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# THE *MAXILLARIA PORRECTA* LINDLEY COMPLEX (ORCHIDACEAE) IN NORTHEASTERN SOUTH AMERICA, INCLUDING A NEW SPECIES

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ABSTRACT. An overview of the *Maxillaria porrecta* Lindley complex is presented for the Venezuelan Guayana, the Guianas, and northeastern Amazonas. *Maxillaria colemanii* Carnevali & W. Fritz is proposed, described, and illustrated as a new taxon in the complex. Within the complex, the new species is easily distinguished by the presence of leaf blades on the 1–2 innermost sheaths enveloping the pseudobulbs, proportionally narrower perianth segments, an almost unlobed labellum, and the lack of wax on the underside of the leaves. A key to the species of the *M. porrecta* complex for Venezuelan Guayana, the Guianas, and northeastern Amazonas is proposed and comments and distributional notes on the members of the complex are provided. *Maxillaria amazonica* Schltr., *M. taracuana* Schltr., and *M. lactiflora* Pabst are all included in the synonymy of *M. kegelii* Rchb. f. *Maxillaria brunnea* Linden & Rchb. f. is included in the synonymy of *M. porrecta* Lindl.

Key words: Orchidaceae, Maxillaria, Maxillaria porrecta complex, Venezuelan Guayana, Guianas, Amazonas

#### INTRODUCTION

The Maxillaria porrecta Lindley (syn: M. brunnea Linden & Rchb. f.) complex is characterized by a combination of features (Carnevali & Atwood 1991). These include mediumsized oblongoid or suborbicular pseudobulbs which are apically 1-leaved. The leaves are oblong or oblong-elliptic, basally attenuated into a conduplicate pseudopetiole that is sometimes absent. Inflorescences totally or partially clothed by tubular, appressed sheaths are of variable length, usually neither much longer than the subtending leaves (as often found in the taxa related to M. lepidota Lindl. and M. guadalupensis Cogn.) nor extremely short (as found in the related M. desvauxiana Rchb. f. complex). The flowers are characterized by oblong or oblongtriangular sepals more or less parallel to the petals and labellum. The labellum, more or less elliptic or oblong-elliptic in general outline, is variously 3-lobed or sub-trilobed in the apical third or fourth. The disk of the labellum is provided with an oblong or oblong elliptic callus that runs lengthwise 1/2-2/3 its length. These relationships have been supported recently by unpublished analyses of molecular data (N.H. Williams & M. Whitten pers. comm.), in which all taxa included in the analyses and previously referred to this complex on morphological grounds fell into a monophyletic clade.

Members of this complex occur frequently in most of tropical America in rain forests or cloud forests at low to intermediate elevations. A related group of taxa occurring in Central America are characterized by larger, white flowers on proportionally shorter peduncles, shorter labella, and narrower perianth segments (e.g., Atwood 1999). This Central American complex, centered around *Maxillaria ringens* Rchb. f., includes such taxa as *M. rousseauae* Schltr. and *M. amparoana* Schltr.

The limits and circumscriptions of the taxa that make up the Maxillaria porrecta complex have been problematic and difficult to understand in the past, because both flowers and plants are similar superficially (e.g., Carnevali & Atwood 1991). The species of the complex, however, are fairly well defined in the Guianas, northeastern Brazil, and the Venezuela Guayana, where apparently most of the taxa occur, thus allowing us to present an account of these entities within this narrow biogeographic circumscription. The present account includes the description of a new taxon detected during studies within the complex for the forthcoming Orchidaceae for the Flora of the Venezuelan Guayana. All specimens mentioned have been seen by the authors, unless otherwise stated.

The *Maxillaria porrecta* complex likely includes four currently recognized species in the

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combined Venezuelan Guayana-Guianas area. These can be distinguished with the use of the following key.

## Key to the Species of the Maxillaria porrecta Complex in Northeastern South America

- 2(1). Petioles long, 1/3–1/4 the length of the foliar blade; newer pseudobulbs totally enveloped by scarious, shiny sheaths; underside of the leaves often glaucous; sepals and petals dark dull redbrown or bright maroon-red .....
- 3(1). Leaves 3.5–4 times longer than wide, long-petiolate, petioles 1/3–1/4 the length of the foliar blade; newer pseudobulbs totally enveloped by scarious, shiny sheaths; sepals and petals dark dull red-brown or bright maroon-red ..... *M. cryptobulbon*
- 3. Leaves 6–12 times longer than wide, sessile to short-petiolate, the petioles up to 1/5 the length of the foliar blade, usually much shorter; newer pseudobulbs only partially enveloped by their sheaths; sepals and petals white or yellowish . .
- Leaves relatively short-petiolate, but petiole distinct; leaf blades 18–21 mm wide; flowers white or pale yellow with a yellow lip; sepals acute, 23 mm wide ..... M. kegellii

Two additional, extralimital species, Maxillaria longiloba (Ames & C. Schweinf.) J.T. Atwood and *M. powellii* Schltr. are also easy to differentiate and will be discussed in the following account of the entities of the group in the context of the Guayanan members of the *M. por*recta complex.

Maxillaria colemanii Carnevali & W. Fritz, sp. nov., TYPE: Venezuela. Bolívar: Carretera El Dorado-Santa Elena de Uairén, km 138 al sur de El Dorado, approx. 6°19'N, 61°25'W, arbustales sobre suelos arenosos, afloramientos de arenisca o turberas, ca. 1500 m, collected 20 Jun. 1994, flowered 4 Jul. 1994 at the greenhouse of William Fritz, St. Louis, Missouri, *Carnevali & Fritz 3693* (Holotype: VEN; Isotypes, CICY, SEL [OIC number OIC12575; living collection number 1997–0150A]). FIGURE 1.

Species haec *M. porrecta* Lindley sed planta subterrestre minore, vaginis pseudobulborum foliis ornatis, sepalis petalisque angustioris acutis proportione longiore, labello proportione breviore recedit.

Terrestrial or lithophytic (presumably also epiphytic) herbs, 12-25 cm tall at maturity, cespitose, growing under shrubs in rather open shrublands. *Pseudobulbs* 2.5-4 cm long, 1.5-2 cm wide, flattened, aggregated, oblongoid to suborbicular, 1-leaved apically, clothed by 2 or 3 sheaths of which the innermost 1 or 2 have foliar blades. Leaves and the blades of the pseudobulb sheaths oblong-elliptic, obtuse, apex slightly unequal, coriaceous, flat or slightly convex; blades 9-24 cm long, 1.8-2.5 cm wide basally with a 1.4-2 cm long petiole. Inflorescence apparently solitary, originating from the bases of the pseudobulbs; peduncle 6-8 cm long, about as long as the foliar-blades of the sheaths, subterete, clothed by 4-6 tubulose-inflated purplish sheaths; floral bract from slightly shorter to longer than the pedicel and ovary, surpassing or slightly shorter than the base of the dorsal sepal, 2.4-2.6 cm long; pedicel and ovary 1.8-2.8 cm long, subterete, purplish. Flowers resupinate, horizontally patent, perianth segments subcampanulate; sepals externally dull maroon, internally dull orange-maroon; dorsal sepal with dull maroon tinges toward base; petals externally pale cream with dull maroon tinges toward the apices, internally dull-cream yellow; labellum dull yellow with dull maroon tinges toward base, callus and central lobe pale bright yellow, underside of labellum clear yellow with dull dark maroon at base of lateral lobes; column and anther dull pale yellow. Pedicel and ovary 15-17 mm long, cylindrical. Sepals oblong-lanceolate, acute; dorsal sepal 23-28 mm long, 3.5-4.5 mm wide; lateral sepals 25-30 mm long, 4 mm wide, somewhat oblique; *petals* 16-20 mm long, 3.0-3.2 mm wide, narrowly oblong-lanceolate, acute-obtuse. Labellum, 11-14 mm long, 5.5-6.5 mm wide, in general outline elliptic-obovate or elliptic, sub-3-lobed in the apical 1/3, central lobe 2.2-2.3 mm long and wide, suborbicular to subquadrate, apically broadly obtuse, partially united to the basal lobe by thin flaps of tissue; basal lobe obovate in general outline, provided with a linear-oblong callus (subtrigonous in cross-section), 9 mm long, 2 mm wide and reaches about 3/5 the total length of the labellum. Column 4.5-5 mm long, 2.5 mm long,

hemiterete, ventrally concave, sparsely pubescent, column-foot 4 mm long; clinandrium margin finely erose; *anther* 2 mm long, sparsely pilose at apex.

**Etymology**. The species is named after Christopher Coleman of Woodlands, Texas, USA, a skilled orchid collector who participated in the collection of the type specimen.

A sterile specimen (although flowers are mentioned on the herbarium label) from French Guiana (Mount Atachi Bacca, 500 m, 17 Jan. 1989, *Granville, Cremers, Hagemann, Leuenberger & Sangrey 10744,* CAY, MO) is tentatively assigned to this new species, possibly expanding the distribution of the new taxon to that country. This specimen features the foliaceous sheaths on the pseudobulbs, but flowers are required to verify the identification.

This new species is closely related to Maxillaria porrecta Lindl., a common widespread species ranging from Costa Rica south to southeastern Brazil. Maxillaria colemanii, however, has leaf-blades on the innermost 1 or 2 sheaths enveloping the pseudobulb. These foliaceous blades, when eventually caducous, leave evidence behind them by the scar of a broad abscission layer that is perpendicular to the main axis of the sheath. It also has narrower, acute perianth segments and is a smaller plant overall. In M. colemanii the inflorescences are about as long as the leaves in length, but they are usually shorter, about 1/2 the length of the leaves, in M. porrecta, although this latter character is variable within the species as currently understood. The labellum of *M. colemanii* is nearly simple because the small apices of the basal lobe (the "lateral lobes") are nearly fused with the apical ("central") lobe by a thin, webbing membrane, the lobes being perceived on lateral view of the fresh labellum as folds on the apical third of the labellum blade. The general outline of the labellum is elliptic (broadest at mid-length) in M. colemanii while it tends to be obovate in M. porrecta. The callus of the new species also differs by being lower (see FIGURE 1), and its apex is rounded as opposed to acute or acutely obtuse (as found in *M. porrecta*), although this feature is easier to observe in fresh or freshly pickled material.

An illustration by G.C.K. Dunsterville (plate #333 in Dunsterville & Garay, Ven. Orch. Ill. 2: 216. 1962) features a plant similar to this new taxon in that one of the pseudobulbs clearly displays a foliaceous blade, and some of the older pseudobulbs show distinctively straight, conspicuous abscission layers to the foliaceous sheaths. The illustration also features flowers with narrower perianth segments (as in *Maxil*-

*laria colemanii*) than true *M. porrecta*, which is the closest probability outside *M. colemanii*. An examination of the pickled flowers on which the illustration was based shows, however, smaller flowers with broader perianth segments; leaving a question as to whether the illustration is wrongly proportioned or the pickled material consists of a mixture of disparate elements. Thus this Dunsterville illustration is only tentatively referred to as *M. colemanii*.

In Maxillaria porrecta and closest relatives, e.g., M. longiloba (Ames & C. Schweinf.) J.T. Atwood, M. cryptobulbon Carnevali & J.T. Atwood, and M. powellii Schltr., the labellum is relatively long as compared to the sepals (with relations of dorsal sepal length/labellum length = 1.25-1.8). The labellum, however, is proportionally shorter in M. colemanii (dorsal sepal length/labellum length = 2.1), approaching the proportions found in the group of taxa around M. ringens Rchb. f.

## OTHER MEMBERS OF THE MAXILLARIA PORRECTA COMPLEX

- Maxillaria cryptobulbon Carnevali & J.T. Atwood, Novon 1: 159. 1991. TYPE: Ecuador. Morona-Santiago: Serranía de Cutucú, 25 km SE of Logroño, flowering at the Marie Selby Botanical Gardens, 6–10 Jan. 1991, *J.D. Ackerman 1041* (Holotype: SEL; Isotypes: MO, VEN)
- Maxillaria brunnea auct. non Linden & Rchb. f. 1854: sensu Dunst. & Garay, Venez. Orchid. Ill. 1: 221. 1962.
- Maxillaria trinitatis auct. non Ames 1923: sensu Dunst. & Garay, Venez. Orchid. Ill. 2: 223. 1962.

This recently described taxon had remained misidentified in herbaria for a long time. It is, however, distinct from the other members of the complex by its broad, long petioled leaves, its pseudobulbs totally enveloped by shiny sheaths (hence the specific epiteth). The sepals are dark dull red or bright maroon red, the petals are pink or yellow-orange within, tinged with dull redbrown without, the labellum is yellow cream with a bright vellow callus, the underside of the central lobe very dark red-purple; dorsal sepal 26-28 mm long. The presence of leaf-bearing sheaths enveloping the pseudobulbs is a variable character in Maxillaria cryptobulbon. Some individuals have some pseudobulbs featuring one character state, while other pseudobulbs feature the alternate state (see Carnevali & Atwood 1991).

This species ranges from Costa Rica to Ecuador and east to Venezuela. It has yet to be



collected in Colombia and Panama. It grows at elevations of (400-)600-1500(-2100) m, usually in premontane rain forests or cloud forests.

**Representative specimens studied. Costa Rica.** Cartago: along camino to Raíz de Hule, 1200–1400 m, 1 Jul.1976, *Croat 36769* (MO). **Ecuador.** Carchi: Chical-Tobar Donoso Trail, 900 m, 27 Nov. 1979, *Madison & Besse* 7064 (SEL); Napo: Jatún Sacha, 400 m, 01°04'S, 77°36'W, 19 Mar. 1989, *C. Cerón 6330* (MO). **Venezuela.** Amazonas: Cerro Neblina, 700 m, *Maguire et al. 42562* (NY); **Bolívar**: La Escalera-Cerro Venamo, 5°50'N, 61°30'W, 500 m, 2 Apr. 1985, *Holst, Steyermark & Manara 2076* (VEN); Miranda: Guatopo National Park, 650 m, 20 Jul. 1985, *Carnevali et al. 1979* (VEN).

- Maxillaria kegelii Rchb. f., Linnaea 41: 127. 1877. TYPE: Suriname: *Kegel 1777* (Holotype: W, not seen; photograph, CICY!, MO!).
- Maxillaria amazonica Schltr., Beih. Bot. Centralbl 42(2): 130. 1925, syn. nov.
- Maxillaria taracuana Schltr., Beih. Bot. Centralbl. 42(2): 134. 1925, syn. nov.
- Maxillaria lactiflora Pabst, Orquídea (Niteroi) 29: 114. 1967.—Maxillaria lactea Schltr., Beih. Bot. Centralbl. 42(2): 131. 1925, non Maxillaria lactea Schltr. (1923), syn. nov.
- Maxillaria parkeri auct., non Hook., sensu Werkhoven, Orchids of Suriname, plate on p.150. 1986.

This is the smallest member of the complex in the general Guianas/Venezuelan Guayana area and probably in the whole of South America, being similar in its dimensions to the Panamanian Maxillaria powellii Schltr. It is characterized by its narrower leaves (18-21 mm wide) on relatively longer petioles than those found in the vegetatively similar M. porrecta. The flowers are pale yellow, yellowish-cream, or white, without any traces of the purple in the labellum usually found in the other members of the complex. They are held on proportionally shorter peduncles that rarely if ever reach half the length of the foliar blade. The perianth segments, including the labellum, are narrower than in the other members of the group, closely approaching the proportions commonly found in the members of the M. ringens group. The labellum, however, clearly places this taxon along with M. porrecta and its allies, because it is longer than  $\frac{1}{2}$  the total length of the lateral sepals. In the *M. ringens* complex, the labellum is shorter than  $\frac{1}{2}$  the length of the lateral sepals (Atwood 1999).

The species seems to have been redescribed several times by Rudolf Schlechter from Amazonian Brazil. The fairly detailed diagnoses of these taxa seem good matches to the single common entity found in the area covered by this treatment, but unfortunately the types apparently were lost during the World War II bombardment of the Berlin Herbarium. Thus the proposed synonymy, although most likely in the light of all present evidence, can only be regarded as tentative at this time.

This species is restricted to the combined Venezuelan Guayana/Guianas/northeastern Amazonian Brazil zone from Suriname westward to the Vaupés area of Southeastern Colombia. It grows at lower elevations than is usual for other members of the complex, usually below 300 m. This account represents the first record of this taxon for Venezuela.

**Representative specimens studied. Brazil.** Amazonas: Road Manaus-Caracarai, km 10, forest on terra firme, terrestrial, flowers yellow, *G.T. Prance 4702* (NY). **French Guiana.** Mont Chauve, 3°49'N, 52°44'W, 240 m, 17 Apr. 1997, *G. Cremers & F. Crozier 15049* (CAY!); **Suriname.** Jodensavanne Mapane Kreek area: low savanna forest near Cassipora, rather common, 6 Mar.1956, *J. P. Schulz 7578* (AMES!); sine locus, *Kegel 1777* (W, microfiche seen). **Venezuela.** Amazonas: Río Mawarinuma, 140 m, 12 Mar.1984, *Liesner 16557* (MO!, VEN!).

Maxillaria longiloba (Ames & C. Schweinf.) J.T. Atwood, Icones Plant. Trop. 16: t. 1562. 1993. Maxillaria brenesii var. longiloba Ames, Sched. Orch. 10: 90. 1930. TYPE: Costa Rica: Heredia: Yerba Buena, northeast of San Isidro, Feb. 1926, 2000 m, P.C. Standley & J. Valerio 49104 (Holotype, AMES-31190!).

This species is similar to *Maxillaria porrecta* but has somewhat smaller flowers of different colors, usually described as greenish yellow with a dark purple labellum. The flowers are distinctly fragrant. The real difference between the two entities lies, however, in the labellum, which is proportionally shorter with a long midlobe which accounts for about half of the total length of the labellum. This long midlobe is usually

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FIGURE 1. *Maxillaria colemanii* Carnevali & W. Fritz. A. Labellum of *M. colemanii*, with cross-section to depict callus. B. Labellum of *M. porrecta* Lindl, for comparison. C. Flowering habit. D. Floral segments, spread. E. Lateral view of labellum and column.

sharply reflexed (Atwood 1999). The species is restricted to Costa Rica and Panama at elevations of 1100–2000 m.

**Representative specimens studied. Costa Rica.** Heredia: Vara Blanca de Sarapiquí, 1770 m, Feb. 1938, *Skutch 3509* (MO!). **Panama.** Chiriquí: Cerro Hornito, 1750 m, 27 Dec. 1977, *Folsom, Dressler & Channell 7252* (MO!).

- Maxillaria porrecta Lindl., Edwards' Bot. Reg. Misc. 192. 1838. TYPE: *Loddiges s.n.*, Brazil: Rio de Janeiro (K, microfiche seen).
- Maxillaria brunnea Linden & Rchb. f., Bonplandia 2: 281. 1854, syn. nov.
- Maxillaria trinitatis Ames, Sched. Orchid. 2: 34. 1923. Maxillaria trinitensis Broadway, Orch. Rev. 34: 202. 1926. (sphalma).
- Maxillaria brenesii Schltr, Repert. Spec. Nov. Regni Veg. Beih. 19: 231. 1923.
- Maxillaria ringens auct., non Rchb. f. 1863: sensu Dunst. & Garay, Venez. Orch. Ill. 2: 216. 1961.
- Maxillaria amazonica auct., non Schltr.1925: sensu Dunst. & Garay, Venez. Orch. III. 2: 198. 1961; Foldats, Fl. Venez. 15(4): 409. 1970.

The name Maxillaria brunnea has been applied to this widely ranging common species, which is almost certainly conspecific with the earlier described M. porrecta. The type of M. brunnea is in very poor shape, but material collected very close to the type locality matches this common species closely. Maxillaria porrecta seems to be widespread and somewhat variable, but many of the synonyms usually attributed to it (usually as M. brunnea) are referable to the M. ringens Rchb. f. complex (e.g., M. pubilabia Schltr., M. rousseauae Schltr., etc); or they are synonyms of other taxa in this complex (e.g., M. amazonica and M. taracuana that are synonyms of M. kegelii). The several species of the complex described by Barbosa Rodrigues (e.g., M. leucaimata Barb. Rodr., M. xanthosia Barb. Rodr., and M. yauaperyensis Barb. Rodr.) will have to be studied carefully, because they all appear closely related to M. porrecta. In addition, all the actual (both herbarium and live) material seen by the authors from that country so far belongs in the broad circumscription taken here for M. porrecta.

As understood here and elsewhere (e.g., Carnevali & Atwood 1991), this is a widespread species ranging from south of Nicaragua (even probably from southern Mexico and Belize) to Ecuador, Peru, Bolivia, Venezuela to the Guianas, and down to southeastern Brazil. Recently authors (e.g., Atwood 1999) have preferred to apply the name *M. brunnea* (including *M. pow*- *ellii* and *M. brenesii*) to the plants from Nicaragua, Costa Rica, Panama, Colombia, and Trinidad. All the plants from this complex, however, (with the exception of those here treated as different species diagnosed by the key provided) fall within our concept of *M. porrecta*.

This species is variable to some degree but easily definable by the combination of petioles short or absent, the sheaths enveloping the pseudobulb lacking foliar blades, and the oblanceolate labellum with a narrowly obtrapezoidal callus. Many individuals of the species display a waxy covering on the undersides of the leaves. Most of the variation within this concept is accounted for by the ranges in inflorescence and petiole lengths. The sepals range from rounded to broadly acute and are totally parallel to the labellum, or sometimes the petals make an arch and cross over the labellum. We have not been able to found any obvious correlation between variation in any of these characters with each other, although some geographical correlation is evident. For example, plants from eastern Ecuador have shorter petioles and inflorescences. and many plants from the Venezuelan Guayana have long inflorescences and petals that cross over the labellum. A more detailed study of populations of the species, as circumscribed here, is required to ascertain whether several entities worthy of recognition are included here. The same circumscription conceived here recently has been applied to French Guianan plants of the complex by Christenson (1997).

Abundant iconography of this species exists, mostly as *Maxillaria brunnea* (see Carnevali & Atwood 1991). A good recent illustration is depicted as *M. brunnea* (Atwood 1999, p. 23, fig 21a).

Representative specimens studied. Nicaragua. Chontales: 700-1000 m, 28 Jan. 1985, Stevens 23543 (MO). Honduras. Cortés: Santa Cruz de Yojoa, 4 Dec. 1933, Edwards 621 (M!) Costa Rica. Alajuela: Reserva Monteverde, 900-1500 m, 29 Oct. 1986, Haber ex Bello 6147 (MO!). Panama. Chiriquí: vic of Fortuna Dam, 1100 m, 5 Dec. 1987, McPherson 11805 (MO!). Colombia. Norte de Santander: Ocaña, 7000 ft., May, Funck & Schlim 1161 (W; G; photo: F, type of Maxillaria brunnea Linden & Rchb. f.). Venezuela. Bolívar: Salto Aicha, ca. Uaipán Tepui, 1100 m, 27-28 Nov. 1982, Davidse & Huber 22830 (MO, VEN). French Guiana. Mont Bakra, Région des Emérillons, 560 m, 14 Apr. 1993, Cremers 13057 (CAY, MO). Brazil. Paraná: Porto Dom Pedro, 16 Mar. 1912, Dusén 14003 (MO).

Maxillaria powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 70. 1922. TYPE: Panama, auf Hügeln bei Panama City, *C.W. Powell* 28 (lectotype, AMES; isolectotypes: K, MO, designated by Christenson, Lindleyana 6: 129. 1991).

This species is virtually identical to *Maxillar-ia porrecta* but smaller in most respects. The sepals are pale yellow and are 1.6-2 cm long (Carnevali & Atwood 1991). It appears to be endemic to Panama where it grows at elevations of 100-1500 m.

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