the Mexican Laelias.

We wish to acknowledge our debt to the keepers of the following herbaria, who granted us permission to study the collections housed in their institutions: AMES, AMO, BM, BR, ENCB, F, G, K, MA, MEXU, MO, NY, OX, P, SEL, W, WU, and XAL.

Part of the original text in Spanish was translated into English by Mr. Pekka Olin, which is very much appreciated; he and Charles and Margaret Baker, among other friends, encouraged us to publish this English edition.

Seller of Laelias, San Miguel de Allende, Guanajuato. Photo Al Mullen.

INTRODUCTION

The genus *Laelia* includes some of the most beautiful and familiar orchids in cultivation; as here understood, *Laelia* is typically Mexican, and one of the most outstanding features of the Flora of our country.

Traditionally, the Laelias have been cultivated and appreciated by the Mexican people, especially by the several Indian groups, from Chihuahua in the north to Chiapas in the deep south. The plants have adorned patios and the flowers offered in religious celebrations and other festivities during centuries. This is the origin of several common names as "calaverita" (little skull), "lirio de todos santos" (All Saints lily), "flor de muerto" (flower of the dead)", "flor de las ánimas" (Souls flower), etc.

Other *Laelia* species that flower in seasons other than fall have also been related to other popular festivities, like Mother's Day (May 10th), the day of the Virgin of

Guadalupe (December 12th), and other feasts devoted to local patron Saints in the churches of small villages. In the markets of Mexico City, Guadalajara, Morelia, Chilapa or Xalapa, and of many other towns, cultivated and wild-collected flowers of Laelias are sold at incredibly low prices, considering that the flowers have been collected in distant places, with the effort of climbing the trees and then transferring them to the marketplace. Traditionally, the racemes are gathered with the last 2-3 pseudobulbs, that give the cut flower a longer lasting quality. Although this practice cripples and weakens the plants, if done only occasionally, it gives them the opportunity to recover; the plants perhaps skip flowering for some years, but once recovered, they continue to flower as before.

In addition to their ornamental importance, an interesting adhesive was extracted from Laelia plants and used in the elaboration of ornaments and clothes adorned with feathers in precolumbian times. With this same substance some candies, known as "alfeñiques" and "calaveritas" were prepared. During the 19th century, Mexican Laelias were sent to Europe, where they won a favorite place in conservatories; one of them, *Laelia anceps* is, undoubtedly, one of the most important orchid species in cultivation.

THE GENUS *LAELIA* AND ITS CLASSIFICATION

The genus *Laelia* was established in 1831 by the English botanist John Lindley in his work "The Genera and Species of Orchidaceous Plants", where he listed two species, the Mexican *Laelia grandiflora* and *L. autumnalis*. *Laelia grandiflora* is known today as *L. speciosa*, and is the type species of the genus. The generic name probably had its origin in the name of one of the Vestal Virgins of ancient Rome, or perhaps in the feminine name "Laelia", used during that period.

Laelia is one of the 43 genera that constitute the subtribe Laeliinae (Dressler, 1993), one of the characteristic groups of American orchids.

Traditionally, *Laelia* has been considered as closely allied to *Cattleya*, the common corsage orchids, but distinguished from it by the four pollinia found in the flowers of *Cattleya*, instead of eight present in *Laelia*. This circumscription of *Laelia* has been maintained by several orchidologists who have worked with the group. Lindley (1842), Pfitzer (1889), Schlechter (1917), Hoehne (1952), Brieger *et al.* (1978), and Withner (1990) considered *Laelia* as a conglomerate that encompasses species distributed in two disjunct areas, Mesoamerica (Mexico plus northern Central America) and southeastern Brazil.

This peculiar distribution, with the absence of Laelias in the area in between, is extremely anomalous among the American orchids, and has led other authors to define *Laelia* in a different way. Williams (1941) included in *Laelia* different species which other authors placed in *Schomburgkia*, *Rhyncholaelia*, and *Myrmecophila*. On the other hand, Jones (1968a, 1976) considered the Brazilian rupiculous Laelias (sect. *Cyrtolaelia*) as a different genus, *Hoffmannseggella*. Actually, the Mexican and Brazilian Laelias seem to be discrete, different groups, descending from two different lineages, although sharing similar flower structure. It is probable that a parallelism in the specialization to cool, dry habitats, and to similar pollinators directed parallel evolution in both groups. The flower of *Laelia* can be considered as a big "gullet flower" (see Dressler, 1981). It has a lip that constitutes a landing platform for the pollinator, in which the lateral lobes are upturned to enclose the column, forming a tunnel-shaped structure, where the pollinator enters in search of nectar, and when it backs away it touches the stigmatic zone and the pollinarium, depositing or removing the latter on its back (photos 1, 2). Many groups of orchids share this flower structure; note the gross similarity of the flowers of some species of *Vanilla*, *Arundina*, *Sobralia*, *Bletia*, *Cattleya*, *Dendrobium*, *Trichopilia*, and many others. In the subtribe Laeliinae gullet flowers are present in several genera, including *Laelia*, *Broughtonia*, *Cattleya*, *Caularthron*, *Encyclia*, *Myrmecophila*, *Schomburgkia*, and *Sophronitis*.

The feature that traditionally separates *Laelia* from *Cattleya*, the number of pollinia, is variable in other genera of the subtribe and variable even in *Cattleya* and *Laelia*. *Cattleya dormaniana* (Rchb. f.) Rchb. f. normally has 8 pollinia, and it is undoubtedly related to other *Cattleya* species from Brazil. On the other hand, the Brazilian subgenus *Crispae* of *Laelia*, that includes *L. purpurata* Lindl. and its allies, is extremely similar to the one-leaved Cattleyas, except in the number of pollinia. It seems that in this group the number of pollinia has defined genera that are not natural.

1 and 2. Lateral and front view of the gullet formed by the lip and column in *Laelia eyermaniana*

Mexican Laelias exhibit a wide range of plant sizes, the largest being *L. superbiens*, and the smallest *L. speciosa*. *Laelia superbiens* is also the species found in more humid areas, sometimes at the border of the mountain rain forest, while *L. speciosa* inhabits incredibly dry areas, in which no other epiphytic orchids can survive. We propose that an important aspect of the evolution of *Laelia* has been the occupation of progressively drier, cooler places with subtropical climate. The ancestor of the Mexican Laelias could have been a large species, from the more tropical Central America.

There are several other morphological features correlated with habitat dryness. Shorter, ovoid pseudobulbs, short inflorescences, shorter, narrower leaves, abbreviated rhizomes, reduced number of bracts of the inflorescence, longer maturation time of the seed pods, and deciduous habit at seedling stage, are features associated with more arid sites, northern distribution or, in the case of *L. furfuracea*, higher elevation. The same trend can be observed in Brazilian Laelias. The vegetative similarity between plants like *L. fidelensis* (sect. Crispae) and *L. anceps*, or between *Laelia rubescens* and *Broughtonia* species, among other cases, are suggested as adaptations to similar habitats.

Floral characters show even more parallelisms, since these seem to be associated to several well-marked pollination syndromes, and very similar flowers are found in species only distantly related. The most obvious of these syndromes is that of flowers pollinated by carpenter bees (e.g. stiff segments, undulate tepals of varnished appearance, column appressed to the lip surface and strongly arcuate, lip paler than

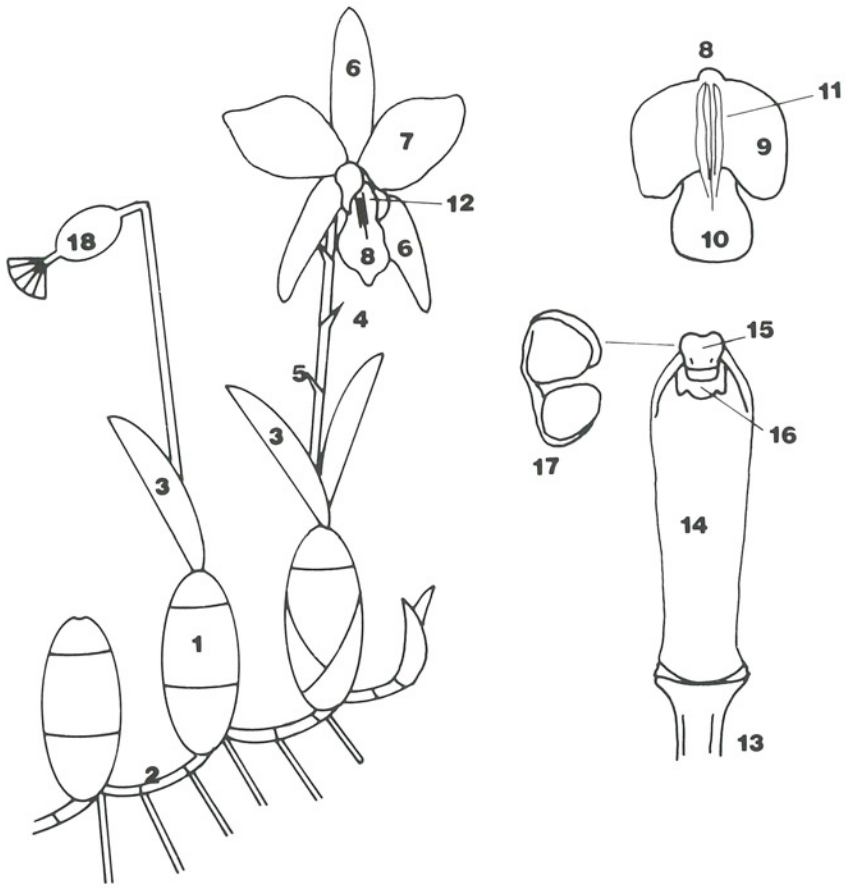
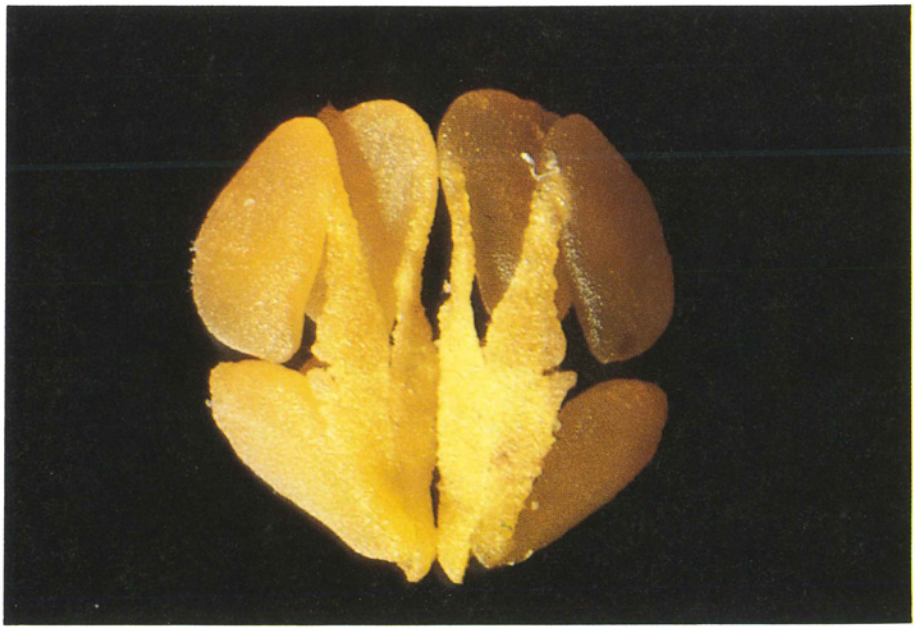


Fig. 1. Morphology of a *Laelia*: 1 = pseudobulbs, 2 = rhizome, 3 = leaf, 4 = inflorescence, 5 = bract, 6 = sepals, 7 = petals, 8 = lip, 9 = lateral lobes of the lip, 10 = mid-lobe of the lip, 11 = keels (callus), 12 = throat, 13 = ovary, 14 = column, 15 = anther, 16 = stigma, 17 = pollinarium, 18 = capsule (fruit).



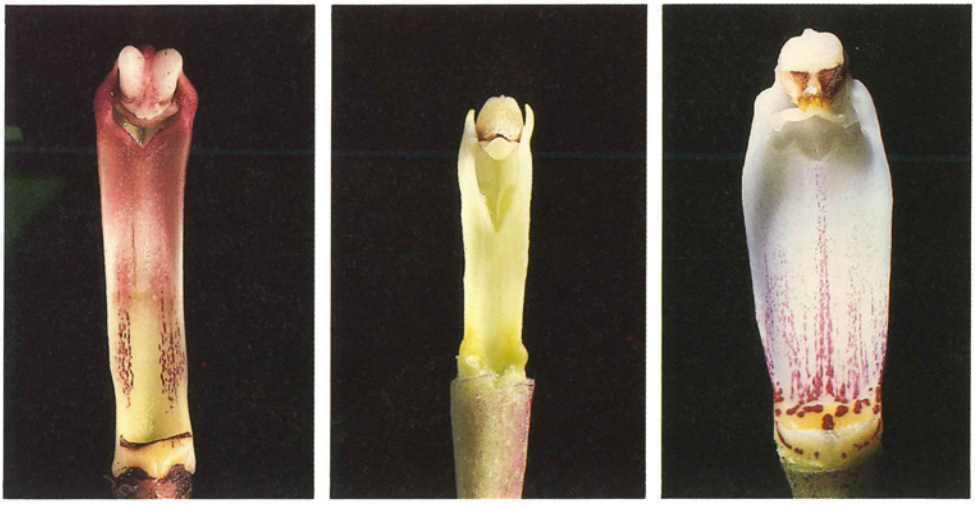
3. The pollinarium of *Laelia eyermaniana*, back

tepals, bilobed anther) that is found in some of the Brazilian bifoliate Cattleyas, in *Schomburgkia*, and in *Myrmecophila*.

Any phylogenetic analysis based on morphological characters in this group of orchids is obscured by these correlated traits adaptative to xerophytic conditions and particular pollinators. Correlated characters must be avoided in cladistic analysis but in some cases are the only available ones.

With these restrictions in mind, and with the belief that characters not available at present (e.g. molecular data) can be more informative, the result of a cladistic analysis of the *Laelia-Cattleya* alliance is shown in fig. 2, page 25 (see details of the analysis in pages 21-28). Few branches of the resulting tree are strongly supported, but it clearly indicates that *Laelia* in its traditional circumscription is a polyphyletic taxon, and even the Mexican species do not form a natural group. Most Mexican species are closely related to each other, and they are the sister group of *Schomburgkia sensu stricto* (excluding *Myrmecophila*), but *L. rubescens* and *L. aurea* are members of a different lineage.

This result is plausible because *Schomburgkia* is almost indistinguishable vegetatively from *L. superbiens* and some forms of *Laelia anceps*. *Laelia superbiens* has a combination of traits of the Mexican mountain Laelias and *Schomburgkia*, although it is a *Schomburgkia* in a strict sense. *Laelia superbiens* has a raceme with flowers arranged helicoidally, undulate segments, colored, large floral bracts, as *Schomburgkia* has, but its column is separated from the lip surface, and the tepal color, the lined throat, the relatively short ovary, and a callus are more similar to those of the



4, 5 and 6. Three different types of columns found in the Mexican Laelias. Left, *Laelia superbiens*, note the bilobed, saddle-shaped anther. Center, *L. rubescens* with a long triangular stigma and a prominent viscarium. Right, *L. eyermaniana*, showing the structure found in most species

Mexican mountain group of *Laelia*.

The hypothesis that the Mexican mountain Laelias are the sister group of *Schomburgkia* is geographically congruent, since Mexican mountain Laelias are "neighbors" of Central American and Jamaican Schomburgkias, and not the Brazilian Laelias which distributed thousands of kilometers far away. Others authors have previously argued a link between the Mexican Laelias and some Schomburgkias. Jones (1968b) suggested that *L. superbiens* is closely related to the Jamaican *Schomburgkia lyonsii*, and Duveen (1984) also stressed a strong similarity between both these taxa.

The genus *Myrmecophila* has usually been submerged into *Schomburgkia* or into *Laelia*, but its vegetative specialization (shared with *Caularthron*) is so significant, that it is difficult to believe that *Myrmecophila* and *Schomburgkia* are sister groups.

We believe that *Laelia* belongs to an unnamed alliance in the Laeliinae that is distinguished by the unbranched inflorescences on shoots that form pseudobulbs (see the cladistic analysis for more diagnostic traits); if the unbranched inflorescences evolved only once, then *Myrmecophila*, *Caularthron*, and *Broughtonia* (all with branched inflorescences) do not form part of this alliance.

Actually, Mexican Laelias and *Schomburgkia* are so closely related that they could be treated as the same genus; however, a re-evaluation of the genera in the entire subtribe Laeliinae must be made in order to construct a reference framework. The results of the cladistic analysis presented here are not well supported by the available data, and a more conclusive phylogenetic hypothesis of the group has to be proposed. The aim of this discussion is to call to attention that *Schomburgkia*, and not the Brazilian Laelias, is the sister group of the Mexican mountain Laelias, but not intends to propose new limits in this group of plants. Brazilian Laelias are a rather diverse assemblage of species, and although some of them seem to be very closely related to *Cattleya*, the rupiculous group could be more appropriately treated as a separate genus, *Hoffmannseggella*, as proposed by Jones.

We have intentionally left aside the relationship of two closely related species with odd features, *Laelia rubescens* and *L. aurea*. While both Mexican mountain *Laelia* and *Schomburgkia* are mainly plants from mid-elevations, *L. rubescens* and its sister species are lowland plants. These species seem to be similar to *L. anceps* but differ from all the members of the Mexican mountain group in the short, suborbicular to widely ovoid, flattened pseudobulbs, formed mainly by one internode, the helicoidal arrangement of flowers, the large blotch on the lip throat, the long triangular stigma, the very well-defined viscarium, the inconspicuous callus, the hairy lips, and the lowland habitat. The vegetative habit of these species is reminiscent of that of the Antillean *Broughtonia*, but we suppose that it represents a parallelism to similar, hot, dry environments, rather than a phylogenetic affinity. In the cladogram of fig. 2, the branch that includes *L. rubescens-L. aurea* is one of the five principal clades, whose relationships are not solved.

The Mexican mountain Laelias are so closely related to each other that sometimes it is difficult to identify specimens, especially in the herbarium. The species most different and apparently specialized to xeric, cold environments being *L. speciosa* and *L. furfuracea*. *Laelia anceps* is likely to be the more unspecialized species, the most widely distributed, and the more variable too. *Laelia anceps* is noticeable intermediate between *L. superbiens* and the *L. autumnalis* complex.

CLADISTIC ANALYSIS OF MEXICAN *LAELIA* AND RELATED GROUPS

Cladistics is a school of systematics that proposes phylogenies based on the parsimonious analysis of characters. For the cladists it is important to know the different evolutionary events in a lineage of organisms, that is, the branching pattern in the group. In this aspect they differ from other taxonomic schools (phenetics and evolutionary) in that they do not pay attention to the similarity or dissimilarity between the groups, because this similarity can be reached by parallelisms or by sharing ancestral features. The cladistic objective is to present a branched diagram that describes nested sets of derived characters, that is, it shows sister groups based on distinct, novel characters.

The cladistic analysis was performed in order to show the relationships among the Mexican species traditionally assigned to *Laelia*, and second, to show that *Laelia* as traditionally circumscribed (e.g. Withner, 1990) is probably a polyphyletic taxon.

Although initially a single matrix was constructed, the resulting analyses were not very informative, apparently due to the high levels of parallelism in the group. Therefore, two distinct matrices were analyzed independently, since traits informative at the specific level are not useful when trying to show the relationships between supraspecific taxa.

These analyses were made with only the information already recorded in the current literature, and no search for new features was attempted. Most information was collected from living specimens, and additional sources of information were Withner's books on the Cattleyas and their relatives, and the work on the foliar anatomy of the Laeliinae by Baker (1972).

The taxa selected to be included in the analysis were those members of the subtribe Laelinae with the following features:

- column footless
- column free or just slightly united to the lip
- pseudobulbous shoots or stems with leaves clustered at apices
- unbranched inflorescence
- pseudobulbs solid, not hollow and not specialized as host to ants
- inflorescence mostly terminal
- leaves not deciduous
- rhizomes appressed to the substrate (not an ascending sympodium)
- inflorescence producing flowers only during one season
- spurless flowers
- druses (aggregates of rhombic crystals) absent in the leaves

The resulting group is basically the same as that called by Baker (1972) the *Cattleya-Laelia* alliance, except that we include also *Brassavola* and *Rhyncholaelia*, but exclude *Encyclia* and *Myrmecophila* (included by Baker in thr *Cattleya-Laelia* alliance), the latter two with branched inflorescences. Baker (1972) presented additional anatomical characters to exclude *Constantia* and *Isabelia*, genera largely unfamiliar to

us and the last with a conspicuous spur. It is not clear whether *Myrmecophila* and *Caularthron* are part of the *Laelia-Cattleya* alliance or if they are a separate, related group.

As in other analysis, terminal taxa (those marked with an asterisk) may actually contain the available information distilled from many species (see Donaghue and Sanderson, 1992). However, the Mexican group was too heterogeneous, and we decided to include only *L. rubescens-L. aurea* (the lowland species), and *L. anceps* as the only member of the mountain group; when the other species were included in the analysis, the resulting trees had very high levels of homoplasy.

Phylogenetic analysis was performed with the "heuristic" searching option (PAUP, Phylogenetic Analysis Using Parsimony, version 3.1, D.L. Swofford, The Illinois Natural History Survey, Champaign, Illinois), the addition sequence was randomized, with 20 replications. Tree-bisection-reconnection (TBR) branch-swapping was performed to find the maximally parsimonious trees. The characters were unordered, some taxa were polymorphic, and were optimized using ACCTRAN (Swofford and Madison, 1987). All characters were weightened (x 2) except characters 25, 29, 30, 33, and 34 (x 1), thought to be correlated with pollination by *Xylocopa*. *Encyclia selligera* was chosen as outgroup, although *Myrmecophila wendlandii* was also considered in other analysis not presented here.

There were found 10 equally parsimonious trees, 401 steps long, whose consistency index was (CI) = 0.569; homoplasy index (HI) = 0.646; CI excluding uninformative characters = 0.462; HI excluding uninformative characters = 0.656; retention index (RI) = 0.651 and rescaled consistency index (RC) = 0.370. One hundred bootstrap replicates were performed, clades found in 50% or more of the resulting trees are labeled with bootstrap percentages. Strict consensus tree of the 10 obtained trees is shown in fig. 2. From it is remarkable the existence of 5 clades with unresolved relationships: 1) that of *Laelia anceps* being the sister group of the Schomburgkias; 2) all the groups of *Cattleya*, plus *Laelia* subgen. *Crispae*, plus *Rhyncholaelia* and *Brassavola*; 3) the subgen. *Parviflorae* of *Laelia* (or *Hoffmannseggella*); 4) *Sophronitis*, and 5) *L. rubescens-L. aurea*. Except for the clade of *Hoffmannseggella*, the other four lineages are not supported by bootstrap values larger than 50%.

The *Laelia-Cattleya* alliance:

1. *Laelia rubescens-L. aurea*
2. *L. anceps*
3. * *Cattleya walkeriana* (subgen. *Rhizantha*)
4. *C. dormaniana* (subgen. *Laeliodea*)
5. * *Cattleya* subgen. *Cattleya* (the Labiata group)
6. * *Cattleya* subgen. *Stellata*
7. * *Cattleya* subgen. *Circumvola*
8. * *Cattleya* subgen. *Intermediae* and *Falcatae*
9. * *Cattleya* subgen. *Schomburgkoidea*
10. * *Sophronitis*
11. *Schomburgkia lyonsii*
12. * *S. crispa* group

13.* *S. undulata* group
14.* *Rhyncholaelia*
15.* *Brassavola*
16.* *Laelia* subgen. *Parviflorae* sect. *Harpophyllae*
17.* *Laelia* subgen. *Parviflorae* sect. *Parviflorae*
18.* *Laelia* subgen. *Parviflorae* sect. *Esalqueanae*
19.* *Laelia* subgen. *Parviflorae* sect. *Rupestres*
20.* *Laelia* subgen. *Parviflorae* sect. *Liliputana*
21.* *Laelia* subgen. *Crispae* sect. *Crispae*
22.* *Laelia* subgen. *Crispae* sect. *Hadrolaelia*
23. *Encyclia selligera* group (outgroup)

Note: infrageneric classification in *Laelia* and *Cattleya* follows Withner (1988, 1990).

TABLE 1

CHARACTERS AND THEIR STATES

1. Pollinia 8, 0
   Pollinia 4, 1
   Pollinia 12, 2 (4 rudimentary)
2. Petals about as wide as the sepals, 0
   Petals conspicuously broader than sepals, 1
3. Habit epiphytic or lithophytic, 0
   Habit exclusively lithophytic, 1
4. Flowers basically non yellow, 0
   Flowers basically yellow, 1
5. Inflorescence without spathaceous bract, 0
   Inflorescence with spathaceous bract, 1
6. Capsule not winged, 0
   Capsule winged, 1
7. Stigmatic surface broader than long, 0
   Stigmatic surface longer than wide, 1
8. Branched inflorescence, 0
   Unbranched inflorescence, 1
9. Pseudobulbs round in cross-section, 0
   Pseudobulbs laterally compressed, 1
10. Inflorescence from the mature pseudobulb, 0
    Inflorescence from the developing pseudobulb, 1
11. Pseudobulbs longitudinally furrowed, 0
    Pseudobulbs not longitudinally furrowed, 1
12. Pseudobulbs with 2-3 leaves, 0
    Pseudobulbs 1-leaved, 1
13. Internodes of the inflorescence >9, 0
    Internodes of the inflorescence 4-9, 1
    Internodes of the inflorescence 1-3, 2
14. Bracts of the peduncle shorter than the internodes, 0
    Bracts of the peduncle subequal or longer than the internodes, 1
15. Flowers arranged helicoidally, 0
    Flowers arranged subdistically, 1
16. Floral bracts greenish and shorter than the green ovary, 0
    Floral bracts subequal or longer than the colored ovary, bracts colored like the tepals, 1
17. Peduncle very elongate, much longer than the subtending leaves, 0
    Peduncle shorter, subequal to or somewhat longer than the subtending leaves, 1
18. Pseudobulbs stalked, 0
    Pseudobulbs sessile, 1
19. Lip 3-lobed, 0
    Lip subentire, 1
20. Midlobe of lip gently recurved or spreading, 0
    Midlobe of lip strongly recurved, 1
21. Pseudobulbs formed by > 4 internodes, 0
    Pseudobulbs formed by ⩽ 4 internodes, 1
22. Leaves terete, 0
    Leaves flat, 1
    Leaves triangular in cross section, 2
23. Margin of lip flat or undulate, 0
    Margin of lip crispate, 1
24. *Leaf length/leaf width = 1.8-2.6, 0
    Leaf length/leaf width = 2.61-3.4, 1
    Leaf length/leaf width = 3.41-4.2, 2
    Leaf length/leaf width = 4.21-5.8, 3
    Leaf length/leaf width = 6.6-7.4, 4
    Leaf length/leaf width = 7.41-8.2, 5
    Leaf length/leaf width = 9.8-11.4, 6
25. Column appressed to the lip surface, 0
    Column not appressed to the lip surface, 1
26. Throat of the lip without a big maroon blotch, 0
    Throat of the lip with a big maroon blotch, 1
27. Flower color basically white-magenta, 0
    Flower color not basically white-magenta, 1
28. Raceme subumbellate, 0
    Raceme not subumbellate, 1
29. Sepals undulate, 0
    Sepals not undulate, 1
30. Petals undulate, 0
    Petals not undulate, 1
31. Flowers resupinate, 0
    Flowers not resupinate, 1
32. Lip keels developed, 0
    Lip keels almost or quite lacking, 1
33. Lip color as dark as or darker than that of tepals, 0
    Lip color paler than that of tepals, 1
34. Tepals without varnished appearance, 0
    Tepals with varnished appearance, 1
35. Tepals concolorous, 0
    Tepals maculate or striped, 1
36. Anther bilobed, saddle-shaped, 0
    Anther subquadrate to ovoid, 1
    Anther subquadrate with two recurved processes, 2
37. Lip keels smooth, 0
    Lip keels tubercled, 1
38. Column body elongate, 0
    Column body abbreviate, 1
39. Viscarium not defined, 0
    Viscarium well-defined, 1
40. Flowers melittophilous or ornithophilous, 0
    Flowers phalenophilous, 1
41. Lateral teeth of the clinandrium non petaloid, 0

Lateral teeth of the clinandium petaloid, 1

42. Lip surface smooth, 0
    Lip surface conspicuously cellular-papillose, 1
43. Base of the column more slender than the apical part, 0
    Base of the column broader and thicker than the apical part, 1
44. Base of the column smooth, 0
    Base of the column with a transverse ridge, 1
45. Upper and lower pollinia subequal, 0
    Upper and lower pollinia conspicuously different, 1
46. Isomodular plants, 0
    Heteromodular plants, 1
47. Rhizome elongate, 0
    Rhizome abbreviate, 1
48. Ventral margins of the column inconspicuous, 0
    Ventral margins of the column conspicuously developed, 1
49. Column wingless, 0
    Column winged, 1
50. Tepals without green coloration, 0
    Tepals with green coloration, 1
51. Column straight, 0
    Column gently arcuate, 1
    Column strongly arcuate, 2
52. Callus with a basal plate-like part, 0
    Callus not as above, 1
53. Lip with branched lines in the throat, 0
    Lip without branched lines in the throat, 1
54. Solid pseudobulbs, 0
    Hollow pseudobulbs, 1
55. Trichomes only on the abaxial surface of the leaf, 1
    Trichomes not only abaxial or absent, 0
56. Trichomes on both surfaces, 1
    Trichomes on only one surface or absent, 0
57. Cells of the cuticle papillose/tuberculate (pseudopits), 1
    Cells of the cuticle not papillose/tuberculate, 0
58. Cells of the cuticle lens-like, 1
    Cells of the cuticle not lens-like, 0
59. Stomatic front cavity without internal processes, 0
    Stomatic front cavity with internal processes, 1
60. Cells of the cuticle transversely/obliquely striate, 1
    Cells of the cuticle not transversely/obliquely striate, 0
61. Cells of the mesophyll anticlinally extended above, rounded below, 1
    Cells of the mesophyll not as above, 0
62. Cells of the mesophyll reticulately thickened, 1
    Cells of the mesophyll not reticulately thickened, 0
63. Extravascular fiber bundles in sub-hypodermal abaxial and adaxial rows, 0
    Extravascular fiber bundles only in sub-hypodermal abaxial rows, 1
64. Secondary veins variously displaced above or below primary vein row, simulating more than one row, 1
    Secondary veins not as above, 0

*Notes: Character 24 was obtained by dividing the leaf length between the leaf width of different leaves, trying to cover, as much as possible, the variation of each taxon. A distribution of frequencies of this ratio was obtained and the 7 different states were defined by the "gap" method. In 3 cases a single OTU showed larger variation than that of the interval; these species were assigned to that category where most of the samples were located.

The analyzed matrix is in Appendix 1.

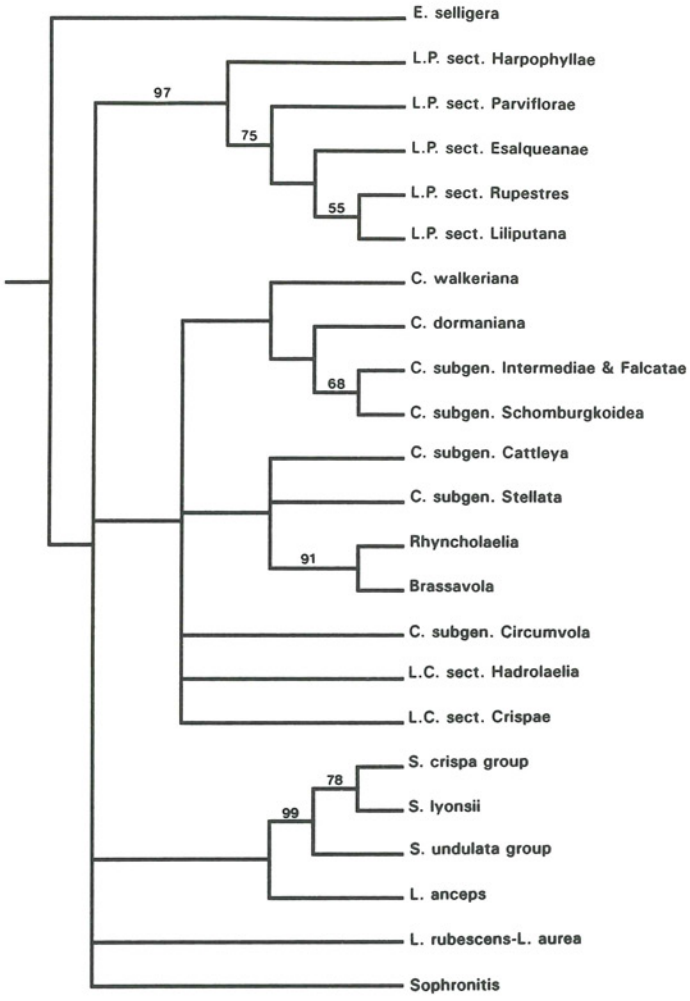


Fig. 2. Strict consensus tree of morphological characters (table 1) of the *Laelia-Cattleya* alliance. An heuristic search using 20 random stepwise addition sequences and weighting (x 2; except characters 25, 29, 30,33, 34 whose weight = 1) found 10 most parsimonious trees, 401 step long. Consistency index (CI) = 0.569; homoplasy index (HI) = 0.646; CI excluding uninformative characters = 0.462; HI excluding uninformative characters = 0.656; retention index (RI) = 0.651; rescaled consistency index (RC) = 0.370. One hundred bootstrap replicates were performed, clades found in 50% or more of the resulting trees are labeled with bootstrap percentages.

The Mexican Laelias:

1. *Laelia albida*
2. *L. anceps*
3. *L. aurea*
4. *L. autumnalis*
5. *L. crawshayana*
6. *L. eyermaniana*
7. *L. furfuracea*
8. *L. gouldiana*
9. *L. rubescens*
10. *L. speciosa*
11. *L. superbiens*
12. *Schomburgkia undulata* alliance, *sensu* Withner 1993.

Phylogenetic analysis was performed with the "branch-and-bound" searching option (PAUP, Phylogenetic Analysis Using Parsimony, version 3.1, D.L. Swofford, The Illinois Natural History Survey, Champaign, Illinois), the addition sequence was the furthest to find the maximally parsimonious trees. The characters were unordered, except characteres 6, 7, 9, 15, 26, 32, 33, 36, and 40 that were ordered. Character 30 was finally excluded of the analysis. Some taxa were polymorphic, and were optimized using ACCTRAN (Swofford and Madison, 1987). Characters were unweightened. The *Schomburgkia undulata* alliance, *Laelia aurea* and *L. rubescens* were chosen as outgroups, because it resulted from the analysis of the *Laelia-Cattleya* alliance; however, the resulted tree could not be rooted such that specified ingroup was monophyletic, due to the strong relationship of *L. superbiens* with *Schomburgkia*.

There was found a single most parsimonious tree (fig. 3), 98 steps long, whose consistency index was (CI) = 0.755; homoplasy index (HI) = 0.296; CI excluding uninformative characters = 0.691; HI excluding uninformative characters = 0.326; retention index (RI) = 0.785 and rescaled consistency index (RC) = 0.590. One hundred bootstrap replicates were performed, clades found in 50% or more of the resulting trees are labeled with bootstrap percentages.

The cladogram indicates that the Mexican mountain Laelias (*L. albida, L. anceps, L. autumnalis, L. crawshayana, L. eyermaniana, L. furfuracea, L. gouldiana, and L. speciosa*) are a monophyletic group. The Mexican mountain Laelias are the sister group of the Schomburgkias, and not to *L. rubescens* and *L. aurea*. *Laelia superbiens* is a member of the clade of *Schomburgkia*, and if this genus is recognized as distinct from *Laelia*, *L. superbiens* must be included in *Schomburgkia*. *Laelia aurea* and *L. rubescens* form a distinct clade that may deserve generic status. Most branches have bootstrap values larger than 50%, except those of *L. albida-L. autumnalis-L. eyermaniana*, an assemblage of species very closely related.

TABLE 2

CHARACTERS AND THEIR STATES

1. Inflorescence from the mature pseudobulb, 0
   Inflorescence from the developing pseudobulb, 1
2. Petals as broad as sepals, 0
   Petals conspicuously broader than sepals, 1
3. Lip smooth, 0
   Lip hairy, 1
4. Flowers basically lilac-purple, 0
   Flowers basically yellow, 1
5. Pseudobulbs with 2-3 leaves, 0
   Pseudobulbs 1-leaved, 1
6. Internodes of the inflorescence >9, 0
   Internodes of the inflorescence 5-9, 1
   Internodes of the inflorescence 1-4, 2
7. Bracts of the peduncle much shorter than the internodes, 0
   Bracts of the peduncle about half the length of the internodes, 1
   Bracts of the peduncle subequal to the internodes, 2
8. Flowers arranged helicoidally, 0
   Flowers arranged subdistically, 1
9. Floral bracts scale-like, 0
   Floral bracts shorter than the ovary, 1
   Floral bracts subequal to the ovary, 2
10. Ovary basically tanned-green, 0
    Ovary mostly colored like the tepals, 1

11. Raceme 1-2-flowered, 0
    Raceme 3-5-flowered, 1
    Raceme > 6-flowered, 2
12. Peduncle elongated, much longer than the subtending leaves, 0
    Peduncle subequal or slighltly longer than the leaves, 1
    Peduncle shorter than the leaves, 2
13. Pseudobulbs stalked, 0
    Pseudobulbs sessile, 1
14. Pseudobulbs fusiform, 0
    Pseudobulbs ellipsoid-ovoid, 1
    Pseudobulbs conic-ovoid, 2
    Pseudobulbs subglobose, 3
    Pseudobulbs discoid, 4
15. Pseudobulbs formed by 2 internodes, 0
    Pseudobulbs formed by 3 internodes, 1
    Pseudobulbs formed by 4 internodes, 2
    Pseudobulbs formed by > 4 internodes, 3
16. Leaf ratio (leaf length/leaf width) < 4.2, 0
    Leaf ratio = 4.21-5.8, 1
    Leaf ratio = 5.81-7.4, 2
    Leaf ratio > 7.41, 3
17. Column exposed, 0
    Column covered by the lateral lobes of the lip, 1
18. Capsule type: keels conspicuous, ridges obscure, score-verrucose, *Schomburgkia* type, 0
    Low keels, inconspicuous ridges, smooth, *L. anceps* type, 1
    High keels, blunt ridges, smooth, *L. autumnalis* type, 2
    High keels, well-defined ridges, smooth, *L. speciosa* type, 3
    Narrow, low keels, obscure ridges, minutely papillose, *L. rubescens* type, 4
19. Throat of lip without a big maroon blotch, 0
    Throat of lip with a big maroon blotch, 1
20. Stigmatic surface not hidden by the rostellum, 0
    Stigmatic surface hidden by the rostellum, 1
21. Flowers arranged in a compact, subumbellate raceme, 0
    Flowers arranged in a lax raceme, 1
22. Sepals undulate, 0
    Sepals not undulate, 1
23. Petals undulate, 0
    Petals not undulate, 1
24. Column appressed to the lip surface, 0
    Column separate from the lip surface, 1
25. Flowers always resupinate, 0
    Flowers resupinate or not, 1
26. Habitat mid-altitude, 0
    Habitat low-altitude, 1
    Habitat high-altitude, 2
27. Lip color paler than that of the tepals, 0
    Lip color as dark as or darker than that of the tepals, 1
28. Flowers with a varnished appearance, 0
    Flowers without varnished appearance, 1
29. Floral bracts colored as the tepals, 0
    Floral bracts not colored as the tepals, 1
30. Tepals maculate, 0
    Tepals concolorous, 1
31. Floral bracts spreading, 0
    Floral bracts appressed, 1
32. Anther cap saddle-shaped, 0
    Anther cap slightly lobed, 1
    Anther cap cordiform-ovoid, 2
33. Rhizomes elongate, 0
    Rhizomes short, 1
    Rhizomes abbreviate, 2
34. Flowers substance stiff, waxy, 0
    Flowers substance weak, 1
35. Keels of the lip undulate-dentate in side view, 0
    Keels of the lip entire in side view, 1
36. Column strongly arcuate, 0
    Column slightly arcuate, 1
    Column straight, 2
37. Callus of the lip with a basal plate-like part, 0
    Callus of the lip without a basal plate-like part, 1
38. Column without basal triangular wings in side view, 0
    Column with basal triangular wings in side view, 1
39. Lip with branched, purple lines in the throat, 0
    Lip without branched purple lines in the throat, 1
40. Flowering season in fall, 0
    Flowering season in winter, 1
    Flowering season in spring, 2
41. Rostellum without a well-defined viscarium, 0
    Rostellum with a well-defined viscarium, 1
42. Stigmatic surface width/length proportion < 1, 0
    Stigmatic surface width/length proportion > 1, 1
43. Stigmatic lobes not protruding in the lower margin, 0
    Stigmatic lobes protruding in the lower margin, 1
44. Ovary smooth, 0
    Ovary scaly, 1
45. Pseudobulbs sulcate, 0
    Pseudobulbs rather wrinkled, 1
46. Rhizome made up by 4-6 internodes
    Rhizome made up by 3-4 internodes
47. Leaves coriaceous-fleshy, 0
    Leaves coriaceous-chartaceous, 1
48. Petals basally cuneate, 0
    Petals subclawed, 1
49. Cuniculus conspicuous, > 2 mm deep, 0
    Cuniculus inconspicuous, < 2 mm deep, 1
50. Lower pollinia oblong-quadrate, 0
    Lower pollinia triangular-oblanceolate, 1

The analyzed matrix is in Appendix 2.

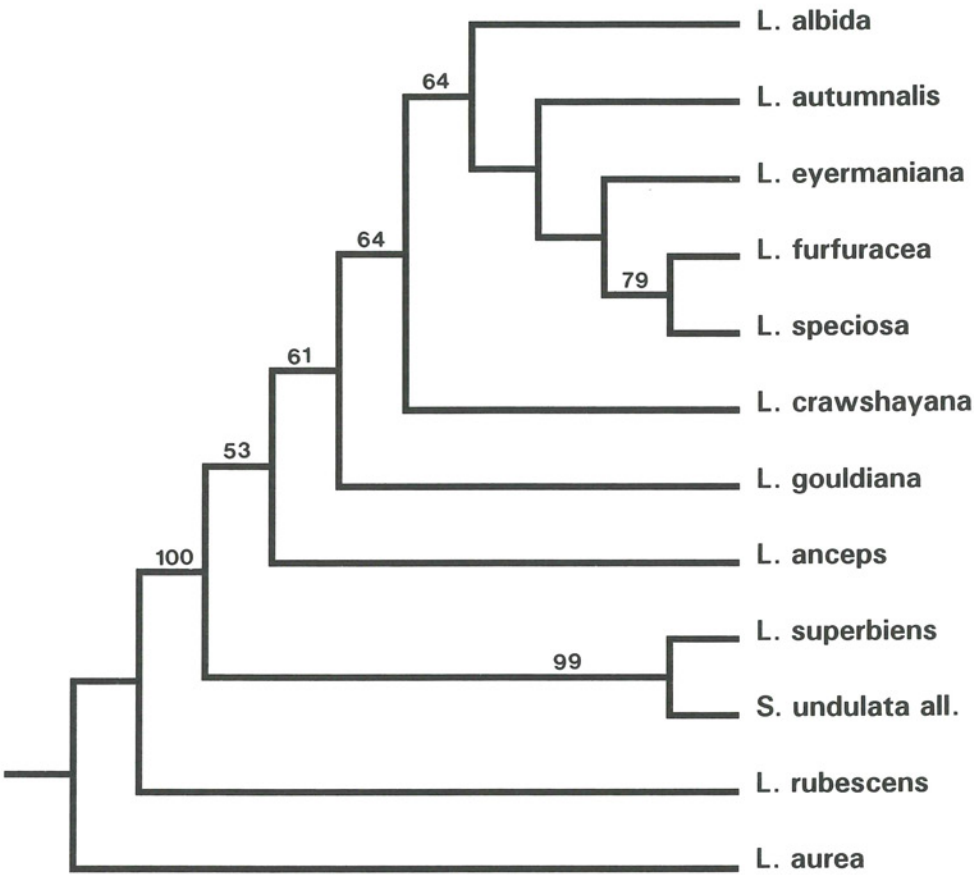


Fig. 3. Single shortest tree of morphological characters of Mexican *Laelia*. A branch-and-bound search in PAUP was conducted, the tree is 98 steps long. Consistency index (CI) = 0.755; Homoplasy index (HI) = 0.296; Retention index (RI) = 0.785; Rescaled CI (RI) = 0.590. One hundred bootstrap replicates were performed; clades found in 50% or more of the resulting trees are labeled with bootstrap percentages.

CLIMATE, HABITAT, AND CULTIVATION

The Mexican Laelias are mostly inhabitants of the mountains. Almost all the species are distributed in the western ranges of the country (Western Sierra Madre, Transverse Volcanic Belt, and Southern Sierra Madre), while on the watershed of the Gulf of Mexico, particularly in the Sierra Madre Oriental, only two species are found, namely *Laelia anceps* and *L. speciosa*. The Isthmus of Tehuantepec can be considered as a natural barrier for the Mexican Laelias, only three species, *Laelia anceps*, *Laelia rubescens*, and *L. superbiens* grow on both sides of it.

There are several species of *Laelia* which grow above 2000 meters elevation. These species tolerate short frosts at dawn and for that reason adapt themselves easily to outdoors cultivation in Mexico City and the high plateau of Mexico, and they can be grown also in patios in California and other temperate, subtropical areas with cool summers. The plants can be fastened on the trunk of a tree in the garden, for example a fruit tree (plum, apricot, peach, apple, or pear trees); or on a trunk of a jacaranda or yucca or any other tree, as long as the tree does not cast an excessively deep shadow. The plants re-establish themselves in a short while and enjoy being watered abundantly 2 or 3 times per week. The result is showy blooming in the proper months for each species. Better control of the plants can be obtained if the orchids are fastened (for example with brass wire) on a piece of oak branch, or slabs of cork or tree fern, because then the plants can be hung in a south-facing place. It is recommended that the plants be fertilized with a very dilute solution, about one gram of foliar fertilizer per one liter of water, preferably twice per month during the growing season which is from May to November. Laelias planted in a basket or a pot, preferably a plastic pot, can be treated in a similar way; the potting medium may consist of pieces of fir or pine bark, lava pebbles or charcoal, or some other mix that dries out rapidly. In winter and early spring, watering is reduced so that the plants can undergo a resting period equal to the one they would have in nature. Plants of *Laelia anceps*, *L. crawshayana* and *L. rubescens* require a more protected place in winter, and *L. aurea* is the species with most need of warmth and a heated greenhouse is preferable for it to prosper.

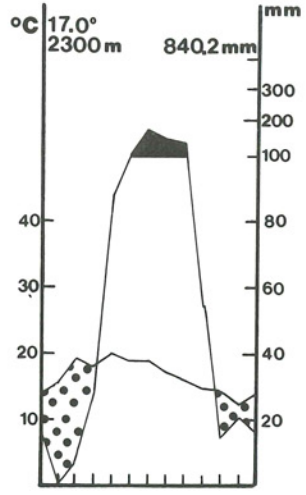
The average temperatures of Mexico City throughout the year (see fig. 4,1) can be illustrative of the growing conditions for the Mexican Laelias native to the mountains above 2000 m elevation (*L. albida, L. autumnalis, L. eyermaniana, L. furfuracea, L. gouldiana,* and *L. speciosa*). Spring is very dry and warm, with practically no rain or fog; temperature is usually 25 to 30°C at noon, and can drop to 5° at night. By the end of May or early June tropical maritime winds affect the climate of all Mexico, except the extreme north. These humid winds mean daily, heavy rainfall in the afternoon and cloudy days and frequent fogs from June to October; temperatures in this period are higher at night (ca. 10-12°C) and lower at noon (18-24°C). Summer and early fall are the growing season and Laelias benefit from heavier feeding in this time of the year. In late October, sometimes early November, the humid winds stop and the days are usually sunny, dry, and sometimes warm, sometimes rather cool, but the atmospheric humidity remains high. Temperatures in late fall can drop at night to 0-5°C for some hours, but Laelias usually are protected from frost by the tree's crown

and the forest canopy. Winter is dry, very sunny, with occasional light frosts (-1 to -3 °C), although not every year, and temperatures at noon rarely are above 18°C. Specially during December and January some regions of Mexico, including the Valley of Mexico, but more typically locations on the Gulf side, experience storms called "nortes", cool, humid winds that produce fog, and prolonged light showers. The "nortes" are practically absent in areas where the Pacific Ocean influence is dominant.

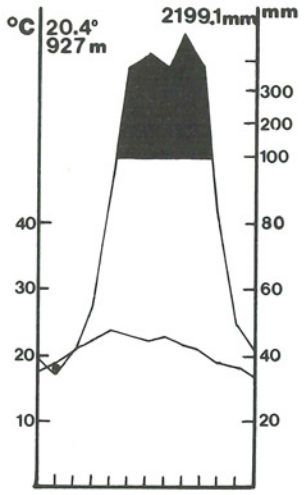
The mountain Laelias that are found below 2000 m elevation (*L. anceps, L. crawshayana*, and *L. superbiens*) are affected by the same general climatic patterns as the upper mountain Laelias. The main difference is that they dwell in slightly more humid forests, usually near the cloud forests, and they receive in addition some fog and rain during the winter and spring; the temperatures at noon are frequently near 30°C and in the night the temperatures remain above 5-7°C; their habitats are practically frost free (fig. 4,2).

The lowland Laelias, *Laelia rubescens* and its sister species, *L. aurea*, inhabit the hot lowlands of the coastal plains and inner basins, usually in tropical deciduous, thorn forests or warm oak forest. The humid season in the summer and early fall is followed by an extremely dry winter and spring, when the plants are exposed to full sunlight due to the deciduous habit of their host trees. Nocturnal temperatures are above 12°C in winter, and 16°C in spring-summer. At noon, the thermometer can reach 35°C. These plants are best suited for the warm greenhouse, where they can receive a lot of sunlight (fig. 4,3).

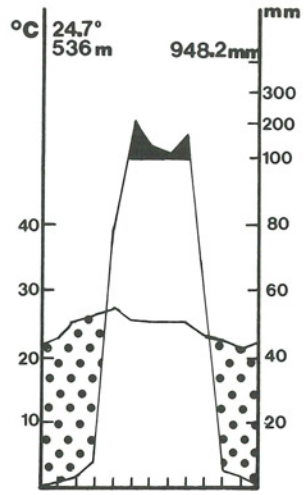
Fig. 4. Ombrothermic diagrams of selected localities with Laelias.



1. High mountain. Tlalpan, Distrito Federal.



2. Mid-elevation. Córdoba, Veracruz.



3. Lowland. Tuxtla Gutiérrez, Chiapas.

ECOLOGY

It can be observed that basically, most Laelias prefer as host trees several species of oaks (*Quercus*), which form open to dense forests at altitudes from sea level up to very high in the mountains; in these forests the orchids receive a lot of light. Of course, other trees also accommodate Laelias, and occasionally they can be found growing on rocks where the conditions are favorable, like near a creek, or at the top of the mountains where the plants can be reached by humid winds.

Mexican Laelias are xerophytic epiphytes, adapted to the seasonally dry climate characteristic of the ends of the tropical belt. Most information on the ecology of Laelias has been gathered by Hernández (1992; see also Soto, 1994), who conducted a detailed demographic study on *Laelia speciosa*. This species is probably more drought tolerant than the other species of the genus, but in many aspects all the species share a lot of life history traits.

The architecture of *Laelia* plants is described in the generic description (pages 38-39). It fits Tomlinson's architectural model. This model consists of equivalent, orthotropic modules, in which the expansion buds are restricted to the basal nodes of the shoot. Like other sympodial orchids with this model of growth, *Laelia* produces only one renewal bud, so that only a single new pseudobulb is produced each year (see also Andersen *et al.* 1988). However, there are 1 to few reserve buds in the adjacent, lower nodes of the pseudobulb; these reserve buds remain dormant for several years, but can become active if there is a failure in the development of the growing shoot, or apparently without any reason, but probably because the presence of unusually good conditions at a particular moment. The activation of the dormant bud gives place to clumped, branched specimens with several growing "fronts", like those seen under cultivation. Some species generally have specimens with several fronts, while others remain simple. *Laelia anceps*, *L. aurea*, *L. autumnalis*, *L. furfuracea*, *L. rubescens*, and *L. superbiens* eventually produce branched specimens in the field; on the other hand, *L. albida*, *L. crawshayana*, *L. eyermaniana*, and *L. speciosa* have populations mostly formed by unbranched or scarcely branched specimens. In *L. speciosa* the branched specimens are much more common in localities on the Gulf of Mexico watershed, probably because these areas have more winter rainfall, resulting in a shorter dry season. In *L. albida* the simple specimens are also more common in drier forests.

As in other sympodial orchids, the renewal buds and the number of internodes play an important role in the plant architecture. Rasmussen (1986) has found that a constant number of internodes in each segment of rhizome results in an asynchronic growth, in which the renewal bud is activated either to the right or to the left of the parental shoot. The resulting zigzag pattern is easily observed in simple, young specimens of *L. speciosa* or *L. eyermaniana*. For *L. speciosa* Hernández (1992) has estimated that 93-97% of the young specimens produce a single renewal bud per year, while 82-86% of the adults retain this same behavior.

Most Laelias, with the very notably exception of the rarest taxa, *L. gouldiana* and *L. anceps* subsp. *dawsonii*, form very large and dense populations. The populations

are usually restricted to a single hill and in many cases occur in less than one square kilometer; the next dense population can be dozens of kilometers distant, with very few scattered specimens in between. In the populations of *L. speciosa* in the basin of Lake Pátzcuaro the density is from 3,000 to 16,000 individuals per hectare, a figure comparable with the densities of *L. furfuracea* in the Mixteca region. The more suitable areas for *L. autumnalis* in the Volcanic Belt have population densities of 100-500 individuals per hectare, a density probably common for most species in favorable localities. These densities could seem to be very high, but it must be considered than most specimens that make them up are immature, non-reproductive plants. In *L. speciosa* only 5-6% of the specimens are reproductive.

The Mexican Laelias are mostly epiphytes; even those species with rupiculous populations are primarily epiphytes. The distribution of Laelias in the trees has been little studied, but they occupy the big, usually horizontal branches and are notoriously absent in the lower levels of the trunk and in the outer branches of the tree crown. In *L. speciosa* the distribution is normal, with a peak between 2 and 3.5 m above ground level, in forests with trees 5 to 9 m high, respectively (see Hernández, 1992).

The gathering of flowers from wild populations produces strong changes in the plant architecture. The common practice is to cut the 1-2 youngest pseudobulbs bearing the raceme. This results in the activation of a dormant, reserve bud or buds of the remaining pseudobulbs. If only a single bud is activated, the resulting new pseudobulb is about the size of a normal, mature pseudobulb; however, in many cases several reserve buds are activated and the resulting pseudobulbs are much smaller than the reproductive ones. If this practice is repeated on the same plants in intervals of few years, the plants become a cluster of many small pseudobulbs, with many fronts; these plants invest a lot of resources in maintaining the several fronts and do not flower. Many of the more accessible populations of *L. speciosa* are made up of this type of plant, and no flowers can be seen for years. Eventually the much branched specimens become very weak, and they are attacked by bacteria, fungi and an unidentified stinkbug with transparent, green wings. The belief that the removal of a few pseudobulbs improves the development of the plants is certainly false in the case of wild specimens.

The phenology of all Mexican Laelias is similar, except that the flowering season can vary greatly depending on the species. The flowering time of the various species of Mexican Laelias covers practically the whole year, the majority of them blooming in autumn. A summary of the flowering times of all the species is given in fig. 5

Root growth starts in February and continues at least until October-December. The shoots sprout in March-May, reaching their full size from August to November. After this the tissues ripe with the cold, dry, and sunny conditions of autumn, and they are going to be ready to face the extreme dryness of the hot spring-time.

The maturity of the seed pod is reached after several months, but this period is also variable, since all species release their seeds at the end of the dry season or at the beginning of the rainy period, in March-June. This period coincides with the moment in which the forests lose their leaves, so there is probably less interference with seed dispersion by the foliage. *Laelia speciosa* and *L. superbiens* capsules take 10-12 months to reach maturity; the pod of *L. eyermaniana* is ripe in 7-8 months, and 6-7

months are necessary for the rest of the autumn-flowering species.

A pod of *L. speciosa* has 250,000 to 1,000,000 seeds. The new seedlings can be seen (with the aid of a magnifying glass) by August; they germinate mostly on *Parmelia*, a crustaceous lichen that covers the trunks of the host oak *Quercus deserticola*. Hernández (1992) estimated that 1 in 5,000 to 20,000 seeds (depending on the locality) germinates under natural conditions; however, once germinated, the seedlings have good chances of success, since after 17 months the survivorship was 68-88%. This fact suggests that there are "safe sites" for the establishment of this species.

Once established, a seedling of *L. speciosa* needs a very long period to store resources before becoming a reproductive specimen. In two areas studied by Hernández this period extended on average 16 and 19 years, although the total variation ranges from 9 to 32 years to produce the first inflorescence. A plant that has reached maturity produces inflorescences intermittently the rest of its life, although the likelihood of reproducing each year is higher in older specimens. The oldest specimens accurately dated of *L. speciosa* are 56 years old, but dating becomes more complicated as the plant becomes older. There are no precise estimations for the other species, except for *L. autumnalis* that reached the reproductive stage after 6-9 years. The cultivated specimens of *L. albida*, *L. anceps* and *L. autumnalis* in the towns close to the wild localities are very probably centenarians.

People with a good sense of smell could distinguish each one of the Mexican Laelias by their distinct fragrance, which is best noted around noon on sunny days. An exception is *Laelia autumnalis* in which the floral fragrance varies greatly along its distribution range. Among Laelias there are both sweet and bitter, delicate and strong fragrances. Kaiser (1993) has shown and discussed the floral fragrances of four Mexican Laelias, based on analysis by gas chromatography. He described the fragrance of *Laelia albida* as "white-floral", "rosy floral" and with a note reminiscent of melons; this odor is the result of the presence of linalool, methyl benzoate, benzyl acetate, hydroquinone dimethyl ether, geranyl acetate, and (Z,Z)-3,6-nonadienol. It is interesting that Kaiser has noted differences between lilac and white-flowered forms of *L. anceps*, surely corresponding to the subspecies *anceps* and *dawsonii*; he has described the lilac-flowered forms as having a rather unassuming slightly terpenic, aldehydic and metallic floral scent, based largely on ocimene; that of the white-flowered forms is described as "usually somewhat stronger, fuller and more floral, and is reminiscent of *L. albida* and honeysuckle". Kaiser also analysed *L. autumnalis*, but he did not state the origin of the sampled specimens. That is important due to the large variability detected by the nose; he described it as "considerably stronger than that of *L. anceps*, with a basic aromatic-floral accord, and in the top note, very delicate, green aldehydic aspects, with an almost dissonant tone reminiscent of *Cattleya percivaliana*. Indeed, the scent contains the two isomers of 2,4-decadienal and the corresponding acetates. But in this case they enhance the basic accord, which consists primarily of benzyl acetate, hydroquinone dimethyl ether, caryophyllene epoxide and cinnamic aldehyde, together with the green note of (Z)-3-hexenol and (Z,Z)-3,6-decadienyl acetate". *Laelia gouldiana*'s scent was described as similar to that of *L. autumnalis*, but with the green, aldehydic note less evident, and possessing a greater concentration of "ionone-floral" aspects. The hybrid origin of *L. gouldiana* (from *L. anceps* and *L. autumnalis*) is apparently not supported by the absence of ocimene, typical of *L.*

anceps, in the fragrance of *L. gouldiana*.

The fragrance of the flowers is one of the means by which the plants attract the pollinating insects. No species produces nectar, nor any other type of reward, and the pollination is apparently of the deception type. The morphology of the *Laelia* flowers suggests that all the species are pollinated by large bees; the few observations that have been carried out (in *L. anceps*, *L. autumnalis*, and *L. speciosa*) have confirmed that these species are pollinated by bumblebees (*Bombus* spp.; *Bombus medius* is one of the species that pollinate *L. anceps*). The introduced European honey bee (*Apis melifera*) frequently visits *Laelia* flowers, but it seems to be too small to be an effective pollinator in *L. speciosa*, *L. autumnalis*, and *L. anceps*. Once the flower is pollinated, it forms a fruit (capsule) with many thousands of minute seeds which are dispersed by the wind.

The absence of any reward, the high population densities reached by some species, and the low efficiency of pollination point to the existence of a density-dependent pollination system to secure the pod production of the population. Apparently a decrease in density has negative consequences in the number of produced capsules; for this reason some Laelia populations are endangered, although a relatively high number of individuals can still be observed in the field.

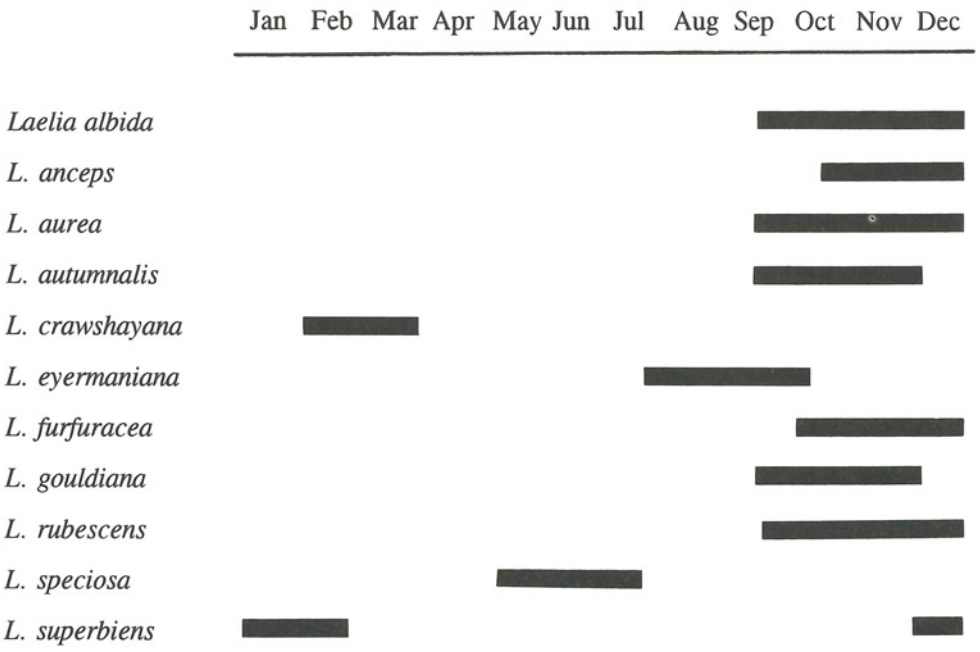


Fig. 5. Flowering periods in Mexican Laelias.

CONSERVATION

Our favorite orchids prefer growing in forests, and every day their survival appears more uncertain and vulnerable. The news of frequent forest fires and the transformation of forested areas into agriculture and pasture lands in all Mexico, which has notably increased during the last 20 years, make us foresee the rapid vanishing of many important localities where Laelias are still growing. We must try to encourage, on every possible occasion, the maintenance, preservation and protection of our forests, in order to mantain, as much as possible, orchid populations *in situ*.

Habitat destruction is only one part of the problem. In all the regions of Mexico where different species of *Laelia* grow in the forests people interested in plants bring Laelias to their homes and grow them on nearby trees. Furthermore, Laelias were exported in large quatities until very few years ago. Some Laelias are on the verge of extinction due to selective gathering to supply plants to these and other orchid growers.

Laelia gouldiana is probably the only known Mexican orchid extinct in the wild. On the other hand, several other Laelias are facing severe conservation problems. *Laelia anceps* subsp. *dawsonii* is considered endangered, and as few as 12 specimens are known in a wild state; this subspecies was sent to other countries in large quantities to provide plants for the cutflower market. *Laelia superbiens* was considered endangered until very recently, when a population of several thousand individuals was discovered in Chiapas, but only few stations are known, and it is common in only one of them.

Undoubtedly the most exploited orchid in Mexico is *L. speciosa*; although an abundant plant in some localities, the incredible volume of picked flowers that are sold in Mexican markets has put this orchid in the category of "under special protection", according the Mexican legislation that protects the flora and fauna (NOM-059-ECOL-1994). Other species are certainly rather common today, and although some populations will be lost, their distribution in areas not useful to man and their commoness in other localities appear to guarantee their survival.

However, the conservation of species, even of those now endangered, is not so difficult. First, we will recognize the importance of conservation *ex situ* and by commercial growers. *Laelia gouldiana* has never been found in the wild; if no plants had been collected and maintained in cultivation for many decades by the peasants in Hidalgo, this species probably would be unknown at present. Although conservation *ex situ* is not the best way to preserve a species, because it does not mantain the original genetic variation and structure, nor the evolutionary processes, it is better than to have lost a taxon completely. A similar situation exists for *Laelia anceps* subsp. *dawsonii* f. *chilapensis*, also unknown in the wild.

Clones that have been a long time in cultivation are usually very desirable from the point of view of horticulture, and they are superb material to propagate commercialy, either for the species itself or to produce hybrids. Several of the cultivars awarded by the Asociación Mexicana de Orquideología are being propagated by local

nurseries. Laelias are not difficult to raise from seed (except the self-incompatible *L. gouldiana*); most species are very fertile and they produce strong seedlings. Once the awarded clones are more easily available to the orchid growers of Mexico and abroad, we hope that collection pressure will decrease to very low levels. This seems to be already the case for *L. anceps*.

The gathering of flowers in the wild, whose results can be seen at present in many Mexican markets, must be stopped in order to maintain healthy, wild populations and to preserve these beautiful plants as a legacy for future generations.

The conservation status indicated for each species is based on the Mexican official regulation for threatened wild species (NOM-059-ECOL-1994).

TABLE 3. Cultivars of outstanding horticultural quality awarded by the Asociación Mexicana de Orquideología, A.C. (A.M.O.; MO/AMO = gold medal; MP/AMO = silver medal; MB/AMO = bronze medal).

SPECIES	CULTIVAR	AWARD	DATE	GROWER
Laelia albida				
	"Achim"	MP	21.10.76	F. Halbinger
	"Bella de Moore"	MP	22.10.77	W. Moore
	"Katherine"	MP	04.12.75	W. Moore
(sulphurea)	"María Aloisi"	MP	23.10.86	M. Aloisi
Laelia anceps subsp. *anceps*				
	"Alejandra"	MB	21.10.93	R. Aguilera
(coerulea)	"Bernardo"	MB	13.10.94	C. Lamas
(veitchiana)	"Cielito Lindo"	MO	21.10.93	C. Lamas
(alba)	"Doña Marina"	MO	21.10.93	C. Lamas
	"Gisela"	MP	17.10.75	W. Vellnagel
(alba)	"Los Pocitos"	MP	17.10.75	S. Dickinson
(veitchiana)	"Ma. del Refugio"	MO	31.10.96	O. Rocha
	"Rodrigo"	MO	03.12.93	R. Aguilera
Laelia anceps subsp. *dawsonii*				
(*chilapensis*)	"Estrella del Sur"	MO	13.10.95	C. Lamas
(*chilapensis*)	"Nanette Cherie"	MP	12.10.87	R. Leleu
(*dawsonii*)	"Pacífico"	MP	07.12.94	C. Lamas
(*dawsonii*)	"Jalisco"	MB	04.12.96	F. Halbinger
Laelia aurea				
	"Nayar"	MP	06.11.78	E. Hágsater

Laelia autumnalis				
(alba)	"Ana Lilia"	MB	11.10.91	A.L. Pensado
	"Chiripa"	MB	20.10.91	G. Sánchez
(*atrorubens*)	"Magna"	MO	03.10.90	F. Halbinger
(*atrorubens*)	"Martha"	MO	21.10.93	S. Reynaud
(*atrorubens*)	"San Lucas"	MP	05.11.75	S. Cusi
(alba)	"Zanteco"	MB	13.10.95	S. Reynaud
	"Zirahuén"	MB	29.10.92	A.L. Pensado
Laelia furfuracea				
(semialba)	"Federico Halbinger"	MP	20.10.91	C. Lamas
(semialba)	"Stella"	MO	10.10.89	F. Halbinger
(alba)	"Taxqueña"	MB	13.10.95	C. Lamas
Laelia gouldiana				
	"Ana Lilia"	MP	11.10.91	A.L. Pensado
Laelia rubescens				
(*peduncularis*)	"Ocuilan"	MP	31.10.96	M. Soto
Laelia speciosa				
(alba)	"Alma"	MO	06.05.92	A. Mulás
(alba)	"Beida"	MB	29.04.94	J. Lamas
(alba)	"Elia"	MB	01.07.77	S. Botello
	"Isis"	MO	04.05.95	F. Halbinger
	"Jupiter"	MO	08.05.96	F. Halbinger
	"M. Ibarrola"	MB	06.05.92	M. Pontes
	"Morelia"	MB	29.04.94	F. Marín
	"Ocuilan"	MP	01.04.97	M. Soto
	"Premio 1991"	MO	01.12.91	R. Leleu
	"Río Verde"	MP	28.05.87	S. Cusi
	"Rubens"	MB	29.04.94	F. Halbinger

LAELIA

Lindl., Gen. & Sp. Orch. Pl. 96, 115. 1831, *nom. cons.* (Dandy, Kew Bull. 1935: 86; see also Garay & Sweet, J. Arnold. Arb. 53(4): 522. 1972). TYPE SPECIES: *Bletia grandiflora* Llave & Lex.
Amalias Hoffmannsegg, Linnaea 16: 228. 1842. Type species: *Laelia anceps* Lindl.; *Amalia* Rchb. f., Herbarienb. Nomencl. 52: 1974. July 1841; *Amalia* Rchb. f., Deutsch. Bot. 1: 52. 1841.

The following generic description includes only the lowland and mountain Mexican species.

Epiphytic or rupiculous, sympodial herbs. **Plants** formed by a succession of similar shoots (isomodular). Each **shoot** (module) arising from the renewal bud of the previous shoot, determinate (Tomlinson's model of growth). The rhizome is actually the sympodium formed by a collection of the basal internodes of the shoots; these segments are prostrate, giving rise to a lignified, stout, usually dorsally compressed structure; it is the only part of the plant that produces roots; it has fugaceous, small, sometimes scale-like sheaths. The **roots** are flexuose, rounded in cross section, covered by velamen; root apex is usually green and young roots are fleshy and at least partially photosynthetic. The **pseudobulb** is built up by the very thickened internodes continuous with those forming the rhizome; the pseudobulbs are frequently arranged in such form that two rows are produced, with subsequent pseudobulbs either to the left or to the right; the pseudobulbs are laterally compressed in various degrees; the limit between pseudobulb and rhizome is the node that bears the renewal bud; an additional reserve bud regularly exists in the internode immediately below the latter; at each node of the pseudobulb a **sheath** is produced which remains green only during shoot development; by the end of the growing season the sheath is dry and scarious, covering the pseudobulb for a couple of years and subsequently vanishing; in some cases the sheath remnants are strongly appressed to the pseudobulb surface, like a silvery, reflecting cover. The upper internodes of the pseudobulb are usually very crowded and are the only ones that bear leaves. The **leaves** are articulate, subsessile, distichous, with a petiole-like, conduplicate, short base and a wide blade; leaves are coriaceous to chartaceous, frequently fleshy and stiff, green and tinged with purple under strong light conditions. The pseudobulb apex bears the simple, scapose **inflorescence**, a peduncle made of by few to many internodes bearing bracts of various sizes, terminating in a raceme of flowers arranged in a helicoidal or subdistichous way; there are **floral bracts** at the nodes of the raceme, green or colored like the tepals, big to scale-like, diverging or appressed to the ovary; the floral bracts sometimes have extrafloral nectaries, and are sticky and shiny. The **ovary** is pedicellate, subterete, somewhat thickened towards the apex, 6-sulcate, green or distinctly colored, smooth, warty or scaly (furfuraceous), and/or glutinous; in some cases the ovary is twisted. The **flowers** are usually resupinate, the color can be white, yellow, or most commonly lilac-magenta. The **sepals** are similar to the petals but narrower and fleshier, they are subequal, free, spreading, and flat to undulate, the dorsal surface can be gently scaly or glutinous. The **petals** are broader than the sepals, of thinner substance, spreading or partially parallel to the lip/column; the base cuneate or more frequently subunguiculate, the blade oblong-oblanceolate to rhombic, they are flat to recurved, entire to widely undulate or repand, with a longitudinal groove on the outer surface. The **lip** is free from the column, 3-lobed,

attached to the column by a minute hinge-like claw; the base of the blade is flat to concave and widely rounded, the lateral lobes are upturned and form a tube around the column, the midlobe is flat to recurved; the disc is adorned with a simple to complex callus made up of 3 to many keels or a thickened, basal plate; the throat is colored with a blotch or branching lines, but they can be absent in some species; there is a longitudinal axial groove on the outer surface. **Column** slightly to strongly arcuate, semiclavate to semiterete, there is a dry shallow to very shallow cuniculus; usually yellow and dotted at the very base; the ventral margins are somewhat prominent, sometimes with a broadened winged base, or more prominent near the stigmatic cavity; the clinandrium is concave and has 1-3 teeth, the median one more prominent, deflexed, pressed strongly on the anther, and the margins are entire to erose. The **anther** is incumbent, 8-celled; it can be ovate, bilobed or strongly bilobed, in this case saddle-shaped in profile. The **pollinarium** has 8 strongly flattened pollinia, in four pairs, in each pair the upper (proximal) and lower (distal) pollinia are slightly different in size and shape; each upper and lower pollinium is attached to one end of a granulose, strap-like caudicle with erose margins. The **stigmatic cavity** is transversely elliptic or long triangular, sometimes 3-lobed, exposed to hidden, deeply to shallowly concave; the lateral lobes conspicuous or not, projecting sometimes towards the base. The **rostellum** is well-developed, a transverse, oblong to ovate, fleshy, convex blade, completely separating the anther from the receptive stigmatic area. On the abaxial surface may be a little-defined viscarium (a diffuse glued area), or a neat, well-defined, protruding viscarium, both of which serve to attach the pollinarium to the insect body. The **capsule** is ellipsoid, with a short peduncle and an apical beak; it has ribs and grooves differently developed.

KEY FOR IDENTIFICATION OF MEXICAN LAELIAS

1. Pseudobulbs with 2 internodes; strongly compressed, discoid, with one terminal leaf; the flowers have a maroon blotch in the throat and the disc is often hairy 2
2. Flowers white or pink, disc sometimes yellow ..... 2a, *L. rubescens*
2a. Disc of the lip smooth; petals rhombic, > 14 mm broad; petals and lip obtuse; Guerrero and Oaxaca ..... f. *peduncularis*
2a. Disc of the lip usually pubescent; petals elliptic, < 14 mm broad; petald and lip acute-subacute; widely distributed ..... f. *rubescens*
2. Flowers entirely yellow ..... *L. aurea*
1. Pseudobulbs with 3 or more internodes; plump, sometimes somewhat compressed, with 1 to 3 terminal leaves; flowers with branched rays in the throat or almost immaculate, the disc smooth 3
3. Inflorescence less than 20 cm long, appearing with the new growth in the spring; the midlobe of the lip has lilac-magenta radiating spots and short lines ..... *L. speciosa*
3. Inflorescence more than 20 cm long, produced by a mature or completely developed pseudobulb, from autumn to late winter; the midlobe concolor, rarely with axial lines or dots 4
4. Pseudobulbs with a single leaf 5
5. Inflorescence up to 40 cm long; peduncle with small bracts, usually 1-3-flowered; pseudobulb sulcate and almost round in cross-section; callus with 3 longitudinal keels; only in Oaxaca ..... *L. furfuracea*
5. Inflorescence usually longer than 40 cm; peduncle with big bracts, often 3-5-flowered; pseudobulb laterally compressed, rhombic in cross-section; callus made up of a basal plate and some terminal keels; from Tamaulipas to Honduras .... 5a, *L. anceps*
5a. Petals narrowly elliptic to elliptic; callus low, with 3 terminal keels; midlobe of lip oblong; populations formed by specimens with pink to purple flowers; E, SE Mexico, Guatemala and Honduras ..... *L. anceps* subsp. *anceps*
5a. Petals rhombic or elliptic-rhombic; callus elevated, with 3-5 terminal keels; midlobe of lip obovate to suborbicular; specimens either with white flowers, or with pale pink tepals and dark purple, velvety lips; Pacific watershed of Mexico .... 5b, *L. anceps* subsp. *dawsonii*
5b. Populations white-flowered or with semialba specimens ..... f. *dawsonii*
5b. Cultivated plants with pale pink flowers and dark purple, velvety lips; petals darker at apex; flowers very rounded ..... f. *chilapensis*
4. Pseudobulbs with 2 or 3 leaves 6
6. Large plants, more than 50 cm tall without the inflorescence; rhizome elongated; pseudobulbs fusiform and more than 15 cm long; sepals undulate; callus with (5)7-9 crenate keels ..... *L. superbiens*
6. Plants small or medium-sized, less than 30 cm tall without the inflorescence; rhizome short, generally hidden by the ovoid, ellipsoid or globular, less than 10 cm long pseudobulbs; sepals not undulate; callus with 3 entire keels 7
7. Leaves linear, narrow, less than 1.8 cm wide; flowers usually white, sometimes suffused pink when fading, small, 2.5-4.5 cm diameter ..... *L. albida*

7. Leaves oblong, lanceolate or elliptical, broad, usually wider than 1.8 cm; flowers usually lilac, rose, or magenta, big, more than 7 cm diameter 8
8. Flowers pale rose to pale lilac from late January to March; midlobe of the lip with short, radiating lines; leaves linear-ensiform; only in Jalisco ..... *L. crawshayana*
8. Flowers usually rose to purple in September-November; midlobe of the lip concolorous or rarely dotted; leaves ensiform to elliptic; Jalisco and elsewhere 9
9. Pseudobulbs ovoid or globular, short; flowers rose-lilac, petals rhombic, the tips of the sepals with green thickenings ..... *L. eyermaniana*
9. Pseudobulbs ovoid to ellipsoid, fairly elongated; flowers lilac-purple to magenta, petals lanceolate to rhombic, the tips of the sepals dark, without any thickening 10
10. Leaves arching; pseudobulbs ovoid, sometimes elongated; flowers lilac-purple, petals lanceolate or elliptical, up to 2.5 cm wide; throat of lip slightly or not lined; western-central Mexico ..... 10a, *L. autumnalis*
10a. Throat of the lip white, yellow areas restricted to the keels, with very scarce purple lines; petals lanceolate; flowers star-shaped, usually dark magenta; from 2000 to 2600 m altitude, higher altitude, easternmost populations ..... f. *atrorubens*
10a. Throat of the lip yellow, the yellow area extending towards the lateral lobes, with several interrupted purple lines, flowers usually full, not conspicuously star-shaped, lilac to magenta 10b
10b. Petals rhombic, flowers magenta; plants from 1300-2200 m altitude, western populations ..... f. *xanthotrophis*
2. Petals lanceolate to elliptic, flowers lilac to pale magenta; plants from 1800-2350 m altitude, central populations ..... f. *autumnalis*
10. Leaves erect; pseudobulbs ellipsoid-fusiform, elongated; flowers magenta, petals rhombic, about 3 cm wide; throat of lip heavely lined; only in Hidalgo ... *L. gouldiana*

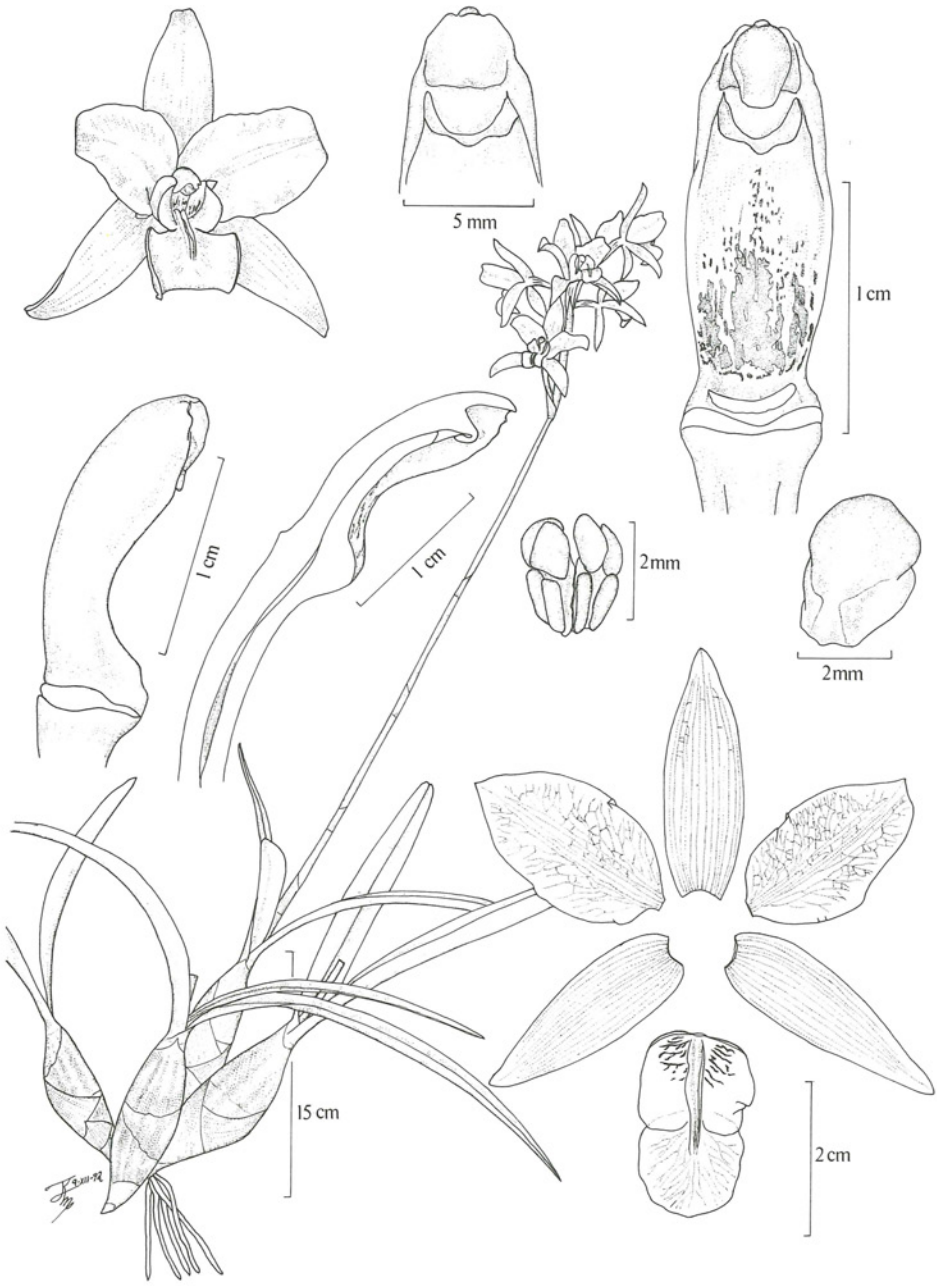


FIG. 6. **LAELIA ALBIDA** Lindl. *M. Soto 3903*. Drawing by R. Jiménez.

LAELIA ALBIDA Batem. ex Lindl., Bot. Reg. 25: misc. p. 2. 1839.

TYPE: "A native of the environs of Oaxaca, whence it was sent to me [Bateman] this spring by Messrs. Sadler"; not located; the lectotype (here designated) is a raceme, without collector data mounted with t. 54 of Bot. Reg. 25. 1839, and two collections from Harris, in K-L!

Cattleya albida (Batem. ex Lindl.) Beer, Prakt. Stud. Fam. Orch. 208. 1854.

Bletia albida (Batem. ex Lindl.) Rchb. f., Walp. Ann. 6: 428. 1862.

Laelia discolor A. Rich. & Gal., Ann. Sci. Nat. ser. 3,3: 23. 1845.
Lectotype (here designated): "unique, *5022 H. Galeotti*. Fl. roseâtres, labellis pourpre et jaune, terre froide, 7500- avec *L. albida* Nov. 1840. Cordillera, Oaxaca, Mexico" with an analytical drawing by A. Richard, W(15188)!

Laelia albida bella Williams, Orch. Grow. Man. 6th ed.: 348, 1885; Warner & Williams, Orch. Album 5, pl. 239. 1886.
Type: not preserved.

Laelia albida Marianne Warner, Journ., Hort. ser. 3, 10: 69. 1865.
Type: not preserved.

Laelia albida var. *stobartiana* Rchb. f., Gard. Chron. 1877, 7: 271; in Sander, Reichenbachia 2: 43, t. 68. 1890.
Type: a plant imported to England by Low, not located.

Laelia albida var. *sulphurea* Rchb. f., Gard. Chron. 1884. 21, p. 76; Warner, Williams & Moore, Orch. Album 7, t. 320. 1888.
Type: "sent me by Messrs. Heath & Sons, Exotic Nurseries, Cheltenham", not located.

L. albida var. *brunnea* Rchb. f., Gard. Chron. 1868: 208.
Type: not located.

L. albida var. *ochracea* Rchb. f., Gard. Chron. 1868: 208.
Type: not located.

L. albida var. *tuckeri* Rchb. f., Gard. Chron. 1868: 208.
Type: not located.

COMMON NAMES: "Huichila" (Oaxaca), "lirio de San Francisco" (lily of San Francisco), "monjitas" (little nuns), "tzicxóchitl", "flor de tatanachtle" (Chontal, Oaxaca).

Plant epiphytic, sometimes lithophytic, often forming dense clumps, up to 35 cm high excluding the inflorescences. **Roots** simple, rounded, pale brown to whitish or greenish, ca. 1.5-2.3 mm thick. **Rhizome** very short, inconspicuous, made up of 2-3 internodes, 4-9 mm long, 4-9 mm thick; somewhat dorsiventrally compressed. **Pseudobulbs** conic-ovoid, slightly compressed, elliptic in cross-section, made up of ca. 4 internodes, green, new ones completely covered by scarious, very tight sheaths, the older ones strongly 8-10-furrowed, 40-74 mm high, 15-31 mm wide, 15-28 mm thick. **Leaves** 1-3, usually 2, linear-ensiform, obtuse to acute, coriaceous-fleshy, stiff, slightly carinate, green, usually suffused with purple, 7-27 x 0.9-2.2 cm. **Inflorescence** from the mature pseudobulb, erect-arcuate, 10-90 cm long, the peduncle subterete, green-dull purplish, 2-4.5 mm thick, bearing 6-9 tubular bracts, the bracts strongly appressed, progressively shorter, acute to obtuse, inconspicuously carinate, scarious at anthesis, whitish, 14-40 mm long, much shorter than the internodes; raceme elongate, subdistichous, 4-12 flowered, the rachis 9.5-19 cm long. **Floral bracts** triangular to ovate, acuminate to obtuse, sometimes mucronate and carinate at apex, appressed to the ovary, scarious at anthesis, pale brownish, 5-14 x 4-6 mm. **Flowers** small, showy, resupinate, with good substance, 2.5-4 cm diameter; tepals and lip cream-white, white-pinkish, rarely entirely rose-pink or cream-yellow, lip purple-veined in the throat, midlobe frequently suffused with pink, column white striped with purple on the ventral surface; strongly fragrant, fragrance sweet, especially on sunny weather. **Ovary** pedicellate, subterete, thickened towards the apex, 6-sulcate, erect, arcuate, not twisted, furfuraceous-glutinous, tannish

green with dark spots, 19-33 mm long, 1.5-2.7 mm thick. **Sepals** spreading, acute, smooth to somewhat furfuraceous on the dorsal surface, rather stiff and fleshy; **dorsal sepal** lanceolate-elliptic to oblong, 24-33 x 6-13 mm; **lateral sepals** oblique to slightly falcate, lanceolate to elliptic, 21-29 x 7-12 mm. **Petals** strongly revolute and recurved at apex, ovate-elliptic to rhombic, oblique, acute to obtuse, sometimes apiculate to emarginate, base abruptly and inconspicuously clawed, the margins entire to slightly undulate, 21-30 x 10-20 mm. **Lip** 3-lobed, 19-23 mm total length, 13-19 mm wide when spread out, arcuate, the basal part subparallel to the column, the midlobe decurved; lateral lobes erect, oblique, obovoid, truncate-rounded, the margins entire, with purple dots at base, ca. 10-14 x 5-8.5 mm; midlobe suborbicular-ovate to transversely elliptic, the apex rounded, truncate, frequently emarginate, deflexed, minutely and inconspicuously undulate to dentate, 9-12 x 9-18 mm; callus simple, made up of 3 longitudinal keels from the base of the lip to the middle of the midlobe, the lateral keels higher than the mid one, the latter arising above the lateral ones, the keels confluent towards the apex, bright yellow with purple dots or stripes at basal half, ca. 13-17 mm long. **Column** slightly arcuate, wingless, oblong-semiclavate, with a almost wanting, very obscure cuniculus at base, ventral margins very prominent, especially near the stigma, with nearly wanting, obscure, basal wings, 13-17 mm long, 3.5-4 mm wide; clinandrium obscurely 3-toothed, the central tooth more prominent, triangular, obtuse or truncate, deflexed, the lateral ones widely rounded, the lower margin somewhat irregular. **Anther** ovoid-subquadrate, 8-celled, white, shriveling to brown, 2.7 mm long, 2 mm wide, 2 mm thick. **Pollinarium** 2.8 x 2.3 mm, made up of 8 yellow pollinia, upper pollinia subquadrate-ovate, widely rounded, 1.0 x 1.1 mm; lower ones obliquely triangular-ovate, 1.2 x 0.7 mm; with 4 strap-like caudicles, 2 mm long. **Rostellum** a transverse, fleshy blade, ovate-subquadrate, rounded, convex, white, ca. 1.5 x 2.3 mm. **Stigmatic cavity** transversely elliptic-subquadrate to triangular-ovate, almost always rounded, greenish white, shiny, lateral lobes scarcely protruding or not, ca. 2.5 x 3.5 mm. **Capsule** ellipsoid, smooth, triangular in cross-section, 3-keeled, the keels prominent, with 3 blunt ridges, 2-3.5 cm long, ca. 0.9-1.5 cm thick, with a 15 mm pedicel and an apical, 5 mm long beak.

ETYMOLOGY: *albidus*, whitish, referring to the color of the flowers.

HISTORY: Count Karwinsky found *Laelia albida* in 1832 in the State of Oaxaca and sent the first plants to Munich, Germany. Six years later, Theodore Hartweg collected it for the second time, and soon this *Laelia* was one of the best known in Europe. Unfortunately, the cultivation systems of that time were inappropriate, and few plants managed to survive. Lindley described this species in 1839, based on a plant sent by Sadler; his description appeared in the Botanical Register. The name *Laelia albida* was suggested by Bateman, and Lindley mentions that the color is basically white which was new to the genus, as all the other species known at that time had rose-colored or purple flowers.

RECOGNITION: The narrow leaves (0.9-2.2 cm wide), white, small (2.5-4 cm diameter) flowers, and the many-flowered raceme (4-12) are characteristic. The flowers have a strong honey fragrance. The petals and sepals are white or cream-colored, the lip is pale to dark rose-colored; in the center three parallel yellow keels can be distinguished, and in the throat of the lip there are branched red-purple lines. The flowers are of good substance and last open for 10 to 15 days if not cut off or the pollinia removed.

DISTRIBUTION: Endemic in the Sierra Madre Occidental, the Sierra Madre del Sur,

and the Valley of Tehuacán-Cuicatlán. *Laelia albida* grows in a vast area, so that it has been found in Sinaloa, Durango, Nayarit, Jalisco, Colima, Michoacán, Guerrero, Oaxaca, and Puebla. It could have reached the dry valleys of central Veracruz, near Cd. Mendoza, since old collections do exist from Veracruz.

HABITAT: The plants grow on trees, preferably oaks and junipers, but also on other trees, sometimes on rocks, at an altitude of 1400 to 2300 meters, in open, dry, deciduous mixed forests of pine (e.g. *Pinus herrerae*, *P. teocote*), oak (e.g. *Q. magnoliifolia*, *Q. scytophylla*, *Q. elliptica*) and juniper; sometimes also in humid though seasonally dry forests. Large plants with dozens of fronts are found occasionally, usually on rocks. Annual rainfall is about 600-1100 mm. In the arid Mexican Plateau it is the hardiest and most easily grown species.

WHERE TO SEE: In the NW, you can see *Laelia albida* along the road MEX 40 (km 190-220 Durango-Mazatlán). Huge cultivated specimens are found along the road MEX 125 (Tehuacán-Huajuapan de León); these cultivated plants in the Tehuacán Valley bear the most attractive flowers.

FLOWERING TIME: From September to December.

VARIATION: The plants native to the northwest (Durango and Sinaloa) produce very short inflorescences that are hardly any longer than the leaves, and the flowers are small, and nearly white. In the rest of its range the flowers are mostly cream-white, except in Oaxaca, where most plants have the lip white, suffused with pink, but other colors are also found. As in other species, the old varieties of the 19th century must be considered cultivars. Some places are known where all the flowers are completely rose-colored and the lip is always darker. *L. discolor* had rosy flowers, as other clones named var. *rosea*, while the var. *tuckeri* was purple, probably similar to the cv. "Achim" (photo 9). In southern Oaxaca there are populations with flowers that fade in light, salmon pink (photo 12), especially in years when the nights are cooler than usual, a clone of this type was the base of the variety *salmonea*. There are flowers in which the coloration of the tepals is also suffused, like in the old var. "Bella", and in the cv. "Bella de Moore" (photo 11). The famous var. *stobartiana* had the apices of tepals and the midlobe of the lip purple, in a pattern similar to that seen in *Chysis limminghei*; this cultivar is not known at present in cultivation. A plant with yellow flowers, *L. albida* var. *sulphurea*, was described in the 19^{h} century, and other yellowish flowers occasionally appear in collections, but the color is not decidedly yellow. Occasionaly there are plants with dull-pink to brownish segments. The flowers with the best, more rounded shape are found in Oaxaca. We have found self-pollinated flowers in the deep, dry, ravines at the base of the massif of Cerro Pelón, in Oaxaca, but that seems to be a response to the damage caused by insects that parasitize the ovary, rather than a genetically fixed trait.

HYBRIDS: *Laelia albida* has been crossed with other orchids to produce interesting plants; there are 15 artificial hybrids registered by the Royal Horticultural Society (RHS); outstanding progeny in the first generation are *Dial.* Snowflake (x *Caularthron*

7. A clump of *Laelia albida* grown on a mesquite tree in Teposcolula, Oaxaca

8. A *Laelia albida* from Oaxaca showing the most common color of this species

9. *Laelia albida* "Achim", MP/AMO

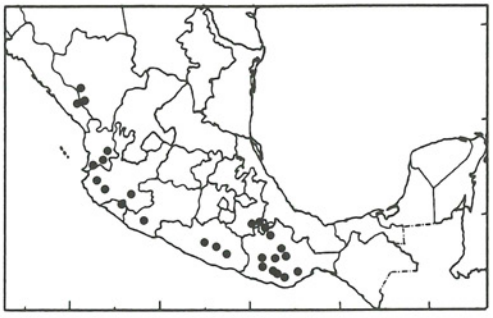
10. *Laelia albida* "Katherine", MP/AMO

bicornutum), *Lc.* Bowri-albida (x *Cattleya bowringiana*), and *Lc.* Nina Bonita (x *Cattleya* Claesiana). The very easy culture, white color, good shape, and flowers of good substance of long lasting qualities, make it one of the most desirable species in breeding programs.

CONSERVATION STATUS: Not threatened; this species is rather common in the field and seldom collected at present. In the Valley of Tehuacán, Puebla, and in the Mixteca Region of Oaxaca, huge plants can be seen in villages, usually growing in mesquite trees (*Prosopis* spp.), and small pieces and flowers can be obtained there. A beautiful population, with plants mostly on rocks, can be found at the entrance to the Park of Omiltemi, Guerrero, a protected area near Chilpancingo.

SPECIMENS EXAMINED: **DURANGO**: *G. Kennedy sub J. Ackerman 1280* SEL! *M. Soto Arenas 3158 & G. Salazar* AMO! **SINALOA**: *M. Soto 1977 & G. Salazar* AMO(x6)! **NAYARIT**: *Diguet 98* P! *Diguet s.n.* P! *O. Nagel 5116* AMES! MEXU! MO! *J. González sub E. Oestlund 5123* AMES! BM! *P. Tenorio 16691 & G. Flores* MEXU! **JALISCO**: *C.G. Pringle 5351* AMES! *S. Rosillo 106, 107, 108, 109, 114, 115* AMO! *M. Soto 2511* AMO(x2)! *M.W. Chase 83202* **COLIMA**: *Roezl* W(no. 8619)! **MICHOACAN**: *Sartorius s.n.* US(photo)! *O. Nagel 6532* AMES! **GUERRERO**: *Roezl* W(no. 8620)! *G.B. Hinton 9915* K! *Y. Mexía 8908* AMES! K! NY! *Y. Mexía 9102a* AMES! *O. Nagel 1627* AMES! *O. Nagel sub E. Oestlund 1434* AMES! MO! *Castelo 423* AMO! FCME! **PUEBLA**: *Liebmann 517* W! *Maury 351* AMES! *E. Oestlund 5865* AMES! *O. Nagel 6429A* AMES! *Moore 4990* AMES! *UC Berkeley 57.185-1* AMES! *F. Halbinger 76* AMO! *M. Sousa 6180 et al.* MEXU! *S. Cusi sub M. Soto Arenas 1925* AMO! **OAXACA**: *Karwinsky* BR! G! W! *Ghiesbreght s.n.* G! P(x2)! *H. Galeotti 5017* BR(x3)! G(x2)! K! P(x2)! P(watercolor No. 103)! W(x 5)! *C.G. Pringle 5831* AMES! MEXU! *C. Conzatti 1522* AMES! MEXU! *O. Nagel sub E. Oestlund 2814* AMES! *F.B. Johnson 1250-10a* SEL! *Reznicek & Bobbette 51* MEXU! NY! *G. Pollard s.n.* AMO(slide)! *E. Hágsater 2015* K! MO! *E. Hágsater 2016* AMES! SEL! *M. Soto 3903* AMO(illustration voucher)! *M. Soto 3909 et al.* AMO(x8)! *M. Soto 6454 et al.* AMO! *M. Soto 7226* AMO! *S.C. Solano y Vara 235* MO! *S.C. Solano & Vara 329* MO! *R. Solano 523, 524, 525, 526, 527 et al.* AMO! *P. Tenorio 12424* IEB! MEXU! MO! *G. Martín GJM-M218* MO! *R. Torres 12745 & P. Tenorio* MEXU! *A. Campos 2702* MEXU! **VERACRUZ**: (perhaps cultivated specimens) *H. Fink no. 4*, W! *Kienast* W(32735)! WITHOUT LOCALITY: "*Cymbidium pallens*" Inedit Icon. Mex. Fl. pl. 120 G! copy MEXU(library)! *Sallé s.n.* BM! *Harris* K-L! *Exp. Malaespina s.n.* MA(293889)! *Sessé & Mociño* MA(4351)!

REFERENCES: Lindley, Bot. Reg. 25: t. 54. 1839; Hooker, Bot. Mag. 66: t. 3957. 1842; Lindley, Bot. Reg. 28: sub t. 62. 1842; Reichenbach, Xenia Orch. 2: 56. 1874; Warner & Williams, Orch. Album 3: t. 138. 1884; Williams, Orch. Mex. 188. 1951; Kennedy, Orchid Digest 42(1): 20. 1978; Senghas & Bockemühl, Orchideenkartei, Die Orchidee 30(6): 1979; McVaugh, Fl. Novo-Galiciana 16: 175. 1985; Soto Arenas, Ic. Orch. I. pl. 50. 1990.



The known geographic distribution of *Laelia albida*.

11. *Laelia albida* "Bella de Moore", MP/AMO

12. *Laelia albida* fading to salmon pink, from southern Oaxaca

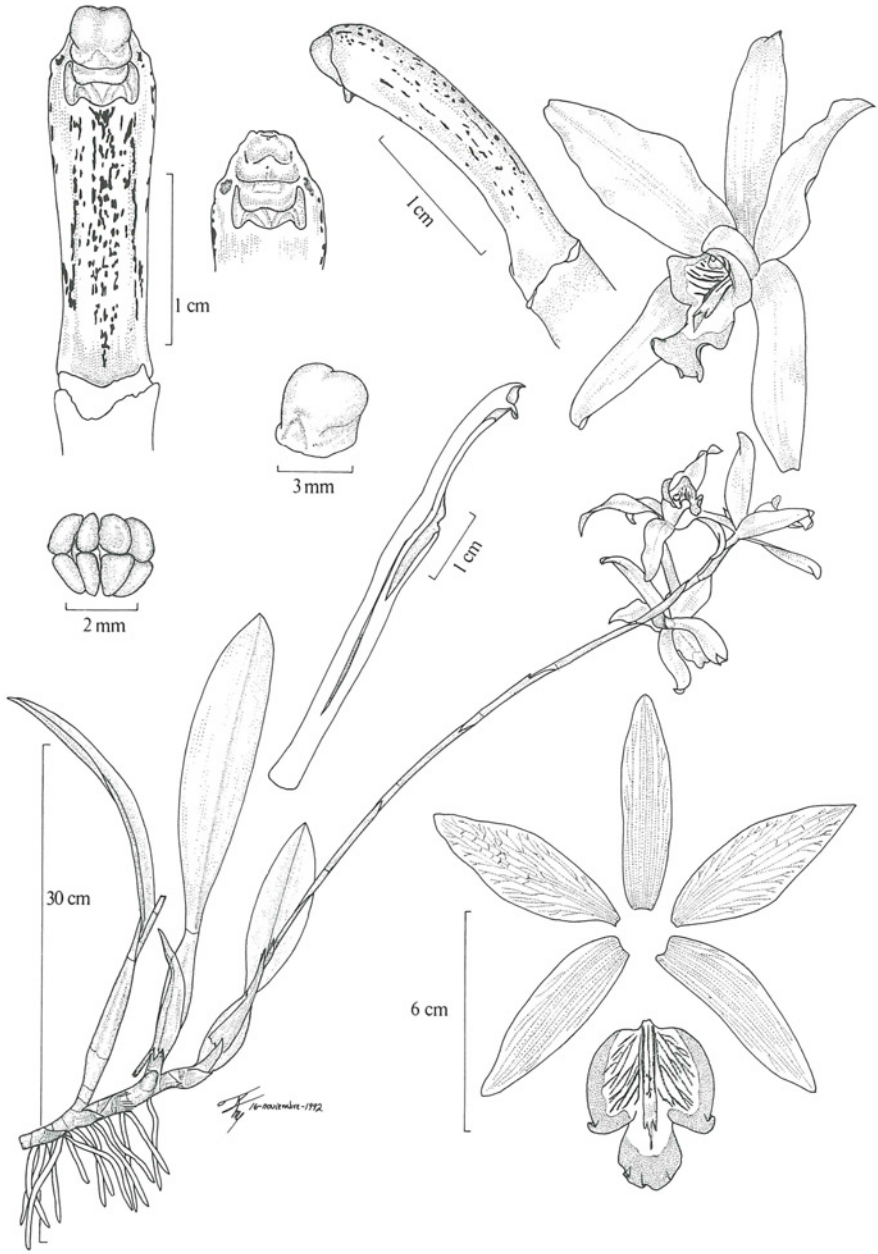


FIG. 7. **LAELIA ANCEPS** Lindl. subsp. **ANCEPS**. *E. Hágsater 6106*. Drawing by R. Jiménez.

LAELIA ANCEPS Lindl., Bot. Reg. 21: t. 1751. 1835.

TYPE: "Imported from Mexico by Messrs. Loddiges ... ", apparently not preserved; holotype, the t. 1751.
Amalias anceps (Lindl.) Hoffmsg., Linnaea 16: 228. 1842.
Cattleya anceps (Lindl.) Beer, Prakt. Stud. Fam. Orch.: 208. 1854.
Bletia anceps (Lindl.) Rchb. f., Walp. Ann. 6: 418. 1862.

2a. Subspecies **ANCEPS**

Laelia barkeriana Knowles & Westcott, Flor. Cab. 1: 63. t. 30. 1837.
Type: Mexico. Xalapa., "hundreds of feet above the level of the city of Xalapa, " *Hechmann ex Hort Barker s.n.*, not preserved. Lectotype (Christenson, Lindleyana 11(1): 17. 1996): t. 30, loc. cit.

L. anceps var. *barkeriana* Lindl., Bot. Reg. 23: t. 1947. 1837.

L. anceps var. *superba* Regel, Gartenfl. 4: t. 140. 1855.
Type: not located.

L. anceps var. *alba* Rchb. f., Gard. Chron., 11: 11. 1879; Gard. Chron. ser. 3, 1: 485. 1887.
Type: a plant cultivated by W. Bull in England, not located.

L. anceps var. *hilliana* Hort. [?Rchb. f.] Gard. Chron. 1881: 1: p. 168; Rchb. f. ex Warner & Williams, Orch. Album 4: pl. 146. 1885.
Type: Mexico, plant in the collection of J. Hill, not preserved.

L. anceps var. *percivaliana* Rchb. f., Gard. Chron., 1883: 110; Warner & Williams, Orch. Album 6: pl. 256. 1887.
Type: plant cultivated in the collection of R.P. Percival, not located.

L. anceps var. *leucostica* Rchb. f., Gard. Chron., n.s. 23(1): 206. 1885.
Type: A plant cultivated by Greenfield in England, not located.

L. anceps var. *blanda* Rchb. f., Gard. Chron. 23(1): 206. 1885.
Type: plant cultivated in England by F. Sander, who received it from W. Cobb, not located.

L. anceps var. *delicata* Hort. ex Williams, Orch. Grow. Man., ed. 6, p. 351. 1885.
Type: not indicated.

L. anceps var. *virginalis* Hort., Journ. Hort., ser. 3, 15: 42. 1887.
Type: not located.

L. anceps var. *scottiana* Warner & Williams, Orch. Alb. 7: t. 325. 1888.
Type: a plant cultivated in England by W.A. Scott, we consider as the type t. 325, op. cit.!

L. anceps var. *grandiflora* Williams, Gard. Chron., ser. 3,3: 105. fig. 17. 1888; Williams, Orch. Grow. Man. ed. 6: p. 351. 1885.
Type: the fig 17 in the protologue.

L. anceps var. *radians* Hort., Gard. Chron., 1888, 1: 298.
Type: not indicated.

L. anceps var. *holocheila* Rolfe, Gard. Chron., ser. 3, 9(1): 426. 1891; Gard. & Forest. 4: 173. 1891.
Syntypes: several plants cultivated in England (Liverpool Horticultural Co. and H.Low & Co.), not located.

L. anceps var. *oweniana* Hort., Journ. Hort., ser 3, 25: 569. 1892; Gard. Chron. ser. 3 12(2): 744. 1892.
Type: a plant cultivated in England by G.D. Owe, not located.

L. anceps var. *obscura* Rchb. f. ex Williams, Orch. Grow. Man. ed. 7: p. 430. 1894.
Type: not indicated.

L. anceps var. *chamberlainiana* Hort., Orch. Rev. 3: 1. 1895; Gard. Chron. ser. 3, 31: 71. 1902.
Type: a plant cultivated in England in the collection of J. Chamberlain, not located.

L. anceps var. *rosefieldiensis* Hort., Orch. Rev. 3: 34. 1895.
Type: A plant cultivated in England by D.B. Crawshay, not located.

L. anceps var. *crawshayana* Hort. [?Rchb. f.], Journ. Hort. 1895 1: 67.

Type: plant cultivated in England by D.B. Crawshay, not located.

L. anceps var. *lineata* J.O'Brien, Gard. Chron. ser. 3, 13(2): 734. 1895.

Type: a plant in the collection of Rothschild, not located.

L. anceps var. *protheroana* O'Brien, Gard. Chron. ser. 3, 19(1): 40. 1896.

Type: a plant cultivated in the collection of J. Broome, not located.

L. anceps var. *roeblingeana* Hort., Orch. Rev. 6: 40. 1898.

Type: a plant cultivated in New Jersey, U.S.A., in the collection of C.G. Roebling, not located.

L. anceps var. *morada* Hort. ex Rolfe, Orch. Rev. 30: 10. 1922.

Syntypes: plants cultivated in England, imported by Cowan & Co., not located.

L. anceps var. *veitchiana* Rchb. f., Gardening World 6: 284.

Type: not located.

COMMON NAMES: "Vara de San Diego" (Wand of San Diego), "flor de San Miguel" (flower of San Miguel), "flor de Todos Santos" (flower of All Saints).

Plant epiphytic, slightly scandent to fairly clumped, ca. 25-50 cm high excluding the inflorescence. **Roots** rounded, whitish, 1.0-3.5 mm thick. **Rhizome** elongate, made up of 5-6 internodes, 3.0-4.5 cm long, 5-7.5 mm thick, slightly dorsiventrally compressed. **Pseudobulbs** ellipsoid-ovoid, elongate, compressed, rhombic in cross-section, shortly (ca. 1-2.5 cm) stipitate, built up of 3 internodes, light green, covered by the remnants of scarious, strongly appressed sheaths, the older ones 5-7 furrowed, furrows not always well defined, 60-100 mm high, 18-34 mm wide, 12-21 mm thick. **Leaf** solitary, oblong-elliptic to lanceolate, acute to obtuse, coriaceous-fleshy, stiff, carinate, conduplicate and subpetiolate at base, green, 12.5-23.3 x 2.3-5.4 cm. **Inflorescence** from the mature pseudobulb, erect-arcuate, 25-75 cm long, peduncle compressed, green, 2.5-5 mm wide, ca. 2.5-3.5 mm thick, with many (ca. 11-16) bracts as long as or slightly longer than the internodes, bracts tubular, appressed, distichous, progressively larger, long triangular, subacute-obtuse, conduplicate, carinate, scarious at anthesis, brown-whitish, 29-70 x 6-12 mm; raceme usually 2-3 flowered, rarely with up to 5 flowers, rachis 2-4 cm long. **Floral bracts** similar to those of the peduncle but usually larger, sheathing the ovary, drying at anthesis, more cymbiform, with the margins papyraceous, 38-58 x 7-20 mm, covered with a transparent, mucilaginous substance. **Flowers** big and very showy, resupinate, substance rather weak, 7.3-12 cm high, 5.5-8.0 cm wide, tepals pink to rose-purple, lip purple with a pale yellow disc, throat with purple, magenta, or brown-reddish stripes, midlobe usually darker than tepals, callus dark yellow, shiny, column white-greenish, often with purple lines and stripes; fragrance weak, sweet. **Ovary** pedicellate, subterete, slightly thickened towards the apex, 6-sulcate, erect-arcuate, slightly twisted, glutinous, not furfuraceous, green, ca. 3.4-4.8 cm long, 4-5 mm thick. **Sepals** spreading, apices slightly thickened and slightly carinate, acute, not furfuraceous on the outer surface; **dorsal sepal** oblong to narrowly elliptic, 47-63 x 9-14 mm; **lateral sepals** lanceolate to narrowly elliptic, oblique, 44-61 x 9-15 mm. **Petals** spreading, lanceolate to elliptic, acute to subacute, slightly convex, widely cuneate, margins slightly undulate, 49-69 x 17-27(32) mm. **Lip** 3-lobed, 38-47 mm total length, 31-40 mm wide when spread out, rather straight; lateral lobes erect, the margins overlapping over the column, obliquely oblong-elliptic, rounded at base, obtuse to obliquely truncate at apex, with the margin somewhat reflexed at apex, 28-36 x 14-17 mm; midlobe deflexed, conduplicate, difficult to spread out, oblong-elliptic to spathulate, truncate to emarginate at apex, margin undulate, 18-24 x 12-26 mm; callus made up as a thickened, longitudinal plate, very low and canaliculate at base, elevated and fleshy at apex (at the basal third of the midlobe) sulcate at apex, finishing in 3 keels, the central one longer, keels slightly irregular and erose-denticulate or undulate, 25-34 mm long, 4-5 mm at its widest point, ca. 1.5-2 mm high. **Column** slightly arcuate, wingless, semiclavate, with a cuniculus ca. 4-5 mm deep; ventral margins prominent, with two widely triangular processes at the base; 18-21 mm long, 5.5-6.5 mm wide;

clinandrium minutely denticulate, with a tongue-shaped apical tooth, truncate, deflexed. **Anther** cordiform-quadrate, truncate, 8-celled, white-cream and brown, 3.5 mm long, 2 mm wide, 2.5 mm thick. **Pollinarium** ca. 2.0 x 2.5 mm long, built up of 8 yellow, compressed pollinia, the upper ones quadrate, rounded, 1.1 x 1.0 mm; the lower ones triangular-ovate, 1.3 x 0.8 mm; united to 4 fusiform, granulose caudicles. **Rostellum** a transverse blade, subquadrate-semiorbicular, convex, white, ca. 2.5 x 2.0 mm. **Stigmatic cavity** transversely elliptic-obovate, shiny, with the lateral lobes conspicuous and protruding, green, shiny, ca. 3 x 4.0-4.5 mm. **Capsule** ellipsoid-ovoid, with 3 inconspicuous ribs and 3 other ridges, broader, not well-defined, green, 4.0-4.8 cm long, 2.0-2.2 cm thick, with a pedicel ca. 15 mm long, and an apical 7 mm long beak.

ETYMOLOGY: *anceps* = two edge, for the double-edged floral bracts and pseudobulbs.

HISTORY: *Laelia anceps* was described by John Lindley in 1835, based on plants imported to England by Loddiges & Sons, and flowered in December 1834. Very soon after its discover, new forms in shape and color could be found in every imported batch of plants. Its popularity reached a rate to be compared with that of a very much appreciated species from Brazil, *Laelia purpurata*. The color and shape varieties were given new names to distinguish them from each other. The best plants were eagerly collected in the States of Oaxaca and Guerrero, but we consider that they constitute a distinct subspecies, subsp. *dawsonii*.

RECOGNITION: The compressed, two-edged, ellipsoid to ovoid pseudobulbs, separated by an elongate (3-4.5 cm) rhizome, the single apical, elliptic leaf, the inflorescence covered with two-edged, large bracts, with 1 to 3 flowers in the terminal part are diagnostic. The flowers are large, showy, 7 to 12 cm high, usually rose-purple; the midlobe of the lip is dark purple. In the middle of the lip, a yellow callus with three terminal ridges can be seen, as well as branched lines of different tones of red in the throat. During very sunny days the flowers emit a pleasant fragrance. The flowers last for 10 to 15 days or more.

DISTRIBUTION: In the Sierra Madre Oriental and the Central Plateau of Chiapas. *Laelia anceps* subsp. *anceps* can be found on the watershed of the Gulf of Mexico; in the states of Nuevo León, Tamaulipas, San Luis Potosí, Hidalgo, Querétaro, Puebla, Veracruz, Oaxaca, and Chiapas; and also in Guatemala and Honduras.

HABITAT: In warm oak forests (*Quercus conspersa*, *Q. oleoides*, *Q. laeta*), usually with tropical deciduous tree species (*Acacia*, *Erythrina*) preferably at the altitudes of 900 to 1500 meters. There are localities in Veracruz with huge populations, of hundreds to thousands of plants, while in other regions the populations are much smaller, and even relictual. Annual rainfall is about 1200 to 2100 mm.

WHERE TO SEE: The classic populations of *L. anceps* are those from central Veracruz. The species is common in the coffee plantations along the road MEX 150 (Orizaba-Córdoba). Scattered specimens can be seen in the suburbs of Xalapa, especially in the lower part of the city (Las Animas).

13. *Laelia anceps* subsp. *anceps* with a darker axial line on petals

14. *Laelia anceps* subsp. *anceps* from Chiapas.

15. A *Laelia anceps* subsp. *anceps* with narrow segments

16. *Laelia anceps* subsp. *anceps* from Chavarrillo, Veracruz

17. *Laelia anceps* subsp. *anceps*; a "semialba carnea"

18. *Laelia anceps* subsp. *anceps*, a pale-colored specimen from Veracruz

FLOWERING TIME: From October to December.

VARIATION: The subspecies *anceps* is less variable than subspecies *dawsonii*. The typical form has rose-purple segments with a darker lip, usually with a yellow throat, heavily marked with dark purple lines. The color ranges from completely white (photo 27) to very dark rose-purple forms (e.g. photo 23). Some of the plants from Guatemala have an unusually rounded form (photo 21), and they are very desirable for cultivation.

Other sought-after forms are the lineatas (photo 26), with striped petals; the veitchianas (photo 19) with white segments and bluish lip, and the semialbas (photos 17-18) which vary from having a very pale to dark-colored lip.

HYBRIDS: *Laelia anceps* is the Mexican species most used in hybridization. The RHS has registered 151 first generation hybrids, two of them presumed also to be wild. Unfortunately, it is impossible to be certain which of both subspecies has been involved in the grex. The resulting progeny is often notably vigorous. Outstanding hybrid progeny are *Laelia* Ancibarina (x *L. cinnabarina*), *L.* canariensis (x *L. harpophylla*), *L.* Santa Barbara Sunset (x *L.* Ancibarina), *Lc.* Twilight Song (x *Cattleya walkeriana*), *Lc.* Wrigleyi (x *C. bowringeana*). The bluish forms of this species, like *L. anceps* cv. Veitchiana, and others have produced some of the better blues in the *Cattleya* alliance. Additional information on *L. anceps* breeding can be found in Rose (1987) and Bechtel (1990).

CONSERVATION STATUS: Subspecies *anceps* is not at risk; there are large populations in Veracruz, San Luis Potosí, and Tamaulipas. However, the plant is really scarce and known only from small, isolated stations in Chiapas and Oaxaca. The subspecies *anceps* has been probably favored by the transformation of the landscape, since the plant is very successful in the coffee plantations that replaced the original cloud forest.

SPECIMENS EXAMINED: **SAN LUIS POTOSI**: *C.G. Pringle 5097* AMES! *S. Rosillo 75* AMO! **QUERETARO**: *E. Carranza 1060* AMO! IEB! *E. Carranza 2815* IEB! *E. Carranza 4422* IEB! *E. Carranza 4423* IEB! *B. Servín 1385* IEB! *L. López 118* IEB! *L. López 744* IEB! *E. González 326* IEB! *E. González 428* IEB! MEXU! *E. González 1306* IEB! *L. Chávez 109* AMO! IEB! XAL! *H. Rubio 224* IEB! *H. Rubio 1225* IEB! *H. Rubio 1386* IEB! AMO! **HIDALGO**: *Coulter 1531* AMES! K! *F. González Medrano 8438 et al.* MEXU! *M. Soto s.n.* AMO! **VERACRUZ**: *Sartorius sub E. Hohenacker* W! *H. Galeotti 5142* P! W! *Schnée, Maury, etc.* P(x4)! *Liebmann 510-514* P! W! *Linden 200* BR! K! *Bourgeau 2090* P! *Bourgeau 1764* P! *Bourgeau 3355* BR! GH! K! P(x2)! *M. Hahn 3355* K! *Botteri 1249* P(x3)! *F. Müller 257* BR! K! NY! P! *F. Müller s.n.* P! *Bilimek 431* P! *Bilimek s.n.* WU! *Meisner 257* AMES! *C.A. Purpus 33* BR! *C.A. Purpus 16278* MICH(photo)! *C.A. Purpus 16291* AMES! MICH(in part, photo!) *C.G. Pringle 11709* AMES! K! MEXU(x2)! *O. Nagel 1158A* AMES! *O. Nagel 1201* AMES! MO(x2)! *O. Nagel 4765* AMES! MO! *Hamlin s.n.* AMO! *W.S. Thurston T-2489 sub E. Hágsater 6106* AMO(x6; illustration voucher)! AMES! MEXU! MO! *Rozynski 600* NY! *M. Sousa 4547 & A. Delgado* MEXU! *L. Trejo s.n.* MEXU! *M. Rosas 678* MEXU! *M. Rosas 733* MEXU! *T.B. Croat 39600* MEXU! *R. Cedillo 317* MEXU! *R. Delgado s.n.* MEXU! *F. Ventura 4451* MO! *P. Valdivia 2170* XAL! *Haager et al. sub Hágsater 5407* AMO(x4)! K! SEL! *G. Salazar 2431 & García Rosas* AMO! *Huerta Alvízar 65* AMO! *M. López Castillo 41* AMO! *Cházaro & Hernández 4083* XAL! *M. Morales 54* XAL! *Chazaro 1088* XAL! *G. Castillo & W. Bussey 2889* XAL! *R. Ortega 590* XAL! *M. Zola 31* XAL! **PUEBLA**: *Maury 244* AMES! *Diguet s.n.* P! **OAXACA**: *Miller s.n.* AMO(photo!) *M. Soto 7600 et al.* AMO(x10)! *7601* AMO(x2)! **CHIAPAS**: *E. Pérez 183* AMO! *E. Pérez 190* AMO! WITHOUT LOCALITY: *Sessé, Mociño* MA(4297; mixed with *L. autumnalis*)! *Mociño et al.* BM! *Pavón* BM! *Linden 200* BR! *Ghiesbreght 200* W! "Cymbidium speciosum" Inedit Icon. Mex. Fl. pl. 1194 G! copy MEXU(library)!

REFERENCES: Lindley, Bot. Reg. 28; sub t. 62. 1842; Warner & Williams, Orch. Album 2: 75. 1883; Senghas & Bockemühl, Orchideenkartei, Die Orchidee 32(6). 1979; Stewart, Amer. Orchid Soc. Bull. 56(5): 492-498. 1987.

19. *Laelia anceps* subsp. *anceps* cv. "Cielito Lindo" MO/AMO. A semialba with amethyst lip, apparently from Veracruz, a type known in horticulture as "*veitchiana*"

20. A *Laelia anceps* subsp. *anceps* with white flowers and reddish stripes in the throat

21. A very rounded form of *Laelia anceps* subsp. *anceps* from Guatemala

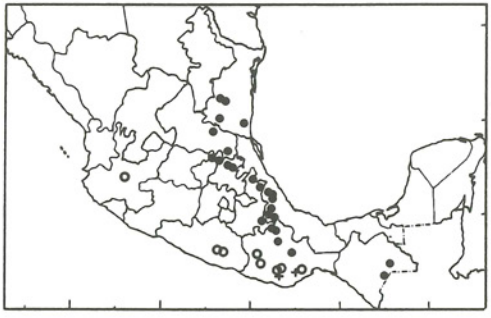
22. *Laelia anceps* subsp. *anceps* cv. "Mendenhall" AM/AOS, a polyploid plant

23 and 24. Two different plants of *Laelia anceps* subsp. *anceps* from central Veracruz

25. *Laelia anceps* subsp. *anceps* growing wild in Chiapas

26. *Laelia anceps* subsp. *anceps*, a specimen from Veracruz with flowers with striped petals, like the old cv. "Lineata"

27. *Laelia anceps* subsp. *anceps* cv. "Doña Marina" MO/AMO



The known geographic distribution of *Laelia anceps*. Subspecies *anceps*, full circles. Subspecies *dawsonii*, empty circles, traditionally cultivated plants; plus sign, wild populations.

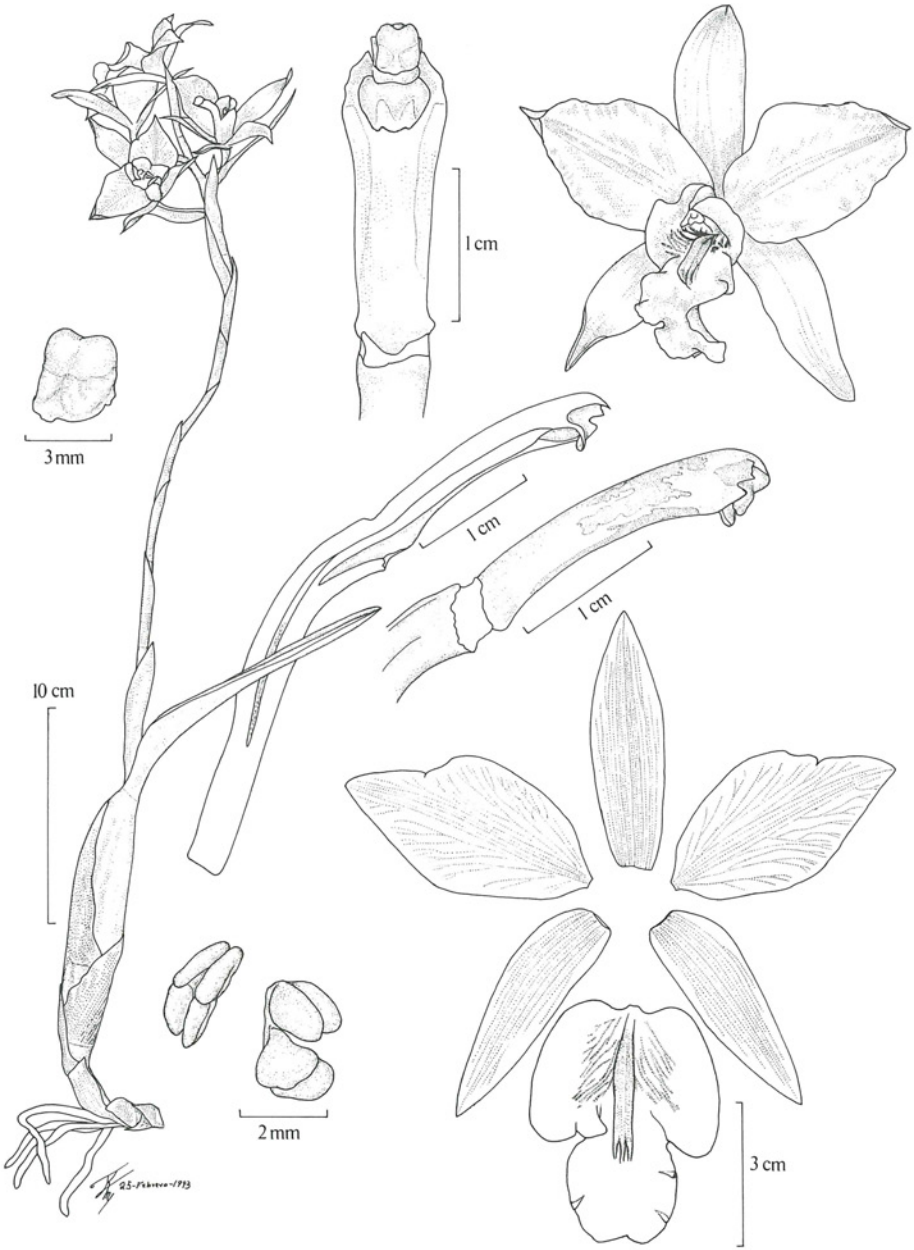


FIG. 8. **LAELIA ANCEPS** subsp. **DAWSONII** (J. Anderson) Rolfe f. **DAWSONII**. *M. Soto s.n.* Drawing by R. Jiménez

LAELIA ANCEPS subsp. **DAWSONII** (J. Anderson) Rolfe, Orch. Rev. 30: 10. 1922.

Basionym: *Laelia anceps* var. *dawsonii* J. Anderson, Gard. Chron. 1868: 27; Warner, Select. Orch. Pl. 2. (12) pl. 34. 1874; Warner & Williams, Orch. Album 1: 44. 1882.

TYPE: "It was found in October, 1865, by the Messrs. Low's indefatigable collector, Mr. John Tucker, near Juquila, in Mexico ... The plants were found near Juquila at a high elevation, about 150 miles from Oajaca, in a Barranca, growing on a rock .... The plant, with flowers from which our description is taken, is in the collection of Mr. Dawson, of Meadow Bank"; not preserved; neotype (here designated): the plate 34!, Warner, Select. Orch. Pl. 2(12). 1874.

L. dawsonii (J. Anderson) Crawshay, Gard. Chron. 32: 414. 1902.

FORMA **DAWSONII**

L. anceps var. *stella* Rchb. f., Gard. Chron. 25: 136. 1866; Warner & Williams, Orch. Alb. 7: pl. 329. 1887.
Type: plant cultivated by H. Gaskell, probably is the specimen W(9870)!

L. anceps var. *vestalis* Rchb. f., Gard. Chron. 13(1): 136. 1880.
Type: a plant flowered in January 15th, 1880, in the collection of Sir Trevor Lawrence, not located.

L. anceps var. *schroederiana* Rchb. f., Gard. Chron. 23: 342. 1885; Warner, Williams & Gower, Orch. Alb. 10: pl. 473. 1893.
Type: plant imported to England by Baron Schroeder, apparently in W!

L. schroederiana (Rchb. f.) Crawshay, Gard. Chron. 32: 414. 1902.

L. anceps subsp. *schroederiana* (Rchb. f.) Rolfe, Orch. Rev. 30(343): 10. 1922.

L. anceps var. *munda* Hort., Gard. Chron. 25: 298. 1885.
Type: not located.

L. anceps var. *williamsii* Sander ex Warner & Williams, Orch. Album 4: pl. 190. 1885.
Type: the plate 190 loc cit.!

L. anceps var. *kienastiana* Rchb. f., Gard. Chron. n.s. 25: 298. 1886.
Type: *Kienast* W(9938)!

L. anceps var. *sanderiana* Rchb. f., Gard. Chron. ser. 3, 1: 281. 1887.
Type: *Sander*, apparently in K!

L. sanderiana (Rchb. f.) Crawshay, Gard. Chron. 32: 414. 1902.

L. anceps subsp. *sanderiana* (Rchb. f.) Rolfe, Orch. Rev. 30(343): 10. 1922.

L. anceps var. *hyeana* Linden & Rodigas, Lindenia 5: pl. 226. 1890.
Type: a plant cultivated in Belgium, in the collection of J. Hye-Leysen, the type is the plate 226 of the original description !

L. anceps var. *hollydayana* O'Brien, Orch. Rev. 2: 74. 1894; Gard. Chron. 1894: 166.
Type: plant cultivated in England, imported from the region of Orizaba by F. Sander & Co., not located.

Laelia hollidayana (O'Brien) Crawshay, Gard. Chron. 32: 414. 1902.

L. anceps subsp. *hollidayana* (O'Brien) Rolfe, Orch. Rev. 30(343): 10. 1922.

L. anceps var. *ashworthiana* O'Brien, Gard. Chron. ser. 3, 15: 103. f. 10. 1894; hort., Orch. Rev. 2: 63. 1894; Journ. Hort. 28: 125, f. 19. 1894.
Type: a plant cultivated in England by F. Sander & Co., the type is the fig. 10 of the original description .

L. anceps var. *waddoniensis* Hort., Gard. Chron., ser. 3, 23: 125. 1898; Hort. Orch. Rev. 6: 94. 1898.
Type: a plant cultivated in England in the collection of P. Crowley, not located.

L. anceps var. *ballantineana* Linden, Lindenia 14: t. 632. 1898; Journ. des Orch. 1: 13. 1898; *non*

Hort. 1891.
Type: the plate 632 with the original description !
? *L. anceps* var. *chamberlainiana* Hort., Gard. Chron. ser 3, 31: 71. 1902.
Type: not located.

COMMON NAMES: "Huichila" (Oaxaca).

Plant epiphytic, somewhat scandent to fairly clumped, ca. 30-50 cm high excluding the inflorescence. **Roots** rounded, whitish, 1.5-3.5 mm diameter. **Rhizome** elongate, made up of 4-5 internodes, 2.2-5.5 cm long, 8-13 mm thick, slightly dorsiventrally compressed. **Pseudobulbs** ellipsoid-ovoid, elongate, slightly compressed, elliptic-rhombic in cross-section, shortly (ca. 1-3 cm) stipitate, built up of 3 internodes, light green, covered by the remnants of scarious sheaths strongly appressed, with 7-8 longitudinal furrows, more or less defined, 9.5-18 cm high, 22-40 mm wide, 16-27 mm thick. **Leaf** solitary, rarely two, oblong-elliptic to oblong-lanceolate, acute-subacute, coriaceous-fleshy, stiff, carinate, conduplicate and subpetiolate at base, pale green, 13-23.5 x 3.5-6.8 cm. **Inflorescence** from the mature pseudobulb, erect-arcuate, 40-70 cm long, peduncle compressed, green, 3-5 mm wide, ca. 2.5-3.5 mm thick, with many (ca. 10-12) bracts as long as or slightly longer than the internodes, tubular, appressed, progressively larger, long triangular, subacute-obtuse, conduplicate, carinate, scarious, brown-whitish, 30-66 mm long, 7-15 mm wide; raceme 2-4(5) flowered, rachis 2-5 cm long. **Floral bracts** similar to those of the peduncle but usually larger, appressed to the ovary, drying at anthesis, more cymbiform, with the margins papyraceous, 41-64 x 12-18 mm, covered with a transparent mucilaginous substance. **Flowers** big and very showy, resupinate, substance rather weak, 7.3-13 cm high, 5.5-9.0 cm wide, sepals and petals white, lip with a white or pale yellow disc with purple, magenta or brown-reddish stripes, shiny, of varying thickness; midlobe white or blotched or suffused with purple-magenta; callus dark yellow, shiny, column white-greenish, often with purple lines, fragrance weak, sweet and floral. **Ovary** pedicellate, rounded, slightly thickened towards the apex, 6-sulcate, erect-arcuate, green, glutinous, smooth, not furfuraceous, grooves straight to twisted, 3.5-5.6 cm long, 3.5-5.5 mm thick. **Sepals** spreading, apices slightly thickened and slightly carinate, acute, smooth; **dorsal sepal** oblong-elliptic, 45-69 x 10-18 mm; **lateral sepals** lanceolate, oblique, 45-60 x 14-16 mm. **Petals** spreading or somewhat directed frontwards, rhombic to elliptic-rhombic, subacute, slightly convex, the margins often reflexed, widely cuneate or rounded, margins sometimes undulate or pleated, 38-65 x 19-40 mm. **Lip** 3-lobed, 38-50 mm total length, 34-45 mm wide when spread out, straight to slightly arcuate; lateral lobes erect, the margins touching or overlapping over the column, obliquely elliptic, rounded at base, truncate and with the margin somewhat reflexed at apex, 25-30 x 13-20 mm; midlobe apically deflexed, conduplicate, difficult to spread out, oblong-obovate to suborbicular, emarginate at apex, margin undulate, 17-31 x 14-23 mm; callus built up of a thickened, longitudinal plate, very low, canaliculate at base, elevated and fleshy at apex (at the basal third of the midlobe) sulcate at apex, finishing in 3-5 keels, the central one longer, keels slightly irregular to erose-denticulate or undulate, 25-38 mm long, 4-7 mm at its widest point, ca. 1.5-2 mm high. **Column** slightly arcuate, wingless, semiclavate, with a cuniculus ca. 4-5 mm deep; ventral margins prominent, with two widely triangular wings at base; 20-22 mm long, 5.5-6.5 mm wide; clinandrium minutely denticulate, with a blade-like, subquadrate, apical tooth, truncate, deflexed. **Anther** cordiform-quadrate, truncate, somewhat bilobed in profile, 8-celled, white-cream and brown, 3.5-4.2 mm long, 3.3 mm wide, 2.5 mm thick. **Pollinarium** ca. 3 x 2.5 mm, built up of 8 yellow, compressed pollinia, the upper ones elliptic-subquadrate, widely rounded, 1.5 x 1.2 mm; the lower ones triangular-obovate, widely rounded, 1.3 x 1.1 mm; united to 4 fusiform, granulose caudicles, arranged in two pairs, ca. 2 mm long. **Rostellum** a subquadrate-semiorbicular blade, white, convex, 2.0 x 3.0 mm. **Stigmatic cavity** transversely elliptic-obovate to ovate, basally truncate to 3-lobed, shiny, greyish-white, with the lateral lobes conspicuous, slightly protruding, ca. 4.0-4.5 x 4 mm.

28. *Laelia anceps* subsp. *dawsonii* f. *dawsonii* cv. "Pacífico" MP/AMO, one of the few specimens with semialba flowers, similar to the original Tucker's specimen

Capsule ellipsoid-ovoid, with 3 inconspicuous ribs and 3 others broader, not well-defined, green, 4.8 cm long, 2.0 cm thick, with an apical beak 7 mm long and a pedicel ca. 15 mm long.

ETYMOLOGY: Dedicated to Mr. Dawson, British orchid grower of the 19th century.

HISTORY: In 1865 J. Tucker sent to Europe the first *L. anceps* plants collected in southern Oaxaca, one of them was described as the variety *dawsonii*. In the following years other similar specimens appeared in the orchid collections, although never as beautiful as the original *dawsonii*. Almost all the specimens were white-flowered or semi-albas. The wild habitat was unknown to the collectors, except for Tucker; Sander (1892) related that all the plants were purchased from the Indians, who grew them in the towns close to the Pacific coast of Oaxaca. Some plants have been maintained under cultivation until the present in a handful of towns in that state.

The wild populations of this plant were unknown to modern orchidologists, except for Thomas MacDougall who first reported in 1943 cultivated plants in a village west of Salina Cruz, and later, in 1947, collected plants in their natural habitat. MacDougall did not disclose the locality but it is inferred that it was in the Chontal region of Oaxaca; we have searched in that area with no success. In 1987 a few specimens were found close to the place where Tucker collected the var. *dawsonii* 130 years ago; this population is obviously relictual, consisting of only 12 clones, and very endangered by human disturbance.

Dr. Leslie Garay has told us that the specimen no. 8211 in the Reichenbach Herbarium is a spontaneous one collected by Tucker ex Low, and must be considered as the type; we have examinated that sheet and certainly it belongs to the form *dawsonii*; however, we were unable to find any indication that it was a Tucker's specimen. Dr. Garay has also pointed out that the original description is that in Garden Chronicle of 1868, since Selected Orchidaceous Plants was published in 1874, not in 1865, as indicated in Soto (1994). Therefore, the plate 34 of Selected Orchidaceous Plants can not be considered as the holotype, and is chosen here as a neotype.

RECOGNITION: The subspecies *dawsonii* is recognized by the white or semi-alba flowers, the rhombic to elliptic-rhombic petals, the thicker callus with 3-5 terminal keels, midlobe of the lip obovate to suborbicular, emarginate, and by its distribution on the Pacific watershed of Mexico. Although usually prettier and distinguishable from subsp. *anceps*, it is not always possible to assign specimens to either subspecies without hesitation, because the indicated diagnostic traits can be variable.

DISTRIBUTION: Endemic, in the Sierra Madre del Sur. Known wild only in southern Oaxaca; cultivated in Oaxaca and Jalisco.

HABITAT: In humid oak forest of *Q. scytophylla*, *Pinus herrerae* and *P. chiapensis*. Annual rainfall is about 1300-1600 mm.

WHERE TO SEE: The exact locality of the single wild population of this endangered species can not be disclosed. A few cultivated plants, maintained by jealous growers, are found in the village of Sola de Vega, on the Oaxaca-Puerto Escondido road.

FLOWERING TIME: From the end of November to January.

CONSERVATION STATUS: **Endangered**. This subspecies was probably once more widely distributed on the Pacific slope of the Sierra Madre del Sur, but we have been unable to find any large population in our field trips to the zone. The plants are known from small villages in Oaxaca and Jalisco, where they are successfully cultivated to sell the inflorescences in early November, which are offered in churches and cemeteries.

VARIATION: In spite of the reduced number of clones in this subspecies, they exhibit a morphological variation comparable to or even bigger than that of the subspecies *anceps* along its extensive range. The plants are from short to very large, the latter approaching those of *L. superbiens*, and comprising the old cv. *schroederiana* and the plants from Jalisco (photo 29); some clones are 2-leaved. The flowers vary from white with few, thin purple lines in the lip throat to white heavily marked in the throat, white with a variable magenta blotch in the midlobe (photos 28,30,31), to concolorous pale pink (photo 32).

The cultivated plants from Guerrero, with pale-pink tepals and velvety dark purple lip are recognized here as a different form, f. *chilapensis*.

SPECIMENS EXAMINED: **JALISCO**: *Gómez Farías s.n.* AMO! *C. Lamas s.n.* AMO! *F. Suro González sub M. Rodríguez s.n.* AMO! **OAXACA**: *F.B. Johnson 1252-1a,b* SEL! *E. Pérez sub M. Soto 7571* AMES! AMO! *M. Soto 6617 et al.* AMO(x8)! *M. Soto 6618 et al.* AMO! *R. Jiménez 1530 et al.* AMO(x2)! *R. Jiménez 1528, 1529 et al.* AMO! *M. Soto 7426 et al.* AMO! *M. Soto 7427 et al.* AMO! *M. Soto 7428 et al.* AMO! *E. Pérez 308* AMO! *A. Lau s.n.* AMO(in spirit)! **MEXICO**: [?Ocuilan, erroneous locality], *E. Oestlund 1784* AMES! **WITHOUT LOCALITY**: cv. Dawsonii W(8211)! *Williams*, '88; *Sander* W(8206)! cv. Williamsiana *Kienast*, watercolor, J. Day W(8213)! cv. Schroederiana crawshayana K! cv. Dawsonii K!

29. *Laelia anceps* subsp. *dawsonii* f. *dawsonii* cv. "Jalisco" MB/AMO

30. *Laelia anceps* subsp. *dawsonii* f. *dawsonii* a pale semialba

31. *Laelia anceps* subsp. *dawsonii* f. *dawsonii* cv. "Helen"

32. *Laelia anceps* subsp. *dawsonii* f. *dawsonii*. An uncommon pale-colored specimen

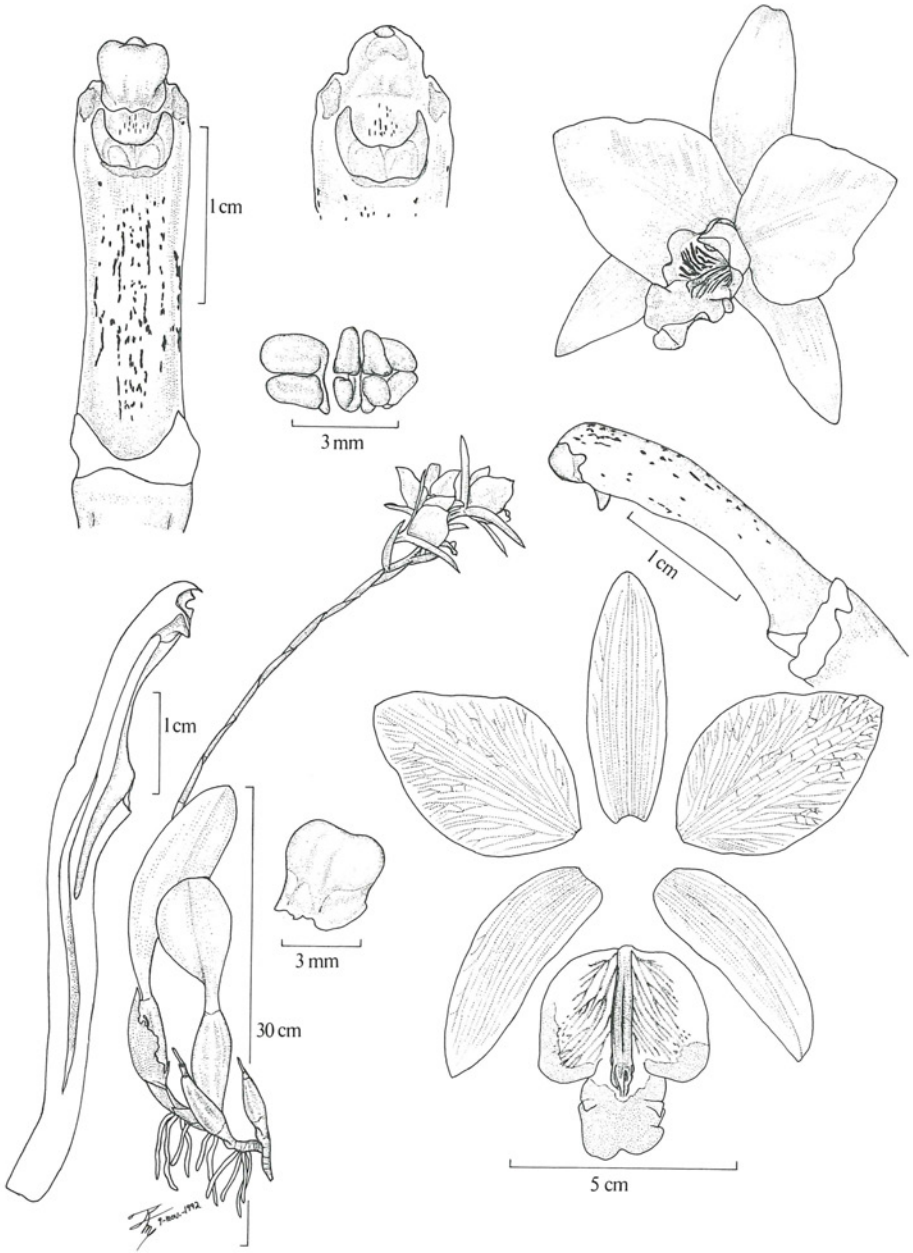


FIG. 9. **LAELIA ANCEPS** subsp. **DAWSONII** f. **CHILAPENSIS**. Soto Arenas. *E. Hágsater s.n.* Drawing by R. Jiménez.

LAELIA ANCEPS subsp. **DAWSONII** f. **CHILAPENSIS** Soto Arenas, Orquídea (Méx.) 13(1-2): 138. 1994.

HOLOTYPE: **MEXICO**: GUERRERO: Mpio Chilapa de Alvarez, Xalchuchú, a 8 km del camino Chilapa-Ahuacuotzingo, por el camino a Najapa, ca. 1600 m; epífita, cultivada, 31 octubre 1992, *M. Soto 7403, F. Halbinger, J. Lamas, E. Martínez & P. Monney* AMO!; isotype AMES!

L. anceps schroederae Hort. ex Sander, Gard. Chron. ser. 3, 1: 72. 1887, *non L. schroederi* Warner & Williams 1882.
Type: "in the possession of Baron von Schroeder, who obtained it at St. Albans at Mr. Sander's", not located.

L. anceps subsp. *schroederae* (Hort. ex Sander) Rolfe, Orch. Rev. 30: 10. 1922.

L. anceps ballantineana Hort., Gard. Chron. ser. 3, 9: 86. 1891; *non* Hort, Lindenia 1898.
Type: "Messrs. F. Sander & Co., St. Albans, staged a few specimens of interest, the most attractive being *Laelia anceps ballantineana*", not located.

L. anceps var. *amesiana* O'Brien, Gard. Chron. 1888, 4: 660: O'Brien, Journ. Hort. 3, 27: 505. fig. 73. 1893.
Type: the plate 73, Journ. Hort. 3, 27.

Laelia [anceps] amesiana crawshayana Hort., Gard. Chron. ser 3, 23: 59, fig. 22. 1898; *non* Hort. 1895.
Type: a plant presented by Crawshay at the meeting of the Royal Horticultural Society, January 11th, 1878; the type is the plate 22 !

Laelia anceps schroederae "Theodora" Journ. Royal Hort. Soc. 29: (proceedings) LXXXI, fig. 117. 1904.
Type: A plant cultivated in England by F. Wellesley, not located.

COMMON NAME: "Calaverita" (little skull, Guerrero).

ETYMOLOGY: The name of this form refers to the town of Chilapa, Guerrero, where the plant is extensively cultivated.

HISTORY: This plant has been cultivated probably for centuries in the villages east of Chilpancingo, Guerrero, especially in Chilapa, where it is very much esteemed by the natives. It is almost a sacred flower, since it is offered during the ceremony of the Day of the Dead, on November 2nd; the images of the cemeteries adorned with these orchids is a really memorable sight, as is the market of the town where thousands of cut racemes are sold, sometimes together with those of *Barkeria vanneriana*.

Members of this form appeared in Europe and North America in the last two decades of the 19th century. The extremely good shape and beautiful colors, and especially the velvety dark purple lip fascinated the *L. anceps* fanciers. Almost nothing was published about it until the decade of the 1970's when plants became widely appreciated in Mexico and in the United States.

The plants grown abroad have won important prizes, as some outstanding cultivars did in Mexico. Of all the colored forms and cultivars of *L. anceps*, this one is certainly the prettiest.

RECOGNITION: Plant and flower morphology fall within the variation already described for subspecies *dawsonii*, most differences are in color; however all plants are 1-leaved. Flowers have noteably flat tepals, completely spreading, giving a very pleasant form to the flower. The sepals are rather short and narrow and pale pink. Petals are ovate-rhombic, very wide, with darker tips and gradually paler towards the

33. *Laelia anceps* subs. *dawsonii* f. *chilapensis*, the original type specimen

34. *Laelia anceps* subs. *dawsonii* f. *chilapensis* cv. "Estrella del Sur" MO/AMO.

base. The lip has a very dark purple, velvety midlobe, the chrome yellow callus is surrounded by a paler rose region and the apex of the lateral lobes is also dark purple. The stigmatic cavity is slightly different from that of f. *dawsonii*, with the lateral lobes protruding downwards.

DISTRIBUTION: Not known. All known specimens are cultivated.

HABITAT: The plant is grown on trees of *Pithecellobium dulce*, scattered in corn fields or in backyards, at 1400-1900 m altitude, with an annual rainfall about 900 mm. However, the plant is probably a native of more humid places.

WHERE TO SEE: The plant is abundant and widespread in the surroundings of Chilapa.

FLOWERING TIME: November.

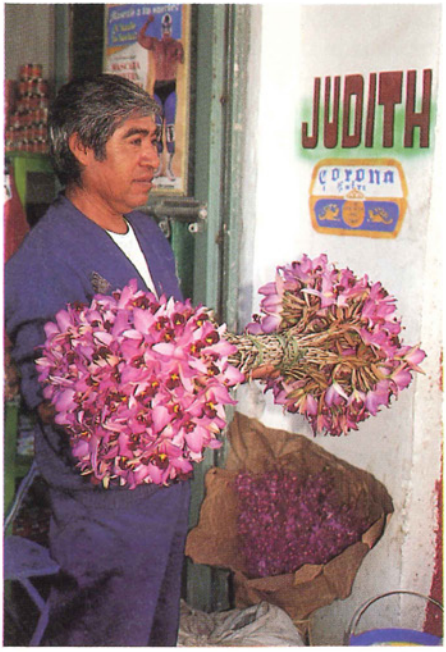
VARIATION: In Guerrero the variation is rather narrow, and we suspect that several named cultivars actually belong to the same clone. However, there is more than one clone in the region of Chilapa, detected by variation in size, color, and plant aspect, and maintained distinct in greenhouse conditions where several specimens are grown side by side. The most different is the cultivar "Estrella del Sur" MO/AMO (photo 34), with very big pseudobulbs, large flowers up to 15 cm high, and slightly paler lip color.

There is a plant purchased in a village of southern Oaxaca (*M. Soto 7449*) that is somewhat intermediate between f. *dawsonii* and f. *chilapensis*. It is richly colored, like f. *chilapensis*, but with pink, concolorous tepals and a magenta, velvety lip. The main difference with the typical *chilapensis* from Guerrero is in the petals, which are less rhombic and arcuate, not flat.

CONSERVATION STATUS: Probably extinct in the wild. However, it is so successfully cultivated that its permanence, at least under cultivation, is almost certain.

SPECIMENS EXAMINED: **GUERRERO**: *E. Oestlund 1596* AMES! BM! *O. Nagel sub E. Oestlund 2670* AMES! MEXU! MO! *E. Hágsater 3680* MEXU! **OAXACA**: *M. Soto 7449 et al.* AMO(x2)! (actually intermediate between f. *dawsonii* and f. *chilapensis*).

35. Raceme of *Laelia anceps* subsp. *dawsonii* f. *chilapensis*



36. A seller of "calaveritas", Chilapa, Guerrero

37. *Laelia anceps* subsp. *dawsonii* f. *chilapensis*, the most common type seen in cultivation

38. *Laelia anceps* subsp. *dawsonii*. *M. Soto 7449*.
An intermediate between forms *dawsonii* and *chilapensis*

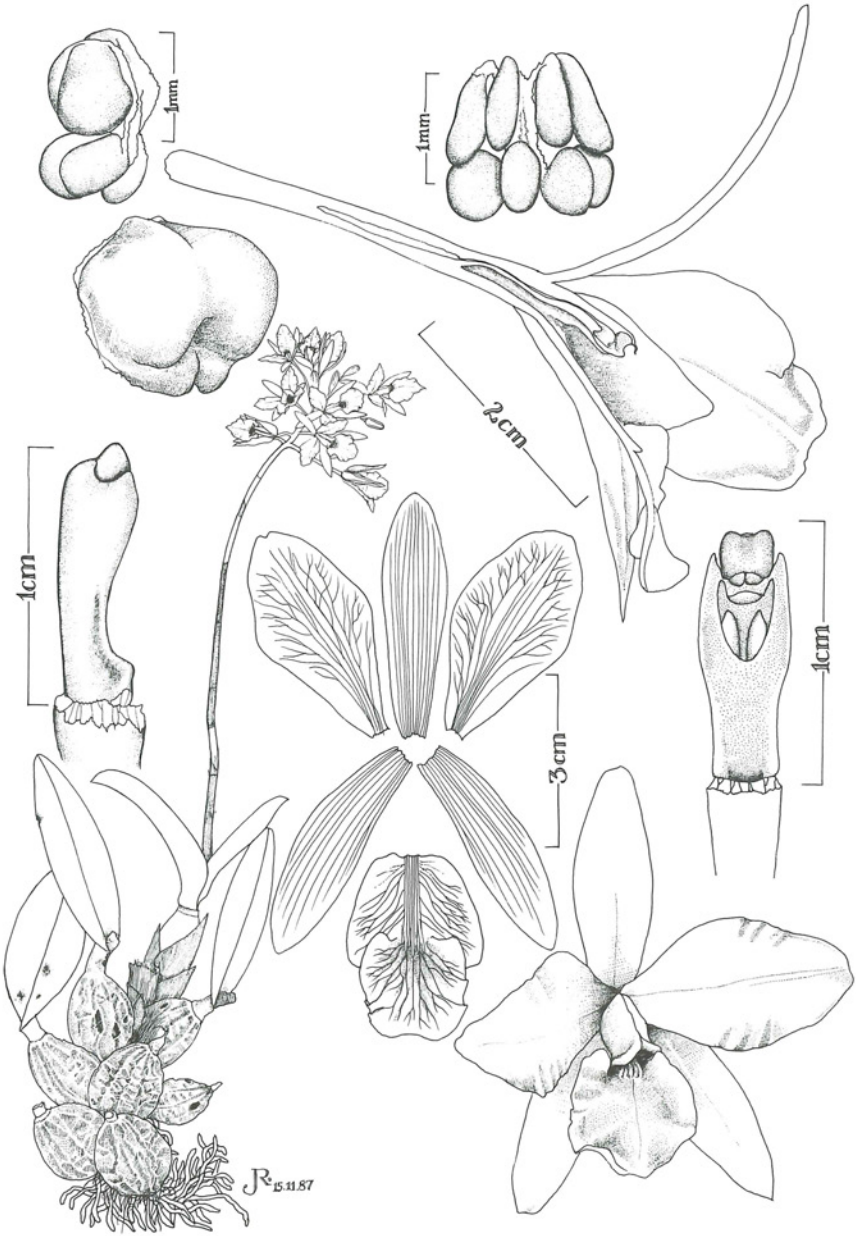


FIG. 10. **LAELIA AUREA** Navarro ex Halbinger & Salazar. *M. Soto 2572*. Drawing by R. Peláez.

LAELIA AUREA Navarro ex Halbinger & Salazar, Orquídea (Méx.) 12(1): 41-46. *figs.* 1990.

HOLOTYPE: MEXICO: NAYARIT: Las Coloradas, epífita sobre árbol a la orilla de arroyo, ca. 200 m alt. Flores amarillas, garganta café. Colectada en agosto de 1974, ejemplar preparado de material cultivado, 25 de septiembre de 1982, *Hágsater 4050* AMO!, isotype K!, clonotypes F!, ENCB!, MEXU! XAL!, SEL!, AMES!, BR!, NY! P! MO! US!

COMMON NAME: Not known.

Plant epiphytic, rupiculous, or terrestrial, 10-20 cm high excluding the inflorescence. **Roots** rounded, slender, flexuose, white to greyish, 2-3 mm thick. **Rhizome** short to somewhat elongate, made up of ca. 3 internodes, dorsiventrally slightly compressed, 10-20 mm long, ca. 5-9 mm thick. **Pseudobulbs** suborbicular, ovate or elliptic, conspicuously compressed, built up by 2 internodes, the basal internode much shorter; green, frequently suffused with purplish, with a glassy appearance; when young, the base covered by several distichous sheaths, imbricate, chartaceous, brownish, fugaceous; when mature wrinkled and with some longitudinal furrows, 20-60 x 15-35 mm; 15-26 mm thick. **Leaf** 1, conduplicate at base, oblong-elliptic to oblong-lanceolate, apex bilobed, with a small mucro in the sinus; coriaceous (not fleshy), very rigid, slightly carinate dorsally, 5-12 x 1.5-3.5 cm; apparently the leaf is lost after 1-2 years. **Inflorescence** from the mature pseudobulb, erect, 10-40 cm long; peduncle slightly compressed, green-purplish, up to 30 cm long, 2-4 mm thick, with 6-9 bracts subequal to the internodes, the bracts tubular, acute, appressed, progressively shorter, apically carinate and conduplicate, subchartaceous, whitish, 1.2-3.6 cm long; with 2 broader, conduplicate, imbricate, brownish bracts, 1-2 cm long at the base of the peduncle; raceme compact, subcorymbose, with 4-16 succesive flowers, 7-11 cm long, 7-13 cm diameter, rachis 2.5-3.5 cm long. **Floral bracts** spreading, triangular-ovate, obtuse or infrequently acute or acuminate, slightly concave, scarious, whitish with translucent margins, the veins slightly prominent, 4.5-15 mm long. **Flowers** showy, resupinate, slightly fragrant, the fragrance similar to that of roses, substance weak, 3-6 cm diameter. Sepals and petals intense yellow (sulphur to golden yellow), darker towards the sepal's apices, lip similar, the central basal half with a large maroon-purplish blotch, column white-yellowish or greenish suffused with purple on the sides and ventral surface, anther white and purple. **Ovary** pedicellate, rounded, slender, slightly thickened towards the apex, not furfuraceous, green, 16-36 mm long, 1.5 mm thick. **Sepals** spreading, slightly convex, recurved, smooth; **dorsal sepal** oblanceolate to narrowly elliptic, obtuse, rounded, 20-39 x 5.5-10.5 mm; **lateral sepals** oblique, oblanceolate to linear-elliptic, obtuse, 20-37 x 5.5-11 mm. **Petals** spreading, slightly convex, recurved, obliquely obovate to elliptic, widely obtuse to rounded, base cuneate, the margins slightly undulate, 21.5-38 x 9.5-19 mm. **Lip** 3-lobed, oblong-quadrate to oblong-ovate in general outline, the basal part tubular, the lateral lobes enclosing the column, the apical half spreading, slightly deflexed; 21.5-31 x 16.5-21.5 m; lateral lobes semiovate, oblique, rounded, 12.5-19.5 x 4-8.5 mm, the apical part protruding; midlobe subquadrate to suborbicular, emarginate, margins undulate, 9-17.5 x 9-19 mm; lip pubescent on the entire upper surface, hairs longer and more numerous at the center and at the base of the midlobe, marginally as sparse papillae; callus made up of 3 low, longitudinal keels, from near the base of the lip to the base of the midlobe, forming 3 lamellae, subtriangular in side view, conspicuous, often with two additional, inconspicuous keels and several thickened veins. **Column** almost straight, semiclavate, ventrally concave, with small, rounded wings near the base; cuniculus 5-6 mm long; the margin of the apical part prominent, but not forming distinct wings, the apex with two lateral teeth, clinandrium with a narrow, dorsal tooth, 8-9 mm long, 2.5-3.5 mm wide near the apex. **Anther** semiglobose-quadrate, bilobed, 8-celled, ca. 2 x 2.5 mm. **Pollinarium** ca. 1.5 mm long, made up

39. *Laelia aurea* cv. "Nayar" MP/AMO, type specimen of this species

of 8, yellow pollinia, strongly compressed laterally, the 4 distal pollinia oblong-ovate, the others suborbicular, with granulose caudicles clustered in a single blade. **Rostellum** a transverse blade, rounded, inclined backwards ca. 45°, with a well-defined viscarium directed backwards. **Stigmatic cavity** up to ca. one half of the column length, obtriangular, concave, lateral lobes conspicuous, triangular. **Capsule** not seen.

ETYMOLOGY: *aureus* = golden.

HISTORY: *Laelia aurea* was not known until the middle of this century and the first collected plants were determined to be a yellow variant of *Laelia rubescens*, which this plant greatly resembles except for the coloration. In 1974 Eric Hágsater, Manuel Bonilla and Jorge Lamas found in Nayarit a plant that formed the base on which, 16 years later, a description for *Laelia aurea* was made, and which with certainty is now considered a distinct species in the Mexican Northwest, with its own proper distinguishing characteristics.

RECOGNITION: The plants are epiphytic, lithophytic or terrestrial and are distinguished by their ovoid, frequently purple-red hued pseudobulbs that, when mature, have longitudinal furrows and transverse easily discerned pleats. The inflorescence bears a compact raceme, the flowers are slightly fragrant, the fragrance is similar to that of roses, the petals and sepals are of an intense yellow color. The lip is also yellow, it has a maroon red spot in the throat and short hairs on all the upper surfaces but densest in the center, where 3, rarely 5, longitudinal keels can be seen (photo 40); the petals are usually broader than in *L. rubescens* and the apex of the lip is emarginate.

This species is closely related to *L. rubescens* but is different in its yellow-colored flowers and the elevated keels of the lip. The plants of *L. rubescens* from Jalisco and Nayarit have pubescent lips and yellowish areas around the blotch of the lip, but really intermediate plants or populations are unknown, and yellow-flowered populations suddenly appear north of Tepic, Nayarit.

DISTRIBUTION: Endemic to the Coastal Plain of the Pacific Northwest, in the foothills of the Sierra Madre Occidental. *Laelia aurea* has only been found in the northwestern states of Mexico, from the central part of Nayarit to Durango and Sinaloa. It probably reaches the deep gorges of SW Chihuahua.

HABITAT: *Laelia aurea* grows mainly in dry tropical forests at an altitude of 100 to 300 meters. These zones have a predominantly hot climate with abundant rain in the summer and a long, sharply defined dry season from November to May. The plants can be epiphytic, but in some ravines they thrive on rocks or directly on the mineral soil, sometimes forming large colonies. Annual rainfall is 900-2000 mm.

WHERE TO SEE: No accessible populations are known. However, the plant can be found on the walls of the canyon of the Río Piaxtla, east of San Ignacio, Sinaloa. This visit is only possible by walking about 10 km along the margins of the river; the hot climate and sun must be taken in account if you are planning a visit. San Ignacio can be reached by a dirt road departing from the road MEX 15, north of Mazatlán.

FLOWERING TIME: The time of flowering in nature is not known. When cultivated in greenhouses, flowering occurs from August to January.

VARIATION: Of the few plants that have been collected, it has been noticed that the flowers of the plants from Nayarit have usually wider petals and the presentation of the flowers is thus more rounded (photos 39,40). Remarkable differences in coloration are not known, and it is unknown if alba forms (white) or semialbas (almost white) exist in this species.

HYBRIDS: Since *Laelia aurea* was described just a few years ago, and there are few plants outside of Mexico, it has no registered hybrids, although perhaps some of those attributed to *L. rubescens* actually involved *L. aurea*; this species is known informally as a variety of *L. rubescens* among the orchid growers of California. As far as we know the only hybrid of *L. aurea* is with *L. speciosa*; it is unregistered and was made by Río Verde nursery, in Temascaltepec, México.

CONSERVATION STATUS: It is probably not within any of the categories of risk; nevertheless, due to its showy character, it could be, if it were increasingly collected in the near future. The plants of Durango and Sinaloa are for the most part inaccessible, because of their habitat in the outlying canyons, but the plants of Nayarit could be more vulnerable.

SPECIMENS EXAMINED: **NAYARIT**: *M. Soto 2572 & G.A. Salazar* AMO(illustration voucher)! *M. Soto 2583* AMO(x5)! **SINALOA**: *M. Soto 6202 & G.A. Salazar* AMO! *Thurston T-1966* (not seen). **WITHOUT LOCALITY**: *W. Bertich* K!

The known geographic distribution of *Laelia aurea*.

40. *Laelia aurea* from Nayarit

41. *Laelia aurea* from Sinaloa. Note the narrow segments

42. *Laelia autumnalis* f. *autumnalis*, typical color, from Morelia, Michoacán

43. *Laelia autumnalis* f. *autumnalis*, cv. "Ana Lilia", MB/AMO

LAELIA AUTUMNALIS (Llave & Lex.) Lindl., Gen. & Sp. Orch. Pl. 115. 1831.

Basionym: *Bletia autumnalis* Llave & Lex., Nov. Veg. Descr. Orch. Opusc. 19. 1825.

Type: "Habitat in montibus Vallisoleto vicinis. Floret tantum Autumno.-Vernacule Flor de los Santos (Itzumaqua, insula Xanichu lacus Pazquarensis pulchiore)", not located; neotype (here designated), Michoacán: Cerro Peña de San Pedro, SW de San Miguel del Monte, Mpio. de Morelia, 8-diciembre-1990, 2400 m, *E. García 3560* IEB!

Cattleya autumnalis (Llave & Lex.) Beer, Prakt. Stud. Fam. Orch. 208. 1854.

Laelia autumnalis var. *alba* Hort., Gard. Chron. 1889, 2: 420; Warner & Williams, Orch. Album, 10, t. 451. 1893.

Type: from a plant exhibited by Veitch and sons, of Chelsea, apparently not preserved.

Laelia autumnalis fournieri André, Rev. Hort. 1896, p. 548.

Type: not located.

COMMON NAMES: "Flor de las ánimas" (flower of all souls); "flor de todos santos" (flower of All Saints); "flor de encino" (oak flower); "flor de la calavera" (flower of the skull); "lirio de San Francisco" (lily of San Francisco); "gallitos" (young cocks).

Plant epiphytic or lithophytic, forming clumps, 20-40 cm high excluding the inflorescence. **Roots** rounded, whitish, 1-2.5 mm thick. **Rhizome** short to somewhat elongate, made up of 3 internodes, 15-25 mm long, 6.5-8 mm thick. **Pseudobulbs** variable, fusiform, conic-ovoid to subglobose, slightly compressed, elliptic in cross-section, with 3-4 internodes, dark green, covered by remnants of papyraceous-scarious sheaths, the older longitudinally 10-12-furrowed, 40-110 mm high, 12-40 mm wide, 22-35 mm thick. **Leaves** usually 2, arcuate, narrowly elliptic, elliptic to ensiform, acute to subacute, coriaceous-fleshy, slightly carinate, dark green, often tinged with purple, 9-23 x 1.6-3.8 cm. **Inflorescence** from the mature pseudobulb, erect-arcuate, 40-100 cm long, the peduncle slightly compressed, green with purple dots, 4-5 mm thick, with 3-6 tubular, appressed bracts, progressively shorter, when spread out ovate-subtriangular, acute to obtuse, slightly conduplicate, scarious at anthesis, white-brown, 15-35 mm long; raceme elongate, subdistichous, 4-13-flowered, the rachis 8-36 cm long. **Floral bracts** triangular-ovate, obtuse, mucronate, carinate, sheathing the ovary or diverging from it, scarious at anthesis, brown-whitish, 9-21 x 7-14 mm. **Flowers** big and showy, resupinate, substance rather weak, 6.5-11 cm diameter; tepals lilac to dark magenta, the apices of the sepals darker; lip with the lateral lobes white suffused with lilac-magenta, midlobe lilac-magenta, disc white to yellow with purple-violet stripes along the veins, these lines almost absent in form *atrorubens*; callus white or yellow in the basal half, yellow in the distal one, with purple-violet stripes and dots near the base and a row of dots from the apex of the callus towards the midlobe; column white to lilac-magenta, sometimes with purple spots on the ventral side; fragrance weak, to intense in sunlight. **Ovary** pedicellate, subterete, thickened towards the apex, 6-sulcate, straight to arcuate, twisted or not, furfuraceous, olive green, base paler, 35-46 x 3-4.5 mm. **Sepals** spreading, with the apices acuminate and recurved, very scarcely furfuraceous on the outer surface; **dorsal sepal** lanceolate to narrowly elliptic, 41-67 x 11-21 mm, **lateral sepals** somewhat oblique, lanceolate, 38-70 x 9-17 mm. **Petals** spreading, the apices flat to slightly recurved, lanceolate to elliptic, (to subrhombic in f. *xanthotrophis*) broader at middle, acute to almost acuminate, the base abruptly subclawed, the blade cuneate to rounded at base, margins entire to very slightly undulate, 38-67 x 14-27 mm (up to 34 mm in f. *xanthotrophis*). **Lip** 3-lobed, 34-48 mm long, 28-39 mm wide when spread out; the basal part straight and subparallel to the column, the apex usually deflexed; lateral lobes erect, oblong-elliptic, widely rounded, the margins entire, somewhat involute, 22-31 x 10-14 mm; midlobe elliptic to ovate, acute to emarginate, mucronate, apex deflexed, margins undulate, 18-28 x 17-26 mm; callus simple, built up of 3 longitudinal keels, from the base to the beginning of the midlobe, 22-23 mm long, 2 mm high; the central one lower and rising above the lateral keels.

Column slightly arcuate, wingless, semiclavate, the cuniculus very obscure and inconspicuous, ca. 2 mm deep, ventral margins prominent, 24-32 mm long and 7 mm wide at the stigmatic cavity; clinandrium with an apical, triangular, acute, deflexed tooth, and minutely denticulate lower margins. **Anther** cordiform-quadrate, truncate, 8-celled, white-cream, 4 x 3 mm. **Pollinarium** 3.0-3.2 x 3.0-3.5 mm, made up of 8 yellow, compressed pollinia, the upper ones flabellate, 1.2 x 1.5 mm, the lower ones obliquely lanceolate, 2.0 x 0.8 mm; attached to granulose caudicles, forming a rather continuous plate, ca. 2.5 mm long. **Rostellum** laminar, transversely oblong-semielliptic to ovate, rounded, convex, hyaline-white, ca. 1.5-2.0 x 3 mm. **Stigmatic cavity** 3-lobed, transversely elliptic in outline, rather hidden, stigmatic lobes conspicuous and slightly protruding, rounded, 2.5-4 x 4-6 mm. **Capsule** ellipsoid, smooth, 3-keeled, with low, not well-defined, blunt ridges, 36 mm long, 28 mm diameter, with a ca. 25 mm pedicel and an apical beak ca. 8 mm long.

ETYMOLOGY: *autumnalis* = autumnal, for its time of flowering in the fall.

HISTORY: The Mexican botanists Pablo de la Llave and Juan Lexarza described in 1825 *Bletia autumnalis*, based on plants collected in the region of Valladolid (nowadays Morelia). When John Lindley established the genus *Laelia* in 1831, this species was immediately transferred to it, and since then it has been known as *Laelia autumnalis*.

RECOGNITION: The plants can be distinguished by the longitudinally furrowed pseudobulbs that have 2-3 oblong, acute, arching leaves up to 3.8 cm wide. The inflorescence carries a raceme of 4 to 13 flowers that open in succession. The size of the flowers varies, and their diameter is 6.5 to 11 cm; on sunny days they have a strong fragrance which lasts only a short time. The lanceolate sepals and the lanceolate to elliptic petals are of a rosy-purple or lilac color. The midlobe of the lip is deflexed and of a darker color, the lateral lobes are erect, white with red rays that branch in the throat, in the center there are 3 yellowish keels. The flowers are showy and can last 10 to 15 days on the plant.

The flowers of *Laelia autumnalis* can be confused with those of *Laelia eyermaniana* which are smaller, more rounded, rose-colored, and have sepals with thickened, green apices. The flowers of *Laelia gouldiana* are magenta-colored, they have wider petals, and a very striped throat, some specimens of f. *xanthotrophis* resemble closely *L. gouldiana*, but the upright, sharp-pointed leaves of *L. gouldiana* are different. *Laelia crawshayana* is also closely allied, but is phenologically separated, since it flowers mostly in February and March, not in the autumn.

The plant identified as *L. autumnalis* var. *xanthotrophis* that appears in Withner's book on Laelias (1990), is actually *L. eyermaniana*.

DISTRIBUTION: Endemic, in the Transverse Volcanic Belt. *Laelia autumnalis* is an orchid typical of the mountains of central Mexico and has been collected in the states of Nayarit, Jalisco, Colima, Michoacán, Guanajuato, México, Morelos, Guerrero, Puebla, and in the Federal District.

HABITAT: The plants grow mostly on oaks and occasionally on rocks at an altitude of 1400 to 2700 meters in either dry or humid, deciduous or evergreen, mixed forests of pines (e.g. *Pinus teocote*, *P. montezumae*) and oaks (*Quercus rugosa*, *Q. crassipes*).

Laelia autumnalis is also found abundantly in the mesophytic barranca forests with pines, oaks and *Carpinus*, *Meliosma*, *Styrax*, *Tilia*, *Oreopanax* and other broadleaved trees. Annual rainfall is about 700-1300 mm.

FLOWERING TIME: From September to November, occasionally to December.

CONSERVATION STATUS: Not threatened, there are large populations found throughout its range.

VARIATION: The species is variable, and the variation follows approximately an east-west pattern. In agreement with the apparent continuity of the variation, and that the differences are rather minor, we have decided to consider them as forms of a single species. Similar conclusions have been reached by García and Avila (1989) who studied the variation of this species in Transverse Volcanic Belt in Michoacán. Three forms are recognized, *atrorubens, autumnalis*, and *xanthotrophis*, but it must be stated that many intermediates are known between them and some plants are difficult to assign to a group. There are perceptible differences in the floral fragrance of the 3 forms, but they are difficult to describe in plain language, and we do not have chemical analysis available at present. Besides the differences that follow a geographic pattern, clones with particular colors, shapes, and sizes are found in populations of the three forms.

We do not know the geographic origin of the first albas. They were discovered in 1887 by Mr. F. Pechacek, a nephew of Roezl; he forwarded a few plants to the United States and from there to England, where they were widely distributed to the most important nurseries.

HYBRIDS: *Laelia autumnalis* has 26 first generation registered crosses; none of them is widely cultivated. However, *L. autumnalis* hybrids are some of the most desirable garden plants in central Mexico, because their easy culture, rapid growth, and showy flowering display.

REFERENCES: Bateman, Orch. Mex. & Guat.: 9. 1838; Lindley, Bot. Reg. 25: t. 27. 1839; Hooker, Bot. Mag. 67: t. 3817. 1840; Lindley, Bot. Reg. 28: sub t. 62. 1842; Williams, Orch. Mex.: 190. 1951; Senghas and Bockemühl, Orchideenkartei, Die Orchidee 27(4). 1976; McVaugh, Fl. Novo-Galiciana 16: 176. 1985.

44-45. Two different clones of *Laelia autumnalis* f. *autumnalis* showing the color variation in this form

LAELIA AUTUMNALIS f. AUTUMNALIS

RECOGNITION: We are including in the typical form the populations lacking the traits characteristic of the populations separated in f. *atrorubens* and *xanthotrophis*, leaving a rather heterogeneous group of plants. The flowers are paler, usually lilac, the petals are rather elliptic, broader than in f. *atrorubens*, narrower than in f. *xanthotrophis*, but they vary in shape. Transition to f. *xanthotrophis* seems to be very gradual in Jalisco. The population in the relatively isolated Sierra of Taxco, Guerrero, has usually darker flowers.

DISTRIBUTION: The typical form is found mostly in Michoacán and Jalisco, especially in the basins of Lakes Pátzcuaro and Chapala, and in the surroundings of Morelia. This form is also present in the mountains near Taxco, in Guerrero.

HABITAT: In different types of oak forest, some of then dry and open, and in mesophytic Barranca forest, from 1800 to 2300 m altitude.

WHERE TO SEE: Populations of f. *autumnalis* can be seen easily on the road from Quiroga to Zacapu, Michoacán, especially on the border of Lake Pátzcuaro.

VARIATION: There are albas (photo 43) and semialbas (photo 44), the most well-known is the cv. "Ana Lilia", a clone with pure white flowers that is also a strong grower. Recently a beautiful cultivar with amethyst colored flowers (coerulea) has been known.

CONSERVATION STATUS: Not threatened, but many populations have been lost by habitat destruction.

SPECIMENS EXAMINED: **JALISCO**: *C.Díaz 18141* MO(4301258)! *E. Hágsater 6240* AMO(card**, slide)! **GUANAJUATO**: *F.B. Johnson 1152-3ab* SEL! *H. Díaz B. 3274* IEB! **MICHOACAN**: *Exp. Malaespina s.n.* MA! *Nee* MA! *[Galeotti] 5207* W! *Arséne 7212* P! *Arsène s.n.* P! *C.G. Pringle 3579* AMES! *C.G. Pringle 5326* MEXU! *C.G. Pringle 10134* AMES! BM! ENCB G(x2)! K! MEXU! NY! P! US(photo)! W! Z(photo)! *C.G. Pringle s.n.* NY! *Aiken sub E. Oestlund 1145* AMES! MEXU! *E. Oestlund 1618* SEL! *Moore 4991* AMES! *G.B. Hinton 15656* AMES! NY! US(photo)! *F. B. Johnson 1152-65* SEL! *Thomsen sub UC Berkeley 57.192-1* AMES! *M. Soto 2527, 2528* AMO! *M. Soto 2540, 2544, 2551* AMO! *M. Soto 4759 et al.* AMO(x2)! *M. González G. 627* MEXU! *J. Rzedowski 45708* IEB! MEXU! *J. Rzedowski 45840* IEB! *J. Rzedowski 46091* IEB! *J.M. Escobedo 411* IEB! *J.M. Escobedo 1885* IEB! XAL! *I. Aguirre s.n.* AMO(card, slides)! *E. Hágsater 6239* AMO(card, slide)! *E. Pérez Caliz 856* IEB! *E. García 3560* IEB! *R. Torres & M. Ramírez 13469* IEB! *R. Torres y M. Ramírez 13663* IEB(x2)! *R. Torres & M. Ramírez 13710* IEB! *E. Pérez & E. García 1888* IEB! *E. Pérez & E. García 2575* IEB! *H. Díaz B. 2028* IEB! *H. Díaz B. 3157* IEB! *H. Díaz B. 4542* IEB! *H. Díaz B. 6430* IEB! *M. Cházaro 6777 et al.* IEB! **GUERRERO**: *E. Oestlund 2844* AMES! *B. Dehriteg* W! *E. Hágsater 6006* AMO(card, slides)! *E. Hágsater 6017* AMO(card)! *E. Hágsater 6018* AMO(card)! *E. Hágsater 6019* AMO(card)! **WITHOUT LOCALITY**: "*Cymbidium limodoroides*" Inedit Icon. Mex. Fl. pl. 1195 G! copy MEXU(library)! *Sessé, Mociño* MA(4297; mixed with *L. anceps*)! *Ghiesbreght s.n.* P! *W. Barker* K-L!

*** Foot note:** The term "card" in the "Specimens Examined" refers to flowers dissected and mounted in cards, and housed in the files of Herbarium AMO.

46. *Laelia autumnalis* f. *autumnalis* from Tangancícuaro, Michoacán

47. A cultivated clump of *Laelia autumnalis*

48. *Laelia autumnalis* f. *atrorubens* "Magna", MO/AMO

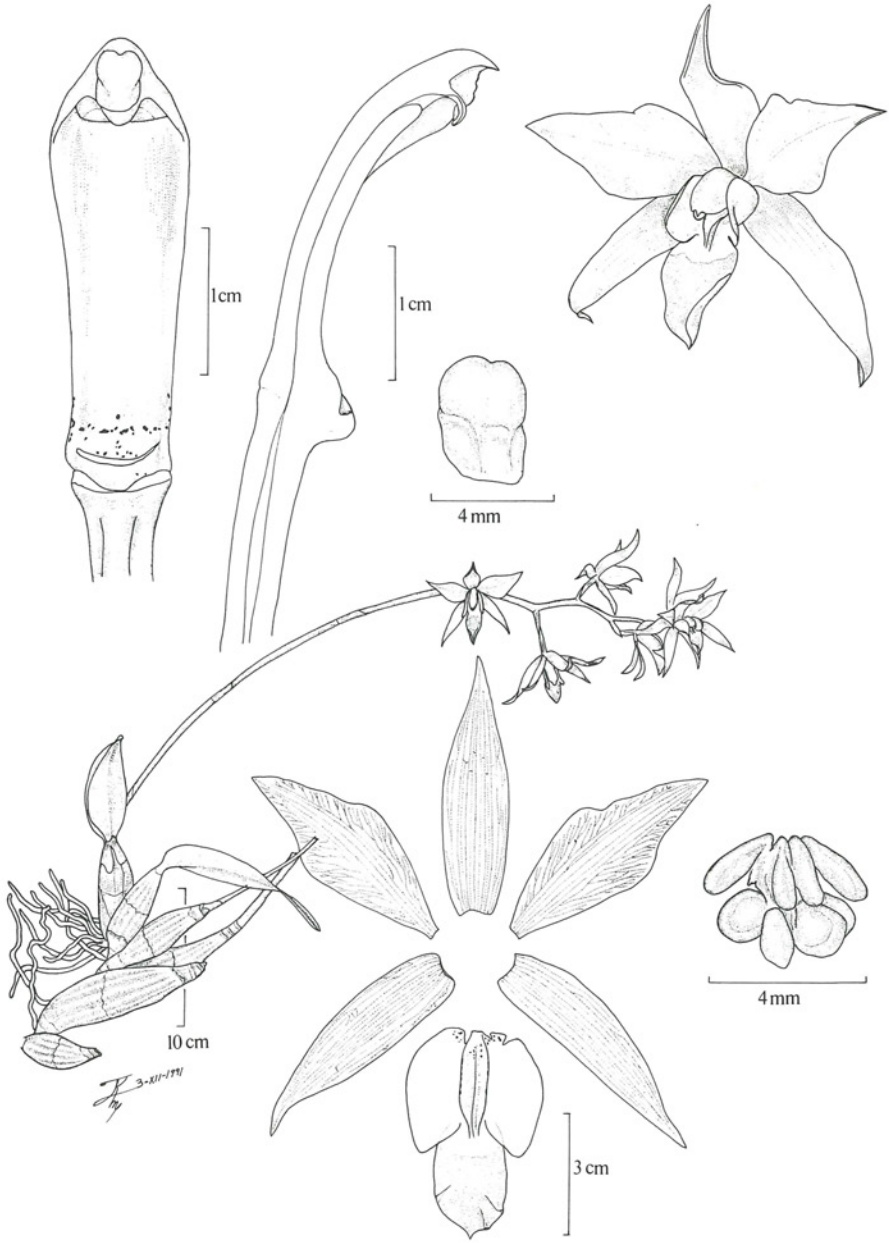


FIG. 11. **LAELIA AUTUMNALIS** Lindl. f. **ATRORUBENS** (W. Gower) Halbinger, *E. Pérez 100*. Drawing by R. Jiménez.

LAELIA AUTUMNALIS f. **ATRORUBENS** (W. Gower) Halbinger, Orquídea (Méx.) 13(1-2): 294. 1993.

Laelia autumnalis atrorubens W.G.[Gower], Garden, 17: 368. pl. 229. 1880.
Type: not preserved; lectotype (here designated) the plate 229!
?*L. autumnalis atropurpurea* Weber, Garten Zeit., Berlin 5: 162. 1886.
Type: not located.
Laelia autumnalis var. *venusta* Hort., Garden 25: 366. pl. 438. 1884; Rolfe, Orch. Rev. 3: 47. 1895.
Type: based on a plant which appeared in the collection of Messrs. James Backhouse and Sons, of York, England, not preserved, lectotype (here designated) plate 438!
Laelia venusta (Hort.) Rolfe, Orch. Rev. 3: 47. 1895.

ETYMOLOGY: The name aludes to the rich, dark color of the flowers.

HISTORY: The varietal name *atrorubens* was applied originally to a clone with dark flowers of large size and very good form, not very different fom the present cultivar "Magna". It seems undoubted that the original *atrorubens* plant came from populations in the State of Mexico, where the most outstanding similar clones have been located. Halbinger (1993) transferred the name to a botanical status of form, to be applied to the populations of the eastern part of the species' range.

RECOGNITION: Besides the dark magenta color, almost white throat, and star-shaped flowers, many specimens have acute lips; the plants are variable but there is a trend to have ovoid, more compact pseudobulbs.

DISTRIBUTION: The plants of *Laelia autumnalis* f. *atrorubens* are confined to the easternmost part of the species' range, from the region of Zitácuaro to the base of the volcanoes Iztaccíhuatl and Popocatépetl; in E Michoacán, State of Mexico, Morelos, Puebla, and the Federal District.

HABITAT: In rather tall and dense oak forests, mainly of *Quercus rugosa* and *Q. laeta*, and in mesophytic Barranca forest, from 2000 to 2600 m altitude, at higher altitudes frost is expected every year from December to February.

WHERE TO SEE: One of the populations easily reached from Mexico City is that on the superhighway from Mexico City to Cuernavaca, in a lava flow with stubby trees, near the steep curve known as "La Pera".

VARIATION: Although the form usually has very dark flowers, paler, and even alba flowers are known. Most of the awarded specimens of *L. autumnalis* correspond to f. *atrorubens* (photos 48, 49).

We believe that var. *venusta* is a pale-flowered specimen of f. *atrorubens*. However, Reichenbach suggested that it could be a hybrid between *L. autumnalis* and *L. furfuracea*, while Rolfe (1895) thought that the parents were *L. furfuracea* x *L. speciosa* (= *L. majalis*), although he also stated a close resemblance to

49. *Laelia autumnalis* f. *atrorubens* "San Lucas", MP/AMO

50. The artificial hybrid between *Laelia autumnalis* and *L. furfuracea*

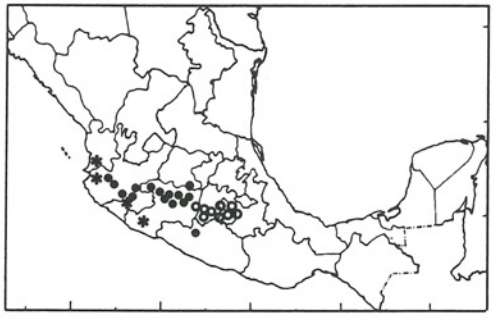
51. *Laelia autumnalis* f. *xanthotrophis* from Nayarit. Note the more yellow callus and throat heavily marked with purple lines

L. eyermaniana. The artificial hybrid between *L. autumnalis* and *L. furfuracea* is shown in photo 50 and is not similar to the plate illustrating var. *venusta*. We have seen the salmon pink form of *L. autumnalis* f. *atrorubens* which closely resembles it.

CONSERVATION STATUS: Not threatened. It is very common throughout its range, although some populations are exploited by gathering racemes at flowering time. It existed in the hills and ravines in the western part of Mexico City, but it disappeared with urban expansion.

SPECIMENS EXAMINED: **MICHOACAN**: *G.N. Jones 22685* MEXU! *G.B. Hinton 13467* AMES! G! K! NY! US(photo)! *E. Hágsater 6035* AMO(cards)! *E. Pérez 100* AMO(illustration voucher)! **MORELOS**: *J. González sub E. Oestlund 1597* AMES! *E. Oestlund 1771* AMES! *O. Nagel & A. González 3229* AMES! *A. González sub Oestlund 3230* (semialba) AMES! MO! *A. González s.n.* BM! *R.L. Dressler 2489* US(photo)! *J. Vázquez 1925* MEXU! *M. Soto 2352 et al.* AMO(x2)! **MEXICO**: *G.B. Hinton 2432* K! *G.B. Hinton 2434* AMES! BM! G! K! US(photo)! *G.B. Hinton 2997* AMES! G! K! MEXU! NY! *E. Hágsater 2783* AMO(drawing)! *E. Hágsater 6021* AMO(alba, card)! *Lamas sub E. Hágsater 6007* AMO(slides)! **DISTRITO FEDERAL**: *Smitz 534* W(nr. 115381, x2)! *E. Matuda 25666* MEXU! WITHOUT LOCALITY: *M. Ocampo 39* P!

REFERENCES: Warner & Williams, Orch. Album 2: 49. 1883.



The known geographic distribution of *Laelia autumnalis*. Form *atrorubens* empty circles; f. *autumnalis* full circles; f. *xanthotrophis* asterisks.

LAELIA AUTUMNALIS f. **XANTHOTROPHIS** (Rchb. f.) Halbinger & Soto Arenas, *stat. nov.*

Basionym: *Laelia autumnalis* var. *xanthotrophis* Rchb. f. in Sander, Reichenbachia 1: 21, t. 10. 1888.

Type: a cultivated plant from the mountains of Colima, not preserved; the lectotype (here designated) is the pl. 10 of the protologue.

ETYMOLOGY: *xanthotrophis* = yellow throat.

HISTORY: The original plant was collected in Colima, and cultivated in England. That plant had a rare color with "shade of rose-pink, with a flush of purple crimson on the ends of the sepals and petals", not known in the more recent collections. In other aspects, like growth habit, yellow throat, and shape of the perianth segments it was like modern specimens.

RECOGNITION: The form *xanthotrophis* has less vigorous plants than its more inland counterparts; the flowers are full and rather rounded, with a rich magenta color, almost as deep as that of *L. gouldiana*; actually the flowers resemble those of *L. gouldiana* closely. They have a very strong and characteristic fragrance, like that of ordinary soap, the petals are very broad and neatly rhombic, and the throat is deep yellow and heavily lined with purple (photo 51).

DISTRIBUTION: It is a plant from the ranges parallel to the Pacific coast, from the region of Coalcomán, Michoacán, the area around the Volcán de Fuego and the Nevado de Colima, the western sierras of Jalisco, and SW Nayarit.

HABITAT: In rather humid pine-oak forest, sometimes in mesophytic forests with *Carpinus*, between 1400 and 2000 m (rarely up to 2200); it is found in much moister areas than f. *autumnalis*.

WHERE TO SEE: Scattered plants can be seen in the National Park of Cerro San Juan, near Tepic, Nayarit, on the old road to San Blas.

VARIATION: Albas and semialbas are known, but they are apparently very rare. Specimens with a darker midlobe of the lip are very beautiful and not uncommon.

CONSERVATION STATUS: Not threatened, many populations are very inaccessible.

SPECIMENS EXAMINED: **MICHOACAN**: *G.B. Hinton 15392* AMES! K! NY! US(photo)! **NAYARIT**: *E. Klaboch* W! *Diguet 99* K! *R.E. González 959* MEXU! *E. Hágsater 3945* AMO! AMO(drawing, cards)! AMES ENCB MEXU *L. Paray 3398* ENCB(photo)! *M. Soto 1242 et al.* AMO! *M. Soto 2450 & G. Salazar* AMO! **JALISCO**: *O. Nagel & Navarro 6479* AMES! *R. McVaugh 13779* AMES! *R. McVaugh 20659* G! NY! ENCB(photo)! *S. Cusi sub E. Hágsater 6244* AMO(card)! *S. Rossillo s.n.* AMO(card)! *E. Hágsater 6038* AMO(card, slides)! *E. Hagsater 5802* AMO(slide, card)! *M. Soto 2182, 2191, 2197 & G. Salazar* AMO!

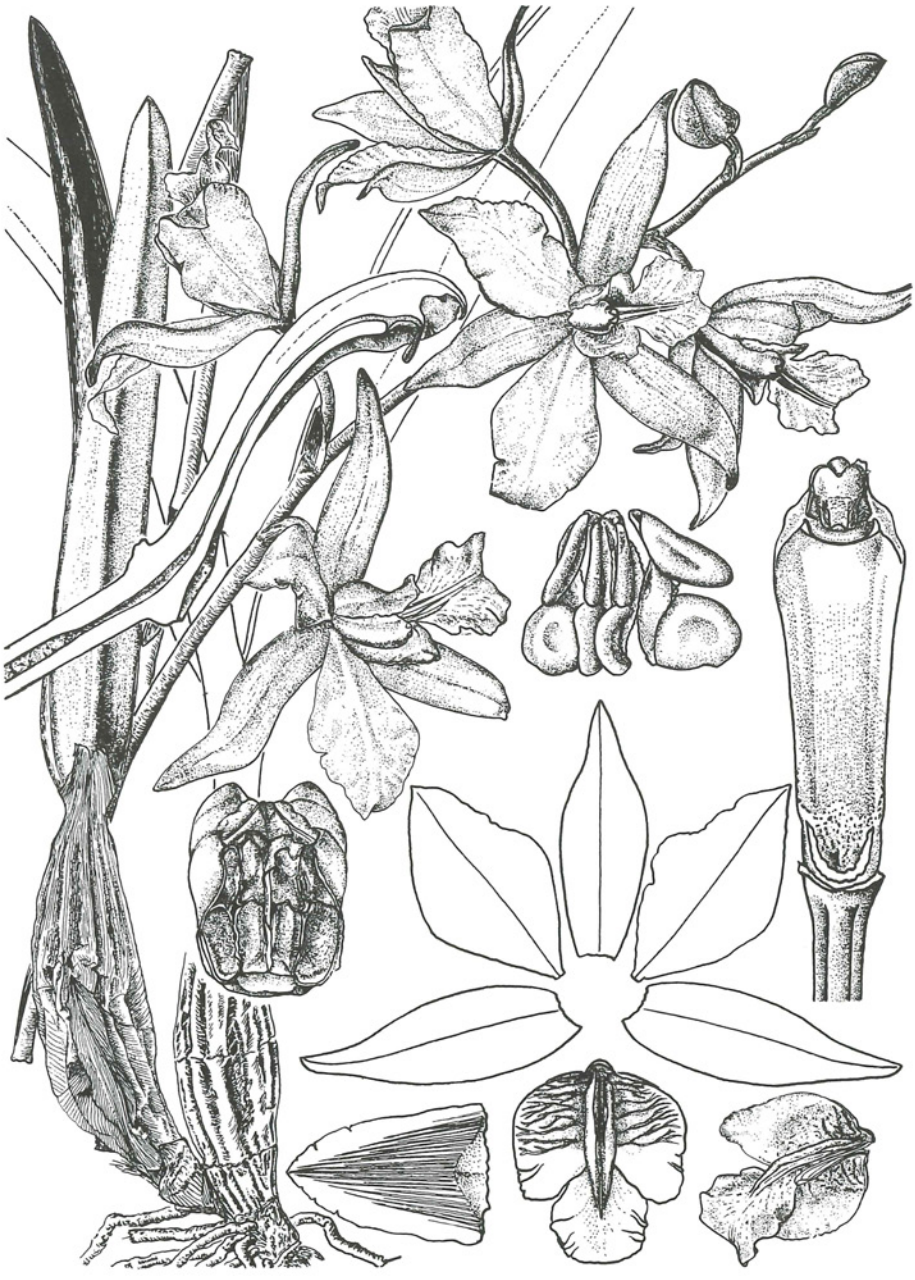


FIG. 12. **LAELIA CRAWSHAYANA** Rchb. f. Drawing by R. González Tamayo.

LAELIA CRAWSHAYANA Rchb. f., Gard. Chron. 1: 142. 1883, *pro hyb.*

HOLOTYPE: A plant imported to England by F. Sander, flowered in the collection of "Mr. De B. Crawshay, Rosefield, Sevenoaks, Kent", 20 Jan 83 W(16956)!

Laelia crawshayana var. *leucoptera* Rchb. f., Gard. Chron., 1884, p. 577.

Type: A plant cultivated in Brussels by Mr. A.A. Peeters, K!

Laelia leucoptera (Rchb. f.) Rolfe, Gard. Chron. 1: 42. 1890.

Laelia bancalarii Glz. Tamayo & Hágsater, Orquídea (Méx.) 9(2): 366-370, *fig. p. 368-369*. 1984.

Holotype: MEXICO: JALISCO: Municipio de Talpa, entre Cuale y Los Lobos, por La Uñera, abundante, flores rosa, epífita sobre encinos, en ladera de bosque de encino, altura 1100 m. 25 febrero 1982, *González Tamayo & P. Ibarra 1188* AMO!; isotypes AMES! ENCB F(1537053)! IBUG K! MEXU SEL P US

COMMON NAMES: "Lirio" (lily).

Plant epiphytic, not forming clumps, up to 40 cm high excluding the inflorescence. **Roots** rounded, white, 1.5-2.5 mm thick. **Rhizome** very short, stout, made up of ca. 3 internodes, ca. 12 mm long, up to 13 mm thick. **Pseudobulbs** ellipsoid-ovoid, slightly compressed, elliptic in cross-section, made up of 3 internodes; green, covered when young by imbricate, scarious sheaths, longitudinally 8-furrowed, 35-110 mm long, 15-40 mm thick. **Leaves** usually 2 or 3, rarely 1 or 4, linear-ensiform, acute-obtuse, minutely mucronate, somewhat cuneate basally, coriaceous-fleshy, finely carinate, green, shining, 13-26 x 1.0-2.5 cm. **Inflorescence** from the mature pseudobulb, erect-arcuate, 10-70 cm long, the peduncle subterete, slightly compressed, purplish greenish, 3-5 mm thick, bearing ca. 3-4 tubular bracts, the bracts appressed, progressively shorter, acute to obtuse, strongly carinate, scarious at anthesis, 10-32 mm long; raceme elongate, subdistichous, 3-10-flowered, the rachis 4.0-7.0 cm long. **Flowers** big and showy, resupinate, substance rather weak, 6-8 cm diameter; tepals pale pink to rose-colored, the petals axially paler, lateral lobes of the lip basally yellow, white often suffused with pale rose at apices, midlobe dark lilac, base white, lightly tinged yellow near the keels, the whole surface traversed by radiating, irregularly branched, purple lines that vanish towards the margins; throat yellowish with purple, branching, interrupted stripes, transluscent to the outer surface; callus yellow, sometimes orange at its apex, purple-spotted above the middle; column white tinged with lilac on the apex, yellowish and purple-dotted at the base of the ventral surface; fragrance similar to that of *Cattleya percivaliana* especially in sunshine. **Floral bracts** triangular, acute or subacute, carinate towards the apex, appressed to the ovary, scarious at anthesis, 5-13 x 5-8 mm. **Ovary** pedicellate, subterete, slightly dilated towards the apex, 6-sulcate, arcuate, straight to slightly twisted, furfuraceous, green, sometimes faintly flushed with purplish-lilac, 23-32 mm long, 3-4 mm thick. **Sepals** spreading, acute to acuminate, smooth to somewhat furfuraceous on the dorsal surface; **dorsal sepal** lanceolate to oblanceolate, mucronate, the mucro green, 42-55 x 13-17 mm; **lateral sepals** oblique, lanceolate to narrowly elliptic, obscurely mucronate, 40-63 x 12-17 mm. **Petals** oblique, rhombic, the apex reflexed, obtuse to shortly acuminate, apiculate, subclawed, the blade basally cuneate, margins slightly undulate, 38-53 x 20-28 mm. **Lip** 3-lobed, 40-45 mm total length, 32-40 mm wide when spread out, arcuate, base subparallel to the column, apex reflexed; lateral lobes erect, oblique, semiovate-oblong, the margins entire, 24-28 x 13-16 mm; midlobe obovate to suborbicular, apex widely rounded, the base cuneate, margins undulate-crenulate, reflexed about the middle, 19-25 x 18-22 mm; callus simple, made up of 3 longitudinal keels, from the base of the lip to below the middle of the midlobe, lateral ones higher than the mid one, the latter lower near the base, gradually increasing in height to surpass the lateral keels, ca. 24-29 mm long. **Column** gently arcuate, wingless, semiterete-semiclavate, cuniculus very shallow, ventral margins

prominent, 26-28 mm long, 9.5 mm wide near the apex; clinandrium 3-toothed, mid-tooth fleshy, acute or retuse, semiterete, decurved, lateral teeth laminar, obtuse or asymmetrically somewhat reflexed apically. **Anther** ovate, 8-celled, base bilobed, apex strongly reflexed, 4.5 x 3.0 mm. **Rostellum** laminar, semicircular, obscurely carinate dorsally near the base, deflexed backwards and downwards in front of the stigma, concealing it from in front; white, the side facing the stigma covered by a thick layer of viscous liquid, 2.5 mm long, 4 mm wide. **Pollinarium** 3 x 3 mm; made up of 8 yellow pollinia, upper pollinia subquadrate-rounded, 1.5 x 1.0 mm, lower pollinia triangular-lanceolate, 2 x 1.3 mm; caudicles 4, ca. 2.8 mm long. **Stigmatic cavity** transversely subquadrate-elliptic, the lateral lobes raised above the liquid layer of the floor, but also liquid-covered, 2.5 x 5 mm. **Capsule** not seen.

ETYMOLOGY: In honor of its famous grower, Mr. De B. Crawshay.

HISTORY: The type was sent to Reichenbach as a probable hybrid between *L. autumnalis* and *L. anceps*, by De B. Crawshay. The plants had arrived in a shipment of *L. autumnalis* sent to Sander in 1881. They were described as with pseudobulbs of *L. autumnalis* and *L. albida*, with leaves like *L. albida*; the flowering period annotated in the preserved material at Kew is from January to March. The original locality was not recorded.

Laelia bancalarii was described by Roberto González Tamayo and Eric Hágsater in 1984, based on a specimen collected near Cuale, Jalisco; previously some plants had been grown in cultivation from material collected by Carlos Bancalari, Salvador Rosillo de Velasco and Roberto González Tamayo. Dr. Bancalari had observed "that it is like *Laelia autumnalis* but flowers in the beginning of spring". Of the species in the "*autumnalis* group", *Laelia crawshayana* is the one that grows at lowest altitude and thus requires higher nocturnal temperatures in cultivation; however, since it originates in montane forests closer to the coast, it is not tolerant of higher diurnal temperatures.

RECOGNITION: Epiphytic plants with longitudinally furrowed pseudobulbs bearing 1 to 2 narrow, linear or sword-like leaves up to 2.5 cm wide. The raceme of 3 to 10 rosy flowers; these very showy, they have a very pleasant fragrance that resembles that of *Cattleya percivaliana*. The petals are wide and the midlobe of the lip can be of a darker coloration. The three keels in the lip are yellow-colored, and there are purple, branched rays on a yellow background in the throat of the lip that become translucent on the outer surface. The flowers of *Laelia crawshayana* can be confused with those of *Laelia eyermaniana* and *Laelia autumnalis*, but these species flower in the autumn while *Laelia crawshayana* only flowers at the end of winter and the beginning of spring.

DISTRIBUTION: Endemic to the northern tip of the Sierra Madre del Sur. *Laelia crawshayana* is only known from a small area in the western mountains of Jalisco. Contrary to McVaugh's (1985) statement, *Laelia autumnalis* f. *xanthotrophis* is found in the same region, but usually at higher elevations than *L. crawshayana*.

HABITAT: The plants grow preferably on oaks at an altitude of 1100 to 1500 meters above sea level, in relatively humid oak forests, sometimes on trees along creeks, in

the border of mesophytic barranca forests; places are known where this plant is abundant while in some other places there are single isolated plants. Annual rainfall is 1000-1200 mm or higher.

WHERE TO SEE: There are very few populations of *L. crawshayana* in a small geographic area. One of them is along the dirt trail between Mascota and San Sebastián, Jalisco. This trip should be attempted only in a high clearance, 4-wheel-drive vehicle, only during the dry season. Mascota can be reached from the road MEX 80, near the village of Unión de Tula.

FLOWERING TIME: From mid February to early March, in the field.

VARIATION: Flowers with an intense pink coloration have been observed; in other places the flowers are of a pale pink color. Only one plant is known that has almost white flowers (semialba) with a small longitudinal red ray in the lip (photo 54).

HYBRIDS: We do not know of hybrids involving *L. crawshayana* as parent.

CONSERVATION STATUS: Not threatened, as the forests where this plant lives in the western part of Jalisco are protected. The limited geographic distribution make it one of the potentially more vulnerable Laelias. The species is seldom cultivated, even in Mexico, and seed flasking is to be much encouraged.

SPECIMENS EXAMINED: **JALISCO**: *S. Rosillo sub Hágsater 3244*, AMO! IBUG! *Anderson & Anderson 5929*, *R. McVaugh 23439* MICH *S. Rosillo sub S. Dickinson s.n.* AMO! *S. Rosillo sub E. Moore s.n.* AMO! *Lamas sub M. Soto 8065* AMO!

REFERENCE: McVaugh, Flora Novo-Galiciana 16: 177, fig. 52. 1985.

The known geographic distribution of *Laelia crawshayana*.

52. A common color in *Laelia crawshayana*

53. Another common form of *Laelia crawshayana*. *E. Hágsater 3244*

54. *Laelia crawshayana*, a pale-colored flower

55. A raceme of *Laelia crawshayana*

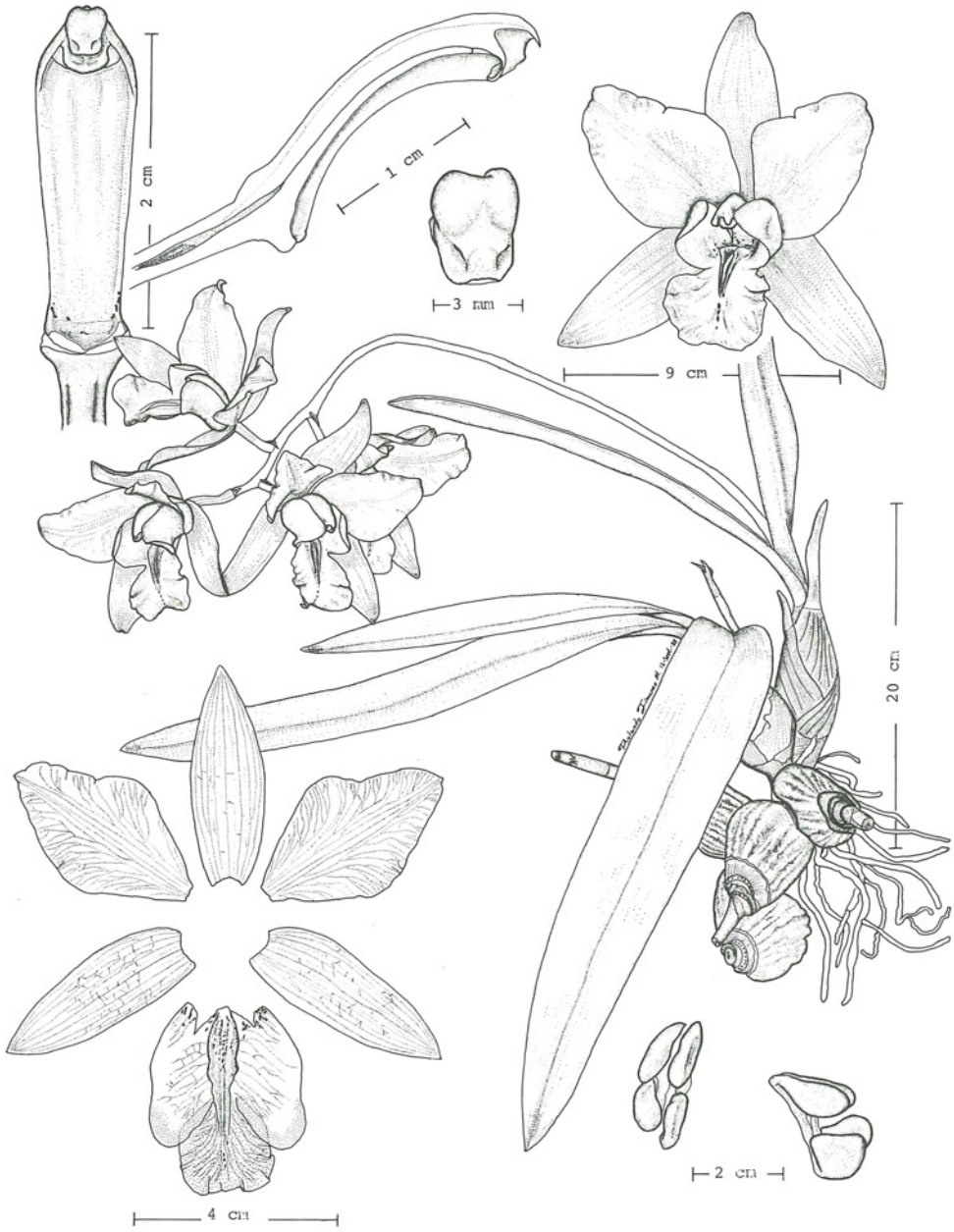


FIG. 13. **LAELIA EYERMANIANA** Rchb. f. *M. Soto 2044*. Drawing by R. Jiménez.

LAELIA EYERMANIANA Rchb. f., Gard. Chron. ser. 3, 4: 91, *fig. p. 109.* 1888, *pro hyb.*

HOLOTYPE: a cultivated plant flowered at the nursery of St. Albans, England, *Sanders*, 1888, W(16958)!

COMMON NAMES: "Kiki" (Warihio, Chihuahua); "flor de peña" (flower of the cliff, Durango), "flor" or "lirio de San Miguel" (flower or lily of San Miguel; Durango).

Plant epiphytic or lithophytic, not forming clumps, 20-30 cm high excluding the inflorescence. **Roots** rounded, whitish, 1-2.5 mm thick. **Rhizome** short, made up of 4 internodes, 10-15 mm long, 7-10 mm thick; slightly dorsiventrally compressed. **Pseudobulbs** conic-ovoid to subglobose, elliptic-rounded in cross-section, slightly compressed, built up of 3 internodes, light green, covered by remnants of papyraceous-scarious sheaths, the older ones rugose, longitudinally obscurely 8-11-furrowed, 42-65 mm high, 16-30 mm wide, 14-28 mm thick. **Leaves** 2-3, lanceolate-elliptic to oblong-lanceolate, acute to subacute, coriaceous-fleshy, carinate, light green, 9.5-18 x 1.5-3.5 cm. **Inflorescence** from the mature pseudobulb, erect-arcuate, 20-100 cm long; the peduncle slightly compressed, green with purple dots, 3-4 mm thick, with 5-6 tubular, appressed bracts, progressively shorter, ovate-subtriangular, acute, conduplicate, scarious at anthesis, white-brown, 20-25 mm long, much shorter than the internodes; raceme 3-12 flowered, subdistichous, the rachis ca. 5-20 cm long. **Floral bracts** ovate-triangular, acute, carinate, sheathing the ovary, scarious at anthesis, whitish brown, 10-15 x 5-8 mm. **Flowers** big and showy, resupinate, substance slightly waxy, 5.5-7.5 cm diameter; tepals rose-pink to pale lilac, the sepals with the apices bright green on the outer surface; lip with the lateral lobes white suffused with or pink-lilac, midlobe lilac, disc white with purple-violet stripes along the veins; callus white in the basal half, yellow in the distal one, with purple-violet stripes and dots near the base and a row of dots from the apex of the callus up to the apex of the midlobe; column white, with a yellow, basal spot, dorsal surface lilac, with purple spots in the ventral side; fragrance floral, intense in sunshine. **Ovary** pedicellate, rounded, slightly thickened towards the apex, 6-sulcate, arcuate, furfuraceous, green, 14-33 mm long, 2-3 mm thick. **Sepals** spreading, with the apices conspicuously thickened and somewhat papillose-verrucose, acute to obtuse, very scarcely furfuraceous, rather fleshy; **dorsal sepal** oblanceolate, oblong-elliptic to elliptic, 29-47 x 8-16 mm; **lateral sepals** oblong-lanceolate, somewhat oblique, 28-43 x 8-16 mm. **Petals** spreading, subrhombic, subacute, obtuse to truncate, rarely emarginate, the apices recurved, base subclawed, blade basally cuneate, margins slightly pleated and wavy, 30-48 x 16-27 mm. **Lip** 3-lobed, 27-39 mm total length, 24-31 mm wide when spread out, slightly arcuate; lateral lobes erect, oblong-elliptic, widely rounded-truncate, the margins entire, somewhat involute, 19-28 x 8-15 mm; midlobe obovate-elliptic to suborbicular, truncate or emarginate, spreading, deflexed at apex, margins undulate, 13-21 x 12-19 mm; callus simple, built up of 3 longitudinal keels, from the base to below the middle of the midlobe, up to 3 mm high, the central keel lower and rising above the lateral keels and extending beyond them, ca. 19-22 mm long. **Column** slightly arcuate, wingless, semiclavate, with a shallow cuniculus at the base, the ventral margins prominent, 19-26 mm long and ca. 7 mm wide at the stigmatic cavity; clinandrium with an apical triangular, uncinate tooth. **Anther** cordiform-quadrate, truncate, 8-celled, white-cream, 4 mm long, 2.7 mm wide, 2.0 mm thick. **Pollinarium** 3.3 x 3.0 mm, made up of 8 yellow pollinia, compressed, the lower ones triangular-obovate, 1.5 x 0.8, the upper ones quadrate-flabellate, 0.9 x 1.1 mm, with 4 granulose caudicles, 2 mm long. **Rostellum** laminar, transversely oblong, rounded, convex, hyaline-yellowish, ca. 2.5 x 1 mm. **Stigmatic cavity** transversely elliptic, stigmatic lobes conspicuous or not, not prominent, greenish white, 2 x 4-5 mm. **Capsule** ellipsoid, hexagonal-rounded in cross-section, 3-keeled, with 3 not well-defined, blunt ridges, 30-56 mm long, 20-27 mm thick, with a

pedicel 24 mm long and an apical beak 12 mm long.

ETYMOLOGY: In honor of J. Eyerman, from Easton, Mass., an enthusiastic North American orchidophile from the end of the 19th century.

HISTORY: This species has had a rather confusing history. Most specimens were first identified as *L. furfuracea*. In fact Hartweg collected the plant in Bolaños, Jalisco, and his specimens are in the Lindley herbarium, Kew, identified as *L. furfuracea*. More recently (McVaugh 1985) some specimens have been compared hesitantly with *L. furfuracea*.

Laelia eyermaniana was described by Heinrich Gustav Reichenbach in 1888; his description was based on a plant received from the well known nurseryman Frederick Sander of St. Albans, England. Mr. Sander expressed his suspicion that it could be a natural hybrid between *Laelia speciosa* and *Laelia autumnalis*; later some other authors said that it could be a hybrid between *Laelia albida* and *Laelia speciosa* (Rolfe, 1895). It took more than a hundred years before the name *Laelia eyermaniana* could be associated with a species, similar to *L. autumnalis*, which had been in cultivation in Mexico for many decades and is found from central Mexico to Chihuahua in the north, and which has well defined characteristics and therefore must be considered a "good", distinct species.

Withner (1990) treated and illustrated a plant of *L. eyermaniana* as *L. autumnalis* var. *xanthotrophis*, a different taxon. Two decades ago *L. eyermaniana* was recognized as distinct by Mexican and American growers, but its identity had not been established; it was informally known as *Laelia catarinensis*, a name not validly published, given by the late Dr. Salvador Rosillo in the Bulletin of the Asociación de Orquideología de Guadalajara.

It is said that the Warihios Indians employ the mucilaginous sap of the pseudobulbs as a glue in the manufacture of musical instruments.

RECOGNITION: An epiphytic plant with ovoid, rarely elongated pseudobulbs, up to 6.5 cm long, with 2-3 succulent leaves. The inflorescence is 20 to 100 cm long, with a raceme of 3 to 12 flowers; the diameter of the flowers is 5.5 to 7.5 cm. The petals and sepals are of a delicate rosy or lilac color, with a green thickening in the apical, external surface of the sepals. The lip is white, with a rosy-purple border, the callus has three pale whitish keels and there are purple branched lines in the throat. The fragrance of the flowers is delicate; the buds open in succession and the inflorescence can therefore stay in good condition for 2 or 3 weeks. Although *Laelia eyermaniana* was confused in the past, in reality the plants can be distinguished from all the other Laelias and the flowers identified by the green thickenings at the tips of the sepals; these enlargements can be clearly observed in the flower buds (photo 56). The plants of this species are smaller than those of *Laelia autumnalis*, *Laelia crawshayana* and *Laelia gouldiana*, and in some aspects are reminiscent of those of *L. speciosa*, with which it shares the same dry habitat in Michoacán, Jalisco and Durango.

DISTRIBUTION: Endemic to the Sierra Madre Occidental and the southern part of the Central Plateau. *Laelia eyermaniana* inhabits a very large area; it has been observed

growing in the states of Sonora, Chihuahua, Sinaloa, Durango, Jalisco, Michoacán, Guanajuato, and Querétaro (in the latter state it is only seen cultivated).

HABITAT: The plants grow on oaks and other trees, or on rocks at an altitude of 1250 to 2200 meters above sea level, in open, deciduous, often very dry, oak forests (e.g. *Quercus deserticola*). Large plants are met infrequently. Severe frost damage has been observed in the plants from the northernmost stations, some having lost their leaves. Annual rainfall is 800-1100 mm.

Laelia eyermaniana has scattered populations and is not common along its extensive range. Near Surutato, Sinaloa, there are single oak trees bearing some dozens of plants, but the species is absent for many hundreds of meters in the surroundings.

WHERE TO SEE: Most populations of *Laelia eyermaniana* are rather remote, but some of them can be reached easily, especially in Jalisco. Plants can be found in stubby oak forest near Mazamitla and La Manzanilla, in the basin of Lake Chapala. In this region, *L. eyermaniana*, *L. autumnalis*, and *L. speciosa* can be found intermingled.

FLOWERING TIME: Late August to October.

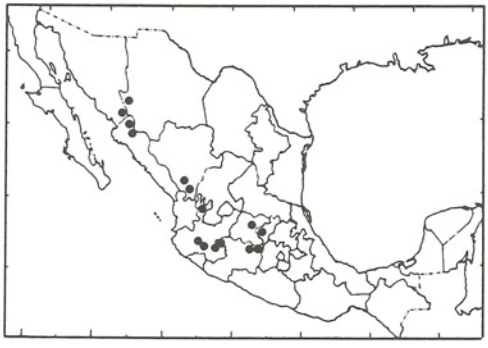
VARIATION: As *Laelia eyermaniana* is an orchid with such a vast distribution, it is understandable that it has a great variation in its coloration; there are clones with a dark lilac midlobe (photo 59), and another with entirely white flowers has been seen recently. Apparently the most desirable plants with larger and better colored flowers come from Chihuahua and Sinaloa (photo 57). Those from Jalisco, though more common in cultivation, are not as beautiful as their northern counterparts.

HYBRIDS: *Laelia eyermaniana* is not recognized as a valid orchid species by the RHS registration index of orchid hybrids. Probably some of the crosses indicated as involving *L. autumnalis* actually included *L. eyermaniana*, since the latter has been confused with *L. autumnalis* by most orchid authorities. The more rounded shape, and heavier substance makes *L. eyermaniana* a better choice than *L. autumnalis* for hybridizing.

CONSERVATION STATUS: Not threatened, and surprisingly very seldom collected. *Laelia eyermaniana* has a patchy distribution, being more common northwards; in the densely populated region of El Bajío, in the southern part of its range, it can be considered as very scarce.

SPECIMENS EXAMINED: **SONORA**: *S. Rosillo & O. Caballero sub E. Hágsater 4803* AMES AMO! AMO(card, drawing, slides)! ENCB K! MEXU NY P SEL *T. Meunier 14* AMO! **CHIHUAHUA**: *H.S. Gentry 2026* AMES! K! MEXU! **SINALOA**: *Kimnach 39279* AMES! *R. Vega 4397 et al.* MEXU! *M. Soto 2032, 2033, 2036, 2047, 2048, 2053, 2054* AMO! *M. Soto 2044* AMO(illustration voucher)! MEXU! *G. Salazar 1959 & Soto* AMO! *E. Hágsater 8505* AMO(slides)! **DURANGO**: *J. González Ortega 4346* US(photo)! *N. Bashor 681-A* AMO! AMO(slide)! **JALISCO**: [*Hartweg*] K! *S. Rosillo s.n.* AMO(card)! *E. Hágsater 3245* AMO(slides)! *E. Hágsater 3246* AMO(slides)! *S. Rosillo sub E. Hágsater 3954* AMO(card, drawing)! *S. Rosillo sub E. Hágsater 3953* AMO! BR ENCB G MICH! *S. Rosillo sub E. Hágsater 4151* AMES AMO! AMO(card)! M SEL *E. Hágsater 5956* AMO(card)! *R. McVaugh 13196*, *R. Soltero 708* AMO! **QUERETARO**: *F.B. Johnson 1050-1* AMES! SEL! (cultivated) *S. Dickinson sub E. Hágsater 5708* AMO(card, slides)! *5709* AMO! **GUANAJUATO**: *Dugés s.n.* AMES! *Johnson 1152-3* AMES! *S. Dickinson sub E. Hágsater 2108* AMO(slides)! *S. Dickinson sub E. Hágsater 4477* AMO(drawing, card)! ENCB MEXU **MICHOACAN**: *R. Merril & T.R. Soderstrom 4595* US(photo)! *S. Dickinson sub Hágsater 4477* AMO! *S. Dickinson sub E. Hágsater 5712* AMO(card)! *E. Hágsater 5711* AMO! *E. Hágsater 5713* AMO! *I. García 1618* IEB! **WITHOUT LOCALITY**: *A. Jones s.n.* AMO(slides)! *E. Moore s.n.* AMO(slides)!

REFERENCES: Rolfe, Orch. Rev. 3: 47-48. 1895; Soto Arenas, Ic. Orch. I. pl. 51. 1990.



The known geographic distribution of *Laelia eyermaniana*.

56. A raceme of *Laelia eyermaniana*; note the characteristic thickenings at the apex of the sepals in the floral buds

57. A darker form of *Laelia eyermaniana* from SW Chihuahua

58. *Laelia eyermaniana* from Jalisco, *E. Hágsater 4151*

59. *Laelia eyermaniana* with a dark midlobe of the lip and pale tepals

60. Typical color in *Laelia furfuracea*. *M. Soto 6269*

61. *Laelia furfuracea* and *L. autumnalis* growing on a plum tree in Federico Halbinger's garden in Mexico City

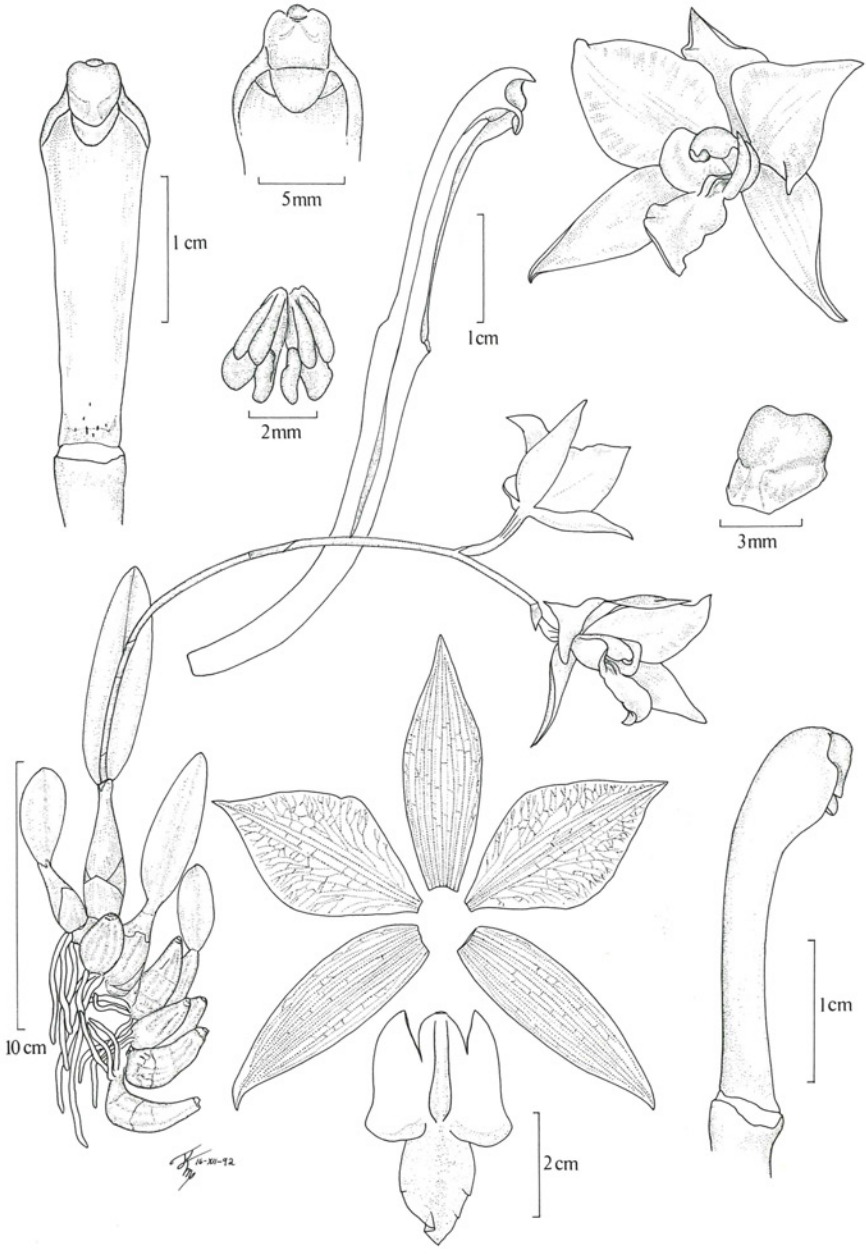


FIG. 14. **LAELIA FURFURACEA** Lindl. *M. Soto 6269*. Drawing by R. Jiménez.

LAELIA FURFURACEA Lindl., Bot. Reg. 25: pl. 26. 1839.

HOLOTYPE: Mexico, "It was found near Oaxaca by Count *Karwinsky*" and imported to England and cultivated by Barker, in 1838, K-L!

Cattleya furfuracea (Lindl.) Beer, Prakt. Stud. Fam. Orch. p. 210. 1854.

Bletia furfuracea (Lindl.) Rchb. f., Walp. Ann. Bot. 6: 428. 1862.

COMMON NAMES: "Lirio de San Francisco" (lily of San Francisco); "monja" (nun), "Gihtsl" (Mixtecan).

Plant epiphytic, rather caespitose, 10-30 cm high excluding the inflorescence. **Roots** rounded, whitish, 1-2 mm thick. **Rhizome** short, inconspicuous, made up of ca. 3 internodes, 7-13 mm long, 4-6 mm thick, conic-subterete. **Pseudobulbs** conic-ovoid to ovoid-ellipsoid, or subglobose, very slightly compressed, elliptic in cross-section, made up of ca. 3 internodes, green, new ones completely covered by scarious, very tight, greyish sheaths; longitudinally 8-10-furrowed, 20-60 x 10-27 mm. **Leaf** 1, ensiform, oblong, or elliptic, obtuse, sometimes acute, coriaceous-fleshy, stiff, slightly carinate, dark green, often suffused with purple; 2.4-10.0 x 0.5-2.6 cm. **Inflorescence** from the mature pseudobulb, arcuate, 15-28 cm long; the peduncle slightly compressed, green with purple dots, 2-3 mm diameter, with 4 tubular, appressed bracts, progressively shorter, ovate-subtriangular, acute, conduplicate, scarious, white-brown, 14-22 mm long; raceme often with 2 (1-3) subdistichous flowers, the rachis 3-15 cm long. **Floral bracts** widely ovate-triangular, acute, carinate, sheathing, scarious, brown-whitish, 11-20 x 7-9 mm. **Flowers** big and showy, resupinate, substance thick and waxy, 5-9 cm diameter; tepals pink to pale lilac, lip with the lateral lobes white suffused with/or pink-lilac, midlobe darker, callus white to cream with a greyish suffusion; column pink to lilac with a yellow dot with purple dots at the very base; fragrance intense, soap-like, in sunshine. **Ovary** pedicellate, subterete, slightly thickened towards the apex, erect-arcuate, 6-sulcate, not or just slightly twisted, furfuraceous, greenish-brown, 25-48 x 3-6 mm. **Sepals** partially spreading, acuminate, scarcely furfuraceous on the outer surface, stiff and fleshy; **dorsal sepal** oblong, lanceolate or narrowly elliptic, 36-50 x 11-16 mm, the **lateral sepals** oblong-lanceolate, somewhat oblique, 33-50 x 10-15 mm. **Petals** partially spreading, conspicuously revolute at apex, rhombic, very broad and notched at the middle, acuminate, the base abruptly clawed, the base of the blade cuneate, margins slightly plicate and broadly undulate, 37-48 x 20-35 mm. **Lip** 3-lobed, 28-42 mm total length, 20-32 mm wide when spread out; basally straight and subparallel to the column, midlobe deflexed; lateral lobes erect, oblong-elliptic, widely truncate-rounded, broader towards the apex, the margins entire, somewhat involute, 21-31 x 9-11 mm; midlobe ovate-elliptic to suborbicular, obtuse to rounded, sometimes minutely mucronate, spreading, recurved at apex, margins undulate, 12-21 x 10-19 mm; callus simple, built up of 2 longitudinal keels from the base to above the base of the midlobe, up to 3 mm high, 17-23 mm long; the central keel very low and inconspicuous, towards the apex of the callus, up to 7 mm long. **Column** slightly arcuate, wingless, semiclavate, the ventral margins prominent, especially at the sides of the stigma, cuniculus very shallow; 21-26 mm long, 6-8 mm wide at the stigmatic cavity; clinandrium with an apical rounded tooth, and 2 inconspicuous, lateral, broadly ovate and rounded teeth, sometimes not well-defined. **Anther** cordiform-quadrate to ovate, truncate, 8-celled, whitish-cream, 4.2 mm long, 3 mm wide, 2 mm thick. **Pollinarium** 3.8 x 3 mm, made up of 8 yellow pollinia, compressed, the upper ones nearly triangular-flabellate, 2 x 1.8 mm, the lower ones obliquely oblanceolate, 2.6 x 1.0; with 4 granulose caudicles, in two loosely united pairs, 2.3 mm long. **Rostellum** laminar, transversely triangular-ovate, rounded, convex, margins reflexed, hyaline-whitish, ca. 2.0-2.5 x 3 mm. **Stigmatic cavity** 3-lobed, rather hidden, transversely elliptic-oblong, in outline, stigmatic lobes conspicuous and protruding, rounded, 2 x 4-5 mm. **Capsule** ellipsoid with 3 high keels and 3

well-defined ridges, green, smooth; ca. 3.1 x 1.6 cm; pedicel 19 mm long, apical beak 5 mm long.

ETYMOLOGY: The name "*furfuracea*" makes reference to the scurfy surface of the ovary, so conspicuous in this species. *furfuraceus* = like husks of bran.

HISTORY: Count Karwinsky found *Laelia furfuracea* for the first time in 1832, near the City of Oaxaca, at an altitude of 2600 m. Shortly thereafter other collectors found this plant in different Oaxacan places. In 1838, one plant flowered in the collection of George Baker in Birmingham, England, and Lindley recognized it immediately as an unknown species and described it in 1839 as a novelty. Almost at the same time, the Royal Horticultural Society distributed a great number of plants, collected by Hartweg, to all its members. Even at that early time, the species had received the reputation of being difficult, and a not freely flowering habit had been noticed.

RECOGNITION: Small epiphytic plants with conic-ovoid, elongated, longitudinally furrowed pseudobulbs, up to 6 cm high, and a single stiff, erect, up to 10 cm long leaf. The inflorescence is rather short bearing a raceme of 1 to 3 flowers, each of which is 5 to 9 cm in diameter. The lanceolate sepals are pointed and the petals are wide, rhombical; the lip is whitish at its base, with two cream-colored keels. The color of the flowers is rosy or rosy-lilac, and they are noted for their harsh fragrance with a certain similarity to that of ordinary soap.

It is difficult to confuse *Laelia furfuracea* with other species, but when only fragmentary herbarium material is available, the flowers are similar to those of *L. eyermaniana*; however, the latter usually has inflorescences with more than 3 flowers on a longer raceme, and the short, ellipsoid pseudobulbs have 2-3 leaves. Furthermore, these species are perfectly separated geographically.

DISTRIBUTION: Endemic in the Sierra Madre del Sur. *Laelia furfuracea* has been found only in the State of Oaxaca, although it is widespread there, and some localities are close to the border with Guerrero.

HABITAT: The plants grow in oak-juniper or pine-oak-*Arbutus* forests, generally on oaks (*Q. castanea, Q, urbanii, Q. liebmannii*) festooned with large quantities of Spanish Moss (*Tillandsia usneoides*), between 2100 and 3000 m altitude. These forests escape the very dry conditions of central Oaxaca, because the humid and fresh winds provide some fog and dew that seems to benefit *L. furfuracea*. No other Mexican *Laelia* climbs so high in the mountains as *L. furfuracea*. It shares its habitat with the cactus *Aporocactus martianus*, and other orchids like *Rhynchostele maculata*, *Epidendrum propinquum*, *Encyclia citrina*, *E. subulatifolia* and *Laelia albida*, among others. Large specimens and in big quantities, sometimes in the order of hundreds, can still be found on ancient, scrubby oaks in several parts of Oaxaca, mainly in the Mixteca Region. Annual rainfall is probably from 700 to 1000 mm; fog is frequent in summer and occasional in winter, and light frost is expected in January in almost all its range, but the plants are always protected by the crown of their host oaks. Cultivation is not difficult if cold, windy, and very bright conditions are provided; its performance

is usually poor when planted in pots.

WHERE TO SEE: A beautiful population of *Laelia furfuracea* is located at km 478 of the road Mexico City-Oaxaca (between Tecomavaca and Telixtlahuaca), in the surroundings of the settlement of Cienaguilla. Look in the ancient oaks festooned with Spanish Moss and *Aporocactus martianus*.

FLOWERING TIME: From the end of October to December.

VARIATION: The range of the color varieties of the flowers is wide, from pale (photo 65) to dark rosy (photo 62), at times flowers with a darker lip can be found (photo 66). Entirely white and almost white flowers have been reported as extremely rare, and a few clones are under cultivation in Mexico (photos 63, 64); the first white clones were purchased by Stirling Dickinson, of San Miguel de Allende, and divisions of these plants were grown in California by Paul Bechtel.

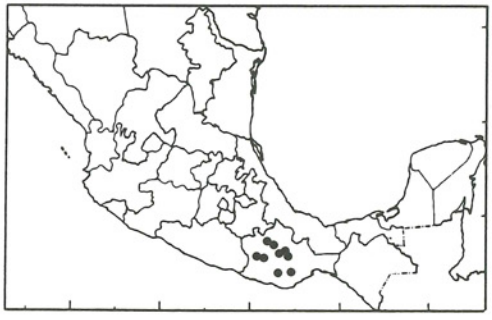
HYBRIDS: The registration index of the RHS listed only 3 artificial crosses involving *Laelia furfuracea*. This is surprising since it has a waxy substance and long lasting flowers; its cool growing preferences are probably responsible for its low impact on breeding.

CONSERVATION STATUS: Not threatened. This species forms very large populations in several parts of Oaxaca. However, those populations close to the City of Oaxaca and in the Mixteca Region are overcollected for selling the flowers, especially at Christmas time. Probably more significant is the loss of the ancient oak forests that produce large volumes of charcoal.

SPECIMENS EXAMINED: **OAXACA**: *Karwinsky* BR! W! *H. Galeotti 5006* BR(x2)! K! K-L! W(x2)! *Liebmann 518, 519*, W! *M. Ghiesbreght s.n.* G(photo)! P(photo!) *C.G. Pringle 6068* AMES! BM! BR! K! MEXU! NY! W! WU! *C.L. Smith 688* BM! MEXU(x2)! NY(x3)! *C.L. Smith s.n.* MEXU! SEL! *O. Nagel sub E. Oestlund 3716* AMES! MEXU! SEL! *Velde sub E. Oestlund 6495* AMES! *O. Nagel sub E. Oestlund 6541* AMES! SEL! *C. Conzatti 108* AMES! MEXU! *E. Hágsater 2037* AMO(slides)! *E. Hágsater 2039* AMO(drawing, slides)! BR! *E.W. Greenwood s.n.* AMO(slides)! *E. Messer 72/202b* MEXU! *Camp 2268* NY! *M. Soto 6269 & E. Pérez* AMO(illustration voucher)! *P. Tenorio 10647 et al.* IEB! MO! *R. Torres 7999 et al.* MEXU! **WITHOUT LOCALITY**: *Sallé s.n.* BM(x3)!

REFERENCES: Hooker, Bot. Mag. 67: t. 3810. 1840; Lindley, Bot. Reg. 28: sub. t. 62. 1842; Reichenbach, Xenia Orch.: 2: 56. 1864; Williams, Orch. Mex.: 190, 1951; Wright, Orq. Mex. fig. 20. 1958; Adams, Amer. Orchid Soc. Bull. 27(8): 315. 1958; Kennedy, Orchid Digest p. 22. 1978; Senghas & Bockemühl, Orchideenkartei, Die Orchidee 32(1). 1981.

62. *Laelia furfuracea*, a very dark form



The known geographic distribution of *Laelia furfuracea*

63. *Laelia furfuracea* cv. "Stella" MO/AMO

64. A pale-colored flower of *Laelia furfuracea*

65. A very pale-colored flower of *Laelia furfuracea*

66. *Laelia furfuracea* with darker lip

67. Raceme of *Laelia gouldiana*

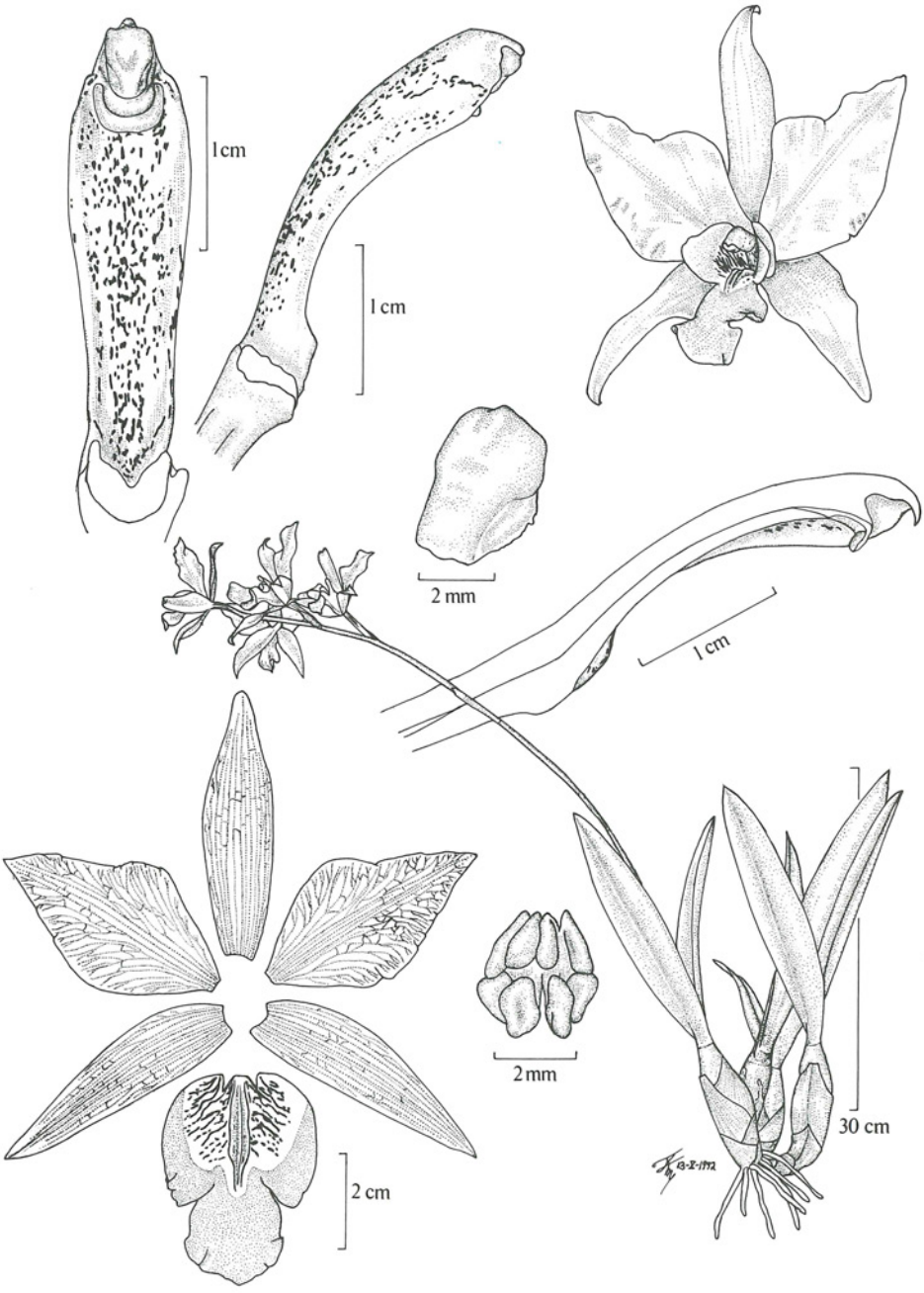


FIG. 15. **LAELIA GOULDIANA** Rchb. f. *M. Soto 8064*. Drawing by R. Jiménez.

LAELIA GOULDIANA Rchb. f., Gard. Chron. ser. 3,3: 41. 1888, *pro hyb.*

HOLOTYPE: a cultivated plant, Dec. 87, *Sander* W(15726)!

COMMON NAMES: "Santorum", "Flor de Muerto" (flower of the dead; Hidalgo), "monjitas" (little nuns; Hidalgo).

Plant epiphytic, forming large clumps, 30-100 cm high excluding the inflorescence. **Roots** rounded, whitish, 1.5-3 mm thick. **Rhizome** short, made up of 4-5 internodes, ca. 2-3 cm long, 7-15 mm thick; dorsiventrally compressed. **Pseudobulbs** ellipsoid-fusiform, somewhat compressed, elliptic in cross-section, made up of ca. 3-4 internodes, green, covered when young by scarious sheaths, 8-furrowed, 54-88 mm high, 18.5-32 mm wide, 17-26 mm thick. **Leaves** 2, ensiform, acute, mucronate, conspicuously erect, coriaceous-fleshy, stiff, conduplicate at base, carinate, dark green suffused with purple, 16.5-24 x 2.8-3.0 cm. **Inflorescence** from the mature pseudobulb, erect, 40-75 cm long, the peduncle slightly compressed, dark green-purplish, 3.5-5 mm thick, bearing 5-8 bracts; the bracts of the inflorescence tubular, strongly appressed, longer near the middle, oblong-lanceolate, acute, carinate, scarious, whitish, 2.5-6.0 cm long, shorter than the internodes; raceme subdistichous, 3-5(-9)-flowered, the rachis 10-18 cm long. **Floral bracts** oblong-triangular, acute, slightly carinate, appressed to the ovary, progressively smaller, scarious at anthesis, whitish brown, 18-32 x 5-11 mm. **Flowers** very showy, big, resupinate, substance rather thin but waxy, 6.5-7.5 cm diameter; tepals purple-dark magenta, shiny, concolor, or slightly paler towards the base; lip with the lateral lobes white with apical margins magenta on the outer surface, inner surface cream-yellowish, heavily marked with purple-magenta lines in the throat; midlobe intense purple-magenta with the base cream-yellowish; callus yellowish at base, chrome yellow at apex, keels with a purple line at the top, and rows of purple dots in the keel's valleys; column white-greenish with many rows of purple dots on the ventral surface, dorsal surface purple-magenta with rows of darker dots, margins white, anther white; fragrance intense, floral-aromatic. **Ovary** pedicellate, subterete, slightly thickened towards the apex, ascending, 6-sulcate, furfuraceous, green suffused with purple, ca. 32-48 mm, 2-4 mm thick. **Sepals** spreading, slightly convex, margins somewhat reflexed, the apices slightly conduplicate and carinate, occasionally recurved; **dorsal sepal** erect, oblong to narrowly elliptic, acute-acuminate, 49-56 x 15-17 mm; **lateral sepals** descending, narrowly elliptic to lanceolate, acuminate, oblique, 45-53 x 13-15 mm. **Petals** spreading, flat or convex, rhombic, acute, subclawed, blade cuneate, apex somewhat conduplicate, margins slightly pleated, undulate, 46-54 x 26-30 mm. **Lip** 3-lobed, 33-46 mm total length, 33 mm wide when spread out, rather straight; lateral lobes erect, elliptic, widely rounded, margin incurved, 26-29 x 13-14 mm; midlobe obovate, attenuate at base, truncate, widely rounded to slightly emarginate at apex, spreading, with the apical margins ascending, and the extreme apex slightly deflexed, margins somewhat undulate, scarcely pleated, 18-21 x 18-23 mm; callus simple, built up of 3 longitudinal keels, from the base to the basal third of the midlobe, keels up to 2.5 mm high, the central one lower and rising above the laterals, ca. 23-26 mm long. **Column** arcuate, wingless, semiclavate, ventral margins prominent, with a cuniculus at base; 23-25 mm long, ca. 6.5 mm wide; clinandrium with an apical, triangular, blunt, recurved tooth. **Anther** subquadrate, truncate, 8-celled, white-brown, 3.7 x 3.0 mm. **Pollinarium** 2.7 x 3.0 mm, made up of 8 pollinia, compressed, the upper ones subquadrangular, 1.4 x 0.9 mm, the lower ones triangular, ca. 1.6 x 1.1 mm; with 4 granulose caudicles, dark yellow. **Rostellum** a transversely oblong-subquadrate blade, convex, widely rounded, cream-yellowish, spotted with purple, 2.8 x ca. 2 mm. **Stigmatic cavity** transversely oblong-subquadrate, lateral lobes inconspicuous, shiny, green, ca. 2 x 4 mm. **Capsule** ellipsoid with 3 high keels and 3 blunt ridges, ca. 42 mm long, 17 mm thick, pedicel ca. 20 mm long, apical beak 6 mm long.

ETYMOLOGY: In honor of Jay Gould, a North American businessman and a great orchid enthusiast from New York, a hundred years ago.

HISTORY: *Laelia gouldiana* was described by Heinrich Gustav Reichenbach in 1888; the same author mentioned also that the marvelous, dark purple color would be difficult to compare. Because Reichenbach did not know the natural origin of the plant, he suggested that it was a natural hybrid, probably between *Laelia autumnalis* and *Laelia anceps*; this cross has been made many times (*Laelia* Autoceps), and the result has always been very different (see Jansen, 1986; photo 70) and so this suggestion has been discarded. For many years now, all plants of *Laelia gouldiana* have come from the backyards of houses of a small region in the State of Hidalgo, where they grow semi-cultivated on trees and stone fences.

This is an enigmatic plant, since it is unknown in the wild state, and it does not form fertile capsules. The variation seen in this species is very narrow, and it is not improbable that all known specimens represent divisions of the same clone.

RECOGNITION: An epiphytic plant with fusiform, elongated pseudobulbs, up to 8.8 cm long, with 2 erect, stiff, sharply pointed leaves up to 24 cm long and 3 cm wide. The inflorescence is erect and straight, 40 to 75 cm long, with a raceme of 3 to 5 (rarely up to 9) flowers that have a diameter of 6.5-7.5 cm and have a herb-like, almost imperceptible fragrance. The sepals and petals are of a fiery purple or dark magenta color, the lip is of the same color, but the throat is white and there are dark purple, branched veins and three yellow keels with red longitudinal rays. The midlobe of the lip is spatulate, although when flattened it is obovate.

Laelia gouldiana is often confused with *L. autumnalis*, but the fusiform pseudobulbs bearing erect, stiff, and pointed leaves are characteristic of *L. gouldiana*. The floral variation in *L. autumnalis* includes some forms similar to *L. gouldiana*, especially those from the westernmost part of its range (f. *xanthotrophis*).

DISTRIBUTION: Endemic, probably to the the Sierra Madre Oriental. It is only known as a cultivated plant in the State of Hidalgo.

HABITAT: Not known. Fortunately, some plants collected in nature were taken away and planted on the roofs of village houses and on nearby trees; and there they have been growing on with almost no caretaking. In the months of October and November, the blooming is impressive. The plants have a tendency to form big clumps, and gigantic specimens are known. They are cultivated most often in region of deep ravines, at an altitude of about 1200 to 1900 meters, almost always on mesquite trees, in a semiarid climate. Annual rainfall is less than 500 mm with no fog or frost in the lower stations.

A specimen collected in 1873 indicates as the locality of origin El Chico, Hidalgo, a famous mining town where the plant no longer exists.

WHERE TO SEE: Huge cultivated plants of *L. gouldiana* are found on mesquite trees between Venados and Metztitlán. Venados is on road MEX 105, between Pachuca and Zacualtipan. Metztitlán is found westwards from Venados, and is reached by a sinuous

road at the bottom of the spectacular gorge of Metztitlán, famous for its numerous endemic cacti.

FLOWERING TIME: September to November.

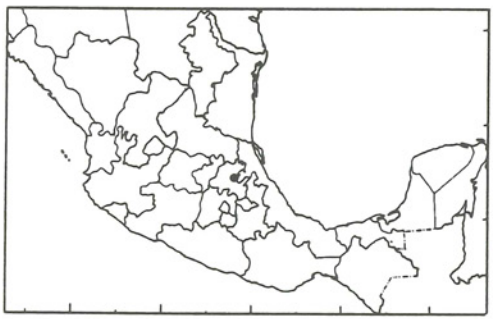
VARIATION: The variation in *L. gouldiana* is so reduced that some people have postulated that only one clone is in cultivation.

HYBRIDS: There are 13 registered hybrids with *L. gouldiana* as ancestor in the preceding generation; none is common in cultivation.

CONSERVATION STATUS: **Probably extinct in nature**, but there is a great number of plants growing in various towns in Hidalgo and elsewhere at present.

SPECIMENS EXAMINED: **HIDALGO**: *M. Urbina s.n.* MEXU! *E. Oestlund 1762* AMES! *E. Oestlund 7296* AMES! *E. Hágsater 1930* AMO! *E. Hágsater 6000* K! MEXU! *Thurston T-2500 sub E. Hágsater 6085* AMES! MEXU! MO(3724013)! NY! SEL! *F.B. Johnson 451-4* SEL! *H.E. Moore 5422* AMES! BM! G! *M. Soto s.n.* AMO(illustration voucher)! AMO(card)! WITHOUT PRECISE LOCALITY: *W. Stevens; T. Lawrence* K! *O. Nagel sub E. Oestlund 1618* US!

REFERENCES: Rolfe, Gard. Chron. 1840: p. 42.



The location of traditionally cultivated specimens of *Laelia gouldiana*.

68. *Laelia gouldiana*

69. *Laelia gouldiana*

70. *Laelia* Autoceps, the artificial hybrid between *Laelia anceps* and *L. autumnalis*. *E. Hágsater 6009*

71. A cultivated specimen of *Laelia gouldiana*

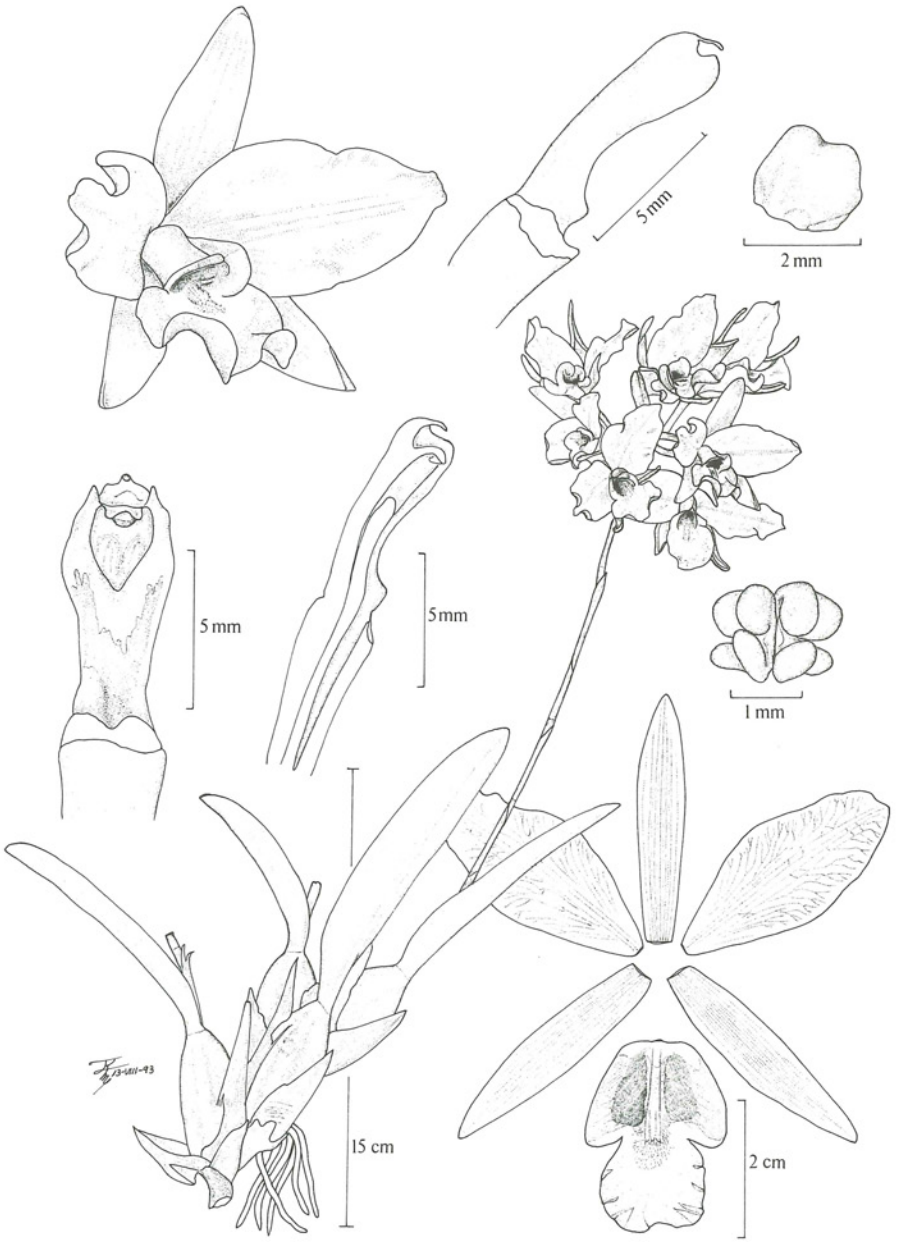


FIG. 16. **LAELIA RUBESCENS** Lindl. *F. Halbinger s.n.* La Huerta, Jal. Drawing by R. Jiménez.

LAELIA RUBESCENS Lindl., Bot. Reg. 26: misc. 25 (p. 20). 1840.

HOLOTYPE: Probably from Mexico, *Mr. Barker*, imported by *Mr. J. Knight*, K-L!

Bletia rubescens (Lindl.) Rchb. f., Walp. Ann. 6. 425. 1862.

Cattleya rubescens (Lindl.) Beer, Prakt. Stud. Fam. Orch. 208. 1854.

Laelia acuminata Lindl., Bot. Reg. 27: misc. 17. 1841; Bot. Reg. 27. t. 24. 1841.

Syntypes: Guatemala, Mr. *Hartweg* (K-L!), and a cultivated specimen by *C. Lemmon* (not located).

Bletia acuminata (Lindl.) Rchb. f., Walp. Ann. 6: 427. 1862.

Cattleya acuminata (Lindl.) Beer, Prakt. Stud. Fam. Orch. 208. 1854.

Laelia violacea Rchb. f., Bonplandia 2: 98. 1854.

Type: "In Hofrath Keil's Garten zu Leipzig von Herrn Tube kultiviert"; Lectotype (here designated): The sheet with a sterile fragment, drawings and notes at W(46461)! and W(46460)!

Bletia violacea (Rchb. f.) Rchb. f., Walp. Ann. 6: 425. 1862.

Laelia inconspicua H.G. Jones, Adansonia ser. 2, 14(2): 300. 1974.

Type: *Herb. Jones Misc. L/217*, Belize (British Honduras). Flowered under cultivation in Barbados, 1967 (not seen; herbarium probably lost).

L. pubescens Lem., Jard. Fleur. 2: Misc. p. 79. 1852.

Type: A plant of unknown origin, not preserved.

COMMON NAMES: "Flor de Jesús" (flower of Jesus, Guatemala), "huichila rosada", "flor de la Concepción" (flower of the Conception).

Plant epiphytic or rupiculous, often forming big clumps, 15-38 cm high excluding the inflorescence. **Roots** rounded, slender, white to greyish, 1.5-2 mm thick. **Rhizome** short to somewhat elongate, made up of ca. 3 internodes, dorsiventrally slightly compressed, 8-20 mm long, 4-6 mm thick. **Pseudobulbs** suborbicular, ovate or ellipsoid, strongly compressed to flattened, elliptic-rhombic in cross-section, made up of 2 internodes, the basal internode very short and inconspicuous, green-yellowish, frequently suffused purplish, new ones partially covered by several distichous sheaths, imbricate, chartaceous, brownish, fugaceous, the older ones wrinkled, but not neatly furrowed, 23-76 mm high, 17-47 mm wide, 13-23 mm thick. **Leaf** 1, rarely 2, conduplicate at base, oblong, narrowly elliptic, elliptic or ensiform, obtuse and bilobed at apex; coriaceous (not fleshy), very rigid, slightly carinate dorsally, 6.3-21.0 x 1.6-3.8 cm. **Inflorescence** from the mature pseudobulb, erect, 15-75 cm long; peduncle slightly compressed, green-purplish, up to 70 cm long, 1.5-3 mm thick, bearing 9-21 bracts subequal to the internodes, the bracts tubular, acute, appressed, progressively shorter, apically carinate and conduplicate, subchartaceous, whitish at anthesis, 1.4-5.0 cm long, with 2 broader, imbricate bracts, 1-2 cm long at the base of the peduncle; raceme compact, subcorymbose, with 3-15 succesive flowers, rachis 1.5-3 cm long. **Floral bracts** spreading, elliptic, obtuse, bilobed, concave, scarious, whitish with translucent margins, the veins slightly prominent, 3-10 x 1-3.5 mm long. **Flowers** small, showy, resupinate, substance weak, 3-7 cm diameter, tepals white, pink to dark lilac, lip similar, the disc with a large maroon-purplish blotch, often surrounded by a paler, whitish or yellowish (in northwestern populations) area, column white-pinkish or greenish suffused with purple on the sides and ventral surface, anther white and purple; fragrance weak, floral. **Ovary** pedicellate, rounded, slender, slightly thickened towards the apex, green, not furfuraceous, 18-44 mm long, ca. 1.5 mm thick at base, 2-3 mm thick apically. **Sepals** spreading, slightly convex, recurved, smooth; **dorsal sepal** oblanceolate to narrowly elliptic, subacute to very obtuse-rounded, 23-45 x 5-9 mm; the **lateral sepals** oblique to falcate, oblanceolate to linear-elliptic, subacute to obtuse, 25-45 x 5-9 mm. **Petals** spreading, slightly convex, recurved, obliquely elliptic to rhombic, widely obtuse to rounded, rarely acute, base cuneate, thinner than the sepals, the

margins slightly undulate, 26-44 x 9-17 mm. **Lip** 3-lobed, oblong-quadrate to oblong-ovate in general outline, rather straight, the basal part tubular, the apical half spreading, slightly deflexed, 22-40 total length, 13-23 mm when spread out; lateral lobes enclosing the column, variable in shape, semiovate, elliptic, sometimes broader and with divergent apices, oblique, rounded, truncate or subacute, apices reflexed, 10-18 x 4-8 mm; midlobe subquadrate, suborbicular, to oblong, rounded or emarginate, margins undulate, 12-23 x 12-20 mm; lip sometimes pubescent on the disc, hairs longer and more numerous at the center and at the base of the midlobe, marginally as sparse papillae; callus made up of 3 very low, longitudinal keels, from near the base of the lip to the base of the midlobe, 10-22 mm long. **Column** straight to very slightly arcuate, semiclavate, trigonous, ventrally concave, cuniculus 1.5 mm deep; with small, triangular rounded wings near the base, the margins of the apical part prominent, but not forming distinct wings, the apex with two lateral teeth; clinandrium with a narrow, deflexed, uncinate tooth, the margins entire, very concave. **Anther** quadrate, bilobed in profile, 8-celled, white suffused with lilac, ca. 2.2 mm long, 2.2-2.5 mm wide, 2.0 mm thick. **Pollinarium** 2.0 x 2.0 mm, made up of 8 pale yellow pollinia, strongly compressed laterally, the lower pollinia obliquely flabellate-quadrate, 1.0 x 0.9 mm, upper pollinia elliptic-quadrate 1.0 x 0.7 mm, with granulose caudicles, strongly united in 2 pairs, each pair rhombic, 1.5 mm long. **Rostellum** a transversely oblong, rounded, inclined backwards, convex, blade, with a well-defined viscarium, a massive area (0.3 mm long) with glue on the abaxial part; 0.5 mm long, 1.4 mm wide. **Stigmatic cavity** up to ca. a third of the column length, obtriangular, concave, shiny, hyaline-pinkish, lateral lobes inconspicuous, not protruding, 3.6 x 2 mm. **Capsule** ellipsoid, green, minutely papillose, with 3 narrow low ribs, and very inconspicuous ridges, 22-28 mm long, 12 mm thick; with a pedicel 14-15 mm long, and an apical beak 6-8 mm long.

ETYMOLOGY: *rubescens* = reddish, referring to the flower that becomes reddish.

HISTORY: It is known that in 1840, the English botanist John Lindley described *Laelia rubescens* for the first time, basing his description on a plant supplied by George Baker from Birmingham, England, but unfortunately, the place of origin could not be defined. In the next year (1841), the same Dr. Lindley described *Laelia acuminata*; this description was based on a plant collected in Retalhuleu, Guatemala. Lindley proposed *Laelia peduncularis* based on another cultivated specimen. Lindley observed differences notable enough to describe with three different names plants that nowadays are considered a single orchid species. The variation found in *Laelia rubescens* is explained because it is distributed along several thousands of kilometers and it has adapted to different altitudes and habitats.

RECOGNITION: The plants are recognized by their almost round, flattened, irregularly furrowed pseudobulbs that almost always bear a single terminal, rigid, oblong-elliptical leaf up to 21 cm long and 4 cm wide. The inflorescence is terminal, 20-60 cm long, with a compact raceme of 3 to 15 flowers that open in succession. The flowers of *Laelia rubescens* are distinguished by their white, slightly rosy or rosy lilac coloration, with a remarkable dark maroon or maroon-violet spot in the throat of the lip; the flowers carry a peculiar fragrance in strong sunshine. The size of the flowers varies greatly, 3 to 7 cm in diameter, and it must be noted that many plants show a great number of short hairs on the lip; in some other flowers this characteristic is but little evident. The texture is delicate, and for this reason each individual flower only lasts for a couple of days, although a raceme can last for a few weeks. Some flowers last considerably longer.

Laelia rubescens is very similar to *Laelia aurea*, but the latter is easily distinguished by the intense yellow color of its flowers and the quite elevated keels of the lip.

DISTRIBUTION: Along the Pacific Coastal Plain, in the Río Balsas Basin, the Gulf Coastal Plain, the Yucatan Peninsula, and the lowlands of Chiapas. *Laelia rubescens* can be found in a very large area. In Mexico it has been collected in the states of Nayarit, Jalisco, Colima, Michoacán, México, Guerrero, Oaxaca, Puebla, Veracruz, Tabasco, Chiapas, Campeche, Quintana Roo, and Yucatán; also in the Central American countries of Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama.

HABITAT: The plants usually grow on trees, but occasionally also on rocks, in dry, deciduous tropical forests, in warm oak forests and savannas, at altitudes of 100 to 1700 meters (in inland basins). This species inhabits hot regions, but it adapts to other climates with more temperate conditions. Annual rainfall is from 650 to 2300 mm.

WHERE TO SEE: *Laelia rubescens* is common in many areas of the Mexican "Tierra Caliente". A dense population is found in the environs of Ocozocuautla, Chiapas, 2 km on the road to Malpaso dam; where a hill of reddish sandstone dominates the landscape on the east side. Populations near Mexico City can be observed on the Acapulco road, on the margins of the Papagayo river.

FLOWERING TIME: From August to November.

VARIATION: The variation exhibited by *L. rubescens* is larger than in other Mexican Laelias; we have been tempted to recognize several taxa in the species but the existence of intermediates between all the known forms and the lack of geographic grouping make a several-taxa solution unrealistic. However, it is difficult to believe that the extreme forms belong to the same species, if only they are compared.

The more common form has rosy-lilac flowers with a large blotch in the lip throat (photo 75); this form is widely distributed on both, the Atlantic and Pacific watersheds, and similar plants are found in Central America. Plants with similar color, sometimes darker and notably larger flowers with very broad petals are recognized as form *peduncularis* and are undoubtedly the more desirable type in the species; f. *peduncularis* is found in southern Oaxaca and Guerrero, but the better forms are from Oaxaca. In Jalisco and southern Nayarit *L. rubescens* is common; most individuals show dense papillae on the surface of the disc of the lip and a yellow area around the throat (photo 73) that are absent in more southern populations; additionally, in many of these plants comparatively higher keels on the disc can be observed. In Chiapas and Guatemala the plants that produce flowers with white segments are more common (photo 76) or may completely replace the rosy-pink form; the true albas, lacking the purple blotch on the throat, also come from this area (photo 74). The type of *L. acuminata* also came from Guatemala, with its acute lip, that has the same hairs as the plants from Jalisco and Nayarit, which are absent in Guerrero and Oaxaca and elsewhere.

72. *Laelia rubescens* from Campeche

73. A raceme of *Laelia rubescens* from coastal Jalisco. Note the bright yellow disc, typical of the plants from this area

74. The alba form of *Laelia rubescens*; this clone from Guatemala has very large flowers

75. *Laelia rubescens*, a common form

76. *Laelia rubescens* with white flowers and blotched throat

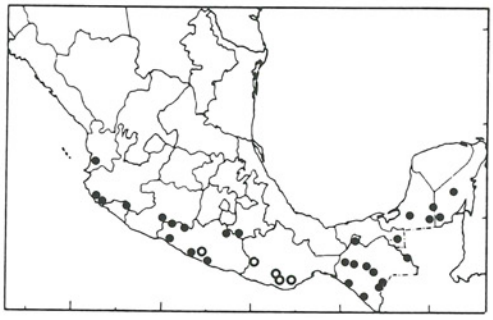
Laelia inconspicua H.G. Jones was proposed based on a Belizean plant (supposedly also recorded from Honduras) with smaller size, much narrower leaves, smaller white flowers, and lip less distinctly trilobed with an acuminate apex. Although we have been unable to examine the type, the differences seem unreliable considering the variation of *L. rubescens*. However, there is a trend in the populations of the Caribbean watershed towards having smaller flowers (photo 72).

HYBRIDS: Despite its small size, weak texture and short flower duration, *L. rubescens* has 50 registered hybrids in first generation; its tolerance of higher temperatures may have influenced its use as a parent. Among its outstanding progeny we found *Blc.* Heirloom (x *Bc.* Binosa) and *Sl.* Sunset Glow (*Sl.* Psyche). *Laeliocattleya* Guadalupana (x *Lc.* Wrigleyi) is a very nice cross with bluish flowers.

CONSERVATION STATUS: Not threatened.

SPECIMENS EXAMINED: **NAYARIT**: *O. Nagel 5114* AMES! *Feddema 2609* NY! **JALISCO**: *Iltis et al. 694* BM! *R. McVaugh 1492* NY! *R. McVaugh 24445* MO(4273584)! NY! *E. Lott 826 & J.A.S. Magallanes* MEXU! **COLIMA**: *M.C. Chase 82026* MICH *Thurston T-2218 sub E. Hágsater 5853* AMO(slides)! **MICHOACAN**: *G.B. Hinton 12551 et al.* AMES! K! *G.B. Hinton 16227* AMES(x2)! *G.B. Hinton 16236* AMES(x2)! *G.B. Hinton 16176* AMES! *G.B. Hinton 16237* AMES(x2)! *B. Guerrero 328* XAL! *B. Guerrero 359* XAL! **GUERRERO**: *Langlassé 940bis* G! *O. Nagel sub E. Oestlund 4851* MO SEL! US *O. Nagel sub E. Oestlund 1747* AMES! MO US *O. Nagel sub E. Oestlund 5119* AMES! BM! MEXU! MO SEL! US *O. Nagel sub E. Oestlund 5120* AMES! *Plummer sub E. Oestlund 3582* AMES! BM! *G.B. Hinton 9798* K! *G.B. Hinton 11601* K! *C. Halbinger sub E. Oestlund 4290 E. Matuda 38286* MEXU! *E. Hágsater 1641* AMES AMO(card)!; *E. Hágsater 1644* AMO ENCB K MEXU MO **PUEBLA**: *Torralba sub E. Oestlund 3217* AMES! MEXU! SEL! *E. Nagel 4851 E. Matuda 38016* MEXU! **CHIAPAS**: *E. Hágsater 6249* AMO(slides)! *D.E. Breedlove 29683 & R.L. Dressler* AMES! *E. Cabrera 3859 & H. de Cabrera* MEXU! XAL! **TABASCO**: *P.E. Valdivia 2047* MO(2628132)! XAL! *P.E. Valdivia 2086* MO(2628131)! XAL! **CAMPECHE**: *Lundell 1108* AMES! NY! *E. Matuda 37497* MEXU! *E. Hernández X. et al. ES=344* MEXU! *G. Pollard s.n.* AMO(slide)! *E. Cabrera 4430 et al.* MEXU! *E. Cabrera 15305* MEXU! *J. Chavelas ES=344* MEXU! *D. Ocaña 314 & C. Coronado* IZTA MEXU(x2)! **WITHOUT LOCALITY**: *Hartweg* K! *Lawrence* K-L!

REFERENCES: Lindley, Bot. Reg. 26: pl. 41. 1840; Lindley, Bot. Reg. 28: sub t. 62. 1842; Paxt. Mag. 10: 49-50; Horich, Die Orchidee 33: 227-229. 1982; Senghas & Bockemühl, Orch. Kart. 31(3). 1980; Mora & Atwood, Ic. Pl. Trop. pl. 1441. 1992.



The known geographic distribution of *Laelia rubescens*. Forma *rubescens* full circles; f. *peduncularis* empty circles.

LAELIA RUBESCENS f. **PEDUNCULARIS** (Lindl.) Halbinger, Orquídea (Méx.) 13(1-2): 294. 1993.

Basionym: *Laelia peduncularis* Lindl., Bot. Reg. 28: Misc. 10 (p. 9). 1842.
Holotype: A Mexican plant flowered in Birmingham, *Geo. Barker* K-L!
Cattleya peduncularis (Lindl.) Beer, Prakt. Stud. Fam. Orch. 208. 1854.
Bletia peduncularis (Lindl.) Rchb. f., Walp. Ann. 6: 425. 1862.

ETYMOLOGY: The form name derives from the long pedicellate ovary.

HISTORY: *Laelia peduncularis* was described by Lindley in 1842, as a separate entity from *L. rubescens* and *L. acuminata*, based on a plant cultivated by Mr. Barker.

RECOGNITION: Differing by "having none of the hairiness of that species [*L. rubescens*], and its flowers being much more closely arranged; from the latter [*L. acuminata*], in neither its petals nor lip being wavy and sharp pointed; and from both, in its very large, whole-colored flowers, flat jagged petals, short recurved lip-lobes, and very long flower-stalks" (Lindley, 1845).

DISTRIBUTION: Apparently confined to Oaxaca and Guerrero.

HABITAT: It is found frequently in warm oak forests or tropical deciduous forests from 700 to 1500 m.

WHERE TO SEE: There is a big population, source of some of the plants known in Europe in the 19th century, along the basin of the River Juchatengo, on the Oaxaca-Puerto Escondido road.

FLOWERING TIME: October-November.

VARIATION: Oaxacan plants are bigger and more colorful (photo 78) than those from Guerrero (photo 77).

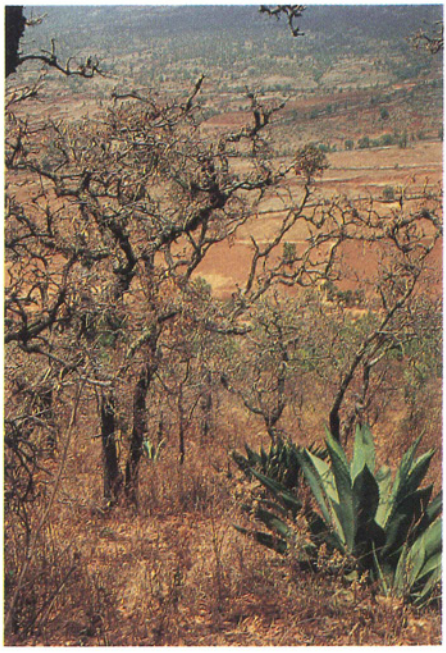
CONSERVATION STATUS: Not threatened.

OTHER RECORDS: **OAXACA**: *H. Galeotti 5044* BR(x3)! P(x3)! W(x2)! *Johnson 1058-24* AMES! *M. Sousa 6323 et al.* MEXU! *M. Sousa 8370 et al.* MEXU! *G. Salazar 4873* AMO(slide, card)! **GUERRERO**: *O. Nagel sub E. Oestlund 1938* MO!

REFERENCES: Lindley, Bot. Reg. 31: pl. 69. 1845; Hooker, Bot. Mag. 70: pl. 4099. 1844; Warner & Williams, Orch. Album 4: 173. 1885.

77. *Laelia rubescens* f. *peduncularis* from Guerrero

78. *Laelia rubescens* f. *peduncularis* from southern Oaxaca, *G. Salazar 4873*



79. The habitat of *Laelia speciosa* in the dry season, near Lake Pátzcuaro, Michoacán

80. A rather common color and form in *Laelia speciosa*

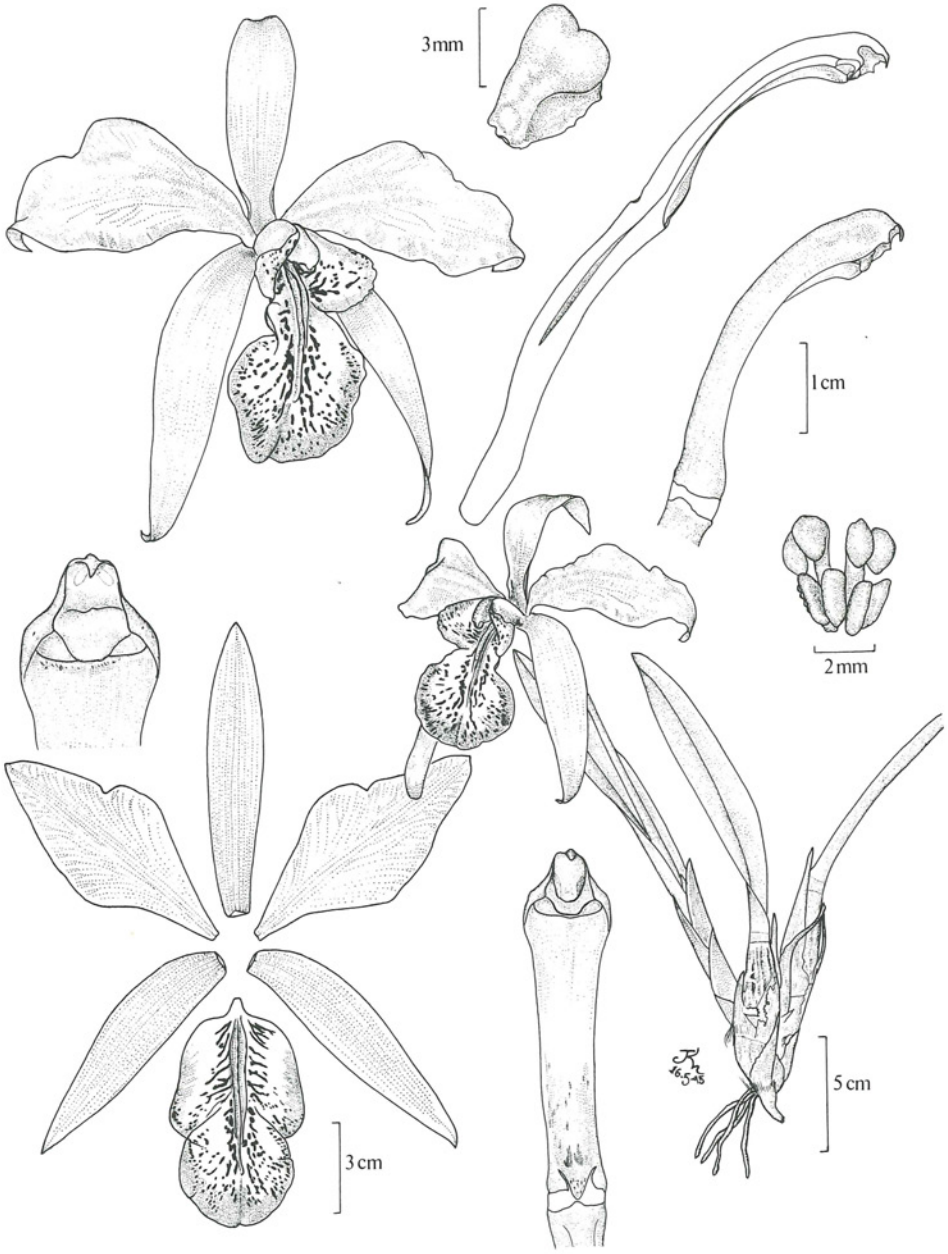


FIG. 17. **LAELIA SPECIOSA** (Llave & Lex.) Schltr. *M. Soto 5663*. Drawing by R. Jiménez.

LAELIA SPECIOSA (H.B.K.) Schltr., Die Orch. 233. 1914.

Basionym: *Bletia speciosa* H.B.K., Nov. Gen. & Sp. 1[quarto]: 342. 1816.

HOLOTYPE: "Crescit locis calidis Regni Mexicani juxta littus Oceani Pacifi inter portum Acapulci et Playas de Coyuca", *Humboldt & Bonpland* P!

Bletia grandiflora Llave & Lex., Nov. Veg. Descr. Orch. Opusc. 2: 17. 1825.

Type: "Habitat supra truncos arborum in tota Provintia Michuacana. Floret Majo et Junio.- Vernacule Lirio, Flor de Corpus, Itzúmaqua inter michoacanos"; not located.

Laelia grandiflora (Llave & Lex.) Lindl., Gen. & Sp. Orch. Pl. 115. 1831.

Laelia grandiflora var. *alba* Dimmock, Amer. Gard. 22: 398. 1901; Hort., Orch. Rev. 9: 202, 312. 1901.

Type: not stated.

Cattleya grahamii Lindl., Gen. & Sp. Orch. Pl. 116. 1831.

Holotype: "N. 3 Flor de Mayo in col., In quercubus parasitica pr. Sn. Bartolo, Mexico, flor majus. Schlechtendal" K-L!

Laelia majalis Lindl., in Benth. Pl. Hartw. 25. 1840.

Holotype: Mexico, Guanajuato, "In montibus prope León, alt. circa 8000 pedibus", [1836] *Hartweg 225*, K-L!; isotypes AMES! BM! K! OX! W(x2)!

Cattleya majalis (Lindl.) Beer, Prakt. Stud. Fam. Orch. 212. 1854.

Laelia majalis alba Hort., Gard. Chron. ser. 3, 40: 45. 1906.

Type: not located.

COMMON NAMES: "Flor de mayo" (flower of May); "flor grande" (big flower); "flor de Corpus" (flower of the Day of the Holy Corpse); "tlacuxóchitl", "deantzá" (Purépecha), "itzámahua" (Purépecha), "chichiltictepetzacuxóchitl" (ancient Náhuatl).

Plant epiphytic or very rarely lithophytic, single or forming compact clumps, 12-40 cm high excluding the inflorescence. **Roots** rounded, whitish, 1.3-3 mm thick. **Rhizome** very short and inconspicuous, made up of 3(-5) internodes, up to 1.5 cm long, 4.5-8 mm thick. **Pseudobulbs** subglobose to ovoid, very slightly compressed, elliptic in cross-section, made up of 2-3 internodes, light green, the surface rugose when older, when young covered by scarious sheaths, obscurely 8-12-furrowed, 3-6 cm high, 15-40 mm wide, 15-31 mm thick. **Leaves** 1-2, lanceolate-elliptic, acute, coriaceous, slightly fleshy, green, occasionally suffused with purplish-red, 7.5-16 x 2-3.5 cm. **Inflorescence** from the new, developing pseudobulb, erect, straight, 15-25 cm long; peduncle straight, somewhat compressed, green suffused with purple, 5-15 cm long, 3-5 mm thick; with a basal, triangular, membranaceous, 15-35 x 4-6 mm bract; sometimes another triangular, long acuminate, similar bract below the middle, 5-25 x 4-6 mm; raceme with 1-2, rarely up to 4 rather distichous flowers. **Floral bracts** small, triangular, mucronate, carinate, membranaceous, 6-14 x 4-8 mm. **Flowers** very large and showy, resupinate, substance weak, 10-16 cm diameter, segments very spreading, sepals and petals almost in the same plane, pink to lilac-purplish; lip white with the margins frequently colored, the midlobe with a very variable design of spots and magenta stripes, usually with solid colored margins; callus with a median, light yellow keel, lateral ones whitish, sometimes striped with magenta; column pink on the dorsal surface, white on the ventral one. **Ovary** pedicellate, subterete, thickened towards the apex, slightly 6-sulcate, somewhat twisted, smooth, greenish, 30-50 mm long, 2-3 mm thick. **Sepals** spreading, lanceolate, acute, smooth; **dorsal sepal** erect, 62-85(103) x 13-18 mm; **lateral sepals** oblique to falcate, 55-85(97) x 10-20 mm. **Petals** spreading, frequently somewhat arcuate and recurved at apex, elliptic to rhombic, acute to subacute, subclawed, blade basally narrowed-cuneate, with the margins slightly irregular and pleated, 60-90(100) x 25-50 mm. **Lip** 3-lobed, 40-70(78) total length, 33-54 mm wide when spread out, very slightly arcuate; lateral lobes erect, oblong to

81. *Laelia speciosa* growing wild in Hidalgo, with Jorge Lamas

obovate, the apex widened, rounded, the margin reflexed, forming a tubular throat embracing the column, 27-40 x 13-21 mm; midlobe obovate, ovate, or transversely elliptic, rounded to emarginate, deflexed, the margin somewhat undulate, 28-49 x 33-54 mm; callus simple, formed by 3 longitudinal keels from the base to the middle of the lip, the central one longer; ca. 42 mm long. **Column** slightly arcuate, clavate, wingless, cuniculus shallow, 1.3 mm deep; 33-36 mm long, 7-9 mm wide; clinandrium with a prominent median tooth, the margin minutely erose. **Anther** ovoid-subquadrate, 8-celled, white, 5-6 x 4 mm. **Pollinarium** 2 x 3-4 mm, made up of 8 laterally compressed, yellow pollinia, the upper ones subquadrate, rounded, 1.6 x 1.4 mm; lower pollinia slightly smaller and triangular, rounded, 2.0 x 1.0 mm; attached to granulose caudicles. **Rostellum** a transverse, ovate-elliptic, fleshy, convex plate, white, 1.5 x 4 mm. **Stigmatic cavity** transversely elliptic, surface viscous, white, shiny, lateral lobes inconspicuous, ca. 2 x 6 mm. **Capsule** ellipsoid, with 3 very prominent ribs and 3 high, well-defined ridges, 6-angled in cross-section, ca. 40-51 x 25-31 mm, with a pedicel 27-33 mm long and an apical beak 12-13 mm long.

ETYMOLOGY: *speciosus* = magnificent, showy, with great appearance.

HISTORY: *Laelia speciosa* is one of the first Mexican orchids cited in the scientific literature. The Jesuit priest Francisco Hernández, physician to King Felipe II of Spain, mentioned this orchid in his book "De la Naturaleza de las Plantas y Animales de la Nueva España", from the year 1615. Baron Alexander von Humboldt found the species during one of his journeys in Mexico and his collaborator Karl S. Kunth described it in 1815 as *Bletia speciosa*. The Mexican botanists Pablo de la Llave and Juan Lexarza described this same orchid as *Bletia grandiflora* in 1825, and John Lindley, for his part, described it as *Laelia majalis*. Finally, Rudolf Schlechter put into effect the currently accepted combination, *Laelia speciosa*, in 1914, and that name has been used ever since. The plants are relatively small, considering the great size of the beautiful flowers which are admired by people from both Mexico and abroad.

Theodore Hartweg, commissioned to send to England plants from the temperate regions of Mexico, was very pleased to find this species near León, Guanajuato, in places of high elevation and abundant wintertime coldness. Unfortunately, the cultivation of *Laelia speciosa* outside of the Mexican highlands is difficult enough - the plants neither grow nor bloom - so that its popularity has decreased abroad.

RECOGNITION: *Laelia speciosa* is considered one of the most beautiful species of the genus, and perhaps one of the most outstanding of all the orchids. The plants are epiphytic, rather small, with globular or ovoid pseudobulbs which carry one stiff, terminal leaf. The inflorescence is 15 to 25 cm long, with 1 to 2 very large flowers which measure 10-16 cm diameter, of pale to dark pink-lilac to purplish coloration. The sepals are lanceolate and the petals are of double their width; the lip is white in its center, the midlobe of the lip is almost round, rosy-lilac at the borders, white in the middle, more or less patterned with magenta-purple spots and rays. The flowers have a weak fragrance that resembles that of violets.

DISTRIBUTION: Endemic in the Sierra Madre Occidental, Oriental, the Transverse Volcanic Belt, and the southern part of the Mexican Plateau. *Laelia speciosa* can be found in a very large area in Mexico, in the states of Durango, Zacatecas, Aguascalientes, Jalisco, Guanajuato, Michoacán, Querétaro, Hidalgo, San Luis Potosí, and Tamaulipas; it has been erroneously reported from Veracruz, Oaxaca, and Guerrero.

HABITAT: The plants grow on oaks (almost always on *Q. deserticola* and *Q. laeta*) in open, deciduous, stunted forests at an altitude of 1900 to 2500 meters. They withstand severe drought from December to June and tolerate short periods below 0°C temperatures. Annual rainfall is from 700 to 1000 mm, and fogs are rare and limited to the summer season.

WHERE TO SEE: Take the old road from Morelia to Quiroga, Michoacán. 500 m beyond the deviation to Tiripetío, look to the north side of the road in search of scattered stubby oaks in an eroded terrain. This place is known as "Puerto del Tigre". *Laelia speciosa* is abundant on the oaks.

82. A very pale-colored specimen of *Laelia speciosa*

83. *Laelia speciosa* alba

84. A unique pastel pink-flowered plant of *Laelia speciosa*

85. A pale colored *Laelia speciosa*

FLOWERING TIME: From April to July.

VARIATION: There is large variation, in size as well as form and coloration in the flowers. The patterns in the lip are as variable as fingerprints, and therefore it can be said that each flower is unique. Completely white flowers are rare enough, but a fair number of them is however known (photo 83). Semialba flowers, with delicate tones, are very beautiful (photos 82, 84, 85); likewise sought after are flowers with very intense and contrasting coloration (photos 86, 87). In recent years some flowers with white sepals and petals with dark, lilac borders have appeared. It is known that the flowers with biggest size and best form come from Michoacán.

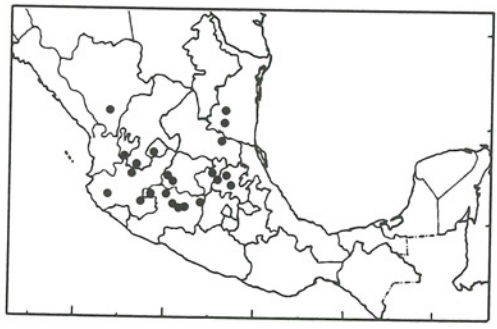
Five color groups have been recognized in this species: (1) rose-lilac, as the more common type in the wild; (2) lilac-magenta, darker than usual, generally with contrasting pattern of the lip; (3) very pale lilac, with delicate tones on the lip; (4) albas, with only the callus slightly yellow, and (5) semialbas, with white to whitish tepals and a very pale design on the lip (Halbinger, in press).

HYBRIDS: *Laelia speciosa* has rarely been used to produce hybrids; its difficult cultivation out of Mexico, weak substance, and droping, arching petals are not favored by breeders. The RHS registration index includes 19 artificial crosses, none common in cultivation.

CONSERVATION STATUS: **Under special protection**. *Laelia speciosa* is one of the four Mexican orchids in this category, together with *Encyclia citrina*, *E. vitellina*, and *Barkeria scandens*. Although there are nowadays localities with a great number of plants, some sites have been exploited to the extent that the plants have almost become extinct locally. Thousands of plants are sold in the streets and markets of Mexican towns. Children and peasants gather every flowering plant of the wild populations, with extremely severe consequences to the seed production of the wild populations. In some areas, no recruitment of new seedlings has been observed in the last several years. The comparative demography of intact and exploited *Laelia speciosa* populations has been studied by Hernández (1992) who concluded from her work that if this illegal traffic continues, many populations will be exterminated in the near future.

SPECIMENS EXAMINED: **TAMAULIPAS**: *M. Soto 8077* AMO! **SAN LUIS POTOSI**: *Virlet 1147* P! *Foster 23* AMES! **QUERETARO**: *E. González 519* IEB! *E. Gonzalez 637* IEB! *S. Zamudio 2106* IEB! **HIDALGO**: *Schiede* BM! *Ehrenberg 46* W! *O. Nagel sub E. Oestlund 2816* AMES! BM! *E. Oestlund 2817* AMES! MEXU! SEL! *R. Hernández M. 6078 et al.* MEXU! MO! *F. Ancona sub H. Bravo 1617* MEXU! *M. Soto 6214 & E. Pérez* AMO! **DURANGO**: *N. Bashor 681* AMO! *P. Tenorio 6193 et al.* MEXU! *M. Gonzalez 1214* IEB! **ZACATECAS**: *Hartweg* K! *M. Soto s.n.* AMO! **JALISCO**: *R.L. Dressler & Wirth 2652* AMES! MO! NY! *R. Acevedo et al. 1197* IEB! XAL! *C.L. Díaz et al. 1668* IEB! XAL! *Gregory & Eiten 241-1* MO! *Feddema 208, S. Rosillo 158* AMO! **MICHOACAN**: *H. Galeotti 5207* P! *Arsène 3077* MEXU(x2)! *Brachway 31,32* MO! *Gregg 780* MO! *M. Soto 5663 et al.* AMO(illustration voucher)! *M. Soto 5665 et al.* AMO! *Shay sub Powman 11792* SEL! *Aiken sub E. Oestlund 1146* AMES! *J.M. Escobedo 1380* IEB! MEXU! XAL! *H. Díaz B. 2312* IEB! **GUANAJUATO**: *Dugés 69* AMES! *Eicken 1382* AMES! *E. Argüelles 1237* MEXU! *J. Kishler 605* MEXU! *E. Ventura & E. López 6702* IEB! *E. Ventura & E. López 6731* IEB! *M. Soto 8063 & E. Huerta* AMO! Oaxaca, erroneous locality: *Andrieux 89* K! **WITHOUT LOCALITY**: *W. Schuman 1382* BM! *Hartweg 621* OX! *Ghiesbreght 52* P!

REFERENCES: Lindley, Bot. Reg. 28: sub t. 62. 1842; Lindley, Bot. Reg. 25: misc. p.35. 1939; Lindley, Bot. Reg. 30: pl. 30. 1844; Reichenbach, Xenia Orch. 2: 56. 1874; Williams, Orch. Mex. 189-190. 1951; Dickinson, Amer. Orchid Soc. Bull. 32: 700-702. 1963; Senghas and Bockemühl, Orch. Kart. Die Orchidee 29(4). 1978; McVaugh, Fl. Novo-Galiciana 16: 179-180; Soto Arenas, Ic. Orch. I: pl. 52. 1990.



The known geographic distribution of *Laelia speciosa*.

86. *Laelia speciosa* with flowers somewhat darker than usual

87. *Laelia speciosa* "Jupiter" MO/AMO, an outstanding dark, full flower; note the heavily marked lip

88. Raceme of *Laelia superbiens* from Chiapas

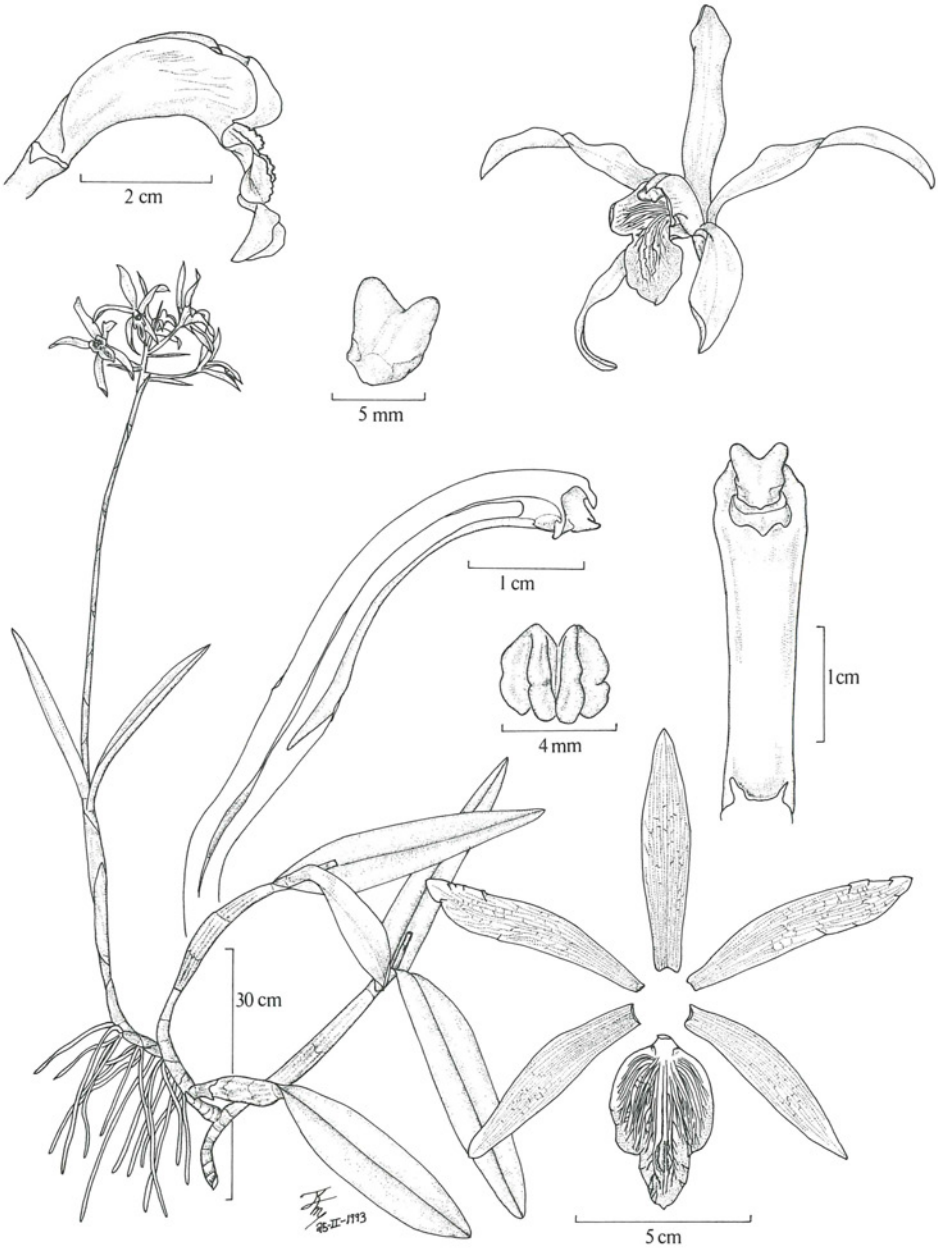


FIG. 18. **LAELIA SUPERBIENS** Lindl. *E. Pérez 187.* Drawing by R. Jiménez.

LAELIA SUPERBIENS Lindl., Bot. Reg. 26: misc. p. 46. 1840.

HOLOTYPE: Guatemala, "found ... evidently planted by the Indians before their doors, in Acatenango, *Skinner*, K-L!; isotype "Guatemala, *Skinner* K! P!

Cattleya superbiens (Lindl.) Beer, Prakt. Stud. Fam. Orch. 214. 1854.
Bletia superbiens (Lindl.) Rchb. f., Walp. Ann. Bot. 6: 418. 1862.
Schomburgkia superbiens (Lindl.) Rolfe, Orch. Rev. 25: 49. 1917.
Laelia superbiens [var.] *quesneliana* Warner. & Williams, Orch. Alb. 8: pl. 383. 1889.
Type: "flowered in the gardens of M. Quesnel, of Havre, France", the holotype is the plate 383.

COMMON NAMES: "Flor de la Candelaria" (Chiapas), "tanal" (Tzeltal), "vara del Señor San José" (Wand of St. Joseph; Guatemala), "chumaqué" (Quiché, Guatemala); "Coteach-Kiaj" (red flower, Comalapa, Guatemala).

Plant epiphytic, stout, scandent, eventually forming clumps, 40-80 cm high excluding the inflorescence. **Roots** rounded, whitish, 1.6-2.5 mm thick. **Rhizome** elongate, conspicuous, made up of 5 internodes, 4-8 cm long, 15-20 mm thick; slightly dorsiventrally compressed. **Pseudobulbs** fusiform, elongate, somewhat compressed, rhombic in cross-section, ca. 25-40 mm long-stipitate, built up of 4-5 internodes, green to yellowish, reddish when older, new ones covered by fibrous-scarious, strongly appressed sheaths, older ones longitudinally 8-furrowed, 16-40 cm high, 27-46 mm wide, 20-37 mm thick. **Leaves** 2 (rarely 1 or 3), oblong-elliptic, obtuse to acute, coriaceous-fleshy, carinate, conduplicate and subpetiolate at base, green-yellowish, 16-36 x 4.5-7 cm. **Inflorescence** from the mature pseudobulb, erect-arcuate, 75-120 cm long, the peduncle almost round, green suffused with purple, 6-9 mm thick, bearing 8-12 tubular bracts, as long as or longer than the internodes, appressed, distichous, carinate, longer about the middle of the peduncle, oblong-triangular, subacute, conduplicate, scarious at anthesis, white-brownish, 60-85 mm long; raceme subumbellate, helicoidal, 7-12 flowered; rachis 8-17 cm long. **Floral bracts** long lanceolate, acuminate, inconspicuously carinate, divergent from the ovary, shriveling at anthesis, scarious, rose-magenta, 65-80 x 10-18 mm. **Flowers** big, very showy, resupinate or not, substance weak, 9.5-18 cm diameter; tepals rose-lilac, pale to dark, with the axial part often paler; lip with the lateral lobes yellowish with rose-lilac margins, densely striped, the lines dark, purple-violet, shiny, midlobe rose-lilac or magenta, crests of the callus cream-yellow, disc yellow, the veins dark purple, callus plate yellowish, the distal part paler, some crests margined with purple; veins of the midlobe darker; column greenish at base, rose to purplish towards the apex; anther white, with a violet stripe (contrasting with the color of the body of the column); fragrance weak, soap-like, especially in sunshine. **Ovary** pedicellate, subterete, thickened towards the apex, 6-sulcate, spreading to ascending-arcuate, slightly twisted, warty-spinose, glutinous, not furfuraceous, greenish densely suffused with pink-magenta, 50-86 mm long, 4-5.5 mm thick. **Sepals** spreading, acute, smooth, the margins wavy; **dorsal sepal** oblong-lanceolate, 70-100 x 15-18 mm; **lateral sepals** with revolute margins, canaliculate at base, oblique, oblong-narrowly elliptic, falcate, 63-93 x 11-17 mm. **Petals** spreading, ascending-arcuate, long oblong-lanceolate, oblanceolate, falcate, obliquely acute-subacute, the base cuneate, not clawed, widely wavy, 60-102 x 9-16 mm. **Lip** 3-lobed, 53-63 mm total length, 33-45 mm wide when spread out, arcuate and basally subparallel to the column, the midlobe decurved; lateral lobes erect, not forming a closed tube above the column, elliptic, widely rounded, the margin minutely denticulate and wavy, the upper surface with the veins elevated, 34-40 x 12-20 mm; midlobe elliptic to ovate-suborbicular, rounded, occasionally mucronate, undulate, spreading, or with the proximal margins deflexed, and the apical ones incurved, 30-34 x 20-32 mm; callus complex; from the base to the middle of the midlobe made up of an elevated, fleshy-waxy plate with a couple of erect, lateral keels; from the

middle of the lip to the middle of the midlobe (5)7-9 keels separate gradually from the plate, these keels becoming high lamellae (up to 6 mm high) with crenate margins; total callus length 35-45 mm, 8-14 mm wide at the apex, 6 mm wide at base. **Column** strongly arcuate, wingless, oblong, semiclavate, with a cuniculus at base ca. 6-7.5 mm deep; fused to the blade of the lip for ca. 2-3 mm, the ventral margins very prominent; 31-32 mm long, 7-9 wide; clinandrium irregular-denticulate, the midtooth well-defined, large, oblong, deflexed, itself minutely denticulate; lateral teeth obscure and wide, not always well-defined. **Anther** bilobed, conspicuously saddle-shaped, truncate, 8-celled, white, 4.3-4.5 mm high, 5.3-6.2 mm wide, 3.5 mm thick. **Pollinarium** 3.2 x 2.7 mm, made up of 8 yellow pollinia, the upper pollinia triangular-ovate, bigger than the lower ones, 1.5 x 1.2 mm; lower pollinia triangular-oblong, 1.2 x 1.0 mm; with 4 caudicles, in two elliptic pairs, ca. 2.7 mm long. **Rostellum** a transverse, fleshy blade, oblong-elliptic, rounded, convex, white suffused with violet, 1.8-2.3 x 5-6 mm. **Stigmatic cavity** triangular-cordiform, rounded, dark green, shiny, lateral lobes inconspicuous, very slightly protruding, 5-6 x 6 mm. **Capsule** ellipsoid-fusiform, with 3 well-defined ribs, and 3 others much broader and obscure, green, rugose-scored, 7.2-8.5 cm long, 3.1-3.7 cm thick, with a pedicel 40-45 mm long, and a short, thick, apical beak ca. 7 mm long.

ETYMOLOGY: *superbiens* = superb, sublime, superior.

HISTORY: *Laelia superbiens* was described by John Lindley in 1840, based on a plant sent to him from Guatemala by George Ure Skinner together with a note that said "Have you ever seen anything like this?!" referring to the magnificient plant he sent. Rolfe transferred this species to the genus *Schomburgkia* in 1917; actually *Laelia superbiens* shows many intermediate characteristics between the Mexican Laelias and the real Schomburgkias. With the Mexican Laelias it shares the similar flower color (rose-lilac segments, not of a varnished appearance, yellow disc and dark lines in the throat) and the column separated from the lip; the Schomburgkias are similar in the vegetative habit, undulate segments, and have the same umbellate raceme with colored bracts.

RECOGNITION: *Laelia superbiens* is one of the most spectacular species of the genus. The plants are really large, epiphytic, with fusiform, elongate, big pseudobulbs carrying 1-3 stiff leaves, 16-40 cm long and 4.5-7 cm wide. The inflorescence is up to 1.2 meters long, with a terminal, helicoidal raceme of 7 to 12 flowers. The sepals and petals often have wavy margins and the arcuate-decurved lip is heavily marked with purple-violet lines. The complex callus is unique in *Laelia* or *Schomburgkia*, but variable even in plants coming from the same population; it is formed by a basal, elevated plate and 5-9 lamellae separating near the base of the midlobe; the lamellae have crenate margins.

DISTRIBUTION: In Mexico in the Sierra Madre Oriental in Oaxaca, and in the Central Plateau of Chiapas, and probably the Sierra Madre of Chiapas. Also in Guatemala, Honduras, and Nicaragua.

HABITAT: In open oak forest (of *Quercus peduncularis, Q. polymorpha, Q. conspersa*) with pines (*Pinus oocarpa, P. maximinoi*), and tropical deciduous trees (e.g. *Zanthoxylum*, *Erythrina*, *Acacia*, *Bursera*, and *Leucaena*), or in pine-oak-liquidambar forests, from 1000 to 1500 m altitude. Annual rainfall in these areas is

89. Close-up of the callus of *Laelia superbiens*

90. A raceme with paler flowers *Laelia superbiens* from Chiapas

from 1200 to 1800 mm; fog is frequent and the growing places are frost free.

In the old literature the habitat of *L. superbiens* is described as cool and with some frost; this is not the case, at least for Mexican populations, since all of them are below 1500 m altitude. In the southern part of the country this indicates warm-temperate climate. A constant feature of all the stations where *L. superbiens* has been found is the continuous, rather strong wind that probably maintains a low temperature of the leaves, even in full sun; if grown in a closed greenhouse with poor ventilation and high light intensity, the big leaves of *L. superbiens* become very warm and eventually suffer some burning.

WHERE TO SEE: Few populations of *L. superbiens* are known in Mexico and some of them are very remote. Beautiful cultivated plants can be seen in Comitán, Las Margaritas, and on the road from La Trinitaria to the National Park Lagunas de Montebello, all of them in Chiapas; in the park there are some plants in the drier areas, mostly with oaks and *Pinus maximinoi*.

FLOWERING TIME: From the end of November to March.

VARIATION: Variants in both size and form of the flowers are known. Albas and semialbas are very scarce, at least in Mexico, but a few clones are known, including one from Nicaragua that has been extensively propagated. A white-flowered clone appeared in a convent near Comitán, and it is said that armloads of racemes of white flowers were once sold in the market of Tuxtla Gutiérrez, Chiapas. Most Mexican plants are of a nice dark color and they usually have a better shape and substance than the plants from Central America. There is also some variation in the number of keels that adorn the callus.

The variety *quesneliana* differs from the typical form by its darker flowers, the lip purple on both surfaces, and the very prominent four keels of the lip; although most Mexican specimens share these traits, it seems unnecessary to recognize them as a distinct variety.

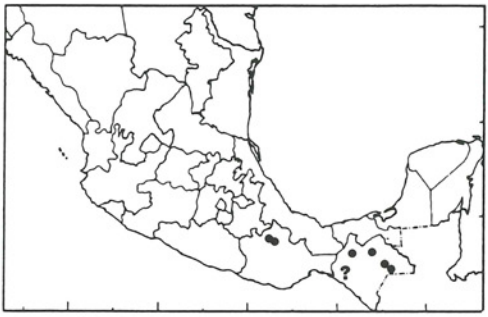
The plants from Oaxaca are very distinct, apparently they have a strong introgression from *L. anceps*; this point is discussed in the chapter on "Natural Hybrids in *Laelia*".

HYBRIDS: The very large plants of *L. superbiens* and its spidery flowers are not favored by the breeders in the *Cattleya* alliance. Only 8 hybrids are listed by the RHS orchid hybrid registration index. However, plants like *L.* Nemesis are very handsome and make beautiful garden specimens in frost free, temperate areas.

CONSERVATION STATUS: Vulnerable. Some time ago it was thought that this species was endangered in Mexico, since only a few dozen plants were known in the wild. However, a very large and extensive population comprising thousands of plants was located a few years ago. In spite of this find, the other populations are small, scattered, and all of them must be protected.

SPECIMENS EXAMINED: **CHIAPAS**: *E. Oestlund 4557* AMES! SEL! *Nelson 3495* AMES! *Miller s.n.* AMO(slides)! *D.E. Breedlove & P. Raven 8402* AMES! *F. Miranda 5075* MEXU! *A. Pérez M. 174* MO(4273444)! *E. Matuda 26042* MEXU! *M. Soto 6246, 6247, 6248, 6249, 6250 & E. Pérez* AMO! *M. Soto 7938, 7939 & E. Pérez* AMO! *E. Pérez 187* AMO(illustration voucher)! **OAXACA**: *S. Salas s.n.* AMO! WITHOUT LOCALITY: *E. Hágsater 1054* AMO(slides)!

REFERENCES: Lindley, Bot. Reg. 28: sub t. 62. 1842; Bateman, Orch. Mex. Guat. t. 38. 1843; Hooker, Bot. Mag. 70: t. 4090. 1844; Hooker, Cent. Orch. Pl. t. 23. 1849; Warner, Select. Orch. Pl. 1(5): pl. 20. 1863; Warner & Williams, Orch. Album 6: pl. 224. 1887; Withner, Cattleyas and their relatives 3: 44-45.



The known geographic distribution of *Laelia superbiens*.

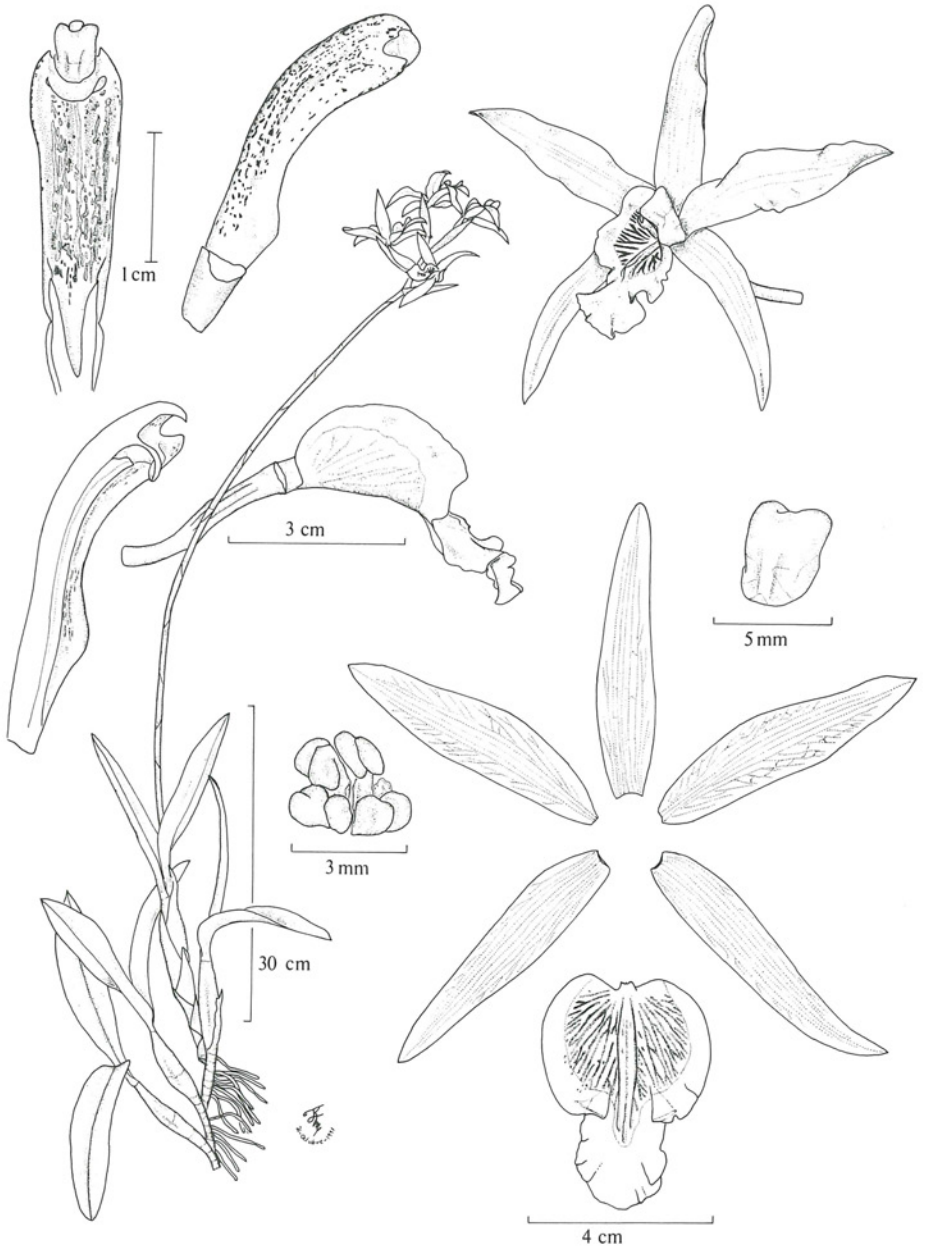


FIG. 19. **LAELIA ANCEPS** x **L. SUPERBIENS**. *A. Lau s.n. sub E. Hágsater 9539*. Drawing by R. Jiménez.

NATURAL HYBRIDS IN *LAELIA*

The Mexican Laelias flowers are not so specialized as to be pollinated by specific agents. Our records point towards bumblebees as the pollinators, and these hymenopters are known to have rather general preferences. As there are sympatric species that flower at the same period, it is not surprising that occasional natural hybrids can be produced, although they are not at all common.

The *Laelia* species that have been found growing and flowering in the same stations are as follow. *Laelia albida* with *L. anceps* subsp. *anceps* in N Oaxaca, with *L. anceps* subsp. *dawsonii* in S Oaxaca, with *L. autumnalis* in Nayarit, Jalisco, and W Michoacán, with *L. eyermaniana* in Sinaloa and Durango, with *L. furfuracea* in Oaxaca. *Laelia anceps* subsp. *anceps* grows sympatrically with *L. superbiens* in N Oaxaca and in Chiapas, and it is wild in the same gorge where *L. gouldiana* is traditionally cultivated. On the other hand, *L. anceps* subsp. *dawsonii* is known from the same range as *L. rubescens* f. *peduncularis*, but at higher altitudes. *Laelia autumnalis* shares its habitat and flowering season with *L. eyermaniana* in the lake country in Michoacán and Jalisco. Other combinations are not expected to form natural hybrids because they are not found growing together (or close enough) or they have different flowering phenology.

We discuss here the possible hybrid origen of some obscure plants commonly considered as natural hybrids in the literature (excluding *L. crawshayana*, *L. eyermaniana*, and *L. gouldiana*, here considered as "good" species); or plants seen in recent years with a combination of features that make us suppose a hybrid origin.

Laelia* x *finckeniana Rchb. f., Gard. Chron. 1: 194. 1883.

Type: a plant flowered in the collection of C.W. Fincken, of Hoyland Hall, Barnsley, from an importation of the Liverpool Horticultural Co.

Supposedly *Laelia anceps* subsp. *dawsonii* x *L. albida*.

A photograph of a specimen cultivated by Fincken appeared in the Orchid Review of 1894. That white flower is almost indistinguishable from *L. anceps* subsp. *dawsonii* f. *dawsonii*, but as Rolfe's note stated, it was smaller, with differently shaped lip, the lateral lobes of the lip not meeting above the column, the callus formed by 3 narrow keels, and more veined throat of the lip; furthermore, the flowers were 5-6 per raceme. These features, together with the plant's aspect, made Rolfe conclude that *L. x finckeniana* was a natural hybrid betwen *L. anceps* and *L. albida*. There was apparently more than one clone attributed to this taxon, and some variation in the plant habit was noted (O'Brien, 1893).

Rolfe's hypothesis is plausible, and we can add that we know of two locations where these species grow intermingled. One of them is in the deep gorge near Macuiltianguis, northern Oaxaca, where *Laelia albida* grows with *Laelia anceps* subsp. *anceps* of typical purple color. The other place is the only known station of *L. anceps* subsp. *dawsonii*, in the District of Juquila, southern Oaxaca, where *Laelia albida* is plentiful, among the few specimens of the subsp. *dawsonii*; both were seen flowering at the same time in December, 1991 and 1992. If *L.* x *finckeniana* was really a natural hybrid, it should have come from this place.

At present, some nurseries are offering the cross *L. anceps* (a white form) x *L. albida*, but we have not had a chance to examine the plants.

The name *L. finckeniana* has been misapplied occasionally (e.g. Orchid Digest

1978, p. 20) to *L. eyermaniana*, a very distinct and clear species.

REFERENCES: O'Brien, Gard. Chron. ser. 3, 14: 194. fig. 805. 1893; Rolfe, Orch. Rev. 2: 9-10. 1894.

Laelia anceps x *L. superbiens*

Laelia Nemesis Hort.

An artificial hybrid between *Laelia anceps* subsp. *anceps* and *L. superbiens*, registered in 1901.

Although *L. anceps* and *L. superbiens* are very scarce in northern Oaxaca, there are several plants that seem to belong to a complete series of intermediates between them. Actually, "typical", "pure" *L. superbiens* has never been found there.

Some specimens at first sight assumed to be *Laelia anceps* show some characters of *L. superbiens*, e.g. undulate sepals, wavy keels in the callus, delayed flowering time, etc. Furthermore, specimens closer to *L. superbiens* from the same area (*A. Jones s.n.*, photo 91; *O. Suáez s.n.*) have a very simple callus, and the anther is not saddle-shaped in profile, as in typical *L. superbiens*. Other specimens are more intermediate, like a first generation hybrid (photo 92). In the last case, plant size and number of flowers are more similar to *L. superbiens*, while flower shape and distichous inflorescence approach *L. anceps*. Withner (1993) shows one such plant, but identified it as *Schomburgkia sawyeri* (a synonym of *Myrmecophila galeottiana*).

At present we believe that considerable gene exchange has occurred between these two species. Interestingly, no intermediates have been found in Chiapas, where *L. anceps* and *L. superbiens* may be plentiful and can also grow intermingled.

This hybrid is a fine plant with horticultural interest, and Lau's plant form impressive clumps with spectacular floral displays in his garden in Fortín de las Flores, Veracruz. It makes beautiful garden specimens, and it has gained popularity among orchid growers in Mexico. Due to its big size, perhaps will not be popular among more northern orchid growers with little space in their crowded greenhouses.

RECORDS: **OAXACA**: *Conzatti sub Oestlund 7074* AMES! MO! *Lau sub Hágsater 9539* AMO(illustration voucher, x 3)! *A. Jones s.n.* AMO(in spirit, slides)! *O. Suárez s.n.* AMO(in spirit)! *M. Soto 7934* (in cultivation)!

Laelia anceps subsp. *dawsonii* x *L. rubescens* f. *peduncularis*

The cultivar "Ocuilan" of *L. rubescens* is a plant intermediate in vegetative morphology between these two species. It was found in a backyard in the town of Sola de Vega, Oaxaca, where both putative parents are cultivated.

The flowers are closer to *L. rubescens* f. *peduncularis*, although bigger, with paler color, higher than broad, with larger bracts, but with the characteristic blotch of *L. rubescens*, the callus with no trace of *L. anceps* subsp. *dawsonii*, and the characteristic long triangular stigma of *L. rubescens*. If a hybrid, it is probably not a first generation product, since the grex of *L. anceps* x *L. rubescens* (*L.* Maronii) is rather different, with the floral details mentioned above very intermediate between the parents. The possibility of a polyploid plant must not be discarded.

RECORDS: **OAXACA**: *E. Pérez 302 & M. Soto* AMO! AMO(slides, photo 94)!

91 and 92. Two members of a hybrid swarm between *Laelia anceps* subsp. *anceps* and *L. superbiens*. Both plants from northern Oaxaca. Top, a specimen cultivated by A. Jones; bottom, a plant collected by A. Lau (sub *E. Hágsater 9539*)

93. A plant presumed to be a natural hybrid between *Laelia albida* and *L. eyermaniana*. *N. Bashor 680-A*

94. *Laelia rubescens* cv. "Ocuilan" MP/AMO. *E. Pérez 302*. A specimen thought to have some genetic influence of *L. anceps* subsp. *dawsonii*

Laelia albida* x *L. eyermaniana

The specimen *N. Bashor 680-A* AMO(slide)!, seems to be a natural hybrid between *L. albida* and *L. eyermaniana*; both species grow close together, or maybe they are sympatric in Durango and Sinaloa (photo 93).

EXCLUDED TAXA

Serapias longifolia Sessé & Mociño, Pl. Nova-Hispania: 142. 1893.

There is a specimen annotated "Serapias longifolia de México." Herb. Pavón, BM! but we are not sure if it belongs to *L. speciosa* or *L. autumnalis*; there are no specimens so annotated in MA, G or other herbaria with Sessé and Mociño's collections, and it is probably the best candidate to lectotypify this obscure taxon.

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NOTE: The ilustration of the "chichiltictepetzacuxóchitl" (*Laelia speciosa*) is reproduced from *Obras Completas de Francisco Hernández II*, page 118. Universidad Nacional Autónoma de México. 1959.

TAXONOMIC INDEX

NOMENCLATURAL CHANGES

Laelia autumnalis f. *xanthotrophis* (Rchb. f.) Halbinger & Soto Arenas, *stat. nov.* p. 95

INDEX TO PLANT NAMES

The asterisk indicate that an illustration appears in that page.

APPENDIX 1. Matrix of morphological data of the *Cattleya-Laelia* alliance used in the cladistic analysis. Characters code on pages 23, 24.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
L. rubescens-L. aurea	0	1	0	0&1	0	0	1	1	1	0	1	1	0	1	0	0	0	1	0	0	1	1	0	3
L. anceps	0	1	0	0	0	0	0	1	1	0	0	0&1	1	0	1	0	0	0&1	0	0	1	1	0	5
C. walkeriana	1	1	0	0	1	?	?	1	0	1	0	0	2	0	?	0	1	0	0	0	1	1	0	1
C. dormaniana	0	0	0	0	1	?	?	1	0	0	0	0	2	0	?	0	1	0	0	0	1	1	0	4
C. subgen. Cattleya	1	1	0	0&1	1	1	1	1	1	0	0	1	2	0	1	0	1	0	1	0	1	1	1	2
C. subgen. Stellata	1	0	0	1	1	1	1	1	1	0	0	1	2	0	1	0	1	0	1	0	1	1	0	1&2
C. subgen. Circumvola	1	0&1	0	0&1	1	?	1	1	1	0	0	0	2	0	0	0	1	0	1	0	1	1	0	2
C. subgen. Intermediae & Falcat	1	0	0	0&1	1	1	?	1	0	0	0	0	2	0	0&1	0	1	0	0	0	1	1	0	1
C. subgen. Schomburgkioideae	1	0	0	0	1	1	1	1	0	0	0	0	2	0	0	0	1	0	0	0	0	1	0	1
Sophronitis	0	1	0	0&1	0	?	1	1	0&1	1	1	1	2	0	0&1	0	1	1	0	0	1	1	0	3
S. lyonsii	0	0	0	0	0	?	0	1	1	0	0	0	0	1	0	1	0	0	0	0	0	1	1	4
S. crispa group	0	0	0	0	0	?	0&1	1	1	0	0	0	0	1	0	1	0	0	0	1	0	1	1	4
S. undulata group	0	0	0	0	0	?	0&1	1	1	0	0	0	0	1	0	1	0	0	0	0	0	1	0	4
Rhyncholaelia	2	0	0	0	1	?	1	1	1	0	0	1	2	0	?	0	1	0	1	0	1	1	0	2
Brassavola	2	0	0	0	0	?	1	1	0	0	?	1	2	0	?	0	1	0	1	0	1	0	0	7
L. P. Harpophyllae	0	0	0	1	1	1	1	1	0	0	1	1	1&2	0	0	0	1	0	0	1	?	1	1	6
L. P. Parviflorae	0	0	1	1	1	1	1	1	0	0	1	1	1&2	0	0	0	0	1	0	1	1	2	1	3
L.P. Esalqueana	0	0	1	1	1	1	1	1	0	0	1	1	2	0	0	0	1	1	0	1	1	2	1	2
L.P. Rupestres	0	0	1	0	1	1	1	1	0	0	1	1	1&2	0	0	0	0	1	0	1	1	2	1	2
L.P. Liliputana	0	0	1	0	1	1	1	1	0	0	1	1	2	0	?	0	1	1	0	1	1	2	1	1
L. C. Crispae	0	1	0	0&1	1	1	0	1	1	0	0	1	2	0	0&1	0	1	0	1	0	1	1	0&1	3
L.C. Hadroalelia	0	1	0	0	1	?	1	1	1	0&1	?	1	2	0	?	0	1	0	1	0	1	1	0&1	1
E. selligera	1	0	0	0	0	?	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	7
M. wendlandii	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	4

	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
L. rubescens-L. aurea	1	1	0&1	0	1	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0
L. anceps	1	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
C. walkeriana	0	0	0	1	1	1	0	1	0	0	0	0	0	0	?	0	0	?	0	?
C. dormaniana	0	0	1	1	1	0	0	1	1	1	0	?	0	0	?	0	0	?	0	?
C. subgen. Cattleya	1	0	0&1	1	1	0&1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
C. subgen. Stellata	1	0	0	1	1	1	0	1	0	0	0&1	1	0	0	1	0	0	0	0	0
C. subgen. Circumvola	1	0&1	0&1	0	1	1	0	1	0	0&1	0	1	0	0	1	0	0	0	0	0
C. subgen. Intermediae & Falcat	0	0	0&1	0	0	0&1	0	1	0&1	1	0&1	1	0	0	0	0	0	0&1	0	0
C. subgen. Schomburgkioideae	0	0	1	0	0	0	0	1	1	1	0&1	1	0	0	?	0	0	?	0	0
Sophronitis	1	0	0&1	1	1	1	0	1	0	0	0	1	0	1	?	0	0	0	0	1
S. lyonsii	0	0	1	0	0	0	1	0	0	0	1	2	0	0	0	0	0	?	0	0
S. crispa group	0	0	1	0	0	0	1	0	1	1	1	0	0	0	?	0	0	0	0	0
S. undulata group	0	0	0	0	0	0	1	0	1	1	0	0	0	0	?	0	0	0	0	0
Rhyncholaelia	?	0&1	1	1	1	1	0	1	0	0	0	1	0	1	1	1	1	0	0	0
Brassavola	?	0&1	1	1	1	1	0	1	0	0	0	1	0	1	1	1	0	0	0	0
L. P. Harpophyllae	1	0	1	1	1	1	0	0	1	0	0	1	1	0	0	0	0	1	1	1
L. P. Parviflorae	1	0	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1
L.P. Esalqueana	1	0	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1
L.P. Rupestres	1	0	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1
L.P. Liliputana	1	0	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	?	?
L. C. Crispae	1	0	0&1	1	1	1	0	1	0	0	0	1	0	0	0	0	0	?	0	0
L.C. Hadroalelia	1	0	0	1	1	1	0	0&1	0	0	0	1	0	0	?	0	?	?	0	0
E. selligera	0	0	1	1	1	1	0	0	?	0	0	0	0	0	1	0	0	0	0	0
M. wendlandii	1	0	1	1	1	1	1	0	1	0	0	0	0	0	?	0	0	0	0	0

APPENDIX 1 (continuation).

	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
L. rubescens-L. aurea	1	0	1	0	0	0	0	1	1	0	?	?	?	?	?	?	?	?	?	?
L. anceps	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	1	2	0
C. walkeriana	?	1	0	0	1	0	0	1	1	0	1	0	1	0	1	1	0	0	1	0
C. dormaniana	?	0	1	?	?	0	?	1	1	0	?	?	?	?	?	?	?	?	?	?
C. subgen. Cattleya	?	0	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	1	1
C. subgen. Stellata	?	0	0	0	0	?	1	1	0	0	?	0	?	?	?	?	?	?	?	?
C. subgen. Circumvola	?	0	0	0	0	0	0	1	0&1	0	1	0	0	0	1	0	1	1	2	0
C. subgen. Intermediae & Falcat	?	?	0	1	0	0&1	2	1	1	0	1	0	1	0	0	1	1	1	1	0
C. subgen. Schomburgkioideae	?	0	0	1	0	0&1	2	1	1	0	1	0	0	0	1	1	1	1	1	0
Sophronitis	?	0	1	0	1	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0
S. lyonsii	0	0	0	1	1	0	2	?	0	0	?	?	?	?	?	?	?	?	?	?
S. crispa group	0	0	0	1	0	0	2	0	1	0	?	?	?	?	?	?	?	?	?	?
S. undulata group	0	0	0	1	0	0	2	0	1	0	1	0	1	0	0	0	0	1	0	0
Rhyncholaelia	1	0	0	0	0	1	1	1	1	0	0	1	0	1	1	0	0	0	2	0
Brassavola	1	0	0	0	0	1	1	1	1	0	0	1	0	1	0	0	0	0	2	1
L. P. Harpophyllae	1	0	0	1	0	0	1	1	1	0	?	?	?	?	?	?	?	?	?	?
L. P. Parviflorae	1	0	1	1	0	0	1	1	1	0	1	0	0	0	0	0	1	0	0	1
L.P. Esalqueana	1	0	1	1	0	0	1	1	1	0	?	?	?	?	?	?	?	?	?	?
L.P. Rupestres	1	0	1	1	0	0	1	1	1	0	?	?	?	?	?	?	?	?	?	?
L.P. Liliputana	?	0	1	?	0	0	1	1	1	0	?	?	?	?	?	?	?	?	?	?
L. C. Crispae	1	0	0	0	0	0&1	1	1	0&1	0	1	0	1	0	1	0	1	1	0	1
L.C. Hadroalelia	?	0	0	0	0	0	1	1	1	0	1	0	1	0	1	0	?	1	1	0
E. selligera	?	0	1	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0
M. wendlandii	?	0	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0	1	0	0

APPENDIX 2. Matrix of morphological data of the Mexican Laelias used in the cladistic analysis. Characters code on pages 26, 27.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
L. albida	0	1	0	0	0	1	0	1	1	0	2	0	1	2	2	3	1	2	0	1	1	1	1	1	0	2	1
L. anceps	0	1	0	0	1	0	2	1	2	0	1	0	0	1	2	0	1	1	0	1	1	1	1	1	0	0	1
L. aurea	0	1	1	1	1	0	2	0	0	0	2	0	1	4	0	0	1	?	1	0	0	1	1	1	0	1	1
L. autumnalis	0	1	0	0	0	1	0	1	1	0	2	0	1	2	2	1	1	2	0	1	1	1	1	1	0	2	1
L. crawshayana	0	1	0	0	0	1	0	1	1	0	2	0	1	2	2	3	1	?	0	1	1	1	1	1	0	0	1
L. eyermaniana	0	1	0	0	0	1	0	1	1	0	2	0	1	2/3	1	1	1	2	0	1	1	1	1	1	0	2	1
L. furfuracea	0	1	0	0	1	2	0	1	1	0	0	1	1	2	1	1	1	3	0	1	1	1	1	1	0	2	1
L. gouldiana	0	1	0	0	0	1	1	1	1/2	0	1	0	?	1	2	2	1	2	0	1	1	1	1	1	0	?	1
L. rubescens	0	1	1	0	1	0	2	0	0	0	2	0	1	4	0	0	1	4	1	0	0	1	1	1	0	1	1
L. speciosa	1	1	0	0	1	2	0	1	0	0	0	2	1	3	1	1	1	3	0	1	1	1	1	1	0	2	1
L. superbiens	0	0	0	0	0	0	2	0	2	1	2	0	0	0	3	1	1	0	0	0	0	0	0	1	1	0	1
S. undulata all.	0	0	0	0	0	0	2	0	2	1	2	0	0	0	3	1	0	0	0	1	0	0	0	0	1	0	0

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
L. albida	1	1	1	1	2	2	1	1	1	1	1	0	0	0	1	0/1	1	0	1	0	1	1	1
L. anceps	1	1	1	1	2	1	1	1	1	0	1	0	0	0	1	1	0	0	0	0	1	0	1
L. aurea	1	1	1	1	1	2	1	1	2	1	1	1	0	1	0	0	0	1	1	1	0	0	0
L. autumnalis	1	1	1	1	2	2	1	1	1	1	0	0	0	0	1	1	1	0	1	0	1	1	1
L. crawshayana	1	1	1	1	2	2	1	1	1	1	0	0	1	0	1	0	1	0	1	0	1	1	1
L. eyermaniana	1	1	1	1	2	2	1	1	1	1	0	0	0	0	1	0	1	0	1	0	1	1	1
L. furfuracea	1	1	1	1	2	2	1	1	1	1	0	1	0	0	1	1	1	0	1	0	1	1	1
L. gouldiana	1	1	1	1	2	1	1	1	1	1	0	0	0	0	1	0	1	0	0	0	1	1	1
L. rubescens	1	1	1	1	1	2	1	1	2	1	1	1	0	0	0	0	0	1	1	1	0	0	0
L. speciosa	1	1	1	1	2	2	1	1	1	1	0	1	2	1	1	0	0	0	1	0	1	1	1
L. superbiens	1	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0/1	0	0	0	0	0	0	1
S. undulata all.	0	0	0	0	0	0	0	0/1	0	0	0	1	1	0	0	0	0	0	0	0	0	?	0

From the first, short edition in Spanish, the following critical comments are quoted:

"An outstanding example of the hybrid between sound science and user-friendly format and production values is *Laelias de México*, by Federico Halbinger ....
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Eric A. Christenson, Ph.D. Research associate, New York Botanical Garden; American Orchid Society Bulletin, *p. 694. June 1994.*

"As soon as I opened this book, I found myself wishing that it could become the standard for all monographs. Everything you need to know is here, in both text and illustrations, and the information is arranged in a most helpful way."
Joyce Stewart, Sainsbury Orchid Fellow, Royal Botanic Gardens, Kew; Orchid Research Newsletter *23: 9 January 1994*

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