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TWO NEW SPECIES IN THE *MAXILLARIA RUFESCENS* COMPLEX FROM CENTRAL AMERICA[1]

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ABSTRACT: Two new species in the *Maxillaria rufescens* complex are described from Central America. *Maxillaria dressleriana* Carnevali & J.T. Atwood is related to *M. hedwigae* Hamer & Dodson but flowers are red-maroon and are held erect on short pedicels, besides other differences in the shapes of the floral segments; it is known from Costa Rica and Panama. *Maxillaria moralesii* Carnevali & J.T. Atwood is only known with certainty from the Central Valley of Costa Rica and is related to the South American *M. acutifolia* Lindley but it is a larger flower with clear yellow-green flowers and differently shaped perianth segments. Illustrations and discussion on affinities of both new species are provided.

THE *MAXILLARIA RUFESCENS* complex is widely distributed in the Neotropics from southern Mexico to southern Brazil. As a group, the complex is characterized by the 1-leaved pseudobulbs each enveloped with 2–3 nonleaf-bearing sheaths. The 1-flowered inflorescences are always shorter than the pseudobulbs. The floral bracts are shorter than the ovary. The labella are 3-lobed with the lateral lobes small, usually porrect to perpendicular to the main axis of the labellum and are typically borne at or below the mid-zone of the blade; the central lobe is usually oblong or oblong-subquadrate, apically truncate to emarginate-bilobed. The pollinarium of the group is characterized by a horse-shoe shaped viscidium with a thick rim to the lower dorsal surface, and a broad, thick, subquadrate to oblong stipe (type XV of Carnevali, 1991). The flowers are much less fibrous than in most other *Maxillaria* groups which combined with the fact that the pseudobulbs take long to dry appropriately on conventional plant dryers, make them emerge from this process over-dry or essentially burnt-out and very difficult if not impossible to rehydrate adequately for study from herbarium specimens.

Because of the difficulties involved in the rehydration of herbarium material of the group, the taxonomy of the group has remained in a state of confusion until recently when more attention to field work and observations of live and freshly pickled material has made evident that we are actually dealing with a group of several closely related species. During the last century John Lindley described two species in this complex. The first, *Maxillaria rufescens,* that lends its name to the group, was described in 1835 from a plant collected in the island of Trinidad along the NE coast of South America. This species is characterized by large flowers (sepals 2.5–4 cm long) which are heavily fragrant of vanilla. The second species to be described in the complex, *M. acutifolia,* this time from British Guiana (currently the independent country of Guyana), has smaller flowers (sepals 1.5–2 cm long), a differ-

[1] Part of the research that led to this publication was conducted while the senior author was a visiting scientist at the Marie Selby Botanical Gardens. William Fritz of St. Louis, Missouri cultivated and successfully flowered plants of *Maxillaria moralesii* collected by the author in 1994; these plants were the basis for the recognition of this taxon as new; plants of *Maxillaria dressleriana* (and of other members of the *Maxillaria rufescens* complex) were also grown there. INBio (Instituto Nacional de Biodiversidad, Heredia, Costa Rica) and Lankaster Gardens (Cartago, Costa Rica) provided logistic support to the senior author during his visits to study the Maxillariinae (particularly the genus *Cryptocentrum* Benth.) of Costa Rica. Some individuals from these institutions were particularly helpful and the field work that I carried out in Costa Rica was successful mainly due to their efforts; the author particularly wants to acknowledge the support given by Dora Emilia Mora Retana and Jorge Warner (Lankester Gardens), Raul Rivero (Selby Gardens), and Barry Hammel and Francisco Morales (INBio). Carlos Vargas at MO provided insightful comment and discussion.

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ently shaped labellum, and a fragrance of fresh fruits. It became common practice in herbarium-based treatments of the group to call all the large- to medium sized-taxa of the complex *M. rufescens* while all the small-flowers entities would be christened *M. acutifolia* (see, for example Ackerman, 1995; Hamer, 1984a, 1984b) or the differences would be altogether ignored (for example, Foldats, 1970; Dodson & Marmol-Dodson, 1980).

In 1975 Brieger and Illg (Illg, 1975) proposed *Maxillaria cleistogama,* a new species in the complex based on the consistent cleistogamous character of the flowers as opposed to the chasmogamous flowers of both *M. rufescens* and *M. acutifolia.* Their new taxon displays smaller flowers than *M. rufescens* and a shorter, broader midlobe of the labellum. The species was said to range from the Coastal Range of Venezuela through the Amazon Basin in Peru and Bolivia to SE Brazil. The type (*Brieger 15.512,* HB) has not been available for study, but it is unlikely that any of the taxa of the complex growing in the Coastal Range in Venezuela could be the same as plants coming from SE Brazil. Material that could be referred to this species has been seen from Amazonian Venezuela and Peru. In 1982 Hamer & Dodson (IPT: 800, 1982) described *Maxillaria hedwigae* from Guatemala, Honduras, and Nicaragua which was going to be the first of a series of new species in the complex proposed by Dodson: *M. chacoensis* Dodson and *M. suarezorum* Dodson from Ecuador would follow. These species differ in details of the flowers that are conspicuous in fresh or pickled material but difficult to recover from rehydrated herbarium material. We now know that several other species await description in South America which will be documented in forthcoming papers.

In nature, the members of this complex are not usually found in strict sympatry, but occasionally they are. When sympatric, there are usually no doubts about the distinctness of the entities. At the extreme south of the phytogeographic province of Chocó, in extreme NW Ecuador, in the region of Lita, Province of Esmeraldas, at least two different species occur together. One of them, closely related to *M. acutifolia,* has smallish dull yellow-orange flowers, laterally compressed pseudobulbs, and nonpetioled leaves. The other has pinkish petals and sepals, an orange labellum, conic pseudobulbs, and petioled leaves. The shape of the floral segments is also different. These two species are probably still undescribed. At extreme NE Bolívar State in Guayanan Venezuela, region of La Escalera, two species coexist again. One of them, *Maxillaria acutifolia,* has small flowers and a basally cuneate labellum. The other has the largest flowers of the complex and a labellum with a rounded to obtuse base, *M. rufescens. Maxillaria acutifolia* here tends to occur at a slightly higher elevational range (750–1400 m) than *M. rufescens* (200–800 M) but they remain distinct when their geographical ranges overlap.

The members of the *Maxillaria rufescens* complex can be recognized by combinations of vegetative and floral characters. The shape of the labellum is diagnostic, particularly the shape and position of the lateral lobes. Flower colors and fragrances are consistent within species. The plants afford interesting diagnostic characters too. In some species the rhizome is shortly but distinctly creeping while it is extremely abbreviated in other taxa. These characters remain constant within populations of the taxa here recognized as distinct species.

The *Maxillaria rufescens* complex is probably not as diverse in Central America as it is in South America, but it is certainly more diverse than suggested by the simplistic view adopted by previous literature (Allen, 1949). Dressler (1993) recognized three species in the complex but, in dealing with "*Maxillaria rufescens,*" acknowledged that: ". . . This name has been applied to many superficially similar species, including *M. acutifolia* and *M. hedwigae.* It may be that none of the Central American plants are really *M. rufescens.* . . ." One of the new species here described (*M. moralesii*) keys out to his "*M. acutifolia,*" another South American species that does not reach Central America.

Fritz Hamer (1982, 1984a, 1984b) recognized the existence of three taxa in the *M. rufescens* complex in his treatment of *Nicaraguan Orchids* for *Icones Plantarum Tropicarum.* One of them was newly described then, *M. hedwigae.* Besides the conspicuously distinct *M. hedwigae,* he had a large flowered species (petals ca. 12 mm long) with brownish flowers with broad leaves obtuse leaves, and a smaller flowered species (petals ca. 11 mm long) with yellow-green flowers and

"acuminate" leaves. The first one he referred to *M. rufescens* albeit recognizing that ". . . this may turn out to be an undescribed species." This species is probably conspecific with the newly described *M. dressleriana.* His second species was assigned to *M. acutifolia* and it is most likely the entity proposed as a new species in this account as *M. moralesii.*

Maxillaria dressleriana Carnevali & J. T. Atwood *sp. nov.* TYPE: PANAMA. Chiriquí: Fortuna Dam, near Rambola. Flowering in cultivation at the Marie Selby Botanical Gardens on January 3, 1995, *SEL-89-0368* (holotype: SEL; isotypes: AMES, INB, MO). Figure 1.

Species haec M. hedwigae Hamer & Dodson sed floribus atroruberrimis, labello longiore, lobulo centrali subquadrato latiore, habito multifloro recedit.

Epiphytic herbs, cespitose, 25–30 cm tall. **Rhizome** abbreviated, clothed by scarious sheaths; **pseudobulbs** clustered, 2.5–4 cm tall, 1–1.5 cm wide and thick, ovoid or ovoid-ellipsoid, section circular, hence pseudobulbs sub-conical; 1-leaved apically, surface shiny, longitudinally many ridged, then transversally closely and shallowly ridged, suggesting a network pattern, dull dark green but tinged with dull dark maroon basally in older pseudobulbs; sheaths enveloping the pseudobulb non-leaf-bearing. **Leaves** 24–27 cm long, 2–3 cm wide, erect on the pseudobulb, coriaceous, elliptic or rarely ovate-elliptic, acute, pseudopetioled; **pseudopetiole** 20–35 mm long, 4.6 mm wide, deeply chanelled on the ventral face, on transversal section elliptic. **Inflorescences** erect, shorter than pseudobulb; **peduncle** 8–12 mm long, terete. **Floral bract** 17–21 mm long, 1.1–1.5 mm wide, broadly obovate or broadly obovate-elliptic, obtuse, apex provided with a 1 mm long mucro, basally loosely tubulose, open at the apical half and inflate. **Pedicellate ovary** 14–19 mm long, terete, shallowly ridged. **Flowers** deep dull red-maroon, the petals paler with a yellowish cast, labellum dark red maroon, apex dull deep yellow, column dull pale cream-yellow; resupinate, lasting 4–6 days. **Sepals** with 2–3 thick nerves at each side of midnerve, and 2–3 faint others, subfleshy; **dorsal sepal** 15–16 mm long, 6.5–7 mm wide, oblong-elliptic, apex obtuse-rounded, in natural position slightly concave and subparallel to the column, margins obscurely rolled-up backwards; **lateral sepals** 15–17 mm long, 5–6 mm wide, oblong, slightly oblique, apex obtuse or obtuse-rounded, margins rolled-up backward, widely spreading in natural position; **petals** 14–15 mm long, 4.55 mm wide, narrowly obovate or narrowly obovate-oblong, apex acute or obtuse-rounded, 5–7-nerved, margins somewhat rolled-up backward; subparallel to column in natural position. **Labellum** 14–16 mm long, 7.5–8.5 mm wide between the forcefully expanded apices of the lateral lobes, **midlobe** 7.5–9 mm long, 4.5–5.5 mm wide at apex, subquadrate-oblong or subquadrate-pandurate, somewhat expanded apically, apex subtruncate, shallowly emarginate; **lateral lobes** 1–1.5 mm long, ca. 1 mm wide at base, falcate-uncinate, acute, emerging just below the middle portion of the labellum; basal margins of the labellum straight, diverging at an 35°–45° from the longitudinal axis of the labellum; **disc** bearing a farinose yellow callus reaching mid-length of the midlobe, thicker at base and at the insertion of the lateral lobes. **Column** 8–10 mm long, 4–5 mm wide near to the apex where it is broadly winged, hemiterete or somewhat dorsoventrally compressed on cross-section at mid-length, arcuate; column-foot 4–5 mm long. **Anther** 2.5–3 mm long, 1.5 mm wide, surface smooth; **pollinarium** typical for the *M. rufescens* group.

Other specimens seen: COSTA RICA. Alajuela: Cantón de Upala, along río Chimurria in vicinity of Colonia Puntarenas, ca. 11 km (by road) SE of Upala, 10°49′5″N, 84°53′W, 80 m, 16 Nov. 1988, *M. Grayum, G. Herrera & R. Evans 9042* (CR, MO)

The group formed by *M. richii* Dodson, *M. hedwigae* Hamer & Dodson, and *M. dressleriana* is characterized by the pseudopetioled leaves, and the conical pseudobulbs. Within this group, *M. dressleriana* is easy to recognize by its deep dull red-maroon flower color, the petals paler with a yellowish cast, labellum dark red maroon, apex dull deep yellow, and the column dull pale cream-yellow dark-red. In *M. hedwigae* the color of the flowers is essentially pale yellow or dirty white with an orange labellum. In *M. richii* Dodson the flower color is pink with a dark rose labellum. These two later species have labella that are conspicuously shorter than the sepals with a short, narrow, tapering midlobe, while in *M. dressleriana* the labellum is about the same length as the

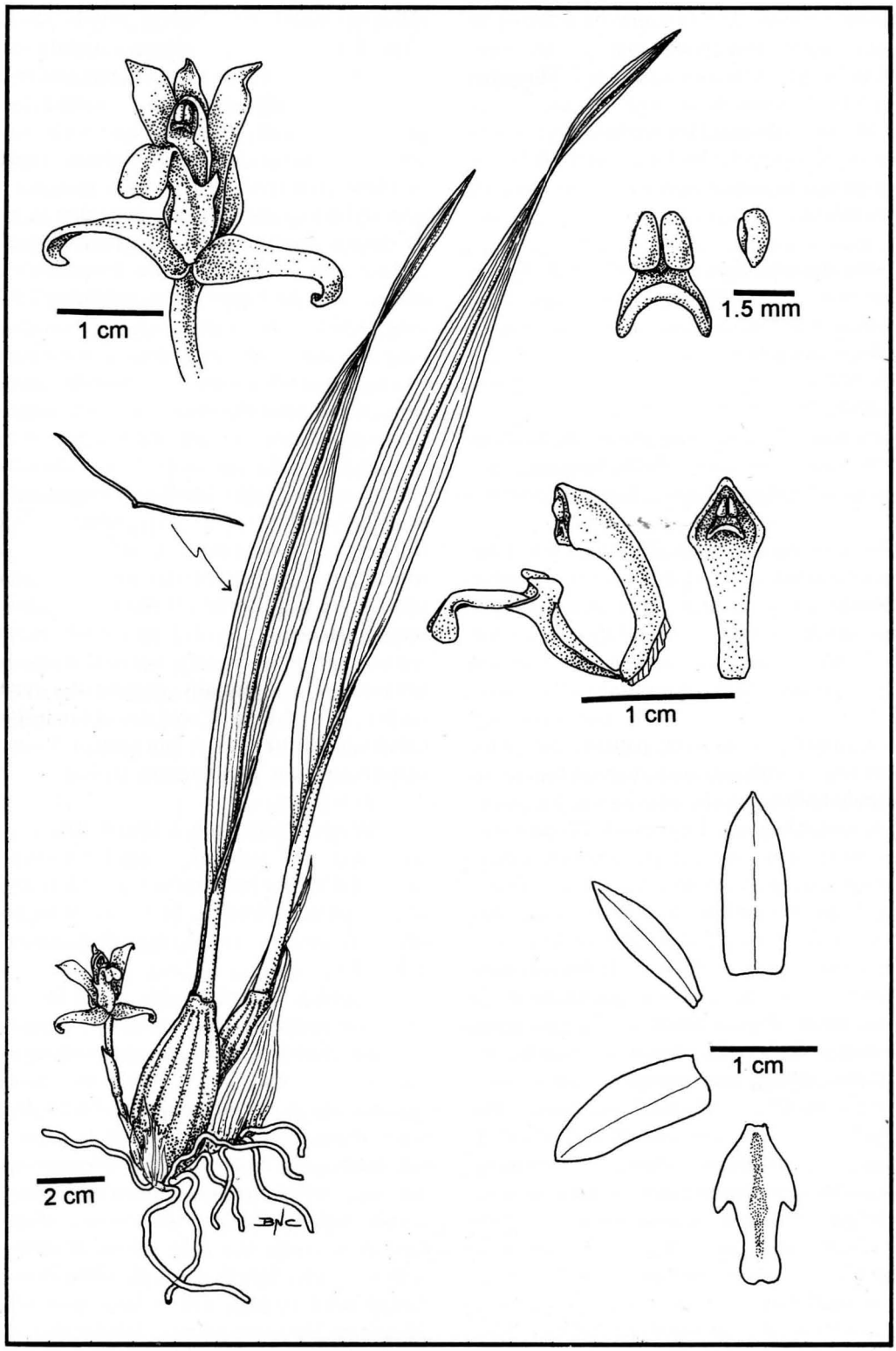

Fig. 1. *Maxillaria dressleriana* Carnevali & J. T. Atwood.

sepals with a long, broad, subquadrate-oblong or subquadrate-pandurate midlobe. In *Maxillaria hedwigae* and in *M. richii,* the lateral lobes of the labellum are narrow and porrect, while they are short, broad, and more or less perpendicular to the main axis of the labellum in *M. dressleriana. Maxillaria dressleriana* is also easily distinguished within the *M. rufescens* complex by its free production of simultaneous, erect, shortly peduncled flowers, often 2–3 flowers open simultaneously produced from the same subtending pseudobulb.

The specimen, *G. Herrera 1207* (COSTA RICA. Alajuela: Guatuso, 10 Nov. 1987, INB) probably also belongs here but the only flower on the specimen is glued to the herbarium sheet and cannot be determined with certainty.

The species is named after Dr. Robert L. Dressler, specialist in the orchid flora of Costa Rica and Panama, and the leading specialist in the suprageneric systematics of the Orchidaceae.

Maxillaria moralesii Carnevali & J. T. Atwood, *sp. nov.* TYPE: COSTA RICA**.** Alajuela: Río Angel, 1 km antes de Cariblanco, 10°15′40″N, 84°10′40″W, 800–900 m, collected 3 Jun. 1994, flowering under cultivation in St. Louis, MO on 25 Dec. 1994, *G. Carnevali & F. M. Morales 3841* (holotype: INB; isotype: SEL). Figure 2.

Species haec M. acutifoliae Lindl. sed floribus majoribus nitide xantho-viridibus, sepala petalaque acutis, sepalis lateralibus late ovate-lanceolatis (vs. late ovate-oblongis), lobulo centrali longioribus recedit.

Epiphytic herbs, cespitose or shortly creeping, 8–15 cm tall. **Rhizome** abbreviated, clothed by scarious sheaths; **pseudobulbs** clustered, 1-leaved apically, 2–3 cm tall, 0.8–1.5 cm wide and thick but always wider than thick, ellipsoid or oblongoid in outline, section transversely rhombic to rhombic, surface smooth or shallowly ridged-reticulate, pale yellow-green, sheaths enveloping the pseudobulb nonleaf-bearing. **Leaves** 6.5–15 cm long, 13–17 mm wide, erect on the pseudobulb, coriaceous, nonpetioled at all; blade elliptic or lanceolate-elliptic, acute. **Inflorescences** erect or horizontally patent, shorter than pseudobulb; **peduncle** 8–12 mm long, terete. **Floral bract** 11–12 mm long; 6–7 mm wide, obovate-elliptic, acuminate. **Pedicellate ovary** 16–17 mm long, terete, shallowly ridged. **Flowers** dull yellow-green; labellum yellow with orange-maroon speckles and callus, column pale green, resupinate, lasting 4–6 days. **Sepals** with 3 nerves at each side of the

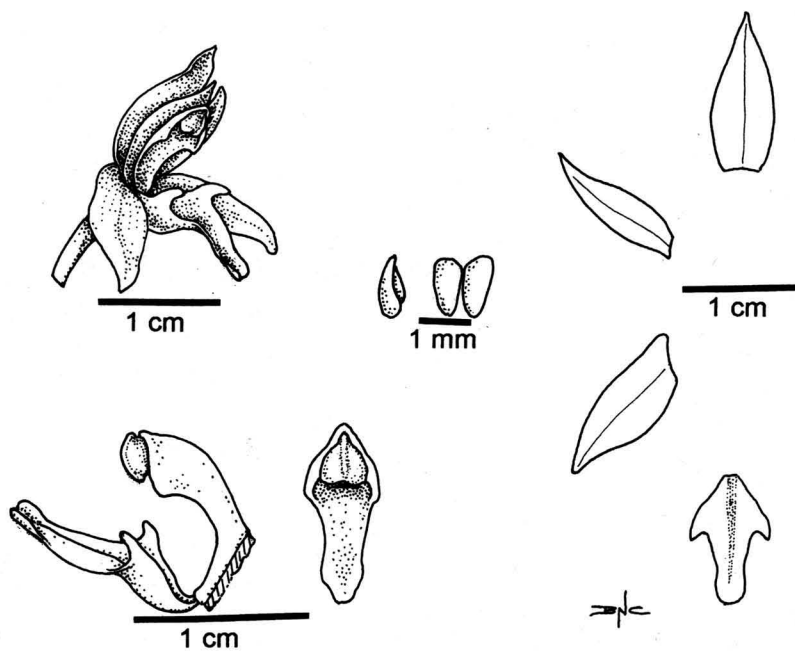

Fig. 2. *Maxillaria moralesii* Carnevali & J. T. Atwood.

midnerve and a few cross-veins, subfleshy; **dorsal sepal** 12.5–13.5 mm long, 6–7 mm wide, ovate-elliptic, acute, concave in natural position; **lateral sepals** 12.5–13.5 mm long, ovate, acute, apically mucronulate, spreading in natural position; **petals** 12.5–13.5 mm long, 3.8–4.2 mm wide, lanceolate, acute, apically mucronulate, 5-nerved with a few cross-veins, somewhat convex, subparallel to column in natural position. **Labellum** 10.5–11 mm long in natural position, reaching 12 mm when flattened, ca. 7 mm wide between the forcefully expanded apices of the lateral lobes; **midlobe** 5.8–6.2 mm long, 2–2.5 mm wide at apex, ovate-oblong-subquadrate, evenly tapering from base to apex, slightly expanded apically where it is folded-convex, apex subtruncate-rounded; **lateral lobes** 1.2–1.5 mm long, 0.8–1 mm wide at base, triangular-ovate, obtuse, erect-uncinate in natural position, emerging from the lower third of the labellum; basal margins of labellum smoothly curved downwards; disc bearing a narrowly triangular farinose callus that tapers toward mid-labellum where it thickens again. **Column** 7.5–8 mm long, 3–4 mm wide, near the apex where it is broadly winged, semiterete or somewhat dorsoventrally compressed on cross-section at mid-length, arcuate; column-foot 2–2.5 mm long. **Anther** 2.3–2.5 mm long, 2.1 mm wide, surface smooth; **pollinarium** typical for the *M. rufescens* group.

Among the named Central American taxa in the *Maxillaria rufescens* complex, *M. moralesii* is easily distinguished by its acute petals and sepals, the labellum midlobe which is ovate-oblong-subquadrate, evenly tapering from base to apex; a thin, poorly developed callus in the disc, and the clear yellow-green color of the flowers.

When compared to related South American species, *M. moralesii* seems most closely related to *M. chacoensis* from Ecuador and Colombia but this later species has obtuse to rounded petals and sepals and a broader midlobe of the labellum with a thicker callus. As compared with *Maxillaria acutifolia, M. moralesii* is easy to distinguish by its acute, long apiculate perianth segments which are clear yellow-green, the sepals are broadly ovate-lanceolate (as opposed to broadly ovate-oblong, obtuse, short apiculate); the labellum also has a midlobe starting on the basal third as opposed to starting about the middle as in *M. acutifolia.* The species is only known with certainty from the Central Valley of Costa Rica, but it probably ranges farther north in Central America. Plate 1042 of *Icones Plantarum Tropicarum* I (Hamer, 1984a, as *Maxillaria acutifolia* Lindley) almost certainly depicts this species, which would make it range then into Nicaragua and Honduras. This is the species treated as *Maxillaria acutifolia* by Atwood (1987) from La Selva Biological Station.

The species is named after Francisco J. Morales, from INBio, a specialist in the Apocynaceae, Bromeliaceae, and Orchidaceae, and who accompanied the senior author in his 1994 trip to Costa Rica, during which this new species was collected.

The following key summarizes the differences between the three described species of the *Maxillaria rufescens* complex in Central America (at least in Costa Rica and Panama):

1. Pseudobulbs not verrucose; leaves not petiolate; perianth segments acute; callus on the disc thin and not well developed; flowers clear green yellow, the labellum of the same general color with orange-maroon speckles and callus . . . . . *M. moralesii*
1. Pseudobulbs verrucose; leaves petiolate; perianth segments obtuse to rounded; callus well developed; flowers with white, dull yellow, or reddish-maroon perianth segments, labellum maroon or orange 2
   2. Flowers erect, labellum pointing upwards in natural position; perianth segments deep dull red-maroon, labellum dark red-maroon; lateral lobes of labellum short, less than ⅕ of total labellum length; petals narrowly obovate or narrowly obovate-oblong; pseudobulbs maroon or brown tinged . . . . . *M. dressleriana*
   2. Flowers patent, labellum horizontal; perianth segments white of yellow perianth segments, labellum orange with red-orange callus; lateral lobes of labellum long, at least ¼ the length of the labellum; petals elliptic; pseudobulbs clear green . . . . . *M. hedwigae*

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