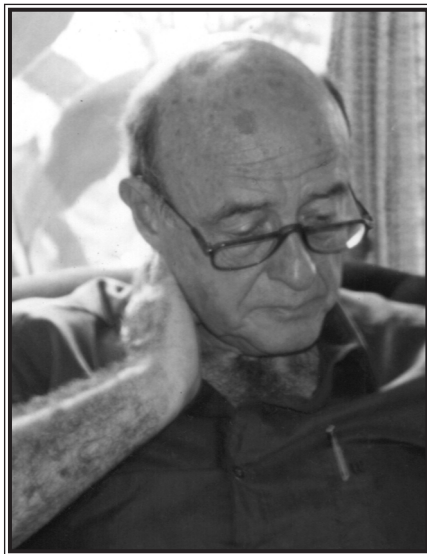


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LUIS FOURNIER ORIGGI  
(1935-2002)

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# LANKESTERIANA

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**No. 5****SETIEMBRE 2002**

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# LANKESTERIANA

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## ECCE HOMO, SCIENTIA CLARUS: LUIS FOURNIER ORIGGI (1935-2002)

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¡He allí al hombre, conocido por su sabiduría! Esta frase latina del título resume mi memoria del Dr. Luis Alberto Fournier Oraggi, eminente ecólogo, botánico y agrónomo de la Universidad de Costa Rica (U.C.R.) fallecido sorpresivamente el pasado 5 de julio. La gran labor científica y agronómica del Dr. Fournier pasó desapercibida para muchos, porque él nunca buscó imagen o renombre. Fue un científico, un docente y un humanista, que transmitía a los estudiantes conocimientos y experiencias, como muy pocas personas pueden lograrlo. En clases y conferencias, como un estímulo para los estudiantes, él citaba al poeta latino Virgilio: "*Felix qui potuit rerum cognoscere causas*"; es decir, feliz quien ha podido conocer las causas de las cosas. Don Luis fue, sin duda, uno de esos seres afortunados que lograron entender el mundo mucho más allá de lo común.

Él se graduó de Ingeniero Agrónomo en la U.C.R. en 1958. En 1961 obtuvo el título de *Magister Agriculturae* en el Instituto Interamericano de Ciencias Agrícolas de la O.E.A. La Universidad de California en Davis le confirió el grado de Ph.D. en Botánica en 1964. De regreso a la U.C.R., en la Escuela de Biología hizo grandes contribuciones para forjar el Herbario de la Universidad de Costa Rica (USJ), que había sufrido los estragos de un incendio el 20 de marzo de 1965. Además, la U.C.R. tuvo en él a uno de sus más destacados docentes e investigadores en ciencias biológicas desde 1959 hasta 1988. En este año Don Luis se pensionó, pero siguió colaborando activamente con la Escuela de Biología como Profesor Emérito hasta el día de su muerte.

Don Luis ha dejado profundas huellas en varias áreas, tales como la ecología forestal, el pensamiento conservacionista y la investigación agronómica (cultivo del café). Décadas de estudios y observaciones le

permitieron comprender mejor que nadie, en la zona neotropical, los problemas ambientales y el desarrollo de bosques en áreas degradadas por actividades antropógenas. A lo largo de 37 años de persistentes y rigurosas observaciones en sus fincas de Ciudad Colón y Tabarcia, él protegió áreas que se convirtieron, con el paso del tiempo, en bosques exuberantes con una diversidad comparable a la que mostraban los antiguos bosques que fueron destruidos. La gran magnitud del legado científico y académico de Don Luis se percibe en sus cerca de 150 publicaciones, que incluyen tesis, artículos científicos y varios libros. Una de sus publicaciones botánicas sobresalientes es *Botany of Cocos Island, Costa Rica*, que es un capítulo del libro *The Galápagos*, editado por R.I. Bowman y publicado en 1966 por la Universidad de California. El martes 9 de julio, cuando velamos en la Escuela de Biología las cenizas de Don Luis, logramos cubrir todas las mesas de un extenso laboratorio con muchas de sus publicaciones, lo que reflejó claramente cuán fructífera fue su vida científica y académica.

Una sólida formación académica y científica se complementaba con una profunda cultura y un gran sentido de humanismo, reflejado en su calidad humana incomparable. Por su clara conciencia histórica, Don Luis poseía un vastísimo conocimiento del desarrollo de las ciencias. Una semana antes de su muerte ofreció, en la Escuela de Biología, un coloquio sobre los "Antecedentes de la investigación biológica en Costa Rica", exponiendo las raíces en la antigua Grecia y culminando en las décadas recientes de la historia de la biología en Costa Rica. Nos queda en el recuerdo, como una lección de rectitud, lo que Don Luis le dijo al M.Sc. Rodolfo Ortiz cuando éste empezó a trabajar en la U.C.R.: "Rodolfo, sírvale a la Universidad, pero no se sirva de ella".

Con un apellido francés y otro italiano, Don Luis me contó, hace varios años, que también tenía una abuela alemana. Él sintió siempre gran admiración y estima por la cultura y las ciencias alemanas. Su conciencia preclara siempre estuvo atenta en busca de la verdad y

del saber, máximos ideales a los que puede aspirar un espíritu universitario. Como recuerdo imborrable del Dr. Fournier tenemos una especie pteridófita de Costa Rica y Panamá: *Elaphoglossum fournierianum* L.D. Gómez, Revista Biol. Trop. 20: 33. 1972.

## NOTES ON THE NATURAL HISTORY OF *CYCLOPOGON OBLIQUUS* (ORCHIDACEAE: SPIRANTHINAE) IN COSTA RICA

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**ABSTRACT.** The occurrence of *Cyclopogon obliquus* (J.J. Sm.) Szlach. [= *Pelexia obliqua* (J. J. Sm.) Garay] is reported for the first time in Costa Rica. Its taxonomic placement is discussed, and its current geographic distribution is reviewed. Observations on its habitat, phenology and reproduction are presented.

**RESUMEN.** Se presenta el primer informe de la existencia de *Cyclopogon obliquus* (J.J. Sm.) Szlach. [= *Pelexia obliqua* (J. J. Sm.) Garay] en Costa Rica. Se discute su posición taxonómica y se presenta una revisión de su actual distribución geográfica. Se presentan observaciones sobre su hábitat, fenología y reproducción.

**KEY WORDS / PALABRAS CLAVE:** Orchidaceae, *Cyclopogon*, *Pelexia*, Spiranthinae, Costa Rica, pantropical species, phenology, deciduousness, autogamy.

In April 2000, I found a leafless, terrestrial Spiranthine orchid with small whitish flowers at La Selva Biological Station, in Heredia province, Costa Rica. It was immediately apparent that it was a novelty for the site's orchid flora (revised by Atwood 1988, Wilbur 1994), but its identity was a mystery to me. There were remains of dead leaves at the bases of the plants, indicating that they were deciduous. Flowering while leafless is characteristic of a number of genera in the Spiranthinae, including *Sarcoglottis*, *Funkiella*, *Brachystele*, *Spiranthes*, and *Schiedeella*. Most species in other genera produce flowers while their leaves are still present. This vegetative dichotomy originally led me to believe that the plant in question belonged in the former group. Assuming it to be a species of *Schiedeella* Schltr., I concluded it was a new species, and prepared a description.

Fortunately, Gerardo Salazar - who is studying the generic delimitations within Spiranthinae - saw the description and recognized the plant as a species of *Cyclopogon*, and suggested it might be the enigmatic *C. obliquus* (J.J. Sm.) Szlach., which I was later able to confirm. So, the publication of another superfluous name for this taxon was prevented (see below). The accompanying illustration (Fig. 1) and following description are based on the two Costa Rican collections, which constitute the first report of this species

for the country. In Central America, the species was previously reported to the north of Costa Rica (Dressler 1993, and references below). Both Mora-Retana & García (1992) and Dressler (1993) listed it as a species of potential occurrence in Costa Rica, because of its previous report from southern Nicaragua. Other diagnostic illustrations can be found in Hamer (1981, as *Pelexia hameri*, and 1984, 1990, as *Pelexia obliqua*) and Hu (1977, as *Manniella hongkongensis*).

***Cyclopogon obliquus*** (J. J. Sm.) Szlach., *Fragm. Florist. Geobot.* 39(2): 425. 1994. FIG. 1

**BASIONYM:** *Spiranthes obliqua* J. J. Sm., *Bull. Dép. Agric. Indes Néerl.* 43: 74. 1910. **TYPE:** Indonesia, Java, Buitenzorg (Bogor), *J. J. Smith s.n.* (BO, not seen).

**SYNONYMS:** *Manniella hongkongensis* S. Y. Hu & G. Barretto, *Chung Chi J.* 13(2): 6. 1976. **TYPE:** China, Hong Kong, *S. Y. Hu 13266* (K, not seen). *Pelexia hameri* Garay, *Bot. Mus. Leafl. Harv. Univ.* 26(1): 22. 1978. **TYPE:** El Salvador, *O. Pank in F. Hamer 613* (AMES, photo!).

*Pelexia obliqua* (J. J. Sm.) Garay, *Bot. Mus. Leafl. Harv. Univ.* 28(4): 345. 1980.

*Plant* a terrestrial herb, geophyte. *Roots* 3 to 6 in flowering individuals, tuberous, fusiform, 1-4.5 cm

long, 6-9 mm thick at the widest point, white-cream, covered with short hairs when young (early leafing stage), glabrous when leafless. *Leaves* petiolate, convolute, produced in a basal rosette, 6 or more in number, held flat against the ground when mature, absent at flowering; petiole white to light green, 4-14 mm long, 2-5 mm thick (longer and thinner in the first smaller leaves), base sheathing; lamina elliptic, acute apically, 1.5-5.8 cm long, 0.8-2.8 cm wide, decurrent onto the petiole, shiny dark green adaxially, crystalline light green abaxially, with a greenish-white thick (2 mm at base) midvein and two main secondary veins diverging from near the base of the lamina; tertiary venation reticulate, faintly visible adaxially. *Inflorescence* terminal, erect, spicate-pedunculate, 13-32 cm long. *Peduncle* terete, puberulous, 9-20 cm long, 1-3 mm thick, light green, covered by 4-6 sheathing bracts. *Spike* dense, 4.5-15 cm long, 9-40 flowered, with 2-4 flowers open at a time. *Peduncular bracts* sheathing, linear-triangular, 2-4 cm long, 3-5 mm wide at the base, pale green. *Floral bracts* subulate-caudate, up to 6 mm long and 1.5 mm wide, scarious. *Flowers* resupinate, straight to slightly nodding at the junction of perianth and ovary. *Ovary* fusiform, trigonous, 8 mm long, 2.2 mm thick, light green; spur completely adnate to the ovary, 2.6 mm long, 0.8 mm wide, covered with glandular hairs to 0.3 mm long. *Sepals* greenish light-brown, externally puberulous. Dorsal sepal oblong-lanceolate, obtuse to rounded, slightly concave at the base, 4.3 mm long, 2 mm wide. Lateral sepals oblong, obtuse apically, subfalcate, 4 mm long, 1 mm wide. *Petals* translucent white with a central longitudinal reddish-brown line; oblanceolate, obtuse apically, coherent to the dorsal sepal, glabrous, 4 mm long, 0.8 mm wide. *Labellum* crystalline white with green lateral lobes; pandurate, auriculate at the base, ecallose, 5.7 mm long (including the basal auricles), 3.3 mm wide; hypochile 2.6 mm long, 3.2 mm wide, margins entire, lateral lobes enfolding the column; basal auricles subfalcate, 1.5 mm long, 0.5 mm wide, inserted in the spur. Epichile transversely bilobed, sides slightly incurved to flat, 1.8 mm long, 3.3 mm wide, margin crenulate; apex retuse with a sinus 0.3 mm deep and 0.4 mm wide. *Column* reddish-cream, 4 mm long, 1.3 mm wide, stigma bilobed; anther brown, 1.2 mm long, 1 mm wide. *Pollinia* cuneate-obovate, white, each one 1.7 mm long, 0.5 mm wide; viscidium dark grey, rhombic, 3 mm wide. *Fruit* a fusiform capsule, 1.2 cm long, 0.5 cm thick. Most flowers developing into fruits.

COSTA RICAN RECORDS: Heredia: Puerto Viejo de Sarapiquí, Estación Biológica La Selva, Sendero Tres Ríos 1550, 10°26' N, 83°59' W, alt. 50 m, 7 Apr. 2000 (buds, flowers, fruits, leafless), Blanco, Horvitz, King, Johnson, & Lange 1488 (USJ, CR, F, MO, SEL, M). Same locality, 18 Jun. 2000 (sterile, leafing), Blanco 1521 (USJ, CR, F, MO, SEL).

*Cyclopogon obliquus* has an interesting historical record. Even though the genus is otherwise exclusively Neotropical, it was first found growing spontaneously in the Bogor Botanic Gardens in western Java, and described in 1910 by Johannes Jacobus Smith – then director of the Herbarium Bogoriense – as a species of *Spiranthes* Rich. It was not until 1976 when it was collected again, this time in Hong Kong, and described as *Manniella hongkongensis* by Hu and Barretto. It was collected a few years later in El Salvador, and described by Garay as *Pelexia hameri*. A couple of years later, Garay himself recognized his species as synonymous with Smith's *Spiranthes obliqua*, transferring the latter to *Pelexia*. In 1994, Szlachetko transferred it once more, this time to the genus *Cyclopogon*. The latter convention is followed here.

Most recent treatments place this taxon under the genus *Pelexia* (Hamer 1984, 1990, 2001; Mora-Retana & García 1992, Dressler 1993, Ackerman 2000, Cribb & Ormerod 2000). However, the combination of a short column, an oblong, fleshy, blunt rostellum, and a nectary that is totally adnate to the ovary, suggests a better placement in *Cyclopogon* (G. Salazar, pers. commun. 2001). On the other hand, Ackerman (2000) also used floral morphology to support a placement in *Pelexia*. Recent cladistic analyses based on DNA data (G. Salazar, unpubl.) indicate that these two genera are not as closely related to each other as previously assumed (e.g., Burns-Balogh & Robinson 1983); therefore, molecular data will likely settle this species' systematic affinities.

*Cyclopogon obliquus* has also turned up in eastern Java (Comber 1990), Sri Lanka (Hamer 1984), Samoa (Cribb & Ormerod 2000), Nicaragua (Hamer 1984, 2001), Guadeloupe, and Cuba (Ackerman 2000). Ackerman (2000) lists vouchers from most of these locations. According to Comber (1990), it also occurs in Argentina and Brazil, but no vouchers are cited. Though the species' geographical origin is unknown, it is clear it must be Neotropical, as are the rest of the species in both *Cyclopogon* and *Pelexia*.

This case is strikingly similar to that of *Oeceoclades maculata* (Lindl.) Lindl., an orchid that

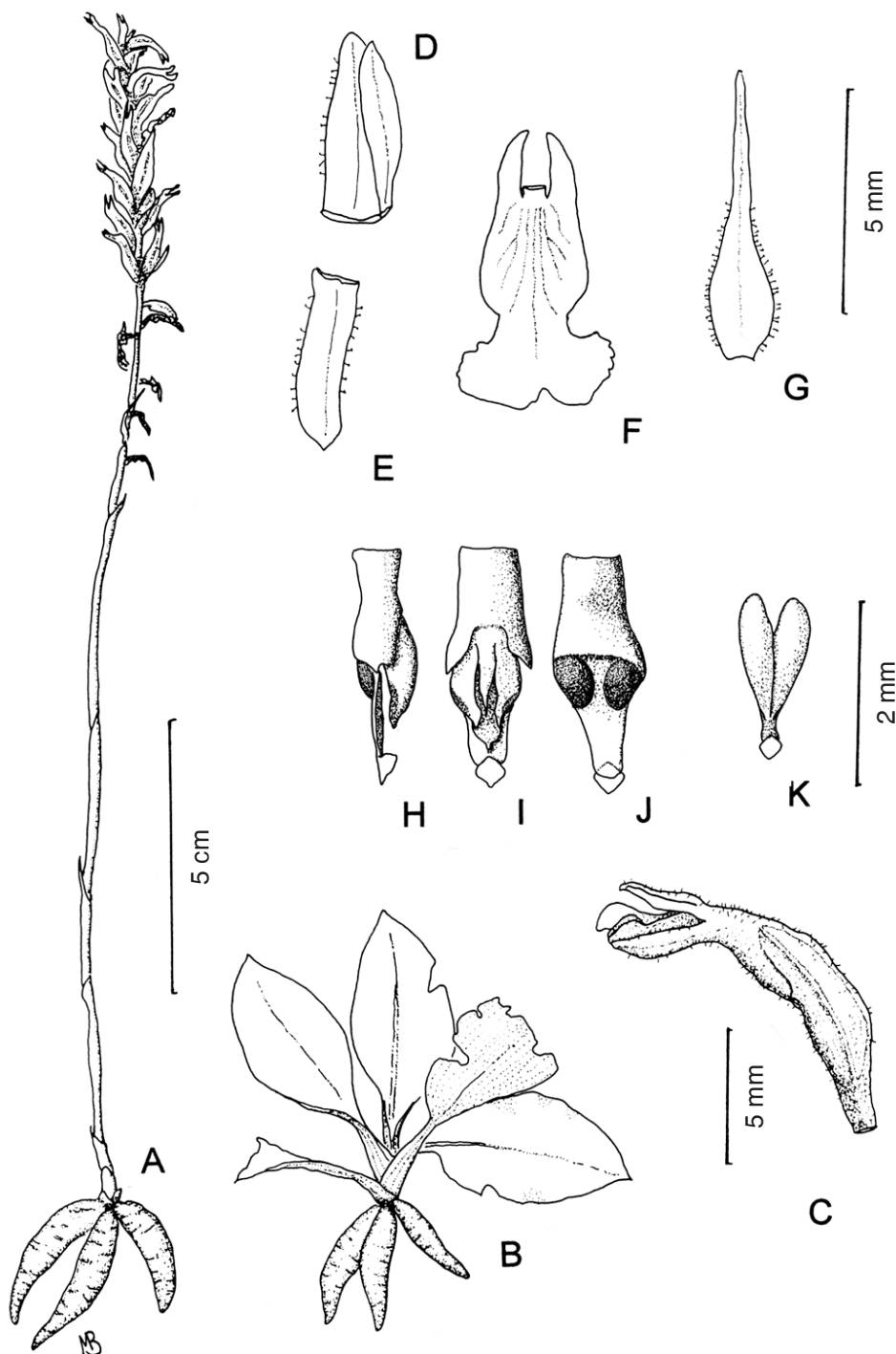


Figure 1. *Cyclopogon obliquus* (J.J. Sm.) Szlach. A - Flowering plant. B - Leafing plant (drawn from dried material; mature leaves lie flat on the ground in living plants). C - Flower, lateral view. D - Dorsal sepal and one coherent petal (the other removed). E - Lateral sepal. F - Lip. G - Floral bract. H - Column, lateral view. I - Column, dorsal view. J - Column, ventral view. K - Pollinia. ILLUSTRATION VOUCHERS: A, C-K, Blanco *et al.* 1488; B, Blanco 1521 (both, USJ). Drawings by the author.



was described in 1821 from material collected wild in Brazil, and not found in its original African habitat until a few decades later (Stern 1988). The range of *O. maculata* has expanded very quickly in the Americas since its presumed introduction less than two centuries ago, and is presently found in most of tropical and subtropical America. It also has a long list of synonyms, mostly due to successive generic transfers (Stewart 1988). As in *Cyclopogon obliquus* (see "Pollination and Fruit Set" below), the success of *O. maculata* as an invasive species can be attributed in part to its self-pollinating capacity (González-Díaz & Ackerman 1988).

**HABITAT:** The only collection of *Cyclopogon obliquus* from what appears to be a natural habitat is *McGillivray 85* (SEL, not found) (Hamer 1984, Cribb & Ormerod 2000), in shady, wet, lower montane tropical forest in the Island of Ometepe in Nicaragua. The Costa Rican collection comes from a lowland site, even less seasonal as does the original type collection from Bogor. Comber (1990) notes that it has become more common in Tretes, as "the seasonal climate in East Java is obviously more to its liking than the almost everwet climate of Bogor". These observations, together with its deciduous behavior, support the idea that this species is better adapted to seasonally dry habitats.

Most of the collections from both the Americas and southeast Asia come from man-made habitats, especially lawns and pots (Garay 1978, Comber 1990, Cribb & Ormerod 2000), suggesting that the seeds—or even whole plants—are accidentally transported in the soil of transplanted crops or ornamentals. This is the most likely scenario on how it got to Bogor in the first place; the Botanic Gardens had been actively importing plants from throughout the tropical world since the 1840's (Indonesian Institute of Sciences 2002). *Cyclopogon obliquus* is possibly more widely distributed in tropical and subtropical areas around the world than currently recognized, but flowering plants are easily overlooked due to their inconspicuous flowers and deciduous habit.

This might also explain why this species stayed undetected at La Selva, where an intensive floristic inventory program has taken place since 1979 (Hammel & Grayum 1982, Hartshorn & Hammel 1994). The inflorescences look like dry grass stems from a distance, and they merge with the colors of the surrounding leaf litter. I noticed them almost acciden-

tally, but a careful inspection of the surrounding area revealed a small colony of 12 flowering individuals.

Plants were growing in alluvial soil right next to a paved trail which runs through a late secondary tropical wet forest, part of an abandoned—and recently removed—cacao plantation. The area next to the trail is periodically mowed, which probably facilitated the establishment of the plants by reducing competition for light. The leaves form a basal rosette and are held flat against the ground surface when fully expanded, so they avoid being damaged by the mowers. However, some trees with big leaves (e.g. *Castilla elastica*, Moraceae) grow in the same area, and their fallen leaves were observed to totally cover a few plants at the leafing stage. Light deprivation can be an important ecological constraint for photosynthesis, growth, and future reproductive output of individual plants, as shown by Willems *et al.* (2001) for a species of *Spiranthes* in the Netherlands.

There was a great variation in the size of flowering individuals. The smallest had an inflorescence 13 cm tall with nine flowers, and only three roots, the largest of which was 2.3 cm long. On the other hand, the tallest individual had an inflorescence of 32 cm with some 40 flowers and fruits, and with five roots present, up to 5 cm in length. There was a whole range of intermediate individuals (Fig. 1A shows one such "average" plant). This suggests that individual plants may start flowering when quite young. The larger plants also seemed to have been flowering for a longer period than the smaller ones, since some of the fruits lower in the spike had already dehisced; in the smaller individuals only flowers and developing fruits were present.

**PHENOLOGY:** The colony at La Selva was revisited periodically to gather phenological data. Two months after the original collection, in June 2000 (early rainy season, Sandford *et al.* 1994), numerous leafing plants were seen at the same spot, even when the flowering specimens had been previously removed as vouchers. By October, the plants still had their old leaves, but were not producing any new leaves. In late December (early dry season) the leaves had already disappeared, and no evidence of the presence of the plants remained at the surface. In mid May 2001 (end of the dry season of that year) most of the plants had already flowered and were fruiting, still leafless. Leaves were already present (and the inflorescences gone) by mid July, the last time I checked

the colony.

Contrary to the pattern observed at La Selva, Comber (1990) reports that populations in Java flower at the beginning of the rainy season. In any case, all the available accounts of the species agree in that inflorescences and leaves never occur simultaneously. This deciduous habit is unusual in both *Cyclopogon* and *Pelexia*. Photographs of the flowering and leafing stages are presented by Comber (1990, as *Spiranthes obliqua*).

In South Florida, Calvo (1990) found that individual plants of *Cyclopogon cranichoides* (Griseb.) Schltr. can survive one or two years (and possibly more) in an underground condition, without producing any leaves. It is possible that *C. obliquus* has similar capabilities; if so, point counts on the number of individuals would likely underestimate the true population size. However, data from marked individual plants are lacking in this species.

**POLLINATION AND FRUIT SET:** Orchids in the "Pelexia-alliance" are adapted to bee pollination; the dorsal viscidium attaches to the underside of the labrum, and the fragile, friable pollinia assume a protected position when the proboscis is retracted (Singer & Sazima 1999). Species of *Cyclopogon* appear to be specialized for pollination by halictid bees (Singer & Cocucci 1999, Singer & Sazima 1999). However, autogamy is reported for several species (Ackerman 1995, Singer & Sazima 1999, van der Cingel 2001). The plants of *C. obliquus* at La Selva appear to be autogamous (at least facultatively), since virtually all the flowers develop into fruits (but see below). As in *C. elatus* (Sw.) Schltr. in Puerto Rico (Ackerman 1995), the simultaneous presence of buds, open flowers and dehiscent fruits in some inflorescences indicate an ephemeral anthesis and rapid fruit ripening. Self-pollination becomes advantageous in conditions where suitable pollinators are absent, as might be the case in southeast Asia.

Both Catling (1982) and Singer & Sazima (1999) report enlargement of ovaries without seed production in unpollinated flowers in several Spiranthe genera, including *Cyclopogon*. Although seeds were observed in some dehiscent fruits in *C. obliquus* at La Selva, I cannot rule out the possibility that the plants require pollinator services in order to set seed, and the unpollinated flowers simply enlarge their ovaries without producing any seeds.

In May 2001, an inspection of the inflorescences

revealed some indehiscent fruits with no seeds within. Most of these had round exit holes, but a few had hymenopteran pupae inside (one per fruit), about 3 mm long. Unfortunately, no adults could be reared when inflorescences were put in clear plastic bags for a few days. Dissection of the pupae revealed they are Eurytomid wasps, possibly belonging to the large genus *Eurytoma*. Species of this genus have been found parasitizing fruits in several orchid species, including *Pelexia adnata* (Sw.) Spreng. in Belize (Catling & Greenwood 1988). The absence of such seed predators in Indonesia might partly account for the apparent higher population densities of *Cyclopogon obliquus* there than in the Neotropics.

**ACKNOWLEDGMENTS:** I thank Carol Horvitz (University of Miami) for funding my stay at La Selva during fieldwork for a project assessing alluvial forest regeneration following removal of cacao trees, when flowering material was collected. Additional collecting was possible due to a research grant by the Andrew W. Mellon Foundation and the Organization for Tropical Studies. Gerardo Salazar (Jodrell Laboratory, Royal Botanic Gardens, Kew) provided much useful information and interesting discussions. Paul Hanson (Universidad de Costa Rica) identified the wasps. Carlos Ossenbach kindly provided several critical references. Robert Dressler, Carlos O. Morales, and Franco Pupulin made useful suggestions for the improvement of the manuscript.

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## THE MAJOR SECTIONS OR GROUPS WITHIN *SOBRALIA*, WITH FOUR NEW SPECIES FROM PANAMA AND COSTA RICA, *S. CRISPISSIMA*, *S. GLORIANA*, *S. MARIANNAE* AND *S. NUTANS*

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RESUMEN. Se presenta una discusión de las secciones o grupos de *Sobralia*, basada en las secciones nombradas por Brieger. Se describen cuatro especies nuevas de Panamá y Costa Rica: *S. gloriana*, una especie escasa y muy llamativa del área de El Valle de Antón, pariente de *S. atropubescens* pero de flores más grandes y de coloración amarilla; *S. mariannae*, una planta pequeña del bosque nuboso de Cerro Jefe, con flores blancas y pelos gruesos en el labelo; *S. crispissima*, pariente cercana de *S. lindleyana*, que se extiende desde Panamá hasta el sur de México, y *S. nutans*, una especie distintiva de la Sección *Globosae*, de Panamá.

ABSTRACT. The sectional classification of *Sobralia* is discussed, based on a system proposed by Brieger, and four new species of *Sobralia* are described from Panama and Costa Rica, *S. crispissima*, *S. gloriana*, *S. nutans* and *S. mariannae*.

*Sobralia* is a conspicuous element in the orchid flora of the American tropics that remains poorly known. The delicate, ephemeral flowers are often showy, but unless they are prepared carefully and dried quickly they make very poor pressed specimens. Even flowers in alcohol may disintegrate with time. Since botanical classification is traditionally based on dried material, *Sobralia* has been much neglected. To achieve a better understanding of this group, we should, ideally, study living material. The sectional classification is here discussed, and four new species from Panama and Costa Rica are described.

### THE SECTIONS AND GROUPS WITHIN *SOBRALIA*

Lindley (1854) divided *Sobralia* into 3 sections, A, B and C. Reichenbach (1873) used the Sections *Eusobralia* and *Brasolia* for two South American groups, but the selection of *S. dichotoma* Ruiz & Pavón as lectotype of the genus by Angely (1973: p. 1268) nullified this and made Section *Brasolia* Rchb.f. a synonym of Section *Sobralia*. Now, Brieger (1983) has published some additional sectional names, and names are now available at least for the three main groups listed by Lindley. Brieger's names are validly published and clearly typified, but there are several species and complexes that do not fit well in Brieger's classification. It might be premature to publish new sectional names at this time. That can wait until we have information on phylogeny from

molecular studies.

Brieger separates Sections *Sobralia* and *Racemosae* by the position of the inflorescence, lateral in Sect. *Sobralia* and terminal in *Racemosae*. However, one may sometimes find both terminal and upper lateral inflorescences on the same stem. Dr. Dodson suggests the relative bract length as a much better and clearer way to distinguish what appear to be two distinct groups (pers. comm.).

Brieger (1983) creates a section *Intermediae* for *S. fragrans* Lindl., but that species seems closely allied to *S. bletiae* Rchb.f., *S. mucronata* Ames & C. Schweinf. and others, so I tentatively apply the name *Intermediae* to a complex of species with smaller flowers and inflorescences. Brieger includes *S. crocea* (Poepp. & Endl.) Rchb.f. in Sect. *Globosae*, but it is very unlike *S. candida*, so I place it with the *Intermediae* for now.

It should be noted that the photograph labelled as *S. fragrans* in Brieger (1983), is actually *S. callosa* L.O. Williams, treated by Brieger as *Lindsayella amabilis*, while the photograph labelled as *S. candida* could well be *S. fragrans*.

The Section *Abbreviatae* is much the largest group, with perhaps 50 known species.

As here delimited, the members of *Sobralia* Section *Globosae* have narrow, acuminate leaves, the column is very narrow basally, and the bract cluster increases in length as flowers are produced, often

reaching 3-4 cm in length. This group includes only a few species, treated in more detail below.

*Sobralia luteola* Rolfe, with a very condensed raceme, may be allied to Section *Intermediae*, though the inflorescence is strikingly different. *Sobralia macrophylla* Rchb.f. and its allies, with the bract cluster largely hidden, may not be a phylogenetic group, though the plants are easily recognized, with or without flowers. *Sobralia undatocarinata* C. Schweinf. and its allies, with loose bract clusters and 2-5 relatively durable flowers produced simultaneously, is quite distinctive, and a few close allies remain to be named. Both *S. amabilis* (Rchb.f.) L.O.

Williams and *S. callosa* (*Lindsayella amabilis*) are superficially similar and probably pollinated by hummingbirds, but they are very distinct in their details. Indeed, *S. callosa* has pollinia very like those of *Elleanthus*, and may have the best claim to generic status of any of the anomalous groups.

Ames and Schweinfurth (1937) emphasized the basal callus as being similar to the basal calli of *Elleanthus*, but nearly all species of *Sobralia* have a callus or a pair of calli at the base of the lip, on which the base of the column appears to rest; of course, the basal calli of *Sobralia* may well be homologous with those of *Elleanthus*.

#### SUMMARY OF SECTIONS, ANOMALOUS GROUPS AND SPECIES

1. Inflorescence racemose, with prominent internodes
  2. Floral bracts shorter than pedicel and ovary ..... Section *Sobralia* [Type: *S. dichotoma* Ruiz & Pavón, aprox. 13 species]
  2. Floral bracts longer than pedicel and ovary ..... Section *Racemosae* Brieger [Type: *S. rosea* Poepp. & Endl., aprox. 8 species]
1. Inflorescence condensed, with very short internodes
  3. Rachis of inflorescence conic, exposed, with flowers and buds exposed simultaneously ..... *S. luteola*
  3. Rachis of inflorescence concealed by bracts, the bracts forming a cone-like structure
    4. Bract clusters continuing growth, flowering over long period
      5. Bract clusters growing in length ..... Section *Globosae* Brieger [Type: *S. candida* (Poepp. & Endl.) Rchb.f., 3-4 species]
      5. Bract clusters growing in girth ..... *S. valida*
    4. Bract clusters flowering only one season, not enlarging appreciably after flowering starts
      6. Bract clusters basally concealed by sheaths of inflorescence bracts (upper leaves); the exposed apices of floral bracts wide, obtuse or retuse ..... *S. macrophylla* complex
      6. Bract clusters basally concealed or not; apices of floral bracts narrow, acute or acuminate
        7. Bract clusters 3-6 cm
          8. Bract clusters compact, usually producing 1 flower at a time; tube of lip subequal to blade or longer ..... Section *Abbreviatae* Brieger [Type: *S. fimbriata* Poepp. & Endl., 45-50 species]
          8. Bract clusters loose, often producing 2-several flowers simultaneously; tube of lip much shorter than blade
            9. Lip with conspicuous undulate keels; all flowers at once, lasting 3-4 days ..... *S. undatocarinata* complex (3-5 species)
            9. Lip without conspicuous, undulate keels; flowers ephemeral, 1-2 at a time ..... *S. amabilis*
      7. Bract clusters less than 2 cm, usually producing 1 or 2 flowers at a time
        10. Pollinia flattened, without distinct caudicles ..... Section *Intermediae* Brieger [Type *S. fragrans* Lindl., 10-15 species]
        10. Pollinia obovoid, attached to distinct caudicles ..... *S. callosa* (*Lindsayella amabilis*)

#### NEW SPECIES

***Sobralia crispissima*** Dressler, *sp. nov.* FIG. 1

HOLOTYPE: PANAMÁ. Chiriquí: al oeste de Volcán, carretera a Río Sereno; alt. 1200 m; 25 ago. 2001, sépalos y pétalos blancos, labelo amarillo-anaranjado con manchas rojas. A. Maduro & E. Olmos 223 (MO, Isotypes, PMA, FLAS).

*Sobraliae lindleyanae* Rchb.f. similis, foliis majoribus et floribus brevioribus, labello reflexo margine valde undulato (crispo), marginibus falcatis appendicibus columnae integris dignoscenda.

*Roots* 6-8 mm in diameter; *stems* 20-40 cm, ca. 5 mm wide, slightly compressed; *sheaths* striate; *leaves* 5 or 6, 9-14 x 3.5-5.4 cm, ovate, slightly attenuate, acute; *inflorescence* terminal, with *floral bracts* con-



cealed in infundibuliform sheaths of inflorescence bracts (upper leaves with reduced blades) with 1 or 2 additional reduced blades of floral bracts exposed, blade of lower inflorescence bract 7-11.5 x 2.2-3.5 cm, blade of upper inflorescence bract ca. 2.5 x 2 cm; ovary and pedicel ca. 20 mm. Sepals and petals white, lip orange-yellow with red spots; *sepals* 3.5-4.5 x 0.9-1.2 cm, oblong or oblong-oblancheolate, apiculate; *petals* 3.5-4.5 x 1-1.5 cm, oblong-oblancheolate, obtuse or apiculate; *lip* 3-4 x 3-3.8 cm, broadly obovate, emarginate, blade strongly reflexed to near middle of tube, with a single rounded basal callus ca. 4.5 x 4 mm, pilose distally, with 3 low ventral keels basally, margin of blade strongly crisped-undulate; *column* ca. 1.8 cm, with porrect, falcate arms (or "wings").

*Sobralia lindleyana* Rchb.f. is common as terrestrial or lithophyte in the Llanos del Volcán, north of Hato del Volcán. This new and related species was recently found to the west of Volcán, in forested areas, and very similar plants without flowers were found to the east, usually growing epiphytically. When I noted that this species resembled *S. lindleyana*, Erick Olmos said "No, *S. lindleyana* is the species in the Llanos, its leaves are smaller and the flowers larger," which nicely summarizes the differences between these species. Reichenbach's drawing of *S. lindleyana* is suggestive of *S. crispissima*, but the type specimen is clearly the familiar species of the Llanos. The flowers of *S. crispissima* are somewhat smaller than those of *S. lindleyana*, and the tube is proportionately shorter. These plants may be distinguished from *S. lindleyana* by the following key.

1. Leaves 5-6 cm long; sepals and petals 5.5-6 cm long; tube of lip subequal to sepals and petals; blade of lip spreading, but not reflexed; column arm serrate-dentate dorsally ..... *S. lindleyana*
1. Leaves 10-14 cm long; sepals and petals 3.5-5 cm long; tube of lip distinctly shorter than sepals and petals; blade of lip reflexed, reaching the middle of the tube; column arm entire dorsally ..... *S. crispissima*

The epithet *crispissima* refers to the strongly wavy margins of the lip.

PARATYPES: MÉXICO. Chiapas: Ocosingo, ca. 8.5 km del camino Monte Libano-Nahá, tomando el camino a Villa las Rosas y El Pozo Ocotal (PEMEX), aprox. 87.2 km al E de Ocosingo, ca. 940 m, 16°55'N, 91°33'W, Selva mediana perennifolia, de montaña con *Talauma*, *Quercus* y *Terminalia*, sépalos y pétalos blancos, labelo amarillo con manchas

café-rojizo, fecha de colecta 7 ago 1992, prensado de material cultivado 24 sept. 1997, M. A. Soto, R. Solano y L. Izquierda 6958 (AMO, FLAS). NICARAGUA. Jinotega: Cerro Grande, elev. 3950 ft., Nov., A. A. Heller 1314 (SEL); Matagalpa: Finca Bavaria, 4100 ft., A. A. Heller 4980 (SEL). COSTA RICA. Cartago: below Pavones on road from Turrialba to Siquirres, 25 Aug. 1963, C. H. Dodson 2516 (SEL).

*Sobralia (Abbreviatae) gloriana* Dressler, sp. nov.

FIG. 2, 3

HOLOTYPE: PANAMA. Coclé: Area de El Valle de Antón, Alt. 800-1000 m. 23 julio 2001, sépalos y pétalos amarillo pálido, bañados por rojo-castaño, bordes y vena media amarillos, labelo rojo-rosado con borde rosado pálido y quillas amarillas. A. Maduro & E. Olmos 212 (MO, Isotype PMA).

Herba epiphytica foliis ellipticis, floribus ab glomere bractearum conico-ellipsoideo productis, luteis, sepalis petalisque castaneo-ferrugineo aspersis, sepalis ellipticis vel lanceolato-ellipticis, petalis oblongo-lanceolatis, labello obovato quinque carinis humilis ornato.

*Roots* 3-5 mm in diameter; *stems* 20-80 cm, 2.5-4 mm wide, slightly compressed; *sheaths* striate, with very short bristles to ca. 0.5 mm on both sheaths and stem; *leaves* several, 8.5-11 x 3.7-4.3 cm, elliptic, short-acuminate, strongly plicate; *sheaths* verruculose; *inflorescence* terminal, bract cluster ellipsoid, ca. 3 x 0.8 cm, largely concealed by sheaths of upper leaves (or foliar bracts); *ovary* and pedicel 20-25 mm; *Sepals* and *petals* pale yellow, flushed with purplish brick red, sepals with yellow median stripe, petals with broader median stripe and yellow margins, lip dull purple with yellow keels in throat; *sepals* 5-6 x 1.4-1.8 cm, elliptic or lance-elliptic, apiculate; *petals* 4-5 x 1.6-1.8 cm, oblong-oblancheolate; *lip* 5.2-6.2 x 3.5-4 cm, cuneate, obovate, basal ridges 9 x 2 mm, with 5 low ventral keels, 3-4 of these reaching nearly to apex, margin distally undulate; *column* 2.6-3.2 cm.

When I first saw this attractive *Sobralia*, I thought it might be a natural hybrid between *S. atropubescens* and some other species with yellow or white flowers. Now several plants of this kind have appeared, all from the area of El Valle de Antón, and it is surely a distinct species, though not very common. It is evidently related to *S. atropubescens*, but the flowers are larger and much more attractive with a distinct color



FIGURE 1. *Sobralia crispissima* Dressler. Flower, from the type locality. Photograph by K. Dressler.



FIGURE 2. *Sobralia gloriana* Dressler. A flower, Finca Dracula, Panama. Photograph by K. Dressler.



FIGURE 3. *Sobralia gloriana* Dressler. A flower cultivated in Florida. Photograph by K. Dressler.



FIGURE 4. *Sobralia mariannae* Dressler. A flower, somewhat faded, Cerro Jefe, Panama. Photograph by K. Dressler.



FIGURE 5. *Sobralia nutans* Dressler. Several inflorescences, some now form part of *Maduro y Olmos* 236, Bocas del Toro, Panamá. Photograph by K. Dressler.



FIGURE 6. *Sobralia nutans* Dressler. Flower, El Valle Chiquito, near El Valle de Antón, Panama. Photograph by E. Olmos.



pattern. One hopes that it will be propagated from seed, and become more widely available for orchid collections and gardens.

The epithet *gloriana* honors Licenciada Gloria Maduro, the charming wife of Andrés Maduro. Since she was foolish enough to marry a rabid orchid nut, she deserves, at the very least, that there be an attractive new species named in her honor.

*Sobralia (Intermediae) mariannae* Dressler, *sp. nov.*

FIG. 4

HOLOTYPE: PANAMA. Panamá, Cerro Jefe, flowered in cult. 24 May 2002, epiphyte, flower white, callus yellow, brown at base, fragrant, *R. L. Dressler* 6352, (MO).

Herba epiphytica caule supra medium foliato, foliis ovatis acuminatis, inflorescentia pedunculo superposita, sepalis oblongis, petalis ellipticis, labello obovato sex carinis trichomatibus crassiusculis quasi digitiformibus ornatis.

Epiphytic or terrestrial, caespitose, *roots* 1.5-2.5 mm, *stems* 28-60 x 0.15-0.2 cm. *Leaves* 4.5-7 x 1.5-2 cm, elliptic-ovate, acuminate, closely spaced at mid-stem and more widely spaced above; sheaths verrucose. *Inflorescence* terminal, with a reduced foliar bract (sometimes two) 2-3 x 0.8-1.6 cm whose inflated sheath covers much of the bract cluster; bract cluster 2-2.5 x 0.4-0.5 cm, about half concealed by sheath of foliar bract, bracts glabrous; *ovary* and pedicel 15-22 mm; flower white, callus yellow, brown at base; *dorsal sepal* 2.7 x 0.67 cm, oblong, apiculate; *lateral sepals* 2.5 x 0.85 cm, oblong-elliptic; *petals* 2.3-2.4 x 0.8 cm, elliptic, acute or apiculate; *lip* 2.5 x 2.1 cm, broadly obovate, 3-lobed distally, with 1 rounded basal callus, 6 yellow keels from base, these short-pilose, reaching near apex, midlobe 6 x 11 mm, retuse; *column* c. 8 x 3 mm.

This species is frequent in the cloud forest on Cerro Jefe. Until recently, we had only a field-collected plant in which the flowers are poorly preserved, but we have found a single flower *in situ* (photo) that was preserved in alcohol, permitting a much more complete description. Even without flowers, the plants are very distinctive, with the leaves closely spaced at mid-stem (1-3 cm apart), with a much longer internode (6-10 cm) above. This species, then, has a distinct peduncle, much like that of *S. fragrans*. This distinctive species may well occur in other areas

of cloud forest in eastern Panama. The epithet honors Marianne Akers, an enthusiastic orchid student in Panama, who has collected the only other pressed specimen I have seen.

OTHER SPECIMEN SEEN: from the type locality, *M. Akers* 488-28 (SEL).

*Sobralia (Globosae) nutans* Dressler, *sp. nov.*

FIG. 5-7

HOLOTYPE: PANAMÁ. Bocas del Toro: Km. 63, al norte de Fortuna, alt. 1050 m, 9 sep. 2001, terrestre; flores péndulas, blancas o crema, sépalos amarillentos por fuera, labelo crema con manchas rojo-castaño por fuera, por dentro amarillo en las quillas, con manchitas rojo-castaño. *A. Maduro & E. Olmos* 236 (MO, Isotypes PMA, SEL).

Herba terrestris foliis ellipticis acuminatis, floribus pendulis ab glomere bractearum elongato in tempo crescenti productis, sepalis petalisque ellipticis, labello ovato obscure trilobato septem carinis ornato, tribus internis basi humili lobulis altis in apice, externis omnino crenato-undulatis.

Terrestrial, *roots* 3-5 mm in diameter; *stems* 60-130 cm, 3-4 mm wide, slightly compressed; *sheaths* striate; *leaves* several, 20-36 x 2.5-4.7 cm, elliptic, acute to long-acuminate, strongly plicate; *inflorescence* terminal, gradually elongating, producing 1-3 pendent flowers at a time, to 4 cm. long; *ovary* and pedicel 20-25 mm; *floral bracts* c. 18 x 5-6 mm, lance-ovate, closely spaced; sepals at first yellowish-green, petals and lip cream, lip with red-brown spots without, keels yellow with red-brown spots near midline; *sepals* 28-31 x 8.6-10.5 mm, elliptic, apiculate, lateral sepals carinate; *petals* 26-36 x 8-10.5 mm, elliptic, apiculate; *lip* 22-23 x 18 mm, ovate, weakly 3-lobed, midlobe markedly undulate, with incurved margins; basal callus ca. 2 x 2 mm, 2-parted; keels 7, the 3 inner keels are low in the basal half and then form erect fin-like lobes 2-2.5 mm tall, to 4 mm long, there is then a crenate-undulate keel on each side, followed by a shorter, similar keel on each side; *column* c. 13 mm, very narrow basally, c. 4 x 4 mm distally, wing-like teeth ca. 2 x 1.3 mm, porrect; *capsule* 10.5 x 1 cm.

In addition to the features given below in the key, *S. nutans* is rather larger than the other species of the section. The margins of the midlobe are somewhat folded in over the terminal lobes of the keels. The epithet,



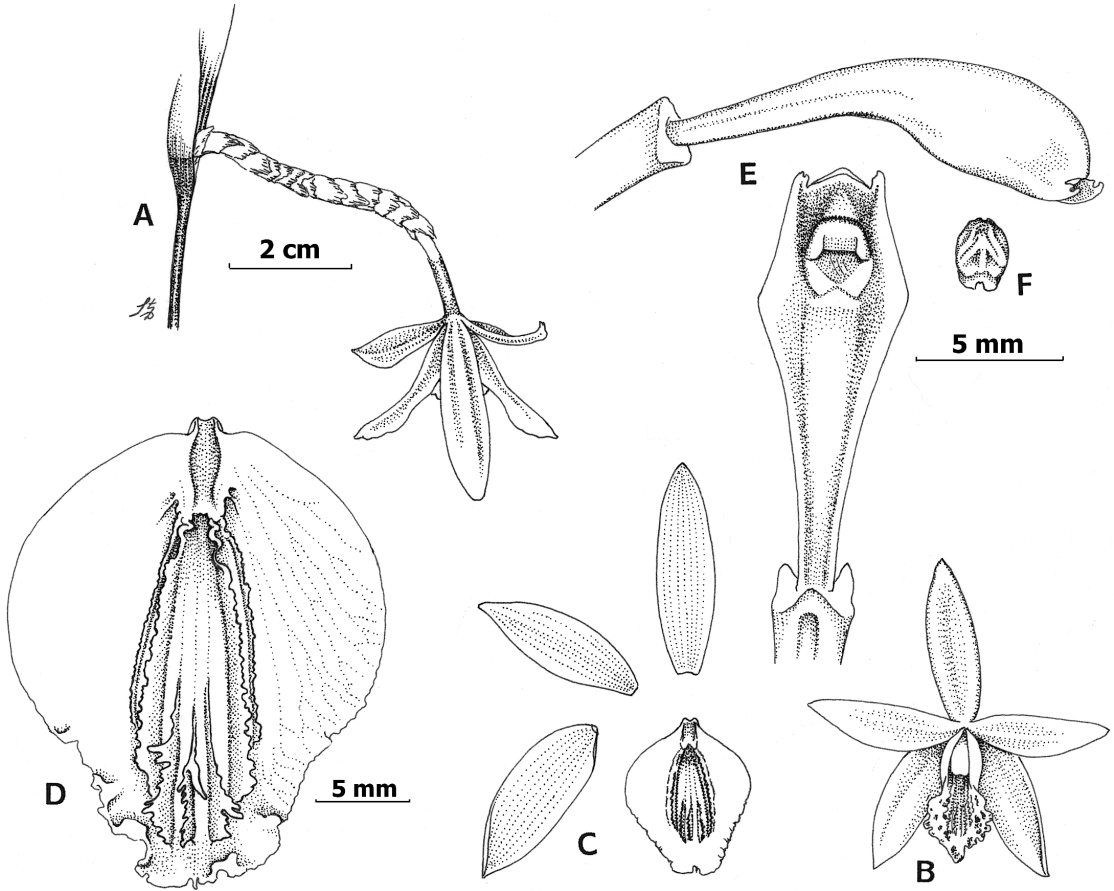


FIGURE 7. *Sobralia nutans* Dressler. A - Flower, natural position. B - Flower, front view. C - Flower parts, spread. D - Lip, spread. E - Column, lateral and ventral views. F - Anther.

*nutans*, refers to the nodding, or pendent, flowers.

PARATYPES: PANAMA. Bocas del Toro: same area as type, 850 m, 27 Oct. 1999, R. L. Dressler & J. T. Atwood 6256 (MO, PMA). Coclé: Vicinity of La Mesa, beyond El Valle, on northern slope of Cerro Gaital, 8°37'N 80°07'W, 850-950 m, 12 July 1978, G. McPherson 11227 (MO); El Valle de Antón, La

Mesa, 4 mi. E of El Valle, 8°36'N 80°07'W, 25 Mar. 1993, T. Croat 74806 (MO).

Better material from Costa Rica may show that *Ingram & Ferrell 813* and other Costa Rican specimens of the Section *Globosae* represent a species distinct from *S. lancea*, or that *S. pardalina* is a synonym of *S. lancea*.

#### KEY TO THE SPECIES OF SECTION *GLOBOSAE*

1. Lip distinctly pandurate, with 2 crenate or undulate keels
  2. Leaves subcoriaceous; lip ecallose basally ..... *S. lancea* Garay [Costa Rica, Colombia, Ecuador]
  2. Leaves thin, membranous; lip with "V"-like basal callus ..... *S. pardalina* Garay [Ecuador]
1. Lip ovate or subovate, with 5-7 keels
  3. Lip with 7 keels, outer 2 keels on each side prominent, crenate-dentate throughout, 3 inner keels low in basal halves with prominent, erect apical lobules ..... *S. nutans* Dressler [Panama]
  3. Lip with 5 low keels, all keels similar, dentate distally ..... *S. candida* (Poepp. & Endl.) Rchb.f. [Venezuela, Colombia, Ecuador, Peru, Bolivia]

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## ***TRICHOPILIA* x *RAMONENSIS* (ORCHIDACEAE), UN HÍBRIDO NATURAL DE COSTA RICA**

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**ABSTRACT.** The natural hybrid *Trichopilia* x *ramonensis* (*T. marginata* x *T. suavis*) from the San Ramón region of Costa Rica is here described and illustrated. The name of this hybrid was used for the first time in 1992, nevertheless it has so far not been validly published.

**RESUMEN.** Se describe e ilustra el híbrido natural *Trichopilia* x *ramonensis* (*T. marginata* x *T. suavis*) de la región de San Ramón, Costa Rica. El nombre de este híbrido se usó por primera vez en 1992; sin embargo, hasta ahora no se ha publicado válidamente.

**PALABRAS CLAVE / KEY WORDS:** *Trichopilia marginata*, *Trichopilia suavis*, *Trichopilia* x *ramonensis*, híbridos naturales, Orchidaceae, Costa Rica.

El género neotropical *Trichopilia* Lindl. (Orchidaceae) se distribuye desde México y Cuba hasta el sur de Brasil y posee unas 30 especies (Horich 1996, Mora-Retana 1999, Bock & Grubb 2000). Garay (1972) ubica el género en la subtribu Trichopiliinae, mientras que Dressler & Williams (1970) y Dressler (1993b) lo hacen en Oncidiinae. Estudios recientes de ADN (Williams *et al.* 2001) sugieren que este género conforma un grupo aislado entre los táxones basales de Oncidiinae. En Mesoamérica se conocen entre 12 y 15 especies; seis de éstas habitan en Costa Rica (Mora-Retana 1999, Pupulin 2002). No obstante, ya se tienen evidencias de que en este país existen otros táxones de *Trichopilia* que rara vez han sido vistos o se han confundido con especies ya descritas (R.L. Dressler, F. Pupulin, com. pers. 2001). En general, este taxon es difícil; así lo reconocen distinguidos estudiosos de las orquídeas, como Horich (1996) y Dressler (1993a, 2001).

*Trichopilia* es, sin duda, uno de los géneros más atractivos de las orquídeas centroamericanas. Son plantas mayormente epífitas que habitan en bosques lluviosos de bajuras, así como en bosques húmedos de altitudes medias. Los pseudobulbos crecen densamente agrupados, son aplanados, subovados a oblongos y cada uno termina en una sola hoja. Las flores son a menudo aromáticas, de coloración variada, con morfología en general similar a la de *Cattleya*. El

labelo es tubiforme o infundibuliforme, en algunas especies abierto y extendido en la parte distal.

En bosques del cantón de San Ramón, Alajuela, en la Cordillera de Tilarán, Costa Rica, se han hallado plantas con características intermedias entre las de *T. marginata* Henfr. (s.l.) y *T. suavis* Lindl., con flores relativamente grandes, de labelo roseo-púrpura, extendido y ondulado. Según comunicación del finado Joaquín García con Clarence K. Horich (1996), ya en el siglo XIX, hace 105 a 110 años, Richard Pfau observó plantas similares cerca del poblado de San Ramón, y el mismo Horich (loc. cit.: 179) lo hizo por ahí de 1973 cerca de La Balsa de San Ramón. La existencia de un híbrido natural de *Trichopilia* fue comunicada por Dressler (1993a) y Mora-Retana (1999). En enero de 1993 Horich envió semillas maduras a Alemania; éstas germinaron en tres semanas y las plantas florecieron siete años después en Bad Gandersheim, Baja Sajonia (Lucke 2000). Mora-Retana & García (1992) anotan un nombre inédito para este taxon: "*Trichopilia* x *ramonensis* J. García & Mora-Retana (nat. hyb.), ined.". Sin embargo, no existe una publicación válida, aun cuando plantas de este híbrido se han reproducido por semillas y han florecido al menos en Costa Rica, Alemania y Estados Unidos de Norteamérica. El híbrido artificial ha sido llamado *Trichopilia* x Charles (Dressler, com. pers. 2001).

*Trichopilia* x *ramonensis* J. García & Mora-Ret. ex C.O. Morales, *nothosp. nova* FIG. 1

HOLOTIPO: COSTA RICA. Alajuela; cantón San Ramón, distrito San Rafael. Berlín. 10°03'N, 84°28'O. Leg. *Luis Acosta s.n.* Floreció en marzo de 1991. USJ-57879 (en líquido).

Nothospecies nova hic descripta, sed multos annos ab egregiis orchideologis nota, apud J. García et Mora-Retana in anno 1992 iam citata sed adhuc non descripta. Epiphyta parva, pseudobulbis dense aggregatis, elongatis, 6-11 cm longis, 1,7-2,1 cm latis, plus minusve rectangulatis, complanatis, interdum falcatis. Foliis elliptico-lanceolatis, petiolo 0,5-2,0 cm longo, lamina 12-24 cm longa, 3,5-6,9 cm lata. Inflorescentia brevis, saepe 1 vel 3 (5) floribus. Sepalis petalisque rubriusculis, sepalis lateralibus ad basim 1,0-1,5 cm connatis; labello roseo-purpureo, inter *Trichopilia* marginatam et *T. suavis* intermedia structurato, 6,1-7,5 cm longo, 4,7-5,8 cm lato [complanato disposito], conspicue venato, ad apicem ampliato, profunde emarginato et obscure tetralobato, marginibus valde undulatis simul irregulatis; columna erecta, 2,8-3,1 cm longa, ad basim 1,0-1,5 cm cum labello connata; clinandrio supra anthera conspicue laciniato. Fructum non vidi.

Epífita con *pseudobulbos* densamente agrupados, alargados, 6-11 x 1,7-2,1 (2,5) cm, un poco más anchos cerca de la base, de forma más o menos rectangular, con bordes laterales casi paralelos, aplanados, a veces falcados. *Hojas* elíptico-lanceoladas, peciolo 0,5-2 cm de largo, lámina 12-24 cm de largo, 3,5-6,9 cm de ancho máximo. *Inflorescencia* un racimo corto, generalmente arqueado, a veces colgante, surgiendo de la base de un pseudobulbo nuevo; con el raquis liso, glabro, levemente aplanado dorsiventralmente, de 3 a 5 mm de diámetro, entrenudos de 0,6 a 2,5 (3) cm de largo, entrenudo terminal reducido, a veces con una bráctea estéril. *Brácteas florales* ovado-lanceoladas, agudas, más anchas en la base, 1,8 cm largo, 1,2-1,4 cm de ancho máximo, grises, papiráceas, con puntos y manchas marrón claro. *Pedicelo* levemente curvo hasta doblado en hoz, 1,3 a 1,5 cm de largo. *Flores* generalmente 1 a 3 (5); sépalos y pétalos pardo-rojizos, labello roseo-púrpura; ovario 2,7-2,8 cm de largo, sulcado; *sépalo dorsal* 5,7-6,6 x 1,1-1,6 cm, lanceolado; *sépalos laterales* 5,3-7,1 x 1,0-1,3 cm, lanceolados, connados 1,0-1,5 cm en la base, a menudo retrorsos en la parte media,

con el haz ligeramente acanalado en el tercio proximal; *pétalos* 5,2-6,7 x 1,1-1,5 cm, oblongos, ligeramente fusiformes, agudos a apiculados; *labello* 6,4-7,5 cm de largo, 5,3-5,8 cm de ancho máximo [siendo extendido y ligeramente aplanado], formando un tubo ensanchado, abierto y extendido hacia el ápice, de forma intermedia entre *T. marginata* y *T. suavis*, envolviendo la columna, profundamente emarginado en el ápice y oscura e irregularmente tetralobado en la parte distal, con bordes muy ondulados e irregulares, lóbulos distales 2,2-2,8 x 1,1-2,3 cm, venación longitudinal conspicua, callo simple: una quilla estrecha elevada en el centro del labello hasta ca. 0,5 cm más arriba de la columna; *columna* 2,8-3,1 cm de largo (hasta la antera), 0,4-0,5 cm de diámetro, recta, paralela a la base estrecha del labello, ventralmente fusionada 1,0-1,5 cm con la base del labello; *clinandrio* prominente, laminar, finamente laciniado, de hasta 0,8 cm sobre la antera y rodeándola; *antera* 0,5 cm de largo, 0,35 cm de ancho, ca. 0,30 cm de alto; *polinios* 2, cada uno 2,5 x ca. 1,5 mm.

PARATIPOS: COSTA RICA. Alajuela: San Ramón. Cataratas. Leg. *Luis Acosta s.n.* 19 de marzo de 1992. USJ-44878 (material seco, piezas florales extendidas). "*Trichopilia* cf. *ramonensis* (Híbrido natural). Tiene caracteres intermedios entre *T. marginata* y *T. suavis*, sobre todo en el labello" (det. Joaquín García & Dora E. Mora). Alajuela: San Ramón [sin localidad exacta]. Leg. *Luis Acosta s.n.* Febrero de 1987. Floreció en cultivo, marzo de 1990. USJ-31985 (material seco, un pseudobulbo, una hoja y una inflorescencia con tres flores). "Híbrido natural. Plantas con pseudobulbos alargados, con hojas elíptico-lanceoladas, anchas. Flores en racimo de 3-5, blanco-rosadas, con puntos y manchas rosado oscuro".

MATERIAL ADICIONAL VISTO: COSTA RICA. Alajuela: San Ramón [sin localidad exacta]. Leg. desconocido. Floreció en enero de 2002, Jardín Botánico Lankester, Cartago, 1350 m (JBL # 33). Planta dibujada, FIG. 1A.

"Híbrido artificial. Cruce hecho por Claudio Salas. Floreció en marzo de 1991". USJ-57881 (en líquido).

Este híbrido natural se reconoce por sus pseudobulbos alargados y estrechos, inflorescencias cortas, arqueadas, con 1 a 5 flores, con el labello roseo-púrpura, ensanchado y abierto hacia el ápice, profundamente emarginado, fuerte e irregularmente ondulado y oscuramente tetralobado en la parte distal. Una variante de *T. marginata* s.l. con labello púrpura ha sido confundida con el híbrido (por ejemplo, USJ-57902, en líquido, de la Reserva Biológica Alberto Brenes, San Ramón, Alajuela), pero las flores del híbrido son

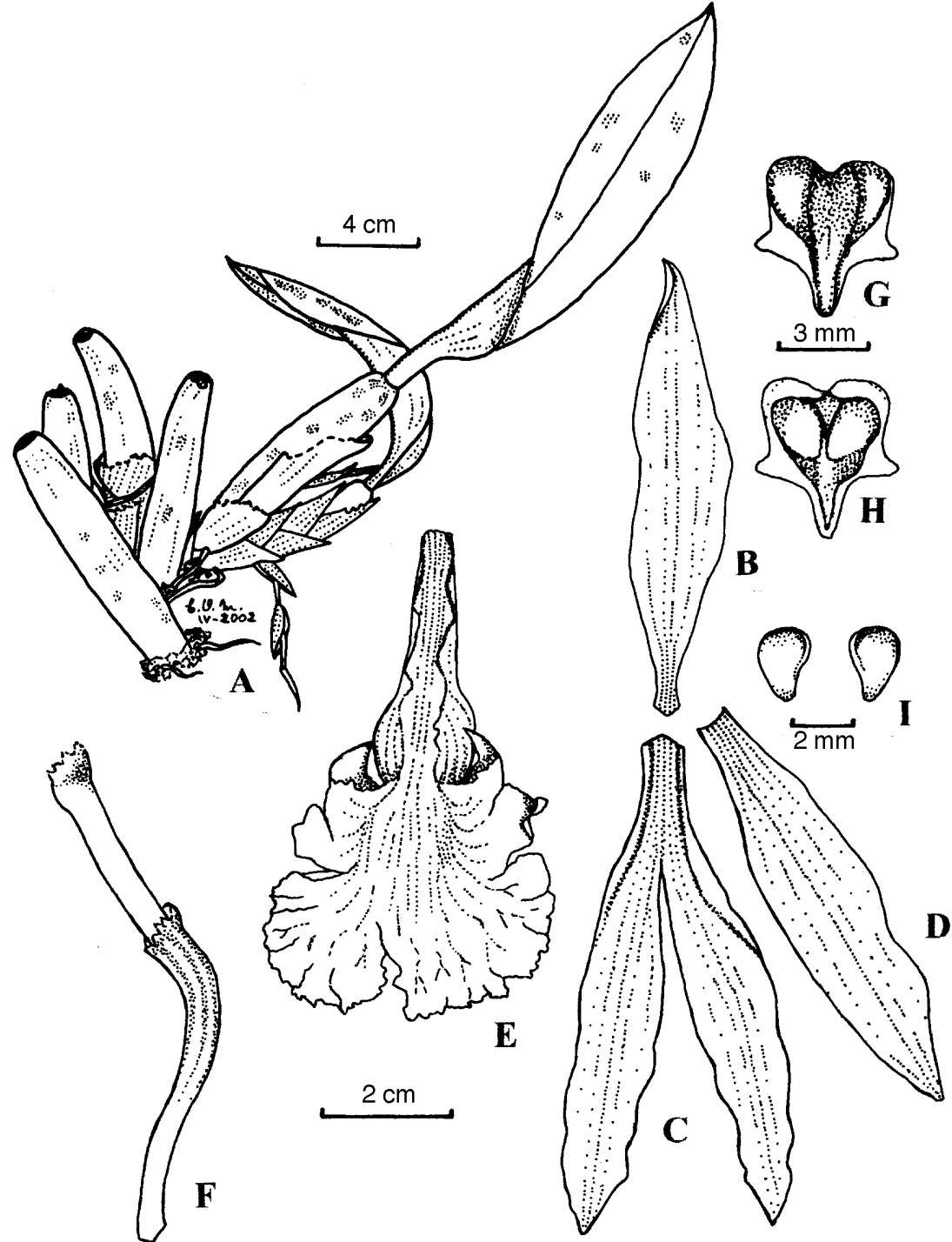


Figura 1. *Trichopilia x ramonensis* J. García & Mora-Ret. ex C.O. Morales. A. Hábito; planta con restos de dos inflorescencias. B. Sépalo dorsal. C. Sépalos laterales. D. Pétalo. E. Labelo (algo extendido y aplanado). F. Columna con pedicelo (N.B. clinandrio incompleto). G. Antera, vista dorsal. H. Antera, vista ventral. I. Polinios. A: Dibujo del autor; planta del Jardín Botánico Lankester. B-I: Dibujos del holotipo (USJ), por Marcia González Garay.



mucho más grandes y voluminosas, con el labelo más extendido y ondulado en la parte distal. Los pseudobulbos son morfológicamente muy similares en el híbrido y en *T. marginata*, pero en esta especie a menudo son mucho más largos que en el híbrido.

ILUSTRACIONES: Lucke (2000) y Bock & Gruß (2000) ofrecen excelentes fotos en colores del híbrido y de los progenitores. En Horich (1996) se halla una fotografía del híbrido en blanco y negro.

ETIMOLOGÍA: El epíteto latinizado *ramonensis* (español: ramonense) es el gentilicio que se refiere a San Ramón, el cantón donde se ha hallado el híbrido natural.

Las flores observadas y medidas muestran notables variaciones de tamaño. Una flor de un cruce artificial (*C. Salas s.n.*, USJ, en líquido), que también fue medida detalladamente, exhibe un tamaño de piezas florales menor que en el holotipo; sin embargo, es fácil predecir que en híbridos artificiales mantenidos en óptimas condiciones de cultivo las flores serán más grandes que en plantas silvestres. Es probable que la variación en tamaño dependa no sólo del ambiente, sino también de la especie en la que se formó la cápsula. Probablemente, las flores son más grandes cuando la cápsula se formó en *T. suavis*, cuyo labelo es más voluminoso que el de *T. marginata*. En el híbrido, a menudo el labelo posee el borde blanco, lo cual también, al parecer, depende del origen de la cápsula (R.L. Dressler, comun. pers. 2002). En el campo, es probable la aparición de especímenes con sépalos laterales libres o unidos sólo por unos milímetros, tal como se observa en el híbrido artificial mencionado. Además, el taxon que, en sentido amplio, conocemos como *T. marginata* es notablemente variable, sobre todo en el color de las flores, lo que seguramente determina cierto grado de variabilidad en el híbrido. Los ejemplares secos de herbario muestran piezas florales notablemente reducidas de tamaño respecto a ejemplares preservados en alcohol o formalina. Por ello, todas las mediciones de órganos vegetativos y piezas florales de la descripción corresponden a ejemplares vivos o preservados en líquido.

DISTRIBUCIÓN Y ECOLOGÍA: Horich (1996: 182) sitúa el híbrido entre Ángeles Norte y el río San Lorenzo, cantón de San Ramón, a altitudes entre 900 y 1100 m. Ahora sabemos que la distribución es más amplia. *Trichopilia x ramonensis* habita en áreas de bosque tropical húmedo y premontano húmedo, entre 800 y

1100 m de altitud, en la Cordillera de Tilarán, incluyendo la Reserva Biológica Alberto Brenes, en San Ramón, puesto que allí se han recolectado las dos especies progenitoras (ejemplares en CR y USJ). También es probable la presencia de este híbrido en la zona montañosa de Monteverde, Puntarenas, que colinda con la Reserva Biológica Alberto Brenes.

Ciertas plantas procedentes de algún lugar del cantón de Pérez Zeledón, zona sur de Costa Rica, cultivadas en el Jardín Botánico Lankester, son muy similares a las de *T. x ramonensis*, tanto vegetativamente como respecto a color y morfología floral. Sin embargo, las pocas flores de esas plantas que he visto son algo más pequeñas, el labelo es menos ondulado y tiene lóbulos mejor definidos que en las plantas de San Ramón. En Bock & Gruß (2000: 758) la foto 2, determinada como *Trichopilia marginata* 'Wössen', muestra flores con labelo púrpura muy similares a las de Pérez Zeledón. Por cortesía de R.L. Dressler (comun. pers., abril de 2002) he visto la foto de una planta florecida de Panamá que, casi con seguridad, es *T. x ramonensis*. En *Die Orchidee* 43(6): 52 (Orchideenbewertung 1991), 1992, aparece una fotografía en colores determinada como "*Trichopilia elegans* 'Mariechen' SM(B) / D.O.G.", que muestra una similitud extraordinaria con el híbrido aquí descrito. El nombre "*T. elegans*" no aparece válidamente publicado. Es necesario revisar detalladamente el material del sur de Costa Rica y de Panamá. Muy probablemente, pronto se revelará que el ámbito de distribución del híbrido natural es mucho mayor que el conocido hasta ahora. Teóricamente, el híbrido podría hallarse en todas las zonas donde coinciden *T. marginata* y *T. suavis* (Costa Rica y Panamá, entre 800 y 1200 m de elevación, aproximadamente; cf. Mora-Retana & Atwood 1992, pero aparentemente no existen recolectas de ninguna de las dos especies en Colombia). No obstante, las poblaciones silvestres de los progenitores han desaparecido o han sido fuertemente diezmadas debido a la destrucción de grandes áreas boscosas y a la recolecta ilegal de orquídeas con fines comerciales. En la actualidad, es casi imposible hallar estas especies y el híbrido de ambas en los mismos sitios sin protección estatal donde fueron observados por Pfau, Brenes, Horich y Mora-Retana. Aunque la época de floración de ambas especies se traslapa (Mora-Retana 1999), no sabemos casi nada sobre las condiciones microambientales que favorecen la hibridación natural y el crecimiento de las plántulas.

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## NOTAS VARIAS SOBRE *HELICONIA RODRIGUEZII* (HELICONIACEAE) DE COSTA RICA

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**ABSTRACT.** *Heliconia rodriguezii* was described in 1982, but all the Costa Rican specimens were at the USJ Herbarium. Isotypes were distributed to other herbaria lately in May and June 2002. Moreover the herbarium acronyms for the isotypes are erroneously cited in the original publication. Notes on distribution, ecology, and morphology of this rare, endemic, and poorly known species are given.

**RESUMEN.** *Heliconia rodriguezii* fue descrita en 1982, pero todos los especímenes de Costa Rica se hallaban en el Herbario USJ. Los isotipos se enviaron a otros herbarios hasta mayo y junio de 2002. Además, los acrónimos de herbarios para los isotipos se citan mal en la publicación original. Se anotan datos sobre distribución, ecología y morfología de esta especie endémica, escasa y poco conocida.

**PALABRAS CLAVE / KEY WORDS:** Heliconiaceae, *Heliconia rodriguezii*, especímenes tipo, Costa Rica

En Costa Rica se conocen unas 42 especies nativas de *Heliconia*. De éstas, unas once especies (ca. 26 %) son endémicas de este país y es probable que aún se describan algunas especies nuevas. Aunque en la literatura aparecen unos 450 nombres de especies, variedades e híbridos, Berry & Kress (1991) sitúan entre 200 y 250 el número total de especies de *Heliconia*. Así, la diversidad registrada en Costa Rica representa entre 15 y 20 % de las especies del género. Stiles (1985) señala que el centro de diversificación se halla en la Sudamérica tropical. En Costa Rica, según las observaciones del mismo autor, la mayor diversidad de *Heliconia* se concentra en la vertiente atlántica al pie de las cordilleras Central y de Talamanca, entre 100 y 700 m de altitud, y en la Península de Osa y áreas vecinas.

En lugar de estudiar material de herbario, Daniels & Stiles (1979) y Stiles (1975, 1979, 1980, 1982, 1985) observaron y describieron las heliconias *in vivo*. De este modo, su trabajo ha sido crítico para entender tanto la taxonomía heliconiácea costarricense como la estrecha relación ecológica y evolutiva existente entre estas plantas y dos grupos de aves: colibríes, que polinizan todas las especies de *Heliconia* de Costa Rica, y aves frugívoras, que dispersan frutos y semillas.

Una de las especies menos conocidas, *Heliconia*

*rodriguezii* F. G. Stiles (1982: 222), dedicada al insigne botánico, artista y humanista costarricense Rafael Lucas Rodríguez, fue descrita de La Montura, en el Parque Nacional Braulio Carrillo, donde, según el autor, la especie es común en laderas y barrancas boscosas y se halla a menudo en claros ocasionados por caída de árboles. Los datos del tipo indican lo siguiente: “Stiles 80-27, forest understory at La Montura, el. 1050 m, Parque Nacional Braulio Carrillo, Provincia San José, Costa Rica, 27 July 1980; UCR (holotype), MNCR, FMNH, USNM.”

Tenemos dos problemas con estos datos:

1) Los acrónimos de los herbarios citados son incorrectos. Sin duda, “UCR” se refiere al *Herbario de la Universidad de Costa Rica* (USJ), “MNCR” alude al *Herbario Nacional* (CR), en el Museo Nacional de Costa Rica, “FMNH” es el *Herbario del Field Museum of Natural History* (F) en Chicago, EE.UU., y “USNM” tiene que ser el *United States National Herbarium* (US), en Washington, EE.UU.

2) En USJ observé siete ejemplares completos del tipo de *Heliconia rodriguezii*, lo que claramente revela que los isotipos citados por Stiles nunca fueron enviados a los respectivos herbarios. Esto ya fue confirmado por curadores de los herbarios CR, F y US.

En mayo y junio de 2002 han sido enviados ejemplares isotipos a los herbarios CR, F, M, ULM y US,



Figura. 1. *Heliconia rodriguezii* F.G. Stiles. Isotipo (USJ). Dibujo del autor.

mientras que el holotipo (así anotado por Stiles) y un isotipo permanecen en USJ.

Según Stiles, las especies más emparentadas con *H. rodriguezii* (Fig. 1) son *H. gracilis* G.S. Daniels & F.G. Stiles y *H. ignescens* G.S. Daniels & F.G. Stiles.

La primera se diferencia de éstas dos por el hábito más musoide, vástago (pseudotallo) más grande y más robusto, hojas más grandes e inflorescencias más anchas y voluminosas. Stiles considera que, morfológicamente, *H. rodriguezii* es un eslabón entre las dos especies mencionadas. Uno de los isotipos (F)

indica: "Planta de 1.5 m de altura. Inflorescencia roja, flor amarillenta." Kress (*in* Hammel *et al.*, inéd.) señala que las brácteas medias poseen una superficie externa glabra, roja a rojo-anaranjada. Además, indica en su clave de las heliconias de Costa Rica que *H. ignescens* tiene láminas foliares menores que 50 cm de largo y brácteas cincinales anaranjadas, mientras que *H. rodriguezii* muestra láminas foliares mayores que 50 cm de largo y brácteas cincinales rojas. Esta especie, que aparentemente florece la mayor parte del año, se considera rara y es endémica en el Parque Nacional Braulio Carrillo, en las laderas atlánticas de la Cordillera Central, entre 800 y 1200 m de elevación, justamente en el área de mayor diversidad del género *Heliconia* en Costa Rica. Stiles (1982) incluye una fotografía de la inflorescencia de *H. rodriguezii* en blanco y negro. En Berry & Kress (1991: 167) aparece una fotografía en colores. En esta última obra, así como en Daniels & Stiles (1979), aparecen también fotografías en colores de las dos especies emparentadas, mencionadas anteriormente.

#### OTROS ESPECÍMENES VISTOS:

*F.G. Stiles 80-32* (USJ). Localidad típica. 27 de julio de 1980. "... flor amarilla."

*F.G. Stiles 83-68* (USJ). "Braulio Carrillo". 8 de abril de 1983.

*F.G. Stiles s.n.* (USJ-30864). Localidad típica, 1020 m de altitud. 23 de abril de 1989. "Brácteas rojas; flores amarillas."

Es indudable que *H. rodriguezii* ha permanecido desconocida para la mayoría de botánicos que trabajan en Costa Rica, en parte debido a que los isotipos no se distribuyeron. Además, muy pocos botánicos han recolectado esta especie después de Stiles. Así, por ejemplo, antes de mayo de 2002 no había ningún ejemplar en CR. En la base de datos TRÓPICOS, del Jardín Botánico de Missouri, se cita un solo ejemplar: *B.A. Loiselle 224* (MO) [Heredia, 1530 m, 10° 14' N, 84° 05' W, January 1987, 1-1.5 m; red upright bracts;

inflorescence and unripe fruit in January]. La base de datos ATTA, del Instituto Nacional de Biodiversidad, incluye asimismo un solo ejemplar: *P.J.M. Maas 7809* (INB) [área del Río Sucio, Parque Nacional Braulio Carrillo]. Durante muchos años esta especie ni siquiera apareció en algunas listas de plantas de Costa Rica.

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## A NEW SPECIES OF *STELLILABIUM* SECTION *TAENIORHACHIS* (ORCHIDACEAE) FROM COSTA RICA

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RESUMEN. Se describe e ilustra *Stellilabium smaragdinum* de los bosques montanos de encino de la Cordillera de Talamanca. *S. smaragdinum* se distingue de otras especies de la sección *Taeniorhachis* por su inflorescencia con 1 a 3 (4) flores simultáneas, los lóbulos basales del labelo oblongos a ovoides y redondeados en el ápice y la peculiar coloración de la setas en los lóbulos laterales de la columna, marfil con bandas púrpura.

ABSTRACT. The new species *Stellilabium smaragdinum* is described and illustrated from the montane oak forests of the Cordillera de Talamanca, Costa Rica. Among the species of Sect. *Taeniorhachis*, *S. smaragdinum* may be recognized for the inflorescence bearing 1-3 (4) simultaneous flowers, the oblong to ovoid, rounded basal lobules of the lip, the non-ciliate margins of the lip midlobe and the peculiar colour of the column setae, cream banded with purple.

KEY WORDS / PALABRAS CLAVE: *Stellilabium smaragdinum*, *Stellilabium* sect. *Taeniorhachis*, Orchidaceae, Costa Rica.

Mesoamerican species of the genus *Stellilabium* Schltr. (Orchidaceae) are not easy plants to spot in the field. In many cases they lack leaves and also when the leaves are present they are usually very small, rarely reaching 3 cm in length, so one needs to rely on inflorescences to distinguish them among the rich epiphytic vegetation of Neotropical forests. It is likely this is the main reason why two thirds of Mesoamerican species of the genus were only described in the last twelve years (Atwood 1989; Salazar-Chávez & Hågsater 1991, Atwood & Dressler 1995, Dressler 1999, 2001), thanks to the help of resident botanists carrying out systematic collections and studies intended for large floristic projects.

Generic circumscription of *Stellilabium* was revised by Braas & Lückel (1982b), Garay & Romero-González (1998) and Dressler (1999). *Stellilabium* in the strict sense, characterized by flowers with simple column, is a group eminently Andean in distribution, perhaps closely allied to *Trichoceros* Kunth and

*Telipogon* Kunth, which includes *Cordanthera* L.O. Williams, *Darwiniella* Braas & Lückel, and *Sodirolella ecuadorensis* Schltr. A formal reinstatement of *Dipterosteles* Schltr. was proposed by Braas & Lückel (1982a, 1982b) to include those species presenting narrowly triangular-acuminate lip and bristles of the column short. Garay & Romero-González (1998) adopted a much wider circumscription of the genus *Dipterosteles* Schltr. and formally assigned to it all the *Stellilabium* species with distinct lateral lobes on the column and a cucullate clinandrium. Dressler (1999) interpreted *Stellilabium* in a broad sense, including *Dipterosteles* Schltr., and identified four distinctive groups within the genus giving them sectional status. Section *Stellilabium* and Sect. *Dipterosteles* (Schltr.) Dressler, both with persistent leaves, mainly terete or triangular rhachis, and margins of floral bracts not decurrent on rhachis, are exclusively South American. Species of *Stellilabium* from Mesoamerica, on the contrary, present epheme-

ral leaves and margins of floral bracts decurrent on the rhachis, so that the flowers are borne on face rather than on the edges of the flattened rhachis. Although their relationships are yet unclear, among species from Central America two main groups may be distinguished. In Section *Taeniorhachis* Dressler the column is 3-lobed, and the fleshy stigma is adnate to the base of the lip, whereas species of Sect. *Ramphostele* Dressler have simple column and a porrect stigma free from the lip. With the notable exception of *S. lankesteri* Ames, flowers of the latter section are completely glabrous (Dressler 1999).

Samples of DNA sequences for the genus are still scanty, but they support distinction between sections *Stellilabium*, *Dipterostele* and *Taeniorhachis* (com. by N.H. Williams, in Dressler 2001), though the three groups may eventually prove to be subgroups of *Telipogon*. It should be noted that if *Stellilabium* Sect. *Taeniorhachis* is ever elevated to the generic rank it would have to be renamed, since that name is already occupied by one species in Poaceae (Cope 1993).

A species pertaining to *Stellilabium* section *Taeniorhachis* from the Talamanca range in Central Costa Rica is here described as new to science:

***Stellilabium smaragdinum*** Pupulin & M.A. Blanco, *sp. nov.* FIG. 1.

TYPE. COSTA RICA. Cartago. El Guarco, La Chonta, Turbera, 09°42'00"N 83°56'20"W, 2400 m, epífita sobre *Quercus* sp., en ramas bajas, 17 julio 2001, M. Blanco 1965, F. Rizo-Patrón, A. Vasco & O. Vargas (holotype, USJ!, USJ-Spirit!; isotypes, CR!, SEL!).

Inter species sectionis *Taeniorhachidi* floribus 1 vel 4 simultaneis lobulis lateralibus labelli oblongis vel ovoideis, rotundatis, marginibus lobi intermedi labelli integris, setis columnae eburneis purpureo striatis dignoscenda.

*Plant* epiphytic, small, nearly acaulescent, the abbreviated stem about 5 mm long. *Roots* thick, flexuous, rounded in section, ca. 1 mm wide. *Leaves* 3-4, distichous, narrowly elliptic to lanceolate, acute, minutely apiculate, 15-18 mm long, 2-3 mm wide, the base enclosing the subterete stem, sometimes absent at flowering. *Inflorescence* a primarily simple raceme

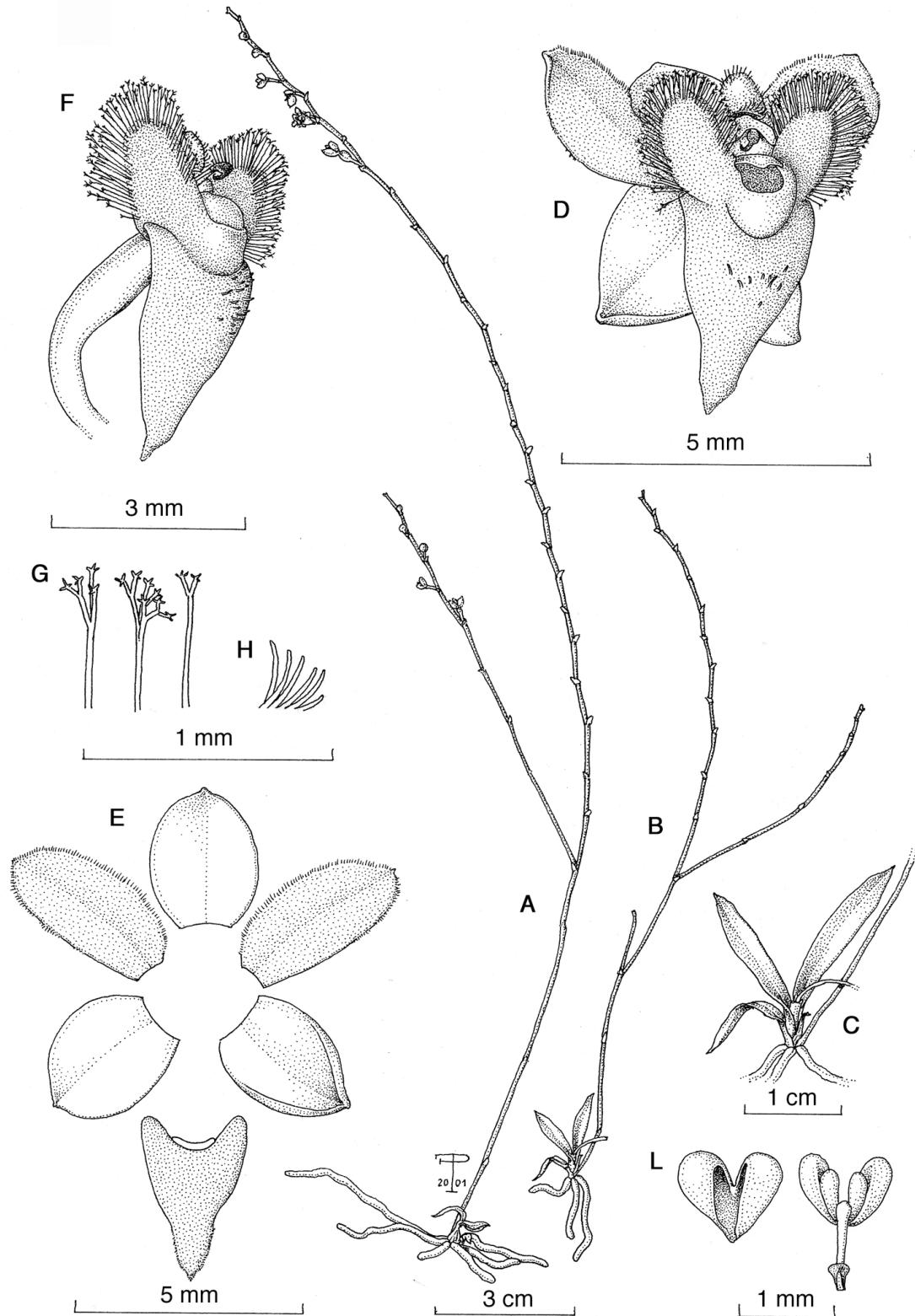
10-33 cm long, producing secondary branches in succession from the lower bracts of the previous axis; *peduncle* terete, 5-9 cm long, with 3-4 triangular, acute bracts about 4 mm long; *rhachis* flattened, 1-1.3 mm wide, successively many-flowered (to 27), with 1-3 (4) flowers simultaneously opened; *floral bracts* triangular, acute, from the margin of the flattened rhachis, 2 mm long, 1.2 mm wide. *Ovary* linear-subclavate, 3.6-4.6 mm long including the pedicel. *Flowers* small, with olive-green sepals and petals, the lip and column emerald green, the dendroid hairs of the column cream, banded purple. *Dorsal sepal* widely elliptic, obtuse, with a rounded apicule, 2.9 mm long, 2.4 mm wide. *Lateral sepals* obliquely widely elliptic-suborbicular, rounded, provided with a rounded apicule, the apical margins somewhat involute in natural position, 2.7 mm long, 2.4 mm wide. *Petals* narrowly elliptic, slightly falcate, subobtuse, apiculate, the margins ciliate, 3.7 mm long, 1.7 mm wide. *Lip* sagittate, 3.4 mm long, 2.3 mm wide, covered with sparse, stiff hairs, the basal lobules oblong to ovoid, rounded, flattened, the median lobe ligulate, velutine, with a prominent, acute apicule, the margins minutely ciliate. *Column* 3-lobed, the lateral lobes elliptic, flattened, 1.5 mm long, 1 mm wide, the dorsal margins covered with dendroid-stellate setae ca. 0.6 mm long, the median lobe helmet-shaped, rounded, 0.8 mm long, 0.7 mm wide, covered with simple setae 0.2-0.3 mm long; stigma globose, rounded. *Anther cap* cucullate, deeply cordate, 2-celled. *Pollinia* 4 in two pairs of different size, obovate, laterally complanate-concave, on a narrow, ligulate stipe; viscidium uncinat. *Fruit* an elliptic-globose capsule, 4 mm long.

ETIMOLOGY: From the Latin *smaragdinus*, emerald-green, in reference to the bright green color of lip and column.

ECOLOGY: Epiphytic on shady, lower branchlets amidst a dense cover of mosses and other epiphytes in wet montane oak forest at 2400 m altitude. More plants possibly grew higher up the tree, where they would be virtually impossible to detect from the ground.

Among the species of *Stellilabium* Sect. *Taeniorhachis*, *S. smaragdinum* may be recognized

Figure 1. *Stellilabium smaragdinum* Pupulin & M.A. Blanco. A, B – Habit. C – Plant. D – Flower. E – Dissected perianth. F – Column and lip, lateral view. G – Setae of lateral lobes of column. H – Setae of midlobe of column. L – Anther cap and pollinarium.



for the inflorescence bearing 1-3 (4) simultaneous flowers, the elliptic, rounded lateral lobes of lip, the non-ciliate margins of the lip midlobe and the peculiar colour of the column setae, cream banded with purple. *Stellilabium smaragdinum* is closely related to other species of Sect. *Taeniorhachis* presenting dendroid-stellate bristles on the lateral lobes of column and simple setae on the midlobe (which sometimes is only glandular-papillose), i.e. *S. butcheri* Dressler, *S. erratum* Dressler, *S. helleri* L.O. Williams, and *S. minutiflorum* (Kraenzl.) Garay. However, plants of the latter species are much smaller (the type, *Endrés s.n.*, W-R 2006!, 2007!, 2011!) and the flower presents a smaller lip with short, narrowly triangular basal lobes (illustration of type, W!. See discussion on *S. minutiflorum* in Dressler 1999: 471).

*Stellilabium helleri* has a fringe of hairs in front of the column that are absent in *S. smaragdinum*, and the column midlobe is obscurely muricate. *Stellilabium erratum* has dark wine-purple flowers with comparatively narrower petals and a markedly hastate lip. The Panamanian *S. butcheri* presents a convex lip with papillose-hispid margins and narrow basal lobules.

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