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DIEGO BOGARÍN, ZULEIKA SERRACÍN, ZABDY SAMUDIO, RAFAEL RINCÓN & FRANCO PUPULIN

An updated checklist of the Orchidaceae of Panama



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THIS PAPER IS DEDICATED
TO ROBERT L. DRESSLER AND KERRY A. DRESSLER
FOR ENCOURAGING US IN THE STUDY
OF THE ORCHIDS OF PANAMA AND FOR INSPIRING
THE NEW GENERATION OF ORCHIDOLOGISTS
IN CONTINUING THIS IMMENSE WORK.

ESTE TRABAJO ESTÁ DEDICADO
A ROBERT L. DRESSLER Y KERRY A. DRESSLER
POR ANIMARNOS EN EL ESTUDIO
DE LAS ORQUÍDEAS DE PANAMÁ Y POR INSPIRAR
A LA NUEVA GENERACIÓN DE ORQUIDEÓLOGOS
EN CONTINUAR CON ESTA INMENSA OBRA.

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AN UPDATED CHECKLIST OF THE ORCHIDACEAE OF PANAMA

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ABSTRACT. The Orchidaceae is one of the most diverse vascular plant families in the Neotropics and the most diverse in Panama. The number of species is triple that of other well-represented families of angiosperms such as Rubiaceae, Fabaceae and Poaceae. Despite its importance in terms of diversity, the latest checklist was published ten years ago and the latest in-depth taxonomic treatments were published in 1949 and 1993. The accumulation of information over the years and the need to update the nomenclature and to clarify taxonomic concepts made necessary the publication of an up-dated checklist of the Orchidaceae of Panama. This checklist was completed by studying specimens strictly collected in Panama and vouchered in herbaria. Species are presented alphabetically with their synonyms and herbarium vouchers. The data were analyzed to explain the patterns of geographic distribution, most diverse taxa, endemism, exotic species and relationships with other nearby floras. The checklist contains 1365 species (including two natural hybrids and three subspecies) in four subfamilies, 16 tribes, 27 subtribes and 187 genera. Four exotic species were recorded. A total of 296 (21.7%) species are endemic. Epidendroideae is the most diverse group housing more than 90% of species. The most diverse subtribes are Pleurothallidinae (30 genera, 405 spp.), Laeliinae (16 genera, 292 spp.), Oncidiinae (29 genera, 157 spp.) and Maxillariinae (18 genera, 132 spp.). The most diverse genera are: *Epidendrum* (206 spp.), *Stelis* (88 spp.), *Lepanthes* (66 spp.) and *Pleurothallis* (54 spp.). Nomenclatural changes are proposed in *Maxillariella*, *Pleurothallis*, *Specklinia*, *Stelis* and *Trichocentrum*. Many areas remain unexplored for orchids, and we estimate that much work remains to complete a floristic treatment that reveals more realistic data on the orchid flora that Panama harbors. This checklist is an important initial step toward the development of an illustrated treatment of the Orchidaceae of Panama.

RESUMEN. Orchidaceae es una de las familias de plantas vasculares más diversas del Neotrópico y la más diversa en Panamá. Su número de especies triplica a las otras familias más diversas de angiospermas como Rubiaceae, Fabaceae y Poaceae. A pesar de su importancia en terminos de diversidad, el último listado de especies se publicó hace diez años y los últimos tratamientos taxonómicos profundos fueron publicados en 1949 y 1993. La acumulación de información a través de esos años así como la necesidad de actualizar la nomenclatura y aclarar conceptos taxonómicos dudosos hace necesaria la publicación de un listado actualizado de las Orchidaceae de Panamá. El presente listado se completó mediante el estudio de especímenes estrictamente recolectados en Panamá y con un testigo en herbario. Las especies se presentan alfabéticamente con sus respectivos sinónimos y se citan los testigos de herbario. Se analizaron los datos para explicar los patrones de distribución, taxa más diversos, endemismos, especies exóticas y relación con floras cercanas. El listado contiene 1365 especies (dos híbridos naturales y tres subspecies) en cuatro subfamilias, 16 tribus, 27 subtribus y 187 géneros. Se registraron 4 especies exóticas. Un total de 296 (21.7%) son especies endémicas. Epidendroideae es el grupo más diverso, concentrando más del 90% de las especies. Las subtribus más diversas son: Pleurothallidinae (30 géneros, 405 spp.), Laeliinae (16 géneros, 292 spp.), Oncidiinae (29, 157 spp.) y Maxillariinae (18 géneros, 132 spp.). Los géneros más diversos son: *Epidendrum* (206 spp.), *Stelis* (88 spp.), *Lepanthes* (66 spp.) y *Pleurothallis* (54 spp.). Se proponen cambios nomenclatoriales en *Maxillariella*, *Pleurothallis*, *Specklinia*, *Stelis* y *Trichocentrum*. Muchas zonas permanecen sin explorar desde el punto de vista orquideológico y estimamos que todavía se necesita mucho trabajo para completar un tratamiento que revele datos más realistas sobre la flora de orquídeas que alberga Panamá. Este listado es un importante paso inicial hacia el desarrollo de un tratamiento ilustrado de las Orchidaceae de Panamá.

KEY WORDS: floristics, taxonomy, systematics, biogeography, species distribution

Introduction. The orchid flora of Panama is one of the most diverse in the Neotropics. The early efforts to understand this family were ephemeral and made by European explorers or expeditions passing through the isthmus on the route to North or South America. James Wallace in 1700 was perhaps the first plant collector in Panama. Wallace collected in the settlement of New Caledonia, on the Atlantic coast of the Kuna Yala (now Punta Escocés and Isla de Oro), in a failed attempt of Scotland to colonize lands in the New World. However, these specimens were not studied by the botanists at the time and no orchid species based on those collections are recorded or mentioned in literature (Wallace 1700-1701). The first documented record of an orchid in Panama was an illustration of *Catasetum* sp., made by Joseph Guío, illustrator of the expedition led by Alessandro Malaspina between 1789 and 1794. The illustration was based on a collection by Louis Néé on Taboga Island in December 1790 (Fig. 1). One of the

earliest mentions of an orchid collected in Panama in a floristic treatment was made by Beurling (1800-1866), in the “*Primitiae florum Portobellensis*” who cited a specimen of *Brassavola nodosa* Lindl., a plant collected “in rupibus extimis ad introitum portus” by J.E. Billberg in 1826 (Fig. 2). However, the first descriptions of new species based on collecting expeditions in Panama were published subsequent to the exploration of Hugh Cuming (Fig. 3A) for the nursery firm of Messrs Loddiges of Hackney. Around 1829-1831 he collected in some areas of the Pacific coast such as Taboga Island, the Las Perlas Archipelago (Pearl Islands), Bay of Montijo and Chiriquí River. Although several of his collections were made at these sites and others on the Pacific coast of Colombia, almost all herbarium specimens were labeled “*Panama et Columbia occidentalis*”. Lindley (1830-1840) described some of these collections: *Aspasia epidendroides*, *Dichaea panamensis*, *Hexisea bidentata* and *Oncidium ampliatum* (Fig. 4). Another



FIGURE 1. Left, Alessandro Malaspina (1754-1810). Navy Museum, Madrid. Right, The first documented record of an orchid in Panama: *Catasetum* sp. Illustration by José Guío in Real Jardín Botánico de Madrid, 1989: plate 137.

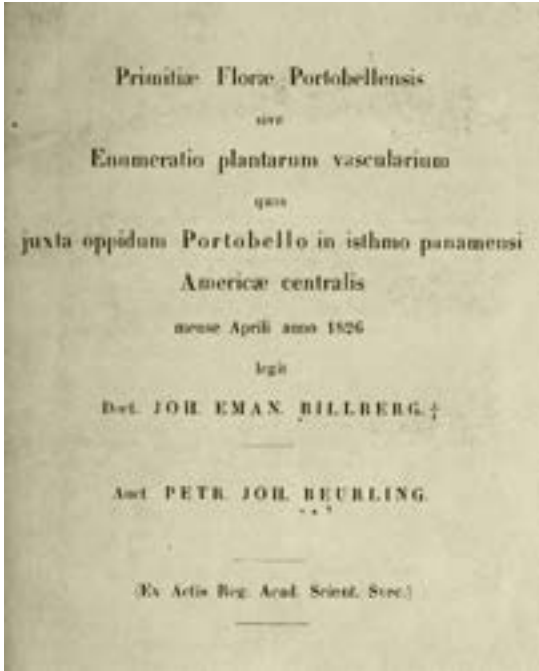


FIGURE 2. Cover of “*Primitiae florae Portobellensis*” by Beurling (1800-1866)

expedition that reached Panama and Taboga Island was *The Voyage of the HMS Sulphur* between 1836-1842. The botanical collections were led by Andrew Sinclair, George Barclay and Richard B. Hinds (1812-1847). A few collections of orchids, including *Lockhartia*

micrantha Rchb.f., *Oncidium stipitatum* Lindl. ex Benth. and *Ornithocephalus bicornis* Lindl. ex Benth., were reported (Hinds 1844, Reichenbach 1852). They also correspond to the first orchid species described from Central America (Fig. 5). These species are typical of coastal areas, indicating that explorations did not penetrate deep into Panama.

Berthold Seemann was another of the pioneer explorers and the author of the work entitled *Flora of the Isthmus of Panama* published in 1854. In 1846 he undertook his first exploration to Panama under *The Voyage of the H.M.S Herald during the years 1845-1851* (Seemann 1852-1857). He explored Chagres, Panama City, Coiba Island, Chiriquí and Darién (Fig. 3B). Seemann (1854) managed to accumulate a total of 104 species of Panamanian orchids.

However, the first plant collector to undertake a serious expedition into the interior was Josef Ritter von Rawicz Warscewicz (Fig. 3C). In 1848, he crossed the intricate Cordillera de Talamanca, starting in the Pacific at David, Chiriquí, ascending towards Dolega to Boquete and Volcán Barú (the highest elevation of Panama) and finishing at Laguna de Chiriquí Grande on the Caribbean (Savage 1970, Fig. 6). Warscewicz (1850) recorded 18 species mainly from Chiriquí and Veraguas. Later, Reichenbach (1866) recorded 63 species that were collected by Warscewicz in Panama. Of them, 34 species and one variety were described



FIGURE 3. Hugh Cuming (1791-1865). From a lithograph by Hawkins, 1850. Courtesy of Rudolf Jenny. B — Carl Berthold Seemann (1825-1871). From *Gardeners' Chron.*, 1871. Courtesy of the Hunt Institute for Botanical Documentation C — Josef Ritter von Rawicz Warscewicz (1812-1866). Courtesy of the Hunt Institute for Botanical



FIGURE 4. Type specimen of *Oncidium ampliatum* Lindl., collected in “Panama et Columbia occidentali” by H. Cuming in 1831. Reproduced with permission by the Board of Trustees, Royal Botanic Gardens, Kew.



FIGURE 5. *Peristeria elata* Hook., the National Flower of Panama described in 1831 by Sir William Jackson Hooker. Taken from the *Curtis's Botanical Magazine*, t. 3116.

as new to science (Reichenbach 1852, 1854, 1866). Warszewicz returned to the country in 1851 and was the first to introduce living orchid plants from Panama to Europe. Then, William Hemsley (1884) published an annotated checklist to the orchids of Central America in the third volume of the botany series of Godman and Salvin's *Biologia Centrali-Americana*, listing 54 species mainly based on the collections of Behr, Cuming, E.P. Duchassaing, S. Hayes, P. Henderson, A. F. Fendler, Seemann, A. Sinclair, F.F. Stange, Stanger, G. Wallis, Warszewicz and G. Zahn. In the fourth volume, Hemsley (1884) listed 104 species and 41 genera for the flora of Panama (Fig. 7).

After sporadic expeditions by European travelers, floristic studies received a major boost with the construction of the Panama Canal between 1904 and 1914 (Fig. 8). From 1910 until 1912 Henry Pittier collected plants in the isthmus as part of the Biological Exploration of Panama by the Smithsonian Institution (Fig. 9). He visited places such as Colón, Darién, San Blas, Puerto Obaldía and the province of Chiriquí. Along with Robert W. Maxon, he explored the region of Boquete in the Chiriquí highlands (the Eldorado of the orchid-lovers in Panama according to Rudolf



FIGURE 6. The route of Josef von Warszewicz in Panama (Savage 1970).

Schlechter), Volcán Barú, Alto de Las Palmas and the Cerro de La Horqueta (Fig. 10). Some 18 species of orchids from these expeditions were described by Schlechter (1913a, 1913b, 1918), including *Lepanthes eciliata* Schltr. and *L. maxonii* Schltr. Schlechter (1918), who listed a total of 117 species for the country. Subsequently, Schlechter (1920a, 1920b, 1921) received a few specimens from Panama mainly by W. Joseph, Pittier and M. Wagner. He described nine species from those collections.

The first major effort to cultivate and study orchids in Panama was undertaken by Charles Wesley Powell. He kept a large collection of orchids near Balboa in Panama City and become the most prolific discoverer of Panamanian orchids (Fig. 11). With Abel A. Hunter he explored the country. Initially, he established contact with Robert Rolfe in Kew. However, after Rolfe's death in 1921, the identification of Powell's specimens ceased (Fig. 12B). Through a correspondent in Costa Rica, Schlechter contacted Powell who later sent his first set of samples to Berlin (Fig. 12C). Based on this material Schlechter (1922) published *Orchidaceae Powellianae Panamensis*, a treatment of collections made by Powell in Panama. Although this work was



FIGURE 7. Orchid species collected in Panama and illustrated in *Xenia Orchidacea* I,II,III. A — *Selenipedium chica* Rchb.f. B — *Epidendrum prismatocarpum* Rchb.f. C — *Odontoglossum warszewiczii* Rchb.f. D — *Pseudepidendrum spectabile* Rchb.f.



FIGURE 8. Panama Canal. National Geographic Society (U.S), 1912.

not a formal treatment of the Orchidaceae, at the time it constituted the largest published compilation on the family (including 260 collections) in the country. From that material, Schlechter identified 184 species in 60 genera, with 75 species described for the first time (Fig. 13). With this contribution, the number of genera in Panama increased to 72 and the number of species to 192. Unfortunately, these were the last of Schlechter's contributions, as he died in 1925 (Ossenbach 2009).

After a short visit to Panama where he met Powell, the American orchid specialist Oakes Ames received some of Powell's specimens. Of these, 29 were new to science. Ames (1921, 1922a, 1922b), Ames & Schweinfurth (1925, 1930, 1937) published the latest orchid species from Panama based on collections by A.M. Bouché, S. Hayes, E.P. Killip, W.R. Lindsay, W.R. Maxon, Pittier and R.S. Williams (Fig. 12A, 12D). Ames and collaborators added a total of 49 species new to science. However, no compilation of all of the orchids of Panama had yet been published. During this period only a few floristic works for specific regions were published, most significantly, the Flora of Barro Colorado Island (Standley 1927) covering 15 species and Flora of the Panama Canal Zone (Ames 1928) with 134 species in 57 genera. Also, 25 species were listed in The Botany of San Jose Island (Gulf of Panama) by Johnston (1949) (where the *Lycaste campbellii* C. Schweinf. was described). Subsequently, the Flora of Barro Colorado



FIGURE 9. Henri Francois Pittier (1857-1950) by Sava Botzarus in the frontispiece of Häslér & Baumann, 2000.

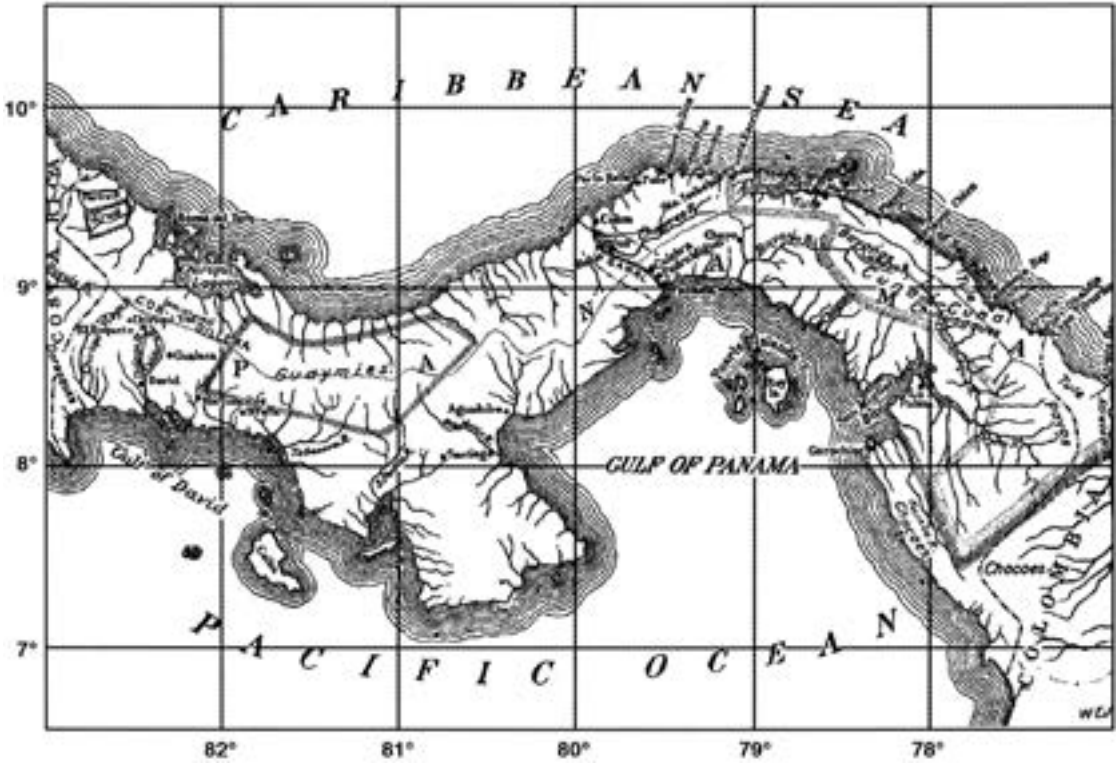


FIGURE 10. Map of Panama by H. Pittier. In Heckadon-Moreno, 1998: 113.



FIGURE 11. Left: exterior side of the orchid garden of Charles W. Powell in Balboa, Canal Zone, Panamá. Right: view of the Powell's living collection of over 7000 specimens of Panamanian orchids. Taken from page 376 of the 1924 Annual Report of the Board of Regents of the Smithsonian Institution.

Island by Croat (1978) treated 89 species.

Woodson & Schery (1943-1981) edited the first formal floristic treatment for the Flora of Panama, based on the accumulated data from herbarium collections. Orchid collections increased from 1930 through the efforts of collectors such as: P.H. Allen, H.P. Butcher, H. A. Dunn, F. H. von Hagen, I. M. Johnston, E.M.

Kieswetter, W.R. Lindsay, R.J. Seibert, O. Shattuck, M.E. Spence Davidson, E. D. Starry, W.R. Taylor, R.H. Woodworth, P.A. Vestal, H. von Wedel, G. and P. White, V. Wolfgang and R.E. Woodson. The orchid contribution for Flora of Panama, prepared by Louis O. Williams and Paul H. Allen (Fig. 14), comprised a total of 469 species (Williams 1940, 1946a, 1946b, Allen



FIGURE 12. A — Oakes Ames (1874-1950). Courtesy of the Oakes Ames Herbarium, Harvard University. B — Robert Allen Rolfe (1855-1921). Courtesy of the Oakes Ames Herbarium, Harvard University. C — Rudolf Schlechter (1872-1925), Courtesy of Dr. N. Kilian, Archives BGBM Berlin-Dahlem. D— Charles C. Schweinfurth (1890-1970). Courtesy of the Oakes Ames Herbarium, Harvard University.

1949a, 1949b, 1953, Williams & Allen 1980). A further five species were added to the Flora of Panama in an update of the Orchidaceae of Mesoamerica, by Williams (1956), producing a total of 474 species in 88 genera.

Robert L. Dressler who worked at the Smithsonian Tropical Research Institute in Panama (STRI) was the most important orchid specialist based in Panama (Fig. 15). In over 20 years of work, he managed to add 328 new records to Williams & Allen (1980) list. D'Arcy

(1987) continued to update the checklist generated during the Flora of Panama project, recording 893 orchid species.

Subsequently, the floristic and taxonomic work of Dressler gave a new impetus to the study of the orchids on the Isthmus. He also encouraged other orchid specialists such as John T. Atwood (Maxillarinae), Eric Hágsater (*Epidendrum*), Carlyle A. Luer (Pleurothallidinae), Norris H. Williams and Mark Whitten (Oncidiinae,



FIGURE 13. Lectotype of *Lycaste powellii* Schltr., collected by C.W. Powell on hills near Panama City. Courtesy of the Oakes Ames Herbarium, Harvard University.

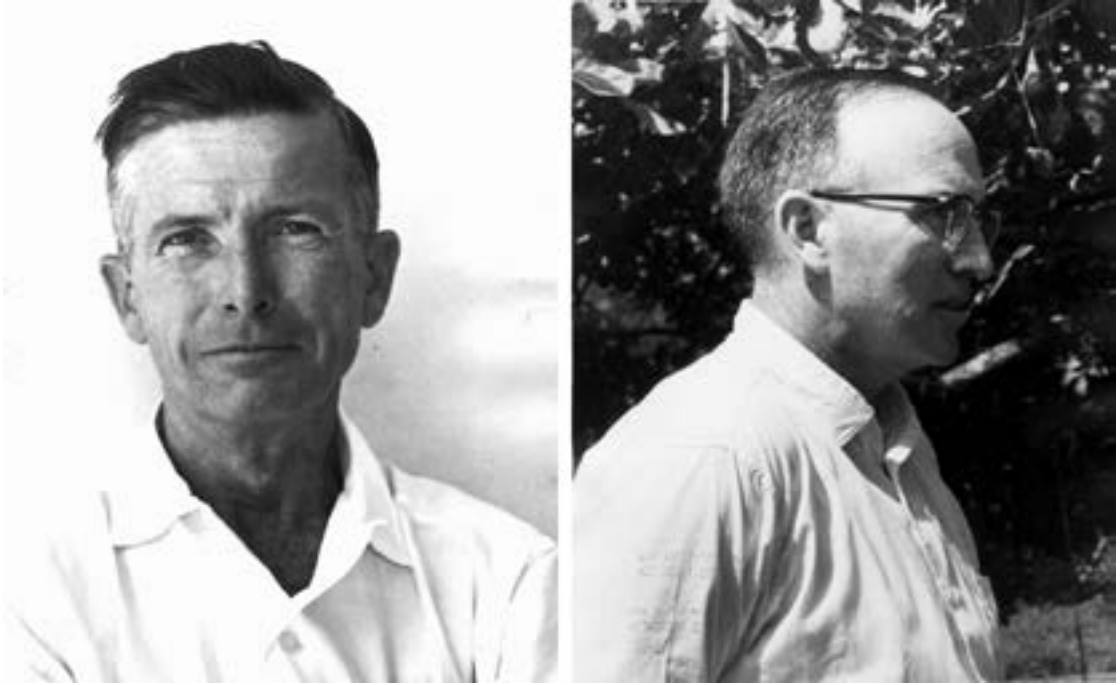


FIGURE 14. A — Paul H. Allen (1911-1963). B — Louis O. Williams (1908-1991). Courtesy of L.D. Gómez.

Stanhopeinae) who all making outstanding floristic contributions (Fig. 16). In 1993, Dressler published his Field Guide to the Orchids of Costa Rica and Panama, where some 950 species of orchids are recorded. In the following years Dressler added many new species (Dressler 1997, 2000, 2002, 2003a, 2003b, 2003d, 2003e, 2004a, 2004b, 2004d, 2005a, 2005b, 2006a, 2006b, 2006c, 2007, Dressler & Pupulin 2003, Pupulin & Dressler 2006, Dressler & Bogarín 2007a, 2007b, 2010). From 1960 other new species and new records for Panama were made by: T. Antonio, W. G. D'Arcy, H. Butcher, D. Cáceres, M.D. Correa, T.B. Croat, R.L. Dressler, J. Duke, J. D. Dwyer, J. Folsom, C. Galdames, A. Gentry, Hágsater, B.E. Hammel, H. Kennedy, L.A. Kenoyer, J. Kirkbride, S. Knapp, W. Lewis, Luer, A. Maduro, G. McPherson, S. Mori, M. Nee, E. Olmos, I. Oviedo, D. Porter, R. Rincón, P.C. Standley, K. Sytsma, Whitten, and Norris Williams among others.

Correa *et al.* (2004), in the Catalogue of Vascular Plants of Panama, listed 1150 orchid species. Although herbarium vouchers (exsiccata) were not cited in most cases, but there is a reference citation for each species. In this treatment, Orchidaceae was the most diverse family of plants in Panama (12.08% of the 9520 species listed),

surpassing any other angiosperm family, and also the family with most endemic species with an impressive 173 species. Ossenbach *et al.* (2007) listed a total 1385 species and 267 endemics, adding 235 species and 94 endemic species but no herbarium vouchers were cited.

Species lists are useful to present an overview of the diversity of a specific area, providing basic information on species distribution, biogeography, conservation, standardization and updating of nomenclature that are starting points for more detailed floristic and ecological studies (Funk *et al.* 2007, Brundu & Camarda 2013).

The aim of this paper is to present an updated checklist of all orchid species found so far in Panama and supporting herbarium vouchers. The data presented here are analyzed to explain the patterns of geographic distribution of species, most diverse taxa, endemism, and relationships with nearby floras. This checklist is a basis for a detailed and updated floristic treatment "*Flora Panamensis: Orchidaceae*" currently developed within the framework of the project "Towards a modern orchid flora of Panama" (Bogarín *et al.* 2013b) by the Jardín Botánico Lankester, Universidad de Costa Rica and the UCH Herbarium of the Universidad Autónoma de Chiriquí, David, Panama.



Left, FIGURE 15. Robert L. Dressler on a field trip to Cerro Arizona (Tute), Veraguas in 1975. Courtesy of Kerry A. Dressler.

Above, FIGURE 16. Robert L. Dressler, Jane Luer and Carl A. Luer on a field trip to Cerro Colorado in 1985. Courtesy of Kerry A. Dressler.

Materials and methods

Study area. Geography—Panama lies in the south-east of Central America (9°38'N-7°12'N, 83°03'N-77°09'W) and comprises the narrowest and lowest land strip of America separating the Atlantic from the Pacific oceans (Figs. 17, 18, 19). The country is well known because of the Panama Canal, which allows the trade between the two oceans and is placed along the narrowest point of Panama that is less than 50 km wide. Panama runs from west to east and comprises 75, 517 km² of land and 2, 210 km² of territorial waters. Politically, it is divided in ten provinces: Bocas del Toro, Coclé, Chiriquí, Colón, Darién, Herrera, Los Santos, Panamá Oeste, Panamá, Veraguas and five indigenous “comarcas” or regions: Emberá, Guna Yala, Kuna de Madugandí, Kuna de Wargandí and Ngöbe-Buglé. Panama is usually divided in western, central and eastern Panama. Western Panama is the continuation of the Cordillera de Talamanca, which spans much of Costa Rica and extends to Chiriquí and Veraguas. This mountain range has the highest elevations of the isthmus, usually above 3000 m. No active volcanoes are found in this range. It is mostly protected by the La Amistad International Park. The highest peaks are found there close to the

border with Costa Rica: Volcán Barú (3475 m), Cerro Fábrega (3335 m), Itamut (3293 m) and Echandi (3162 m). The Cordillera de Talamanca crosses the provinces of Bocas del Toro, Chiriquí, Veraguas and Comarca Ngöbe-Buglé. It loses elevation towards central Panama in the provinces of Veraguas and Coclé where it is also known as Serranía del Tabasará. Its main slope is: Cerro Santiago (2127 m). The provinces of Herrera, Los Santos and part of Veraguas are called central provinces and comprise mostly the Península de Azuero. Here the highest point is Cerro Hoya (1559 m), which is isolated from the Cordillera de Talamanca and Tabasará by the dry plains of Veraguas. Colón, Panamá and Panamá Oeste are in Central Panama, on the narrowest stretch of the country where elevations are relatively low, usually less than 1000 m. The area includes the slopes of Cerro Azul (571 m), Brewster (899 m), Campana (1030 m), Gaital (1185 m), Jefe (1007 m) and Nombre de Dios (587 m). Eastern Panama comprises the provinces of Darién (the easternmost province and adjacent to Colombia) and Panamá towards the boundary with Colombia and the comarcas Emberá, Guna Yala, Kuna de Madugandí and Kuna de Wargandí. The Pan-American highway

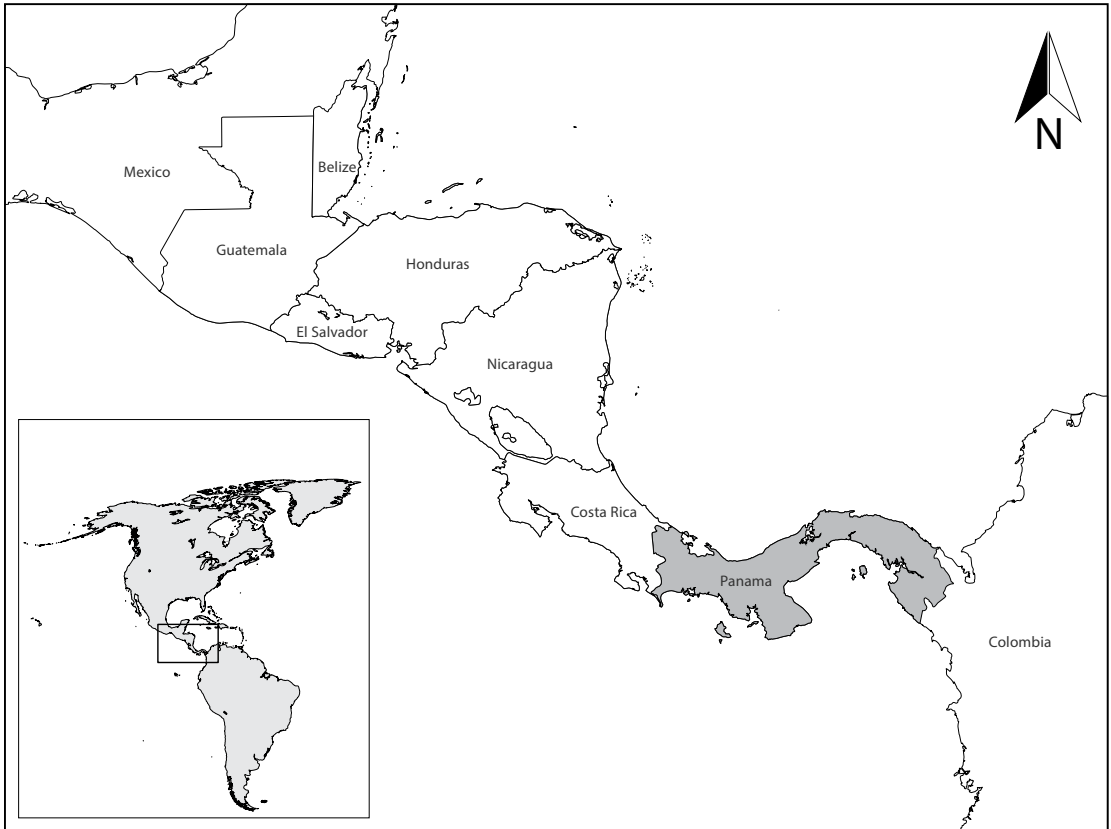


FIGURE 17. Panama lies in the southeastern part of Central America.

terminates at Yaviza in Darién. There is no connection by road with Colombia after this point. The ridge of Darién which extends along the Atlantic has the highest peaks of eastern Panama: Sasardi (610 m), Bell (1046 m), Chucurtí (1695 m), Gandi (1160 m), Armila (1421 m), Tanela (1421 m), Tacarcuna (1875 m) and Nique (1550 m). Serranía de San Blas along the Kuna Yala extends along the coast from central to the southeastern point, with Cerro Habú (747 m), Ebitan (736 m) and Diablo (518 m), among the highest points. Along the Pacific side, the main ranges are Majé with its highest points Cerro Chucantí (1430 m) and Pechito Parado (591 m), which is isolated from Serranía del Sapo with Cerro La Piña (1580 m); Jurado with Cocalita (1052 m), Bagre and Pirre with Cerro Pirre (1569 m). This area of Darién is perhaps the richest in plant species but the least known botanically. Panama has over 480 rivers. The most important are Changuinola, Cricamola and Teribe in Bocas del Toro; Caldera, Chiriquí, Chiriquí Viejo and Piedra in Chiriquí; Tabasará in Comarca Ngöbe-Buglé;

Santa María in Coclé and Herrera; Balsas, Chagres, Chucunaque (the longest with 231 km) and Tuira in central-eastern Panama. There are three main lakes: Alajuela (also known as Madden), Bayano and Gatún (artificial). The main islands are all off the Pacific coast: Cébaco (80 km²) in Montijo Bay, Coiba (493 km²) and Isla del Rey (234 km²) in the Archipiélago de Las Perlas. Coiba is the largest island in the Pacific of Central America (IGTG 2007).

Geology —. Panama lies on the Costa Rica-Panama microplate, a complex area of interaction of three tectonic plates: Nazca, Cocos and Caribe. Panama emerged as an archipelago of islands about 15 Mya ago in the middle Miocene. However, the complex evolution leading to the formation of the Isthmus started during the Late Cretaceous and ended about 3.5 Mya in the Pliocene, resulting in the complete closing of the isthmus separating the Atlantic and Pacific oceans. The ranges of Costa Rica and Panama together with those of western Colombia are among the youngest in

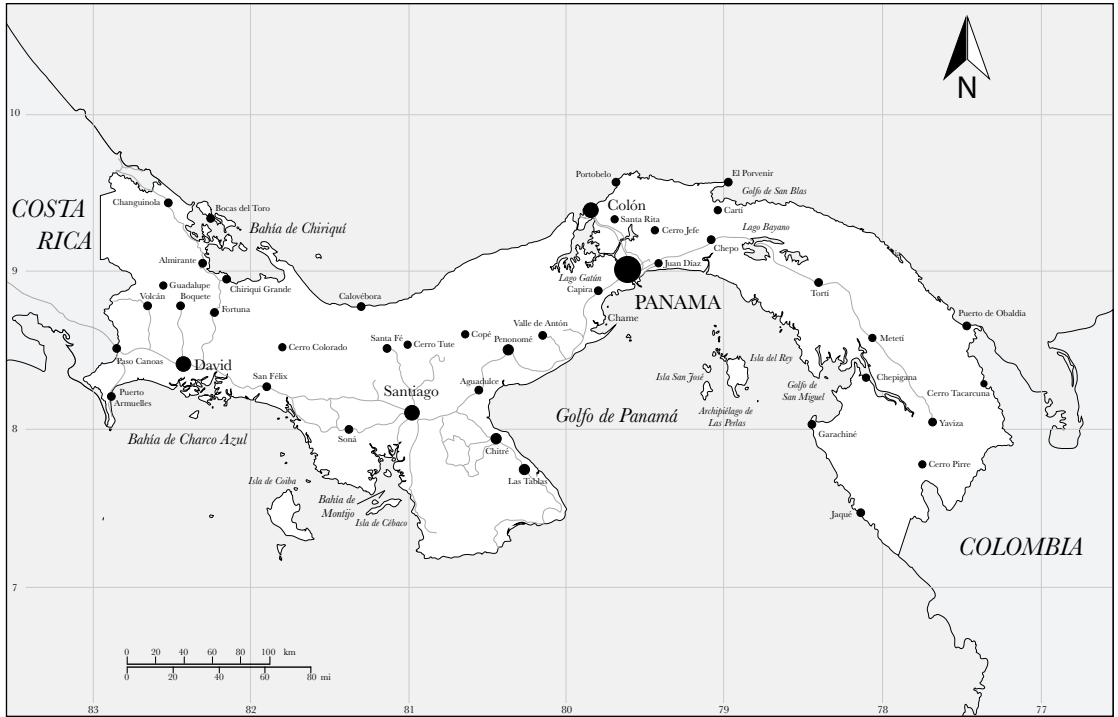


FIGURE 18. Map of Panama showing some of the most important cities and places visited by botanists. Map by D. Bogarín.

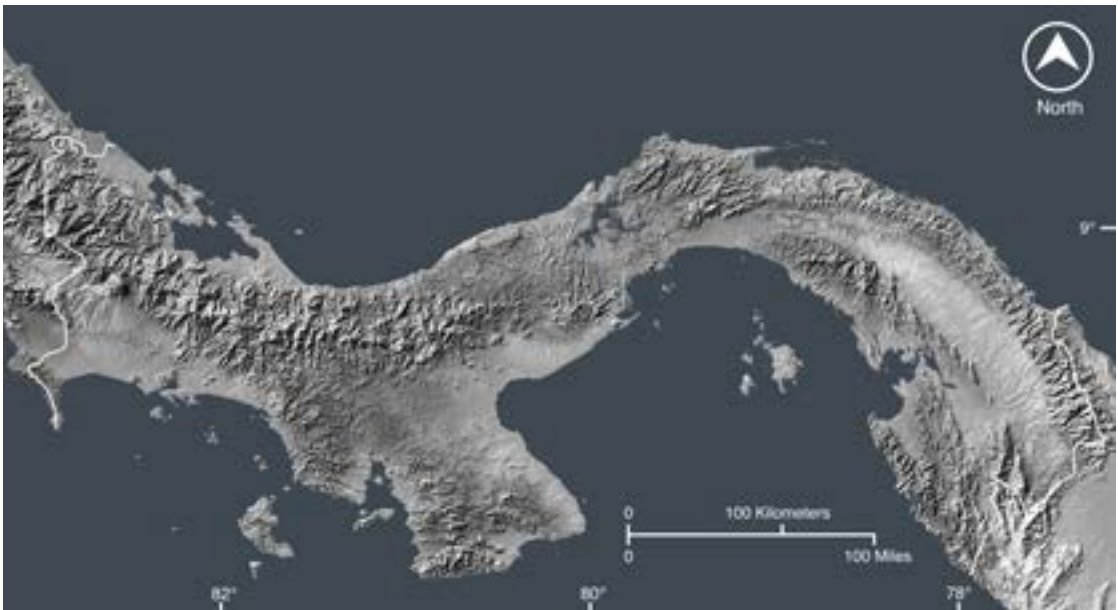


FIGURE 19. Geomorphology of Panama. Modified from false-color image of Panama by the Shuttle Radar Topography Mission, NASA/JPL/NIMA/SRTM Team.

the Neotropics (Kirby 2011). Some exotic lands that were volcanic islands in the ancient archipelago now make up Azuero, Burica and Coiba. These islands were

pushed by the Cocos Plate toward the subduction zone with Caribbean Plate along the Pacific coast of Costa Rica and Panama. According to Coates *et al.* (1992)

and Coates & Obando (1996) three major events led the tectonic evolution of the southern Central American isthmus. First, the volcanic activity caused by the convergent tectonics of the eastern Pacific subduction zone, one of the primary forces that created the volcanic arc extending from North America to the south. Another tectonic effect was the subduction of the Cocos Ridge on the Pacific. This submarine range led to the rise of the isthmus from the Arenal Volcano in Costa Rica to nearby Cerro Campana and Gaital at El Valle, Panama. From this region, the Cordillera de Talamanca (which contains the highest points of the isthmus) emerged and reduced its marine connections. The southern region of the isthmus was affected by the collision of the volcanic arc with north-western South America and led to the uplift of eastern Panama (San Blas, and Darién ranges) and northern Andes of Colombia and Venezuela in the late Neogene (Coates *et al.* 2004).

Climate –. The climate of Panama is affected by its geographical position close to the Equator, the narrow strip of land surrounded by two oceans, the mountain chains with different elevation ranges and the prevailing wet winds of the Caribbean. Usually the Caribbean lowlands are moist and warm. Precipitation originates mostly by the trade winds from the Caribbean colliding with the mountain ranges, primarily on the Cordillera de Talamanca and the action of the Inter-tropical Convergence Zone (Kohlmann *et al.* 2002, ANAM 2010). This climate is present from Bocas del Toro, to the Caribbean of Veraguas, Coclé and Colón. Average temperature varies from 25-27°C and precipitation from 2500-4500 mm/y. The Cordillera de Talamanca has broad elevation ranges and the wind system is quite complex. The western Pacific slope of Talamanca, and mid-elevation areas of Coclé, Panamá, San Blas and Darién are wet due to the interaction of local winds with the moist air from the Pacific Ocean. Average temperature varies from 26-28°C and precipitation from 2500-3500 mm/y. The Peninsula de Azuero is warm and dry with marked seasonality and an extended dry season. Average temperature varies from 27-28°C and precipitation is less than 2500 mm/y. In central Panama, there are low hills such as Campana and Gaital and Hoya in Azuero, where montane forests predominate from the interaction of the wet winds. In eastern Panama the climate is warm and rainy, (similar to Chocó in

Colombia), and is one of the wettest regions on Earth (Dressler 1993). In general, there are two seasons in Panama: the dry season extending from the late of November to March-April and the wet season from May to November. The wet and dry seasons are better defined on the Pacific slope, while along the Caribbean slope, rains are seasonally variable, with no pronounced dry season (ANAM 2010).

Vegetation –. The flora of Panama is greatly influenced by the biotic exchange between North and South America, resulting in one of the richest countries in terms of plant diversity in the Neotropics. About 3 Mya ago, the vegetation of Panama consisted of open savannas. Some elements of the Laurasian flora colonized the Isthmus: *Alfaroa* Standl., *Alnus* Hill., *Berberis* L., *Billia* Peyr., *Caryocar* L., *Castilleja* Mutis ex L. f., *Magnolia* Juss., *Papaver* L., *Prunus* L., *Quercus* L., *Rubus* L., *Saurauia* Willd., *Ulmus* L. and *Vaccinium* L. At the same time, other southern groups moved northward including, *Drymis* Juss., *Gunnera* L. and *Weinmannia* L. Panama has 12 life zones (ANAM 2010). The most complete account of the flora of Panama by Correa *et al.* (2004) recognizes about 10,444 (91.2%) species of vascular plants and some 924 (8.8%) species are nonvascular. About 80% of the vascular plants are angiosperms. Of all angiosperms, 29.77% are monocotyledons and 60.15% are dicotyledons. Ferns comprise 9.85% but gymnosperms are poorly represented with less than 0.23% of species. The largest families in terms of species number in relation to the total vascular species in Panama are: Orchidaceae (13%), Rubiaceae (5.2%), Fabaceae (5.1%), Poaceae (4.4%), Araceae (3.6%), Melastomataceae (3.2%) and Asteraceae (3.1%). The families with most epiphytic species are Orchidaceae, Araceae, Bromeliaceae (1.9%) and Gesneriaceae (1.8%). Families containing greatest endemism are the Orchidaceae (23.6%), Rubiaceae (8.9%), Araceae (8.6%), Myrsinaceae (6.1%) and Melastomataceae (4.9%). According to the Vegetation Map of Panama (ANAM 2000) there are 24 vegetation types. An estimated of 46% of the territory is covered by forest, where the tropical ombrophile evergreen, latifoliated lowland forest occupies the largest area (24.48%). Regarding the state of conservation of the flora, ANAM (2000) recorded 1,305 endemic

species, 3,615 vulnerable, 1,041 endangered and 37 critically endangered. The mountains of Darién, Cerro Tacarcuna, the Cordillera de Talamanca, Cerro Azul and Cerro Jefe are considered the main centers of endemism (Correa *et al.* 2004).

Methods. This checklist was completed from studying specimens strictly collected in Panama and deposited in different herbaria mainly: AMES, CR, F, JBL, K, MO, NY, PMA, SEL, UCH, US and USJ. We included vouchers cited in: several taxonomic treatments (Williams & Allen 1980, Hágsater & Salazar 1993, Hágsater 1999, 2001, 2010, 2013, Dressler 2003c, Hágsater & Sánchez 2004, 2006, 2007, 2008, 2009, Hills 2012, Luer 1986, 1987, 1997a, 1997b, 1998a, 1998b, 1999, 2001a, 2001b, 2004, 2005, 2006, 2007, 2009, 2010, 2011, Ormerod 2004, 2005, 2007, 2008, 2009, 2013, Szlachetko *et al.* 2005, Pupulin 2010, among others), vouchers directly studied in herbaria, other historical collections and specimens collected by the authors in the field.

For the species described on the basis of material collected in Panama preference was given to the type collections as vouchers and the information was obtained directly from protologues (see Literature cited). The main taxonomic and floristic works studied are: Williams (1946a, 1946b), Allen (1949a, 1949b), Williams & Allen (1980) D’Arcy (1987) and Correa *et al.* (2004). Ossenbach *et al.* (2007) was used as reference, though the absence of herbarium vouchers did not allow us to confirm or compare some taxonomic concepts adopted there. Therefore, these examples were not discussed in the excluded species section (see format of the checklist). Some other cases of questionable or misapplied species for the flora of Panama in D’Arcy (1987) and Dressler (1993) were clarified by Correa *et al.* (2004) (see excluded species). Specimen citations, synonyms and information localities cited in the literature were also obtained from the following online electronic databases: EPIDENDRA (The Botanical Databases by Lankester Botanical Garden, <http://www.epidendra.org>), IPNI (International Plants name Index, <http://www.ipni.org>) WCSP (World Checklist of Selected Plant Families: Royal Botanic Gardens, Kew, <http://apps.kew.org/wcsp/home.do>) and TROPICOS (Missouri Botanical Garden Databases, <http://www.tropicos.org>).

Information on publications and protologues was obtained from EPIDENDRA, BHL (Biodiversity Heritage Library, <http://www.biodiversitylibrary.org>) and the Library of Royal Botanic Gardens, Kew, Lankester Botanical Garden and Herbarium UCH. We added new records collected and documented between January 2012 and August 2014 as part of the activities and preliminary results of the project “Towards a modern orchid flora of Panama” (see introduction). These new records were documented by photographs and by drawings using the techniques described by Pupulin *et al.* (2012) and Bogarín *et al.* (2014). Georeferencing for specimens were obtained using a Garmin eTrex Vista GPS and Google Earth 6.1.0 © and herbarium vouchers were deposited at JBL, UCH and PMA herbaria.

Format of the checklist. Species are presented as an alphabetical list of accepted names with their respective homotypic and heterotypic synonyms and herbarium vouchers. Accepted names are indicated in bold and italics. A herbarium voucher for each accepted name is given. Homotypic and heterotypic synonyms are listed in italics but without bold face and are arranged chronologically. Some species are known to occur in Panama or have been cited in formal taxonomic treatments elsewhere but we have not been able to locate a voucher. The voucher is cited as “not seen” and we refer to the taxonomic work that cited it. In some cases we added a short note warning of a particular case such as species with disjunct distributions with a voucher from a cultivated plant or where we suspect a taxonomic problem.

Several names have been misapplied to the flora of Panama or they have changed since previous taxonomic works. For example species currently accepted under a broad concept that have been redefined or clarified, infraspecific taxa that are now accepted in the range of species or some errors or omissions. To clarify these records, we present a list of excluded species (Appendix 3), in which we discuss the exclusion of doubtful species or the taxonomic clarification of certain concepts that no longer apply to the Panamanian material previously cited in the literature. The endemic species are listed separately. We included only the accepted names for the endemic species list.

A basionym list is presented with the respective accepted name in bold. This list is useful as reference for the species whose type locality is within Panama and for future taxonomic and nomenclatural treatments. Locality data and citations for this list were obtained directly from protologues (see Literature cited).

Nomenclatural considerations. In all cases where it is intended to make a list of the orchid species for a particular region, there are always issues regarding to the classification system followed, mainly from the generic viewpoint. The nomenclature of Orchidaceae has undergone many changes after the publication of several phylogenetic studies (Chase & Palmer 1989, 1992, van den Berg *et al.* 2000, Cameron *et al.* 1999, Cameron 2001, Pridgeon *et al.* 2001a, Chase *et al.* 2003, Salazar *et al.* 2003, Whitten *et al.* 2005 and Williams *et al.* 2005, among others). This list relies largely on the generic concepts proposed in *Genera Orchidacearum* (Pridgeon *et al.* 1999, 2001a, 2001b, 2003, 2005a, 2005b, 2005c). In a few cases we adopted redefined concepts proposed after *Genera Orchidacearum* (Chase & Whitten 2011, Karremans 2014).

To facilitate the understanding of nomenclature issues, we present three tables summarizing the main nomenclatural changes that affected the orchid flora of Panama. Table 1 provides a guide to the genera that have been lumped into other genera and accepted for this work. Table 2 presents the genera that have been segregated into various other genera. As a guide for the reader, Table 3 presents the general classification followed in this checklist with the genera and their respective number of species accepted for Panama including the total of endemic species. The list also provides an overview of the genera that are represented in the country.

This catalog is not intended to discuss the different generic classifications but to serve as a study guide for future taxonomic and floristic works in Panama. Clearly, there are different trends in orchid classification and acceptance of generic boundaries varies from one author to another. Nevertheless, citation of homotypic synonyms will help the reader to determine which names have been proposed by different studies and to easily find the latest changes affecting Panamanian species even if the reader is not familiar with those changes.

Results and discussion

This checklist contains 1,365 taxa (1,360 species, two natural hybrids and three subspecies) in four subfamilies, 16 tribes, 27 subtribes, 187 genera (Figs. 20–26, Table 3). Since the last checklist published in the Catalogue of Vascular Plants of Panama by Correa *et al.* (2004) this is an increase of 210 species published since the last decade. We were able to add 32 records in 17 genera that have not been mentioned so far in the literature. With regard to Ossenbach *et al.* (2007) there is a reduction of 25 species although it was not possible to corroborate the voucher specimens in that treatment. Though we do not yet know the exact number of orchid species that exist in Panama, the country has one of the richest floras of Mesoamerica. The orchid diversity index (calculated as the number of species / km²) shows 0.018 spp./km². The number of species and diversity index are among the highest in the Mesoamerican region together with Costa Rica and southeastern Mexico (Ossenbach *et al.* 2007). The area between Costa Rica and Panama treated as Lower Central America (LCA) is widely recognized for its high number of endemic species, and the number for Orchidaceae is not an exception

(Myers *et al.* 2000). Now that we have more accurate numbers, both countries contain a total of 2,030 species of orchids (between 6.5–8% of the global biodiversity of the family) in 130,000 km² (about 0.09% of Earth's land area). Some factors explaining this extraordinary diversity are: 1) a natural land bridge uniting three of the 25 recognized hotspots world-wide (Mesoamerica, Choco/Darién/Western Ecuador and Tropical Andes) that are centers of diversity of many groups of orchids 2) the climatic influence of the Pacific and Atlantic oceans. 3) the orographic and tectonic factors such as the lifting of the Cordillera de Talamanca between Costa Rica and Panama and the formation of foothills of Majé, Darién and San Blas from Panama and western Colombia.

Epidendroideae, with more than 90% of species and over 85% of the genera, is the most diverse group in Panama, significantly outnumbering the other three recorded subfamilies. Orchidoideae contains less than 13% and Vanilloideae and Cyripedioideae less than 1% of the species (Table 4). The most diverse tribes of the 16 recorded are Epidendreae, Cymbidieae, Cranichideae and Sobralieae. These groups make up 25% of tribes,

TABLE 1. List of orchid genera which have been lumped into other genera by recent authors affecting the nomenclature of the orchids of Panama.

| Genus | Reduced under | Reference |
|--|--|--------------------------------|
| <i>Acostaea</i> Schltr. | <i>Specklinia</i> Lindl. | Pridgeon & Chase (2001) |
| <i>Ada</i> Lindl. | <i>Brassia</i> R.Br. | Chase & Whitten (2011) |
| <i>Amparoa</i> Schltr. | <i>Rhynchostele</i> Rchb.f. | Hágsater & Soto (2003) |
| <i>Arelidia</i> Luer | <i>Specklinia</i> | This paper |
| <i>Chelyorchis</i> Dressler & N.H.Williams | <i>Rossioglossum</i> (Schltr.) Garay & G.C.Kenn. | Chase <i>et al.</i> (2008) |
| <i>Cohniella</i> Pfitzer | <i>Trichocentrum</i> Poepp. & Endl. | Williams <i>et al.</i> (2001) |
| <i>Cucumeria</i> Luer | <i>Specklinia</i> | This paper |
| <i>Goniophilus</i> M.W.Chase | <i>Leochilus</i> Knowles & Westc. | Chase <i>et al.</i> (2008) |
| <i>Hexisea</i> Lindl. | <i>Scaphyglottis</i> Poepp. & Endl. | Dressler <i>et al.</i> (2004a) |
| <i>Hybochilus</i> Schltr. | <i>Leochilus</i> | Chase <i>et al.</i> (2008) |
| <i>Leucohyle</i> Klotzsch | <i>Trichopilia</i> Lindl. | Dressler (2004c) |
| <i>Lophiaris</i> Raf. | <i>Trichocentrum</i> | Williams <i>et al.</i> (2005) |
| <i>Mesospinidium</i> Rchb.f. | <i>Brassia</i> | Chase & Whitten (2011) |
| <i>Oerstedella</i> Rchb.f. | <i>Epidendrum</i> L. | Hágsater & Soto (2005) |
| <i>Osmoglossum</i> (Schltr.) Schltr. | <i>Cuillauzina</i> La Llave & Lex. | Dressler & Williams (2003) |
| <i>Pachystele</i> Schltr. | <i>Scaphyglottis</i> | Dressler <i>et al.</i> (2004a) |
| <i>Platyglottis</i> L.O. Williams | <i>Scaphyglottis</i> | Dressler <i>et al.</i> (2004a) |
| <i>Pachyphyllum</i> Kunth | <i>Fernandezia</i> Ruiz & Pav. | Chase & Whitten (2011) |
| <i>Pleurothallis</i> R.Br. | <i>Stelis</i> Sw. | Pridgeon & Chase (2001) |
| <i>Psymorchis</i> Dodson & Dressler | <i>Erycina</i> Lindl. | Williams <i>et al.</i> (2001) |
| <i>Restrepiopsis</i> Luer | <i>Pleurothallopsis</i> Porto & Brade | Pridgeon & Chase (2001) |
| <i>Salpistele</i> Dressler | <i>Stelis</i> | Pridgeon & Chase (2001) |
| <i>Scelochilus</i> Klotzsch | <i>Comparettia</i> Poepp. & Endl. | Chase <i>et al.</i> (2008) |
| <i>Sigmatostalix</i> Rchb.f. | <i>Oncidium</i> Sw. | Chase <i>et al.</i> (2008) |
| <i>Stellilabium</i> Schltr. | <i>Telipogon</i> Kunth | Williams <i>et al.</i> (2005) |
| <i>Ticoglossum</i> R.L.Rodr. ex Halb. | <i>Rossioglossum</i> | Chase <i>et al.</i> (2008) |

TABLE 2. List of orchid genera segregated by recent authors affecting the nomenclature of the orchids of Panama.

| Genus | Segregate Genera | Reference |
|------------------------------|--------------------------------------|---------------------------------|
| <i>Chondrorhyncha</i> Lindl. | <i>Benzingia</i> Dodson | Romero-González & Dodson (2010) |
| | <i>Daiotyia</i> Dressler | Whitten <i>et al.</i> (2005) |
| | <i>Stenotyia</i> Dressler | Whitten <i>et al.</i> (2005) |
| <i>Elleanthus</i> C.Presl | <i>Adeneleuterophora</i> Barb. Rodr. | Dudek & Szlachetko (2010) |
| | <i>Evelyna</i> Poepp. & Endl. | Dudek & Szlachetko (2010) |
| <i>Eltroplectris</i> Raf. | <i>Callistanthos</i> Szlach. | Szlachetko & Rutkowski (2008) |
| <i>Epidendrum</i> | <i>Coilostylis</i> Raf. | Whitner & Harding (2004) |
| <i>Erythrodes</i> Blume | <i>Aspidogyne</i> Garay | Ormerod (2007), Ormerod (2009) |
| | <i>Kreodanthus</i> Garay | Ormerod (2008) <i>continues</i> |

TABLE 2. *Continues.*

| Genus | Segregate Genera | Reference |
|--------------------------------|--|---|
| <i>Erythrodes</i> Blume | <i>Microchilus</i> C.Presl <i>Platythelys</i> Garay | Ormerod (2002) Ormerod (2007) |
| <i>Habenaria</i> Willd. | <i>Bertauxia</i> Szlach <i>Habenella</i> Small <i>Platantheroides</i> Szlach. | Szlachetko (2004a) Szlachetko & Kras (2006) Szlachetko (2004b) |
| <i>Kefersteinia</i> Rchb.f. | <i>Senghasia</i> Szlach. | Szlachetko (2003) |
| <i>Ligeophila</i> Garay | <i>Aspidogyne</i> Garay | Ormerod (2007) Meneguzzo (2012) |
| <i>Lycaste</i> Lindl. | <i>Selbyana</i> Archila | Archila (2010) |
| <i>Malaxis</i> Sol. ex Sw. | <i>Microstylis</i> (Nutt.) Eaton | Szlachetko & Margońska (2006) |
| <i>Masdevallia</i> Ruiz & Pav. | <i>Acinopetala</i> Luer <i>Alaticaulia</i> Luer <i>Buccella</i> Luer <i>Diodonopsis</i> Pridgeon & M.W.Chase <i>Fissia</i> (Luer) Luer <i>Reichantha</i> Luer <i>Spilotantha</i> Luer <i>Zahleria</i> Luer | Luer (2006) Luer (2006) Luer (2006) Pridgeon & Chase (2001) Luer (2006) Luer (2006) Luer (2006) Luer (2006) |
| <i>Maxillaria</i> Ruiz & Pav. | <i>Adamanthus</i> Szlach. <i>Calawaya</i> Szlach. & Sitko <i>Camaridium</i> Lindl. <i>Chaseopsis</i> Szlach. & Sitko <i>Chelyella</i> Szlach. & Sitko <i>Christensonella</i> Szlach., Mytnik, Górniak & Śmiszek <i>Heterotaxis</i> Lindl. <i>Inti</i> M.A.Blanco <i>Laricorchis</i> Szlach. <i>Mapinguari</i> Carnevali & R.B.Singer <i>Maxillariella</i> M.A.Blanco & Carnevali <i>Mormolyca</i> Fenzl <i>Nitidobulbon</i> Ojeda, Carnevali & G.A.Romero <i>Ornithidium</i> Salisb. ex R. Br. <i>Pseudocymbidium</i> Szlach. & Sitko <i>Pseudomaxillaria</i> Hoehne <i>Psittacoglossum</i> La Llave & Lex. <i>Rhetinantha</i> M.A.Blanco <i>Sauvetrea</i> Szlach. <i>Viracocha</i> Szlach. & Sitko <i>Xanthoxerampellia</i> Szlach. & Sitko | Szlachetko & Śmiszek 2006[2007] Szlachetko & Sitko (2012) Blanco <i>et al.</i> (2007) Szlachetko & Sitko (2012) Szlachetko & Sitko (2012) Szlachetko, Mytnik, Górniak & Śmiszek Ojeda, Carnevali & Romero (2005) Blanco <i>et al.</i> (2007) Szlachetko & Sitko (2012) Blanco <i>et al.</i> (2007) Blanco <i>et al.</i> (2007) Blanco <i>et al.</i> (2007) Ojeda, Carnevali & Romero (2009) Blanco <i>et al.</i> (2007) Szlachetko & Sitko (2012) Szlachetko & Sitko (2012) Szlachetko & Sitko (2012) Blanco <i>et al.</i> (2007) Blanco <i>et al.</i> (2007) Szlachetko & Sitko (2012) Szlachetko & Sitko (2012) |
| <i>Oncidium</i> Sw. | <i>Brevilongium</i> Christenson | Christenson (2006b) <i>continues</i> |

TABLE 2. *Continues.*

| Genus | Segregate Genera | Reference |
|----------------------------|--|--|
| <i>Oncidium</i> Sw. | <i>Chelyorchis</i> Dressler & N.H.Williams <i>Heteranthodium</i> Szlach., Mytnik & Romowicz <i>Otoglossum</i> (Schltr.) Garay & Dunst. <i>Rossioglossum</i> (Schltr.) Garay & G.C.Kenn. <i>Stacyella</i> Szlach. <i>Trichocentrum</i> Poepp. & Endl. <i>Vitekorchis</i> Romowicz & Szlach. | Dressler & Williams (2000), Carnevali <i>et al.</i> Szlachetko, Mytnik & Romowicz (2006) Williams <i>et al.</i> (2001) Chase <i>et al.</i> (2008) Szlachetko (2006) Williams <i>et al.</i> (2001) Romowicz & Szlachetko (2006) |
| <i>Pleurothallis</i> R.Br. | <i>Aberrantia</i> Luer <i>Acronia</i> C.Presl <i>Acianthera</i> Scheidw. <i>Anathallis</i> Barb.Rod. <i>Ancipitia</i> (Luer) Luer <i>Apoda-prorepentia</i> (Luer) Luer <i>Arelidia</i> Luer <i>Crocodelanthe</i> Rchb.f. & Warsz. <i>Cucumeria</i> Luer <i>Didactylus</i> Luer <i>Dracontia</i> (Luer) Luer <i>Echinella</i> Pridgeon & M.W.Chase <i>Echinosepala</i> Pridgeon & M.W.Chase <i>Effusiella</i> Luer <i>Elongatia</i> (Luer) Luer <i>Empusella</i> (Luer) Luer <i>Gerardoia</i> Luer <i>Kraenzlinella</i> Kuntze <i>Lankesteriana</i> Karremans <i>Lalexia</i> Luer <i>Loddigesia</i> Luer <i>Lomax</i> Luer <i>Muscarella</i> Luer <i>Niphantha</i> Luer <i>Pabstiella</i> Brieger & Senghas <i>Panmorphia</i> Luer <i>Phloeophila</i> Hoehne & Schltr. <i>Rhynchopera</i> Klotzsch <i>Ronaldella</i> Luer <i>Sarcinula</i> Luer <i>Specklinia</i> Lindl. <i>Stelis</i> Sw. | Luer (2005) Luer (2005) Pridgeon & Chase (2001) Pridgeon & Chase (2001), Hągsater & Soto Luer (2004) Luer (2004) Luer (2004) Luer (2004) Luer (2004) Luer (2004) Luer (2004) Luer (2004) Luer (2005) Luer (2004) Pridgeon & Chase (2001) Pridgeon & Chase (2002) Luer (2007) Luer (2004) Luer (2004) Luer (2006) Luer (2004), Hągsater & Soto (2003) Karremans (2014) Luer (2011) Luer (2006) Luer (2006) Luer (2006) Luer (2010) Luer (2007) Luer (2006) Pridgeon & Chase (2001), Luer (2006) Szlachetko & Margońska (2001) Luer (2006) Luer (2006) Pridgeon & Chase (2001), Hągsater & Soto Pridgeon & Chase (2001) <i>continues</i> |

TABLE 2. *Continues.*

| Genus | Segregate Genera | Reference |
|-------------------------------------|--|---|
| <i>Pleurothallis</i> R.Br. | <i>Tribulago</i> Luer <i>Sylphia</i> Luer <i>Unciferia</i> (Luer) Luer <i>Unguella</i> (Luer) Luer <i>Zosterophyllanthos</i> Szlach. & Marg. | Luer 2004, Luer (2006) Luer (2006) Luer (2004) Luer (2005) Szlachetko & Margońska (2001), Szlachetko & Kulak (2006) |
| <i>Prosthechea</i> Knowles & Westc. | <i>Anacheilium</i> Rchb.f. ex Hoffmanns. <i>Hormidium</i> (Lindl.) Heynh. <i>Panarica</i> Withner & P. A. Harding <i>Pollardia</i> Withner & P. A. Harding <i>Pseudencyclia</i> Chiron & V.P. Castro | Withner & Harding (2004) Withner & Harding (2004) Withner & Harding (2004) Withner & Harding (2004) Chiron & Castro-Neto (2003) |
| <i>Stanhopea</i> Frost ex Hook. | <i>Stanhopeastrum</i> Rchb.f. | Szlachetko (2007) |
| <i>Trichosalpinx</i> Luer | <i>Tubella</i> (Luer) Archila | Archila (2000) |

87.7% of the genera and more than 90% of the species. Ten tribes (62.5%) contain less than three genera and ten species (Table 5). These groups also encompass the most diverse subtribes. Of the 27 recorded, Pleurothallidinae has 30 genera and 405 spp. (by far the most diverse), Laeliinae 16 genera and 292 spp., Oncidiinae 29 genera and 157 spp. and Maxillariinae with 18 genera and 132 spp. are the most numerous in terms of species richness and endemism. All these subtribes together surpass 100 species and account for 50% of the genera and 72% of species. Seven subtribes (26%) have more than ten species while ten (37%) contain less than ten species. A comparison among the most diverse subtribes is shown in Table 6. Recent estimates of the age of the Orchidaceae based on molecular clock calculations by Ramírez *et al.* (2007) and subsequent recalibration by Gustafsson *et al.* (2010) and Guo *et al.* (2012) show that the common ancestor of Orchidaceae existed in the Late Cretaceous 80-90 Mya. From this perspective, current subfamilies diverged before the mass extinction of the Cretaceous/Paleogene (K-Pg). Most notably, after this period, Epidendroideae and also Orchidoideae diversified in the numbers that we know today (Ackerman 2014). The diversification of the Pleurothallidinae, Laeliinae, Oncidiinae and Maxillariinae, the largest subtribes within Epidendroideae, may have occurred about 15-20 Mya in the Early Miocene. This diversification coincided with geological events that shaped the tropical Andes and the Isthmus of Panama and were perhaps key geological

events in the evolutionary history of these groups. In fact, they are the two best represented subfamilies in the tropical Andes and Costa Rica-Panama. The uplift of the Cordillera de Talamanca, resulting in the final closure of the isthmus about 3.5 Mya in the Pliocene as well as the abrupt appearance of the Andes between 6-10 Mya created new environments, isolation of regions and local climate changes (appearance of cold and humid regions, where the highest number of species and endemism are found) thus promoting rapid diversification by allopatric speciation. Further work is required to study the biological processes that could boost radiations of diverse groups (see discussion of endemic species). Other groups did not diversify and contain few species in the region. For example, Cyripedioideae, has only three representatives on the isthmus. *Selenipedium chica* Rchb.f. is the sole member of the subfamily with plicate leaves in Central America and is found only from central Panama to the southeast (Fig. 7A). Guo *et al.* (2010) indicate that the isthmus served as a corridor for species that managed to diversify in South America but not in Costa Rica and Panama. *Selenipedium* Rchb.f. evolved during the Paleocene, while representatives with conduplicate leaves (*Phragmipedium* Rolfe) originated around the Eocene. Vanilloideae is a pantropical group with few representatives in Panama, but the isthmus could also be used as a bridge for future dispersion between the two land masses. Other representatives of Old World diverse

TABLE 3. Classification of the Orchidaceae of Panama, species number and endemism.

| Taxa | Species number | Endemism | Taxa | Species number | Endemism |
|-----------------------------------|----------------|----------|--------------------------------|----------------|----------|
| Subfamily VANILLOIDEAE | | | Subtribe Coeliopsidinae | | |
| Tribe Vanilleae | | | <i>Coeliopsis</i> | 1 | |
| Subtribe Pogoniinae | | | <i>Peristeria</i> | 3 | |
| <i>Cleistes</i> | 1 | | Subtribe Cyrtopodiinae | | |
| Subtribe Vanillinae | | | <i>Cyrtopodium</i> | 1 | |
| <i>Vanilla</i> | 8 | | Subtribe Eriopsisinae | | |
| Subfamily CYPRIPEIDIOIDEAE | | | <i>Eriopsis</i> | 1 | |
| <i>Phragmipedium</i> | 2 | | Subtribe Eulophiinae | | |
| <i>Selenipedium</i> | 1 | | <i>Eulophia</i> | 1 | |
| Subfamily ORCHIDOIDEAE | | | <i>Oeceoclades</i> | 1 | |
| Tribe Cranichideae | | | Subtribe Maxillariinae | | |
| Subtribe Cranichidinae | | | <i>Camaridium</i> | 48 | 8 |
| <i>Gomphichis</i> | 1 | | <i>Christensonella</i> | 2 | |
| <i>Pseudocentrum</i> | 1 | | <i>Cryptocentrum</i> | 7 | 1 |
| <i>Pterichis</i> | 1 | | <i>Heterotaxis</i> | 4 | |
| <i>Solenocentrum</i> | 1 | | <i>Inti</i> | 2 | |
| <i>Baskervilla</i> | 2 | 1 | <i>Lycaste</i> | 9 | 1 |
| <i>Prescottia</i> | 2 | | <i>Mapinguari</i> | 1 | |
| <i>Ponthieva</i> | 4 | | <i>Maxillaria</i> | 21 | 3 |
| <i>Cranichis</i> | 6 | | <i>Maxillariella</i> | 11 | |
| Subtribe Goodyerinae | | | <i>Mormolyca</i> | 5 | 1 |
| <i>Aspidogyne</i> | 5 | 1 | <i>Neomoorea</i> | 1 | |
| <i>Goodyera</i> | 2 | | <i>Nitidobulbon</i> | 1 | |
| <i>Kreodanthus</i> | 3 | 2 | <i>Ornithidium</i> | 6 | 1 |
| <i>Microchilus</i> | 12 | 6 | <i>Rhetinantha</i> | 3 | |
| <i>Platythelys</i> | 3 | | <i>Rudolfiella</i> | 1 | |
| Subtribe Spiranthinae | | | <i>Teuscheria</i> | 2 | |
| <i>Beloglottis</i> | 2 | | <i>Trigonidium</i> | 3 | |
| <i>Brachystele</i> | 1 | | <i>Xylobium</i> | 5 | |
| <i>Coccineorchis</i> | 7 | | Subtribe Oncidiinae | | |
| <i>Cyclopogon</i> | 9 | 1 | <i>Aspasia</i> | 2 | |
| <i>Discyphus</i> | 1 | | <i>Brassia</i> | 8 | 1 |
| <i>Eurystyles</i> | 3 | | <i>Cischweinfia</i> | 4 | 2 |
| <i>Pelexia</i> | 4 | 1 | <i>Comparettia</i> | 2 | |
| <i>Sacoila</i> | 1 | | <i>Cuitlauzina</i> | 2 | |
| <i>Sarcoglottis</i> | 4 | 1 | <i>Cyrtochiloides</i> | 2 | |
| <i>Stenorrhynchos</i> | 1 | | <i>Eloyella</i> | 1 | |
| Tribe Orchideae | | | <i>Erycina</i> | 3 | |
| Subtribe Orchidinae | | | <i>Fernandezia</i> | 3 | |
| <i>Habenaria</i> | 20 | 4 | <i>Ionopsis</i> | 2 | |
| Subfamily EPIDENDROIDEAE | | | <i>Leochilus</i> | 5 | |
| Tribe Arethuseae | | | <i>Lockhartia</i> | 9 | |
| Subtribe Arethusinae | | | <i>Macradenia</i> | 1 | |
| <i>Arundina</i> | 1 | | <i>Macroclinium</i> | 10 | 2 |
| Tribe Calypsoeae | | | <i>Miltoniopsis</i> | 2 | |
| <i>Govenia</i> | 4 | 1 | <i>Notylia</i> | 4 | 1 |
| <i>Wulfschlaegelia</i> | 2 | | <i>Oncidium</i> | 32 | 6 |
| Tribe Collabieae | | | <i>Ornithocephalus</i> | 7 | 3 |
| <i>Calanthe</i> | 1 | | <i>Otoglossum</i> | 2 | |
| <i>Spathoglottis</i> | 1 | | <i>Plectrophora</i> | 1 | |
| Tribe Cymbidieae | | | <i>Psychopsis</i> | 1 | |
| Subtribe Catasetinae | | | <i>Rhynchoatele</i> | 1 | |
| <i>Catasetum</i> | 3 | | <i>Rodriguezia</i> | 2 | |
| <i>Clowesia</i> | 1 | | <i>Rossioglossum</i> | 4 | |
| <i>Cycnoches</i> | 9 | 3 | <i>Systemoglossum</i> | 2 | 1 |
| <i>Dressleria</i> | 3 | 3 | <i>Telipogon</i> | 23 | 17 |
| <i>Galeandra</i> | 2 | | <i>Trichocentrum</i> | 9 | 1 |
| <i>Mormodes</i> | 7 | 2 | <i>Trichopilia</i> | 12 | 5 |
| | | | <i>Trizeuxis</i> | 1 | |
| | | | Subtribe Stanhopeinae | | |
| | | | <i>Acineta</i> | 4 | 1 |

TABLE 3. *Continues.*

| Taxa | Species number | Endemism | Taxa | Species number | Endemism |
|-----------------------------------|----------------|----------|--------------------------------|----------------|----------|
| <i>Coryanthes</i> | 4 | 2 | <i>Dresslerella</i> | 4 | 3 |
| <i>Gongora</i> | 10 | 1 | <i>Dryadella</i> | 6 | 2 |
| <i>Horichia</i> | 1 | | <i>Echinosepala</i> | 6 | 1 |
| <i>Houlletia</i> | 2 | | <i>Kraenzlinella</i> | 1 | |
| <i>Kegeliella</i> | 2 | | <i>Lalexia</i> | 1 | |
| <i>Lacaena</i> | 1 | | <i>Lankesteriana</i> | 4 | |
| <i>Paphinia</i> | 2 | 1 | <i>Lepanthes</i> | 66 | 21 |
| <i>Polycycnis</i> | 5 | 1 | <i>Lepanthopsis</i> | 2 | 1 |
| <i>Sievekingia</i> | 3 | 1 | <i>Masdevallia</i> | 26 | 9 |
| <i>Stanhopea</i> | 10 | 2 | <i>Muscarella</i> | 3 | |
| Subtribe Zygotetaliinae | | | <i>Myoxanthus</i> | 7 | |
| <i>Benzingia</i> | 1 | | <i>Octomeria</i> | 5 | |
| <i>Chaubardiella</i> | 1 | | <i>Pabstiella</i> | 1 | |
| <i>Chondroscaphe</i> | 3 | 1 | <i>Phloeophila</i> | 2 | 1 |
| <i>Cochleanthes</i> | 1 | | <i>Platystele</i> | 20 | 3 |
| <i>Cryptarrhena</i> | 2 | | <i>Pleurothallis</i> | 54 | 23 |
| <i>Daiotyia</i> | 2 | | <i>Pleurothallopsis</i> | 2 | |
| <i>Dichaea</i> | 26 | 3 | <i>Restrepia</i> | 3 | |
| <i>Euryblema</i> | 1 | 1 | <i>Scaphosepalum</i> | 4 | 1 |
| <i>Galeottia</i> | 1 | | <i>Specklinia</i> | 34 | 7 |
| <i>Huntleya</i> | 2 | | <i>Stelis</i> | 88 | 23 |
| <i>Kefersteinia</i> | 11 | 4 | <i>Trichosalpinx</i> | 18 | 4 |
| <i>Koellensteinia</i> | 1 | | <i>Trisetella</i> | 4 | 1 |
| <i>Pescatoria</i> | 2 | | <i>Zootrophion</i> | 3 | |
| <i>Stenotyia</i> | 3 | 1 | Subtribe Ponerinae | | |
| <i>Warczewiczella</i> | 2 | | <i>Helleriella</i> | 1 | |
| <i>Warrea</i> | 1 | | <i>Isochilus</i> | 3 | |
| <i>Warreopsis</i> | 1 | | <i>Nemaconia</i> | 1 | |
| Tribe Epidendreae | | | Tribe Gastrodieae | | |
| Subtribe Blettiinae | | | <i>Uleiorchis</i> | 1 | |
| <i>Bletia</i> | 2 | | Tribe Malaxideae | | |
| Subtribe Chysinae | | | <i>Crossoglossa</i> | 5 | 2 |
| <i>Chysis</i> | 3 | 2 | <i>Liparis</i> | 3 | |
| Subtribe Coeliinae | | | <i>Malaxis</i> | 15 | 2 |
| <i>Coelia</i> | 1 | | Tribe Neottieae | | |
| Subtribe Laeliinae | | | <i>Palmorchis</i> | 4 | |
| <i>Acrorchis</i> | 1 | | Tribe Dendrobieae | | |
| <i>Barkeria</i> | 1 | | Subtribe Bulbophyllinae | | |
| <i>Brassavola</i> | 2 | | <i>Bulbophyllum</i> | 2 | |
| <i>Cattleya</i> | 1 | | Tribe Sobralieae | | |
| <i>Caularthron</i> | 1 | | <i>Elleanthus</i> | 23 | 2 |
| <i>Dimerandra</i> | 1 | | <i>Sobralia</i> | 39 | 16 |
| <i>Dinema</i> | 1 | | Tribe Triphoreae | | |
| <i>Encyclia</i> | 7 | 1 | Subtribe Triphorinae | | |
| <i>Epidendrum</i> | 206 | 53 | <i>Monophyllorchis</i> | 1 | |
| <i>Guarianthe</i> | 1 | | <i>Psilochilus</i> | 3 | 1 |
| <i>Homalopetalum</i> | 1 | | <i>Triphora</i> | 4 | |
| <i>Jacquinella</i> | 6 | 1 | Tribe Tropidieae | | |
| <i>Laelia</i> | 1 | | <i>Corymborkis</i> | 1 | |
| <i>Nidema</i> | 2 | | Tribe Vandaeae | | |
| <i>Prosthechea</i> | 21 | 2 | Subtribe Aeridinae | | |
| <i>Scaphyglottis</i> | 39 | 5 | <i>Phalaenopsis</i> | 1 | |
| Subtribe Pleurothallidinae | | | Subtribe Angracinae | | |
| <i>Acianthera</i> | 13 | 1 | <i>Campylocentrum</i> | 9 | |
| <i>Anathallis</i> | 4 | | Subtribe Polystachyinae | | |
| <i>Barbosella</i> | 5 | 1 | <i>Polystachya</i> | 2 | |
| <i>Brachionidium</i> | 12 | 5 | | | |
| <i>Diodonopsis</i> | 1 | | | | |
| <i>Dracula</i> | 6 | 3 | TOTAL | 1365 | 296 |

TABLE 4. Number of taxa, percentage of total (%) and endemism in each subfamily recorded in Panama.

| Subfamily | Tribes | Subtribes | Genera | Species | Endemism |
|-----------------|-----------|-----------|------------|-------------|------------|
| Epidendroideae | 13 (81.3) | 21 (77.8) | 159 (85.5) | 1257 (92.1) | 278 (94.3) |
| Orchidoideae | 2 (12.5) | 4 (14.8) | 24 (12.8) | 96 (7.0) | 17 (5.8) |
| Vanilloideae | 1 (6.3) | 2 (7.4) | 2 (1.1) | 9 (0.7) | 0 (0) |
| Cypripedioideae | 0 (0) | 0 (0) | 2 (1.1) | 3 (0.2) | 1 (0) |
| Total | 16 | 27 | 187 | 1365 | 296 |

TABLE 5. Genera, species, endemism and percentage of total (%) in the 16 tribes present in the orchid flora of Panama.

| Tribe | Genera | Species | Endemism |
|--------------|-----------|------------|------------|
| Epidendreae | 52 (27.8) | 708 (51.9) | 174 (58.8) |
| Cymbidieae | 87 (46.5) | 427 (31.3) | 81 (27.4) |
| Cranichideae | 23 (12.3) | 76 (5.6) | 13 (4.4) |
| Sobralieae | 2 (1.1) | 62 (4.5) | 18 (6.1) |
| Malaxideae | 3 (1.6) | 23 (1.7) | 4 (1.4) |
| Orchideae | 1 (0.5) | 20 (1.5) | 4 (1.4) |
| Vandaeae | 3 (1.6) | 12 (0.9) | 0 (0.0) |
| Vanilleae | 2 (1.1) | 9 (0.7) | 1 (0.0) |
| Triphoreae | 3 (1.6) | 8 (0.6) | 1 (0.3) |
| Calypsoeae | 2 (1.1) | 6 (0.4) | 1 (0.3) |
| Neottieae | 1 (0.5) | 4 (0.3) | 0 (0.0) |
| Collabieae | 2 (1.1) | 2 (0.1) | 0 (0.0) |
| Dendrobieae | 1 (0.5) | 1 (0.1) | 0 (0.0) |
| Arethuseae | 1 (0.5) | 1 (0.1) | 0 (0.0) |
| Gastrodieae | 1 (0.5) | 1 (0.1) | 0 (0.0) |
| Tropidieae | 1 (0.5) | 1 (0.1) | 0 (0.0) |

subtribes (*Angraecinae* and *Bulbophyllinae*) have their centers of diversity in other regions such as Brazil and not on the Isthmus of Panama. On the other hand, groups such as *Eriopsidinae*, *Gastrodieae*, *Ponerinae*, and *Triphorinae*, are not diverse in the Neotropics.

The genera with the most species are shown in Tables 3 and 7. The most diverse are: *Epidendrum*, 206 spp. (70% of *Laeliinae* and alone exceeding 100 species), *Stelis* (88 spp.), *Lepanthes* Sw. (66 spp.) and *Pleurothallis* (54 spp.) (together accounting for 50% of *Pleurothallidinae*), *Camaridium* 48 spp., *Scaphyglottis* and *Sobralia* Ruiz & Pav. with 39 spp. Of the 187 genera recorded, 159 (85%) have fewer than ten species

TABLE 6. Genera, species, endemism and percentage of total (%) in many different subtribes in the orchid flora of Panama.

| Subtribe/Tribe* | Genera | Species | Endemism |
|--------------------------|-----------|------------|------------|
| <i>Pleurothallidinae</i> | 30 (16) | 405 (29.6) | 110 (37.2) |
| <i>Laeliinae</i> | 16 (8.6) | 292 (21.4) | 62 (21.0) |
| <i>Oncidiinae</i> | 29 (15.5) | 157 (11.5) | 39 (13.2) |
| <i>Maxillariinae</i> | 18 (9.6) | 132 (9.7) | 15 (5.1) |
| <i>Sobralieae*</i> | 2 (1.1) | 62 (4.5) | 18 (6.1) |
| <i>Zygopetalinae</i> | 17 (9.1) | 61 (4.5) | 10 (3.4) |
| <i>Stanhopeinae</i> | 11 (5.9) | 44 (3.2) | 9 (3.1) |
| <i>Spiranthinae</i> | 10 (5.3) | 33 (2.4) | 3 (1.0) |
| <i>Goodyerinae</i> | 5 (2.7) | 25 (1.8) | 9 (3.1) |
| <i>Catasetinae</i> | 6 (3.2) | 25 (1.8) | 8 (2.7) |
| <i>Malaxideae*</i> | 3 (1.6) | 23 (1.7) | 4 (1.4) |
| <i>Orchidinae</i> | 1 (0.5) | 20 (1.5) | 4 (1.4) |

and represent 52% of the flora, while the remaining 15% of the genera contains 48% of the species (Fig. 20–26). Similar to its geological history, Panama and Costa Rica show a strong floristic relationship with the Tropical Andes. When analyzing the most numerous genera of the *Pleurothallidinae* (the most diverse Neotropical subtribe) that reach the highest number of species in the Andes such as *Lepanthes*, *Pleurothallis* s.l., *Stelis* s.l. as well as *Brachionidium* Lindl. and *Platystele* Schltr., we found a clear trend. These genera are more diverse in Costa Rica and Panama than in other regions of Central America. When comparing the floristic data of Panama with the flora of Ecuador, one of the most intensively studied Andean countries (Dodson 2003), we found that there is proportionately the same trend. The genera with the most species are *Epidendrum*, *Pleurothallis* (> 400 spp.), and *Stelis* s.s., *Lepanthes* (> 300 spp.). Other groups with high number of species in

TABLE 7. The most diverse orchid genera in Panama.

| Genera | Species number | Percentage of the flora |
|----------------------|----------------|-------------------------|
| <i>Epidendrum</i> | 206 | 15.09 |
| <i>Stelis</i> | 88 | 6.45 |
| <i>Lepanthes</i> | 66 | 4.84 |
| <i>Camaridium</i> | 48 | 3.96 |
| <i>Pleurothallis</i> | 48 | 3.52 |
| <i>Scaphyglottis</i> | 39 | 2.86 |
| <i>Sobralia</i> | 39 | 2.86 |
| <i>Specklinia</i> | 34 | 2.49 |
| <i>Oncidium</i> | 32 | 2.34 |
| <i>Dichaea</i> | 26 | 1.90 |
| <i>Masdevallia</i> | 26 | 1.90 |
| <i>Telipogon</i> | 23 | 1.68 |
| <i>Elleanthus</i> | 23 | 1.68 |
| <i>Maxillaria</i> | 21 | 1.54 |
| <i>Prosthechea</i> | 21 | 1.54 |
| <i>Habenaria</i> | 20 | 1.47 |
| <i>Platystele</i> | 20 | 1.47 |
| <i>Trichosalpinx</i> | 18 | 1.32 |
| <i>Malaxis</i> | 15 | 1.10 |

the Andes include *Fernandezia* Lindl., *Telipogon* Kunth and terrestrial genera such as *Aa* Rchb.f. and *Petrichis* Lindl. are other examples of Andean influence (Dodson 2003, García-Castro *et al.* 1993). The results found are similar to that of Costa Rica in terms of number of taxa (Dressler 2003c). The definition of LCA treating Costa Rica and Panama as two areas with high biological similarity is supported by our data. Unpublished results on the floristic affinities of LCA with other areas of the Neotropics show that Panama shares at least 70% of its orchid flora with Costa Rica (Bogarín *in prep.*). Floristic inventories in Costa Rica have also revealed a strong component of Panamanian species mainly in the region of the Cordillera de Talamanca, strengthening a close biological relationship (Bogarín *et al.* 2008, Karremans *et al.* 2012, Fernández *et al.* 2014). Most species of *Epidendrum*, *Lepanthes*, *Pleurothallis*, and *Stelis* found in both countries are in the region of Talamanca. However, the whole country does not have close relations with Costa Rica. The central regions

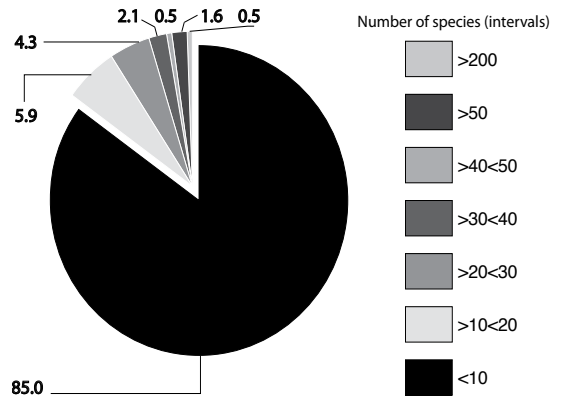


FIGURE 20. Percentage of the number of genera with their respective number of species.

(Coclé), and southeastern Panama (Panama, Darién and comarcas Emberá, Guna Yala, Kuna de Madugandí and Kuna de Wargandí) show more affinities to South American taxa, which are not distributed in Costa Rica or even in the western provinces (Chiriquí and Bocas del Toro and part of Veraguas). Among them we can mention *Houlletia odoratissima* Linden ex Lindl. & Paxton, *Huntleya fasciata* Fowlie, *Kefersteinia mystacina* Rchb.f., *Lycaste campbellii*, *Lycaste powellii* Schltr., *Miltoniopsis roezlii* (Rchb.f.) God.-Leb., *Selenipedium chica* and genera such as *Eloyella* P. Ortiz, *Euryblema* Dressler, *Koellensteinia* Rchb.f., *Neomoorea* Rolfe and *Rudolfiella* Hoehne, absent in northern Central America (Dressler 2003c).

The Southern Pacific region of Panama is geologically and biologically more related to the Department of Chocó in Colombia. Recent studies in the Serranía del Baudó support this floristic relationship. Misas (2005) documented from this region with several species described from Panamanian material. Of the 357 species recorded, 167 (48%) are also found in Panama, mostly in the central and southeast. Among the species recorded are: *Epidendrum flexuosissimum* C.Schweinf., *Lockhartia obtusata* L.O. Williams, *Lycaste campbellii*, *L. powellii*, *Scaphyglottis coriacea* (L.O. Williams) Dressler and *Specklinia areldii* (Luer) Pridgeon & M.W. Chase among others. Additionally, we determined a specimen of *Cryptocentrum misasii* P. Ortiz & Carnevali, recently described from Serranía del Baudó by Carnevali *et al.* (2012) that was collected in

the Darién National Park. These data demonstrate that the increasing collecting efforts and the publication of floristic treatments in the border provinces of Panama and Colombia will help to better understand its narrow phytogeographical relationships. There are few groups with greater diversity in northern Mesoamerica than is found in Panama. *Barkeria* Knowles & Westc. with about 20 species in Mesoamerica and *Rhynchosstele* Rchb.f. with a center of diversity in Mexico and Guatemala, among others, contain a single species in Panama. LCA can be seen as a biotic unit, but it could in turn be subdivided on its orchid diversity into biogeographic provinces proposed for other groups such as fish, insects and birds (Myers *et al.* 2000).

Although at genus level there is a similarity with neighboring areas of the isthmus, at the species level the picture may be different for some groups. By analyzing the most diverse genera we noted that few species (mainly in the Pleurothallidinae) are shared between the tropical Andes and LCA. For example, of the nearly 150 species of *Lepanthes* of Costa Rica and Panama, only two species are shared with Colombia and Ecuador, countries whose floras each reported over 300 species (Luer 2006, Luer & Thorerle 2012). Again floristic work intensification in the southeastern region of Panama may change this scenario. However, it is clear that there are certain trends towards more specific biogeographic characterization for LCA. The other diverse groups such as *Maxillaria*, *Pleurothallis* and *Stelis* have been subject to nomenclatural changes and generic recircumscriptions (Pridgeon & Chase 2001, Luer 2002a, Blanco *et al.* 2007). Furthermore, *Epidendrum* (206 spp.), the largest genus in Panama, is accepted as a broadly defined genus. However, because of their heterogeneity, about 35 genera proposed so far are currently reduced in synonymy (Hágsater & Salazar 1993, Hágsater 1999, 2001, 2010, 2013, Hágsater & Sánchez 2004, 2006, 2007, 2008, 2009, Hágsater & Soto Arenas 2005). All these nomenclatural issues suggest that the phytogeographic conclusions should be interpreted in context.

A distribution analysis of species recorded in this study reveals that Panama shares the majority of taxa with: Costa Rica (90.6%), Colombia (15.6%), Ecuador (12.5%) and northern Mesoamerica (9.3%). In the past decade 108 species, belonging to 38 genera, were described based on Panamanian material. Some species

described prior 2004 were not included by Correa *et al.* (2004). About 44.9% of these records are still endemic to Panama, 47.3% are shared with Costa Rica, 6.7% with Colombia and 2.4% with other regions of the Neotropics. These data support the narrow floristic relations between Costa Rica and Panama formerly discussed. However, we must also consider that there is some bias regarding botanical exploration, with most expeditions undertaken of greater intensity in the provinces bordering Costa Rica and less intense toward the provinces bordering Colombia. Despite the low percentage of species that Panama shares with Colombia and Ecuador in terms of new floristic contributions of the last decade, it is expected that an increase in botanical exploration in the province of Darién and surrounding areas will reveal more species in common. Unfortunately, the access to this area is restricted and problematic, hampering research efforts. It is likely that the number of records now regarded as endemic will decrease with the increasing botanical explorations in regions neighboring Costa Rica and Colombia.

Ecologically, the family is more diverse at elevations from 1500 to 2800 m where most of the species are found. Regions such as the dry lowland areas of Azuero at sea level are poor in orchid species. The highlands of Volcán Barú, Cerro Echandi, Cerro Fábrega and Cerro Itamut are less diverse as they are located above 3000 m elevation; however, they are the only places in Panama where it is possible to observe some genera such as *Pterichis* or some species of *Telipogon*. About 173 (12.7%) of the species recorded are terrestrials and 1193 (87.3%) are epiphytes. Some species (*Eriopsis* Lindl., or some species of *Epidendrum*, *Sobralia* and *Elleanthus*) exhibit both habits, existing as either terrestrials and / or epiphytes. Other species such as *Vanilla* Mill. with eight species can be considered climbing or scandent vines. Some species of Pleurothallidinae, Laeliinae, Maxillariinae can be seen in rocky, humid, mossy areas but they cannot be considered strictly terrestrials.

So far we have analyzed some of the biological, evolutionary and geological factors behind the numbers found in the flora of Panama. However, the knowledge of a region involves an analysis of the level of effort that the scientific community has undertaken in order to understand the diversity of a particular site.

A total of 686 taxa described (658 species, 3 subspecies and 25 varieties) in 131 genera were based

TABLE 8. Authors who published most of the basionyms of Panama.

| Author | Standard form | Number of species |
|-------------------------|---------------|-------------------|
| Carlyle A. Luer | Luer | 148 |
| Rudolf Schlechter | Schltr. | 117 |
| Robert L. Dressler | Dressler | 112 |
| Heinrich G. Reichenbach | Rchb.f. | 64 |
| Eric Hágsater | Hágsater | 55 |
| Oakes Ames | Ames | 51 |
| Louis Williams | L.O.Williams | 43 |
| Charles Schweinfurth | C.Schweinf. | 34 |
| John T. Atwood | J.T.Atwood | 13 |
| John Lindley | Lindley | 9 |

on type material collected in Panama. Of the total, 392 (57.2%) names are accepted as names lacking synonyms, 158 (23.0%) are accepted as homotypic synonyms and 136 (19.8%) have been treated as heterotypic synonyms. The genera with most species described are: *Epidendrum* (112 spp.), *Pleurothallis* (86 spp.), *Lepanthes* (45 spp.), *Sobralia* (33 spp.), *Maxillaria* (31 spp.), *Oncidium* and *Stelis* (30 spp.). The authors that published most species of orchids in the flora of Panama are shown in Table 8. Luer, Schlechter and Dressler are the major contributors to the taxonomy of Orchidaceae of Panama (Figs. 12C, 15, 16). Schlechter through C.W. Powell managed to describe several species in the early stages of orchid research in Panama (Figs. 11, 12C). Dressler's major contributions were made during his more than 20 years at the STRI in Balboa, Canal Zone and Luer contributed with the taxonomy of Pleurothallidinae, the largest subtribe in Panama. The most important herbaria for the orchid flora of Panama in terms of type specimens are summarized in Table 9. Most of the type specimens of the species described by Schlechter were lost in Berlin (Christenson 1991a, 1991b, 1991c). We recorded 97 names that have been lectotypified. Most of the specimens that were lost at Berlin correspond to Powell's collections described by Schlechter. Duplicates are mostly found at AMES, BM, K, MO, S and W (Christenson 1991b). AMES is an important herbarium because it houses copies of Schlechter's original drawings of types made under his supervision (Ames 1944) as well as the majority of

TABLE 9. Number of type specimens deposited in the most important herbaria for Panama.

| Herbaria (Acronym) | Holotypes | Isotypes | Lectotypes |
|--------------------|-----------|----------|------------|
| MO | 157 | 53 | 4 |
| B | 115 | 0 | 0 |
| SEL | 104 | 10 | 0 |
| AMES | 97 | 37 | 81 |
| W | 54 | 0 | 6 |
| US | 37 | 7 | 0 |
| AMO | 33 | 6 | 0 |
| PMA | 20 | 47 | 0 |
| K | 14 | 13 | 5 |
| F | 11 | 10 | 0 |
| FLAS | 9 | 6 | 0 |
| CR | 5 | 5 | 0 |
| NY | 4 | 6 | 0 |

lectotypes (Table 9). Syntypes are cited for ten names, all described by Schlechter or Reichenbach. Seven herbaria in the United States keep more than 60% of the holotypes, 10% is kept in Europe (about 17% were lost in B), 5% in Mexico at AMO (mostly *Epidendrum*) and only 3% are kept in Panama (all at PMA herbarium). The MO herbarium is the most important in terms of type specimens for the orchid flora of Panama (Table 9). Figure 17 shows some locations where type specimens have been collected in Panama.

Some genera have traditionally been studied more intensively than others. In addition to the recognized contributions of Schlechter, Ames and L.O. Williams to the Panamanian orchids, Dressler promoted the study of Orchidaceae of the Isthmus in a broad sense. He made major contributions in *Sobralia* and *Elleanthus*, *Chysis* Lindl., *Oncidium*, *Trichopilia* and *Telipogon* among others. Hágsater and colleagues have led to a better understanding of *Epidendrum*, Atwood in *Maxillaria s.l.* and Luer in Pleurothallidinae. The decreasing activity of these scientists in the flora of Panama, has led to a slowdown in terms of scientific publications in comparison with neighboring countries such as Costa Rica (Bogarín *et al.* 2013b). Furthermore, many areas remain unexplored for orchids. The most urgent areas to be explored are the Cordillera de Talamanca, on both Pacific and Caribbean slopes, indigenous comarcas

TABLE 10. Twenty genera with the most endemic species in the orchid flora of Panama.

| Genus | Endemic species | Total species |
|----------------------|-----------------|---------------|
| <i>Epidendrum</i> | 53 (18.0) | 206 |
| <i>Pleurothallis</i> | 23 (7.8) | 54 |
| <i>Stelis</i> | 23 (7.8) | 88 |
| <i>Lepanthes</i> | 21 (7.1) | 66 |
| <i>Telipogon</i> | 17 (5.8) | 23 |
| <i>Sobralia</i> | 16 (5.4) | 39 |
| <i>Masdevallia</i> | 9 (3.1) | 26 |
| <i>Camaridium</i> | 8 (2.7) | 48 |
| <i>Specklinia</i> | 7 (2.4) | 34 |
| <i>Oncidium</i> | 6 (2.0) | 32 |
| <i>Microchilus</i> | 6 (2.0) | 12 |
| <i>Scaphyglottis</i> | 5 (1.7) | 39 |
| <i>Brachionidium</i> | 5 (1.7) | 12 |
| <i>Trichopilia</i> | 5 (1.7) | 12 |
| <i>Habenaria</i> | 4 (1.4) | 20 |
| <i>Trichosalpinx</i> | 4 (1.4) | 18 |
| <i>Kefersteinia</i> | 4 (1.4) | 11 |
| <i>Dichaea</i> | 3 (1.0) | 26 |
| <i>Maxillaria</i> | 3 (1.0) | 21 |
| <i>Platystele</i> | 3 (1.0) | 20 |

TABLE 11. Relationship between the number of endemic species and the total of species of the genera with most endemic species.

| Genus | Endemics/total |
|----------------------|----------------|
| <i>Telipogon</i> | 73.9 |
| <i>Microchilus</i> | 50.0 |
| <i>Pleurothallis</i> | 42.6 |
| <i>Brachionidium</i> | 41.7 |
| <i>Trichopilia</i> | 41.7 |
| <i>Sobralia</i> | 41.0 |
| <i>Kefersteinia</i> | 36.4 |
| <i>Masdevallia</i> | 34.6 |
| <i>Lepanthes</i> | 31.8 |
| <i>Stelis</i> | 26.1 |
| <i>Epidendrum</i> | 25.7 |
| <i>Trichosalpinx</i> | 22.2 |
| <i>Specklinia</i> | 20.6 |
| <i>Habenaria</i> | 20.0 |
| <i>Oncidium</i> | 18.8 |
| <i>Camaridium</i> | 16.7 |
| <i>Platystele</i> | 15.0 |
| <i>Maxillaria</i> | 14.3 |
| <i>Scaphyglottis</i> | 12.8 |
| <i>Dichaea</i> | 11.5 |

(albeit with inherent problems obtaining collection permits), the Caribbean side of Veraguas, Colón, Panama and the foothills of Majé, San Blas, Sapó and Darién. Panama is a privileged country biologically; however we estimate that much work remains to complete a floristic treatment that reveals more realistic data on the orchid flora that the country hosts. This checklist is a starting point in this direction and we hope that this contribution will encourage and boost orchid research on the Isthmus of Panama and the surrounding regions. We are still working to develop a taxonomic illustrated treatment covering all the Orchidaceae of Panama (Bogarín *et al.* 2013b).

Endemism. A total of 296 (21.7%) endemic species in 69 (36.9%) genera were recorded (Table 3). This percentage of endemism is superior to other Central American countries except Costa Rica and southern

Mexico (Ossenbach *et al.* 2007). The high number of species in the most diverse taxa of the flora of Panama is proportionally reflected in the number of endemic species. For example, Epidendroideae concentrates 94.3% of the endemic species, the tribes Epidendreae (58.8%) and Cymbidieae (27.5%) and subtribes Pleurothallidinae (37.2%), Laeliinae (20.9%) and Oncidiinae (13.2%) are the groups with the most endemic species in the country (Tables 4,5,6). The genera with the highest number of endemic species are *Epidendrum* (53 spp., 18%), *Pleurothallis* (23 spp., 7.8%), *Stelis* (23 spp., 7.8%), *Lepanthes* (21 spp., 7.1%), *Telipogon* (17 spp., 5.8%) and *Sobralia* (16 spp., 5.4%). These six genera account for 50% of endemic species (Table 10). The remaining genera have less than ten endemic species and 31 (45%) of the genera have only one endemic species. The percentages of endemism within Pleurothallidinae are

high. It is likely that the complex pollination systems propitiated narrow distributions in some genera. According to Ackerman (2014), the exploitation of highly diverse groups of pollinators such as Diptera (Pleurothallidinae), Lepidoptera (*Epidendrum*) and Hymenoptera (*Sobralia*) is one of the possible reasons for the diversification of Neotropical orchids. Clear examples are the genera pollinated by sexual deception such as *Lepanthes* and *Telipogon* that “exploit” highly diverse groups of insects belonging to Sciaridae and Tachinidae respectively (Dodson 2003, Blanco & Barboza 2005). Both groups are quite diverse in the Andes and the highlands of Costa Rica and Panama where the levels of endemism are also high.

Within the system of classification followed in this paper we did not document endemic genera for the flora of Panama. However, this conclusion should be viewed with caution. The arbitrary political boundaries of countries and different nomenclatural trends could alter or skew biogeographic interpretations. For example the group of species allied to *Salpistele Dressler* (= *Stelis s.l.*) is not endemic to Panama as there is one species in Costa Rica and if considered a member of *Stelis s.l.* it would not be endemic to Panama. But nomenclatural issues and political boundaries aside, clearly the *Salpistele* group is endemic to Costa Rica and Panama. Other groups that are more diverse on the isthmus are *Dracontia* Luer and *Unciferia* (Luer) Luer (= *Stelis s.l.*), Certain clades, including *Specklinia*, *Epidanthus* L.O. Williams, *Neowilliamsia* Garay and *Oerstedella*, members of *Epidendrum*; and *Panarica* Withner & P.A. Harding (= *Prosthechea* Knowles & Westc.) among others, can be considered endemic or more diverse in Costa Rica and Panama than in neighboring areas (Dressler 2003c). Other genera that have suffered nomenclatural changes, such as *Camardium* and *Scaphyglottis*, also show the tendency to have a greater number of endemic species in Costa Rica and Panama (Dressler *et al.* 2004, Kirby 2011). Despite being a geologically young region, the evolution of the orchids on the isthmus is complex. There are several theories that attempt to explain this phenomenon. Some are related to the ancient volcanic arc of islands that created favorable sites for speciation that joined and mixed their floras with the existing continental populations. This is a probable hypothesis to explain the presence of certain lineages

on the isthmus but has yet to be tested by integrating molecular and biogeographical data (Burger 1980).

By comparing the ratio of the number of endemic species with the total number of species in the flora of Panama for each genus, the highest percentage of endemism is found in *Telipogon* (73.9%) followed by *Microchilus* (50%), *Pleurothallis*, *Brachionidium*, *Trichopilia* and *Sobralia* (between 41-43%), *Kefersteinia*, *Masdevallia* and *Lepanthes* (between 31-36%), *Epidendrum* and *Stelis* (25–26%), *Trichosalpinx* (22.2%) and the remaining genera have relationships between 7 and 20% (Table 11). Two genera have all their species endemic: *Dressleria* Dodson (3 spp.) and *Euryblema* (1 sp.). *Dresslerella* Luer has four species recorded of which three (75%) are endemic. The high percentage of endemism in *Telipogon* (Dodson & Escobar 1993) should not be surprising considering its complex pollination syndrome (Dodson 2003). However, if we consider that those species were collected very close to Costa Rica, it is likely that some of them will also be found there. On the other hand, the high number of endemic species in *Telipogon*, *Sobralia*, *Epidendrum* and other groups within Pleurothallidinae is also attributable to a greater effort in the study of those genera. The above groups were the preferential study subjects of the taxonomists who made the major contributions to the orchid flora of Panama. It is still necessary to make more comprehensive taxonomic studies, especially in subtribes Laeliinae, Pleurothallidinae, Goodyerinae and Spiranthinae both in Panama and in its neighboring countries, in order to have a more precise conclusion regarding endemism.

Interpretations of endemism evaluated in a context of political boundaries are also biased and lose sense in biological terms. For example, Panama “lost” 11 endemic species of *Lepanthes* because they were recorded in Costa Rica (Fernández *et al.* 2014). However, these collections of *Lepanthes* in Costa Rica come from biogeographical regions related to Panama, such as the Cordillera de Talamanca. Despite the caution required when making interpretations of endemism at the country level, it is nevertheless necessary to record these data because the political decisions on conservation and the sustainable use of natural resources vary from one border to another.

Exotic flora. In Panama, four (0.3%) species are currently recorded as non-native wild populations.

The percentage is low compared to the West Indies but is similar to Costa Rica (Dressler 2003c, Ackerman 2014). At least *Arundina graminifolia* (D. Don) Hochr., *Spathoglottis plicata* Blume from Asia and *Oeceoclades maculata* (Lindl.) Lindl. from Africa and Madagascar are widely dispersed in the Neotropics. *Arundina graminifolia* and *S. plicata* plants are often grown as ornamentals in gardens and naturalization was recorded in Costa Rica, Cuba and Hawaii (Pupulin 2005b, Ackerman 2007). In the case of *A. graminifolia*, the flowers with a trumpet-like shaped lip (similar to *Sobralia*) apparently attract bees that pollinate them. *Spathoglottis plicata* plants are often self-pollinated and do not require native pollinators for reproduction. Both species are terrestrial and grow in places with direct sunlight such as rocky roadsides (Cohen & Ackerman 2009).

Oeceoclades maculata is a fast growing orchid and was classified as an invasive species (Ackerman 2007). It is perhaps the most common introduced orchid in

Panama. It is found throughout the Neotropics from Florida (USA) to Brazil. Populations of *O. maculata* are common along both the Caribbean and Pacific lowlands where they are often found among understory vegetation. The adaptation to grow in a wide variety of environments contributes to its invasive prowess. Reproductive success is due to self-pollination (it does not need native pollinators) and high rates of fruit production (Cohen & Ackerman 2009).

The most curious case is perhaps the naturalization of *Phalaenopsis stuartiana* Rehb.f., an endemic orchid from the island of Mindanao in the Philippines (Fig. 26B). It has only been reported from Isla Colón in Bocas del Toro Archipelago where it probably encountered climatic conditions and coastal environments like those on Mindanao. It is the only epiphytic orchid naturalized in Panama. Its introduction, population status and pollination have yet to be investigated. To date, the few herbarium records that exist are all known from this site.

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CHECKLIST OF THE ORCHIDACEAE OF PANAMA

ACIANTHERA Scheidw.

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Aberrantia aberrans (Luer) Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 103: 310. 2005.
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Didactylus butcheri (L.O.Williams) Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 95: 257. 2004.
 VOUCHER: H. P. Butcher 651 (F).
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Acianthera congruens (Luer) Pridgeon & M.W.Chase, *Lindleyana* 16(4): 243. 2001.
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- Acianthera lojiae* (Schltr.) Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 95: 254. 2004.
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This species is known from Mexico to Nicaragua, Antilles and Panama. The voucher cited here was prepared from a cultivated plant at Finca Dracula ostensibly collected in Panama.

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LEPANTHES SW.

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LEPANTHOPSIS (Cogn.) Ames

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Although widely distributed in the Neotropics we were unable to see a Voucher from Panama. This species was cited by Luer (1991) based on Dunsterville & Garay (1961); however, they did not cite any voucher. It is likely that a population of this species will appear in Panama.

Lepanthopsis rinkei Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 88: 104. 2002.

VOUCHER: C. Luer 20048 (MO).

This species is based on a plant without collecting data (ostensibly from Panama), purchased from Andy's Orchids, who had obtained the plant from Maduro in Panama (Luer 2002b).

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VOUCHER: G. McPherson 13545 (MO).
- Maxillaria powellii* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 70. 1922.
VOUCHER: C.W. Powell 28 (MO).
- Maxillaria ramonensis* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 235. 1923.
Maxillaria brevipes Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 302. 1923.
VOUCHER: W.D. Stevens 1841 (MO).
- Maxillaria reichenheimiana* Endrés & Rchb.f., Gard. Chron. 1871: 78. 1871.
VOUCHER: H.W. Churchill 5426 (MO).
- Maxillaria ringens* Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6: 523. 1863.
Maxillaria yzabalana S.Watson, Proc. Amer. Acad. Arts 12: 286. 1888.
Maxillaria tuerckheimii Schltr., Repert. Spec. Nov. Regni Veg. 10: 295. 1912.
Maxillaria rousseauae Schltr., Beih. Bot. Centralbl. 36(2): 413. 1918.
Maxillaria pubilabia Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 71. 1922.
Maxillaria amparoana Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 54. 1923.
Maxillaria lactea Schltr., Beih. Bot. Centralbl. 42(2): 131. 1925., nom. illeg.
Maxillaria lactiflora Pabst, Orquídea (Rio de Janeiro) 29: 114. 1967.
VOUCHER: Mrs. Rousseau (MO).
- Maxillaria rodrigueziana* J.T.Atwood & Mora-Ret., Icon. Pl. Trop. 14: t. 1361. 1989.
VOUCHER: T. Antonio 2137 (MO).

MAXILLARIELLA M.A.Blanco & Carnevali

- Maxillariella acervata* (Rchb.f.) M.A.Blanco & Carnevali, Lankesteriana 7: 528. 2007.
Maxillaria acervata Rchb.f., Bonplandia (Hannover) 3: 217. 1855.
Maxillaria panamensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 70. 1922.
Maxillariella panamensis (Schltr.) Szlach. & Sitko, Biodivers. Res. Conservation 25: 31. 2012.
VOUCHER: C.W. Powell 124 (AMES).
- Maxillariella alba* (Hook.) M.A.Blanco & Carnevali, Lankesteriana 7: 528. 2007.
Dendrobium album Hook., Exot. Fl. 2: t. 142. 1825.
Broughtonia alba (Hook.) Spreng., Syst. Veg. 3: 735. 1826.
Maxillaria alba (Hook.) Lindl., Gen. Sp. Orchid. Pl.: 143. 1832.
Camaridium album (Hook.) Hoehne, Arq. Bot. Estado São Paulo, n.s., f.m., 2: 72. 1947.

Maxillaria hedyosma Schltr., Repert. Spec. Nov. Regni Veg. Beih. 8: 169. 1921.

VOUCHER: *K. Systma 1560* (PMA).

Maxillariella caucae (Garay) Bogarín, *comb. nov.*

Bas.: *Maxillaria caucae* Garay, Bot. Mus. Leaflet. 21: 258. 1967. *Maxillaria parvula* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27: 176. 1924., *nom. illeg.* [non *Maxillaria parvula* Hook. Exot. Fl. t. 217. 1826].

VOUCHER: *F. C. Lehmann 103* (B, destroyed).

Schlechter (1924) described *Maxillaria parvula* Schltr. *nom. illeg.* based on a plant collected by F.C. Lehmann in Montijo Bay. Schlechter (1924) stated that he was not sure if that locality belongs to Colombia or Panama; however, he wrote Cauca in the type locality. The name is predated by *Maxillaria parvula* Hook., so Garay (1967) proposed a new name, *M. caucae* (although Cauca is actually part of Colombia, and the type locality stated by F.C. Lehmann today belongs to the province of Veraguas, Panama along the Pacific coast (Fig. 18). Schlechter (1924) compared the species with *M. acervata* because of the foliate pseudobulbs but distinguished it by the black-brownish flowers. This species should be treated in *Maxillariella* according to Blanco *et al.* (2007).

Maxillariella costaricensis (Schltr.) M.A.Blanco & Carnevali, Lankesteriana 7: 528. 2007.

Maxillaria costaricensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 10: 232. 1923.

VOUCHER: *M.A. Blanco & D. Penneys 2900* (PMA).

Maxillariella diuturna (Ames & C.Schweinf.) M.A.Blanco & Carnevali, Lankesteriana 7: 528. 2007.

Maxillaria diuturna Ames & C.Schweinf., Schedul. Orchid. 8: 58. 1925.

VOUCHER: *C.W. Powell 376* (AMES).

Maxillariella foliosa (Ames & C.Schweinf.) Bogarín, *comb. nov.*

Bas.: *Maxillaria foliosa* Ames & C.Schweinf., Schedul. Orchid. 8: 60. 1925.

VOUCHER: *I. Gordon & J. Him 491* (PMA).

Maxillariella foliosa has been treated as synonym of *M. acervata* however, it differs mainly by the suberect plants with elongated secondary stems (cespitose with short secondary stems), the obtuse sepals (vs. acute) and the pollinarium shape among other features. The species are found at different elevations, with *M. foliosa* above 1200 m and *M. acervata* is found below 800 m along the Pacific coast of Costa Rica and Panama (Atwood 2003).

Maxillariella linearifolia (Ames & C.Schweinf.) M.A.Blanco & Carnevali, Lankesteriana 7: 529. 2007.

Maxillaria linearifolia Ames & C.Schweinf., Schedul. Orchid. 10: 95. 1930.

VOUCHER: *T.B. Croat 49987* (MO).

Maxillariella oreocharis (Schltr.) M.A.Blanco & Carnevali, Lankesteriana 7: 529. 2007.

Maxillaria oreocharis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 69. 1922.

VOUCHER: *C.W. Powell 256* (AMES).

Maxillariella ponerantha (Rchb.f.) M.A.Blanco & Carnevali, Lankesteriana 7: 529. 2007.

Maxillaria ponerantha Rchb.f., Bonplandia (Hannover) 2: 17. 1854.

VOUCHER: *R.L. Liesner 405* (MO).

Maxillariella sanguinea (Rolfe) M.A.Blanco & Carnevali, Lankesteriana 7: 529. 2007.

Maxillaria sanguinea Rolfe, Bull. Misc. Inform. Kew 1895: 8. 1895.

VOUCHER: *J. O'Brien s.n.* (K).

Maxillariella variabilis (Bateman ex Lindl.) M.A.Blanco & Carnevali, Lankesteriana 7: 530. 2007.

Maxillaria variabilis Bateman ex Lindl., Edwards's Bot. Reg. 23: t. 1986. 1837.

Maxillaria variabilis var. *unipunctata* Lindl., Edwards's Bot. Reg. 24(Misc.): 23. 1838.

Maxillaria angustifolia Hook., Hooker's Icon. Pl. 4: t. 348. 1841.

Maxillaria lyonii Lindl., Edwards's Bot. Reg. 31(Misc.): 17. 1845.

Maxillaria revoluta Klotzsch, Allg. Gartenzeitung 20: 186. 1852.

Maxillaria variabilis subvar. *lutea* A.H.Kent in H.J.Veitch, Man. Orchid. Pl. 9: 162. 1893.

Maxillaria chiriquiensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 68. 1922.

Maxillariella chiriquiensis (Schltr.) Szlach. & Sitko, Biodivers. Res. Conservation 25: 31. 2012.

Maxillariella variabilis var. *unipunctata* (Lindl.) Solano, Acta Bot. Mex. 97: 52. 2011.

VOUCHER: *C.W. Powell 125* (MO).

MICROCHILUS C.Presl.

Microchilus calophyllus (Rchb.f.) Ormerod, Lindleyana 17: 216. 2002.

Physurus calophyllus Rchb.f., Beitr. Orchid.-K. C. Amer.: 64. 1866.

Erythrodes calophylla (Rchb.f.) Ames, Orchidaceae 7: 68. 1922.

VOUCHER: *C. Galdames et al. 1307* (PMA).

Microchilus epiphyticus (Dressler) Ormerod, Lindleyana 17: 216. 2002.

Erythrodes epiphytica Dressler, Orquidea (Mexico City), n.s., 13: 257. 1993.

VOUCHER: *R.L. Dressler 4383* (MO).

Microchilus fuscatus Ormerod, Harvard Pap. Bot. 11(2): 161. 2007.

VOUCHER: *S. Mori & J. Kallunki 3412* (MO).

Microchilus maasii Ormerod, Harvard Pap. Bot. 11(2): 161. 2007.

VOUCHER: *B. E. Hammel 4593* (MO).

Microchilus nigrescens (Schltr.) Ormerod, Lindleyana 17: 218. 2002.

Physurus nigrescens Schltr., Beih. Bot. Centralbl. 36(2): 380. 1918.

Erythrodes nigrescens (Schltr.) Ames, Orchidaceae 7: 74. 1922.

Erythrodes killipii Ames, Proc. Biol. Soc. Wash. 34: 150. 1921.

Microchilus killipii (Ames) Ormerod, Lindleyana 17: 217. 2002.

VOUCHER: *E. P. Killip 3561* (MO).

Microchilus ovalis Ormerod, Harvard Pap. Bot. 11(2): 164. 2007.

VOUCHER: *G. McPherson 15047* (MO).

Microchilus panamanicus Ormerod, Harvard Pap. Bot. 9: 414. 2005.

VOUCHER: *P.H. Allen 3768* (AMES).

Microchilus subquadratus Ormerod, Harvard Pap. Bot. 11(2): 172. 2007.

VOUCHER: *A. Gentry et al. 16834* (MO).

Microchilus tessellatus Ormerod, Harvard Pap. Bot. 11(2): 172. 2007.

VOUCHER: *C.W. Hamilton & G. Davidse 2692* (MO).

Microchilus tridax (Rchb.f.) Ormerod, Lindleyana 17: 223. 2002.

Physurus tridax Rchb.f., Beitr. Orchid.-K. C. Amer.: 64. 1866.

Erythrodes tridax (Rchb.f.) Ames, Orchidaceae 7: 76. 1922.

Physurus purpureus Ames, Orchidaceae 2: 259. 1908.

Erythrodes purpurea (Ames) Ames, Orchidaceae 5: 28. 1915.

VOUCHER: *G. McPherson 11084* (MO).

Microchilus vesicifer (Rchb.f.) Ormerod, Lindleyana 17: 223. 2002.

Physurus vesicifer Rchb.f., Beitr. Orchid.-K. C. Amer.: 63. 1866.

Erythrodes vesicifera (Rchb.f.) Ames, Orchidaceae 7: 78. 1922.

Physurus lehmannii Schltr., Beih. Bot. Centralbl. 36(2): 379. 1918.

Erythrodes lehmannii (Schltr.) Ames, Orchidaceae 7: 71. 1922.

VOUCHER: *W.G. D'Arcy 13151* (MO).

Microchilus whitefoordiae Ormerod, Harvard Pap. Bot. 11(2): 173. 2007.

VOUCHER: *R.J. Hampshire & C. Whitefoord 867* (BM).

MILTONIOPSIS God.-Leb.

Miltoniopsis roezlii (Rchb.f.) God.-Leb., Orchidophile (Argenteuil) 9: 148. 1889.

Odontoglossum roezlii W.Bull., Garden (London 1871-1927) 4: 20. 1873.

Miltonia roezlii (W.Bull.) G.Nicholson, Ill. Dict. Gard. 2: 369. 1886.

Odontoglossum roezlii var. *alba* W.Bull. ex W.G.Sm., Fl. Mag. (London), n.s., 1875: t. 164. 1875.

Miltoniopsis santanae Garay & Dunst., Venez. Orchids Ill. 6: 276. 1976.

Miltoniopsis roezlii var. *alba* (W.Bull. ex W.G.Sm.) Lückel, Orchidee (Hamburg) 46: A119. 1995.

VOUCHER: *R.L. Dressler 4134* (MO).

Miltoniopsis warszewiczii (Rchb.f.) Garay & Dunst., Venez. Orchids Ill. 6: 278. 1976.

Odontoglossum warszewiczii Rchb.f., Bot. Zeitung (Berlin) 10: 692. 1852.

Miltonia endresii G.Nicholson, Ill. Dict. Gard. 2: 368. 1886.

Miltonia superba Schltr., Repert. Spec. Nov. Regni Veg. 3: 249. 1907., *nom. illeg.*

VOUCHER: *J. Warszewicz s.n.* (W).

MONOPHYLLORCHIS Schltr.

Monophyllorchis microstyloides (Rchb.f.) Garay, Calsadia 8: 517. 1962.

Pogonia microstyloides Rchb.f., Flora 69: 547. 1886.

Monophyllorchis colombiana Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 39. 1920.

Monophyllorchis maculata Garay, Fl. Ecuador 9(225: 1): 43. 1978.

VOUCHER: *R.L. Dressler 5890* (PMA).

MORMODES Lindl.

Mormodes colossus Rchb.f., Bot. Zeitung (Berlin) 10: 636. 1852.

Mormodes citrina B.S.Williams, Orch.-Grow. Man., ed. 2: 120. 1862.

Mormodes wendlandii Rchb.f. in W.G.Walpers, Ann. Bot. Syst. 6: 581. 1863.

VOUCHER: not seen, cited by Salazar & Dressler (2003c).

Mormodes fractiflexa Rchb.f., Gard. Chron. 1872: 141. 1872.

VOUCHER: *Z. Serracin* 87 (UCH).

Mormodes hookeri Lem., Jard. Fleur. 1(Misc.): 116. 1851.

Mormodes atropurpurea Hook., Bot. Mag. 77: t. 4577. 1851., *nom. illeg.*

Mormodes barbata Lindl. & Paxton, Paxton's Fl. Gard. 2: 57. 1851.

VOUCHER: *J. Warscewicz s.n.* (W).

Mormodes lancilabris Pabst, Ann. Missouri Bot. Gard. 62: 510. 1975.

VOUCHER: *R.L. Dressler s.n.* (RB).

Mormodes lobulata Schltr., Repert. Spec. Nov. Regni Veg. 8: 456. 1910.

VOUCHER: not seen, cited by Salazar & Dressler (2003c).

Mormodes powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 55. 1922.

VOUCHER: *C.W. Powell* 59 (MO).

Mormodes skinneri Rchb.f., Gard. Chron. 1869: 50. 1869.

VOUCHER: *S. Laube et al.* 616 (PMA).

MORMOLYCA Fenzl

Mormolyca culebrica Bogarín & Pupulin, Orchid Digest 74: 44. 2010.

Maxillaria culebrica (Bogarín & Pupulin) Christenson, Richardiana 11: 78. 2011.

VOUCHER: *D. Bogarín* 2951 (PMA).

Mormolyca dressleriana (Carnevali & J.T.Atwood) M.A.Blanco, Lankesteriana 7: 531. 2007.

Maxillaria dressleriana Carnevali & J.T.Atwood, Lindleyana 11: 29. 1996.

Xantherampellia dressleriana (Carnevali & J.T. Atwood) Szlach. & Sitko, Biodivers. Res. Conservation 25: 37. 2012.

VOUCHER: *M. Akers JJ* (see OIC9304) (SEL).

Mormolyca hedwigiae (Hamer & Dodson) M.A.Blanco, Lankesteriana 7: 531. 2007.

Maxillaria hedwigiae Hamer & Dodson, Icon. Pl. Trop. 8: t. 800. 1982[1983].

Xantherampellia hedwigiae (Hamer & Dodson) Szlach. & Śmiszek, Biodivers. Res. Conservation 25: 37. 2012.

VOUCHER: *R.L. Dressler* 3305 (MO).

Mormolyca moralesii (Carnevali & J.T.Atwood) M.A.Blanco, Lankesteriana 7: 531. 2007.

Maxillaria moralesii Carnevali & J.T.Atwood, Lindleyana 11: 31. 1996.

Xantherampellia moralesii (Carnevali & J.T.Atwood) Szlach. & Sitko, Biodivers. Res. Conservation 25: 37. 2012.

VOUCHER: *T.B. Croat* 22196 (MO).

Mormolyca ringens (Lindl.) Gentil, Pl. Cult. Serres Jard. Bot. Brux.: 124. 1907.

Trigonidium ringens Lindl., Edwards's Bot. Reg. 26(Misc.): 57. 1840.

VOUCHER: not seen, cited by Dressler (2003c).

The Voucher *R.L. Dressler* 6375 cited in TROPICOS database was not located at PMA.

MUSCARELLA Luer

Muscarella aristata (Hook.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 96. 2006.

Pleurothallis aristata Hook., Ann. Nat. Hist. 2: 329. 1839.

Humboldtia aristata (Hook.) Kuntze, Revis. Gen. Pl. 2: 667. 1891.

Specklinia aristata (Hook.) Pridgeon & M.W.Chase, Lindleyana 16: 256. 2001.

Pleurothallis barberiana Rchb.f., Gard. Chron., n.s., 16: 6. 1881.

Pleurothallis urbaniana Rchb.f., Ber. Deutsch. Bot. Ges. 3: 279. 1885.

Humboldtia barberiana (Rchb.f.) Kuntze, Revis. Gen. Pl. 2: 667. 1891.

Pleurothallis dichotoma Ames, Schedul. Orchid. 6: 58. 1923., *nom. illeg.*

Pleurothallis divexa Ames, Schedul. Orchid. 7: 20. 1924.

VOUCHER: *M.E. Davidson* 187 (not located, cited by Williams & Allen 1980).

Distributed in the Antilles, Costa Rica, Ecuador, Peru

and Bolivia. Luer (2006) did not cite records from Panama. The specimen cited by Williams (1946a) is “unsatisfactory” according to them and the locality is odd for the species. The description fits with a species of *Muscarella*. It may be another species of the genus but we were unable to check the specimen.

Muscarella marginata (Rich.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 111. 2006.

Epidendrum marginatum Rich., Actes Soc. Hist. Nat. Paris 1: 112. 1792.

Pleurothallis marginata (Rich.) Cogn. in C.F.P.von Martius & auct. suc. (eds.), Fl. Bras. 3(4): 478. 1896., *nom. illeg.*

VOUCHER: *S. Laube et al.* 488 (PMA).

Muscarella quinqueseta (Ames) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 114. 2006.

Pleurothallis quinqueseta Ames, Schedul. Orchid. 9: 35. 1925.

Specklinia quinqueseta (Ames) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 263. 2004.

VOUCHER: *C.A. Luer* 9342 (SEL).

MYOXANTHUS Poepp. & Endl.

Myoxanthus colothrix (Luer) Luer, Selbyana 7: 36. 1982.

Pleurothallis colothrix Luer, Phytologia 49: 202. 1981.

VOUCHER: *C.A. Luer & H.P. Butcher* 1259 (SEL).

Myoxanthus hirsuticaulis (Ames & C.Schweinf.) Luer, Selbyana 7: 43. 1982.

Pleurothallis hirsuticaulis Ames & C.Schweinf., Schedul. Orchid. 10: 29. 1930.

VOUCHER: *B.E. Hammel* 4682 (PMA).

Myoxanthus octomeriae (Schltr.) Luer, Selbyana 7: 47. 1982.

Pleurothallis octomeriae Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 21. 1922.

Myoxanthus octomerioides var. *octomeriae* (Schltr.) O.Gruss & M.Wolff, Orchid. Atlas: 237. 2007.

VOUCHER: *C.W. Powell* 252 (MO).

Myoxanthus scandens (Ames) Luer, Selbyana 7: 49. 1982.

Pleurothallis scandens Ames, Schedul. Orchid. 5: 18. 1923.

VOUCHER: *C.A. Luer et al.* 1018 (MO).

Myoxanthus sotoanus Pupulin, Bogarín & Mel.

Fernández, Lankesteriana 9: 470. 2010.

VOUCHER: *S. Laube et al.* 545 (MO).

Myoxanthus speciosus (Luer) Luer, Selbyana 7: 51. 1982.

Pleurothallis speciosa Luer, Selbyana 3: 392. 1977.

VOUCHER: *C.A. Luer & H.P. Butcher* 1371 (SEL).

Myoxanthus trachychlamys (Schltr.) Luer, Selbyana 7: 51. 1982.

Pleurothallis trachychlamys Schltr., Repert. Spec.

Nov. Regni Veg. Beih. 17: 23. 1922.

VOUCHER: *C.W. Powell* 215 (MO).

NEMACONIA Knowles & Westc.

Nemaconia striata (Lindl.) Van den Berg, Salazar & Soto Arenas, Neodiversity 2: 8. 2007.

Ponera striata Lindl., Edwards's Bot. Reg. 28(Misc.): 18. 1842.

VOUCHER: not found, cited by Dressler (2003c).

NEOMOOREA Rolfe

Neomoorea wallisii (Rchb.f.) Schltr., Orchid Rev. 32: 355. 1924.

Lueddemannia wallisii Rchb.f., Linnaea 41: 109. 1876.

Moorea irrorata Rolfe, Gard. Chron., ser. 3, 8: 7. 1890.

Neomoorea irrorata (Rolfe) Rolfe, Orchid Rev. 12: 30. 1904.

VOUCHER: *A.A. Hunter s.n.* (MO).

NIDEMA Britton & Millsp.

Nidema boothii (Lindl.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 43. 1922.

Maxillaria boothii Lindl., Edwards's Bot. Reg. 24(Misc.): 52. 1838.

Epidendrum boothii (Lindl.) L.O.Williams, Ann. Missouri Bot. Gard. 26: 282. 1939.

Dinema paleaceum Lindl., Edwards's Bot. Reg. 26(Misc.): 51. 1840.

Epidendrum auritum Lindl., Edwards's Bot. Reg. 29(Misc.): 4. 1843.

Epidendrum lindenianum A.Rich. & Galeotti, Ann. Sci. Nat., Bot., sér. 3, 3: 20. 1845.

Epidendrum paleaceum (Lindl.) Rchb.f., Beitr. Orchid.-K. C. Amer.: 80. 1866.

Nidema paleacea (Lindl.) Acuña, Bol. Estación Exp. Agron. Santiago de las Vegas 60: 70. 1939.
Encyclia paleacea (Lindl.) A.Lemée, Fl. Guyane Franç. 1: 419. 1955., no basionym ref.

VOUCHER: *S. Laube et al* 382 (PMA).

Nidema ottonis (Rchb.f.) Britton & Millsp., Bahama Fl.: 94. 1920.

Epidendrum ottonis Rchb.f., Hamburger Garten-Blumenzeitung 14: 213. 1858.

Encyclia ottonis (Rchb.f.) Pabst, Orquídea (Rio de Janeiro) 29: 276. 1972.

Nidema boothii var. *australis* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 211. 1923.

Nidema boothii var. *triandrum* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 211. 1923.

Nidema ottonis var. *triandrum* (Schltr.) Nir, Orchid. Antill.: 407. 2000.

VOUCHER: *C.W. Powell* 131 (AMES).

NITIDOBULBON Ojeda

Nitidobulbon nasutum (Rchb.f.) Ojeda & Carnevali, Novon 19: 99. 2009.

Maxillaria nasuta Rchb.f., Beitr. Orchid.-K. C. Amer.: 104. 1866.

Maxillaria oxysepala Schltr., Repert. Spec. Nov. Regni Veg. 27: 73. 1929.

Maxillaria brevipedunculata Ames & C.Schweinf., Schedul. Orchid. 10: 91. 1930.

VOUCHER: *M.A. Blanco & D. Penneys* 2829 (PMA).

NOTYLIA Lindl.

Notylia albida Klotzsch, Allg. Gartenzeitung 19: 281. 1851.

Notylia panamensis Ames, Orchidaceae 7: 112. 1922.

VOUCHER: *R. S. Williams* 977 (NY).

Notylia latilabia Ames & C.Schweinf., Schedul. Orchid. 8: 71. 1925.

VOUCHER: *C.W. Powell* 406 (AMES).

Notylia pentachne Rchb.f., Bonplandia (Hannover) 2: 90. 1854.

Notylia gracilispica Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 75. 1922.

VOUCHER: *Herrn Keferstein sub Lehmann s.n.* (W).

Notylia pittieri Schltr., Beih. Bot. Centralbl. 36(2): 418. 1918.

VOUCHER: *Z. Samudio et al.* 249 (UCH).

OCTOMERIA R.Br.

Octomeria costaricensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 111. 1923.

VOUCHER: *R.L. Dressler* 3882 (MO).

Octomeria graminifolia (L.) R.Br. in W.T.Aiton, Hortus Kew. 5: 211. 1813.

VOUCHER: *G. McPherson* 12555 (PMA).

Octomeria valeroi Ames & C.Schweinf., Schedul. Orchid. 10: 51-52. 1930.

VOUCHER: *B. Hammel* 2132 (SEL).

Octomeria scirpoidea (Poepp. & Endl.) Rchb. f., Bot. Zeitung (Berlin) 10: 856. 1852.

VOUCHER: *S. Mori & J. Kallunki* 2158 (MO).

Octomeria yauaperyensis Barb.Rodr., Vellozia, ed. 2, 1: 120. 1891.

Octomeria hondurensis Ames, Bot. Mus. Leaf. 1(4): 1. 1933.

Octomeria complanata C.Schweinf., Bot. Mus. Leaf. 10: 195. 1942.

VOUCHER: *R.L. Dressler* 3747 (PMA).

OECEOCLADES Lindl.

Oeceoclades maculata (Lindl.) Lindl., Gen. Sp. Orchid. Pl.: 237. 1833.

Angraecum maculatum Lindl., Coll. Bot.: t. 15. 1821.

Limodorum maculatum (Lindl.) G.Lodd., Bot. Cab. 5: t. 496. 1821.

Aerobion maculatum (Lindl.) Spreng., Syst. Veg. 3: 718. 1826.

Eulophia maculata (Lindl.) Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6: 647. 1863.

Eulophidium maculatum (Lindl.) Pfitzer, Entwurf. Anordn. Orch.: 87. 1887.

Graphorkis maculata (Lindl.) Kuntze, Revis. Gen. Pl. 2: 662. 1891.

Angraecum monophyllum A.Rich., Mém. Soc. Hist. Nat. Paris 4: 58. 1828.

Epidendrum connivens Vell., Fl. Flumin. 9: t. 44. 1831.

Geodorum pictum Link in J.H.F.Link, J.F.Klotzsch & C.F.Otto, Icon. Pl. Rar. 1: 14. 1840., *nom. illeg.*

Eulophia monophylla (A.Rich.) S.Moore in J.G.Baker, Fl. Mauritius: 360. 1877.

Eulophia ledienii Stein ex N.E.Br., Bull. Misc.

- Inform. Kew 1889: 90. 1889., orth. var.
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Formerly known as *O. ornithorhynchum* Kunth, this species ranges from Mexico to Nicaragua. The Costa Rican Vouchers are dubious (Dressler 2003c). The Panamanian voucher cited here has been allegedly collected alive by James L. Sawyer in Cerro Punta.

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PABSTIELLA Brieger & Senghas

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Pleurothallis tripterantha Rchb.f., Bonplandia (Hannover) 2: 24. 1854.

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VOUCHER: *C.W. Powell 277* (AMES).

At least two different species have been treated under *P. tripterantha* in Costa Rica, Panama, Colombia and Ecuador. One is characterized by the coriaceous leaves, the yellow flowers with brown spots and the caudate sepals, thickened at the apex. The other species has thick but subcoriaceous leaves, purple abaxially and the flowers are purple-maculated with acute, tailless sepals. A careful review of the heterotypic synonyms and a more accurate morphological characterization are needed to clarify the taxonomy of this group. In this paper, this species is accepted in a broad sense. The voucher cited here is the type of *P. hunteriana* and it fits well with the specimens having yellow flowers, with brown lines or spots and caudate sepals.

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Pleurothallis pyrsodes Rchb.f., *Gard. Chron.*, n.s., 6: 386. 1876.
Humboldtia alpestris (Sw.) Kuntze, *Revis. Gen. Pl.* 2: 667. 1891.
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Humboldtia vilipensa (Rchb.f.) Kuntze, *Revis. Gen. Pl.* 2: 668. 1891.
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 VOUCHER: C.A. Luer & H. Butcher 1244 (SEL).
- Specklinia costaricensis* (Rolfe) Pridgeon & M.W.Chase, *Lindleyana* 16: 257. 2001.
Pleurothallis costaricensis Rolfe, *Bull. Misc. Inform. Kew* 1917: 80. 1917.
Pleurothallis ehrhartiiflora Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 19: 187. 1923.
 VOUCHER: R.L. Dressler 5367 (UCH).
- Specklinia cucumeris* (Luer) Bogarin & Karremans, *comb. nov.*
 Bas.: *Pleurothallis cucumeris* Luer, *Selbyana* 5: 162. 1979.
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 VOUCHER: C. Luer *et al.* 2258 (SEL).
- This species should be treated in *Specklinia*. The phylogenetic relationships of *Specklinia* and closely related genera will be treated in a further paper (Karremans *et al.* in prep).
- Specklinia displosa* (Luer) Pridgeon & M.W.Chase, *Lindleyana* 16: 257. 2001.

- Pleurothallis displosa* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 172. 1999.
- Sarcinula displosa* (Luer) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 212. 2006.
- VOUCHER: *C. Luer et al.* 6533 (MO).
- Specklinia dressleri*** (Luer) Bogarin & Karremans, **comb. nov.**
Bas.: *Pleurothallis dressleri* Luer, Selbyana 3: 98. 1976.
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- VOUCHER: *R.L. Dressler* 3033 (SEL).
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- VOUCHER: *C.W. Powell* 335 (MO).
- Specklinia glandulosa*** (Ames) Pridgeon & M.W.Chase, Lindleyana 16: 257. 2001.
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- VOUCHER: *C.W. Powell* 306 (AMES).
- Specklinia grobyi*** (Bateman ex Lindl.) F.Barros, Hoehnea 10: 110. 1983[1984].
- Pleurothallis grobyi* Bateman ex Lindl., Edwards's Bot. Reg. 21: t. 1797. 1835.
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VOUCHER: C.A. Luer *et al.* 10600 (MO).

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Humboldtia microphylla (A.Rich. & Galeotti) Kuntze, Revis. Gen. Pl. 2: 668. 1891.

Pleurothallis rotundifolia Rolfe, Bull. Misc. Inform. Kew 1895: 191. 1895.

Pleurothallis panamensis Schltr., Repert. Spec. Nov. Regni Veg. 17: 140. 1921.

VOUCHER: M. Wagner 24 (AMES).

At least two species have been treated under *S. microphylla* in Costa Rica and Panama (Luer 2003b). One species is restricted to the seasonally dry Pacific forest of Costa Rica and Panama. It is characterized by the creeping, repent plants with prostrate, superposed, rounded, granulose-verrucose leaves with lax inflorescences. The flowers are yellow with red stripes on the dorsal sepal and petals and the lip is stained with red purple (Bogarín & Pupulin *in prep.*). It has not been possible to locate the holotype of the Mexican *P. microphylla* to confirm the identity of the populations from southern Central America. An illustration of type at AMES differs in flower details with the specimens studied from Costa Rica and Panama.

Specklinia cf. microphylla (A.Rich. & Galeotti) Pridgeon & M.W.Chase, Lindleyana 16: 258. 2001.

VOUCHER: S. Laube *et al.* 532 (PMA).

This is the other species treated under *S. microphylla*. It is restricted to the Caribbean lowlands of Costa Rica and

Panama (and possibly Nicaragua) (Luer 2003b). Plants differ in the erect or suberect leaves (vs. prostrate, creeping) and the subpandurate lip (vs. oblong), among other floral details. A careful taxonomic study is needed to clarify the status of these taxa from southern Central America.

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VOUCHER: C.A. Luer *et al.* 1444 (SEL).

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Humboldtia florulenta (Linden & Rchb.f.) Kuntze, Revis. Gen. Pl. 2: 667. 1891.

Humboldtia marginata (Lindl.) Kuntze, Revis. Gen. Pl. 2: 668. 1891.

Lepanthes plurifolia Barb.Rodr., Vellozia, ed. 2, 1: 118. 1891.

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Pleurothallis integrilabia Ames, F.T.Hubb. & C.Schweinf., Bot. Mus. Leaf. 3: 39. 1934.
Specklinia florulenta (Linden & Rchb.f.) Pridgeon & M.W.Chase, Lindleyana 16: 257. 2001.
Specklinia marginata (Lindl.) Pridgeon & M.W.Chase, Lindleyana 16: 258. 2001.
 VOUCHER: *H. Pittier 4787* (AMES).
Specklinia recula (Luer) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 263. 2004.
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 VOUCHER: *C. A. Luer at al. 742* (SEL).
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Sarcinula simmleriana (Rendle) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 105: 218. 2006.
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 VOUCHER: *H. Wedel 185* (AMES).
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Pleurothallis spectabilis Ames & C.Schweinf., Schedul. Orchid. 8: 34. 1925.
 VOUCHER: *C.W. Powell 382* (AMES).
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Specklinia tribuloides (Sw.) Pridgeon & M.W.Chase, Lindleyana 16: 259. 2001.
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VOUCHER: *R.L. Dressler 5099* (PMA).
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VOUCHER: *K.R. Reading & R.R. Tasker s.n.* (MO).
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VOUCHER: *Z. Serracín 107* (UCH).
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VOUCHER: *M. Whitten 94082* (FLAS).
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VOUCHER: *C.W. Powell 295* (MO).
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VOUCHER: *S. Laube et al. 586* (PMA).
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VOUCHER: *C.W. Powell 103* (MO).
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VOUCHER: *R.L. Dressler 4808* (SEL).

Stelis carpinterae (Schltr.) Pridgeon & M.W.Chase, Lindleyana 16: 261. 2001.

Pleurothallis carpinterae Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 105. 1923.

Elongatia carpinterae (Schltr.) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 257. 2004.

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Stelis gratiosa Luer, Selbyana 5: 192. 1979.

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VOUCHER: *R.K. Baker 249* (MO).

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VOUCHER: *C.W. Powell 180* (MO).

Stelis convallaria (Schltr.) Pridgeon & M.W.Chase, Lindleyana 16: 262. 2001.

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VOUCHER: *C.A. Luer & R.L. Dressler 1133* (SEL).

Stelis costaricensis Rchb.f., Bonplandia (Hannover) 3: 225. 1855.

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 VOUCHER: *R.L. Dressler s.n.* (SEL).
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Stelis seleniglossa Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 97. 1923.
 VOUCHER: C.A. Luer & H.P. Butcher 1240 (SEL).
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VOUCHER: *P.H. Allen 1463* (MO).

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 VOUCHER: C.W. Powell 234 (AMES).
- Stelis praemorsa*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 17. 1922.
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This Voucher belongs to the group of *Telipogon* formerly treated under *Stellilabium*. It seems different from the other species of the genus recorded in Panama (Williams *et al.* 2005). A comparison with the Costa Rican species of *Telipogon* is needed to confirm its identity.

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Telipogon nunezii Dressler, Orchideen J. 14: 14. 2007.

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Telipogon olmosii Dressler, J. Orchideenfr. 13: 212.
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- Trichosalpinx ringens*** Luer, *Lindleyana* 11: 108. 1996.
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- Trisetella dressleri* (Luer) Luer, *Phytologia* 47: 57. 1980.
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- Trisetella tenuissima* (C.Schweinf.) Luer, *Phytologia* 47: 58. 1980.
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VOUCHER: *P.C. Standley 29353* (AMES).

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Notylia inodora (Schiede) Conz., Fl. Taxon. Mex. 3: 151. 1947.

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VOUCHER: *F.W. Hunnewell 16433* (AMES).

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VOUCHER: *C.W. Powell 412* (AMES).

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VOUCHER: *P.C. Standley 40897* (US).

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Vanilla pittieri Schltr., Repert. Spec. Nov. Regni Veg. 3: 106. 1906.

VOUCHER: *H. Pittier 6600* (AMES).

Soto Arenas & Dressler (2010) treated *V. pompona* Schiede as a variable, widely distributed species. They recognized three subspecies: *V. pompona* subsp. *pompona* restricted to Mexico; *V. pompona* subsp. *grandiflora* (Lindl.) Soto Arenas for populations restricted to the Amazon basin, Guyanas, Venezuela and Brazil; and *V. pompona* subsp. *pittieri* for populations ranging from Honduras to the Pacific coast of Panama.

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VOUCHER: *R.L. Dressler 4571* (PMA).

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VOUCHER: Barry E. Hammel 2729 (MO).

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Maxillaria colleyi Bateman ex Lindl., Edwards's Bot. Reg. 24(Misc.): 87. 1838.

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Xylobium brachypus (Rchb.f.) Hemsl., Biol. Cent.-Amer., Bot. 3: 252. 1884.

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VOUCHER: R.L. Dressler 3748 (MO).

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VOUCHER: M.A. Blanco & D. Penneys 2937 (PMA).

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Maxillaria stachyobiorum Rchb.f., Bot. Zeitung (Berlin) 10: 735. 1852.

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Xylobium filomenoi Schltr., Repert. Spec. Nov. Regni Veg. Beih. 9: 100. 1921.

VOUCHER: J. Warszewicz s.n. (W).

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- Xylobium scabrilingue* (Lindl.) Schltr., Orchis 7: 23. 1913.
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- VOUCHER: not seen, cited by Dressler (2003c).
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- Maxillaria sulfurina* Lem., Fl. Serres Jard. Eur. 4: t. 330. 1848.
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- Xylobium tuerckheimii* Kraenzl., Ann. Naturhist. Mus. Wien 44: 325. 1930.
- VOUCHER: *C.W. Powell 117* (AMES).
- ZOOTROPHION Luer**
- Zootrophion endresianum*** (Kraenzl.) Luer, Selbyana 7: 82. 1982.
- Cryptophoranthus endresianus* Kraenzl., Repert. Spec. Nov. Regni Veg. 17: 437. 1921.
- VOUCHER: *R.L. Dressler 6072* (MO).
- Zootrophion gracilentum*** (Rchb.f.) Luer, Selbyana 7: 82. 1982.
- Masdevallia gracilenta* Rchb.f., Gard. Chron., n.s., 4: 98. 1875.
- Cryptophoranthus gracilentus* (Rchb.f.) Rolfe, Gard. Chron., ser. 3, 2: 693. 1887.
- Cryptophoranthus lehmannii* Rolfe, Orchid Rev. 11: 303. 1903.
- Cryptophoranthus lepidotus* L.O.Williams, Ann. Missouri Bot. Gard. 29: 340. 1942.
- VOUCHER: *P.H. Allen 2718* (AMES).
- Zootrophion williamsii*** Luer, Selbyana 23: 41. 2002.
- VOUCHER: *C. Luer 0676* (SEL).

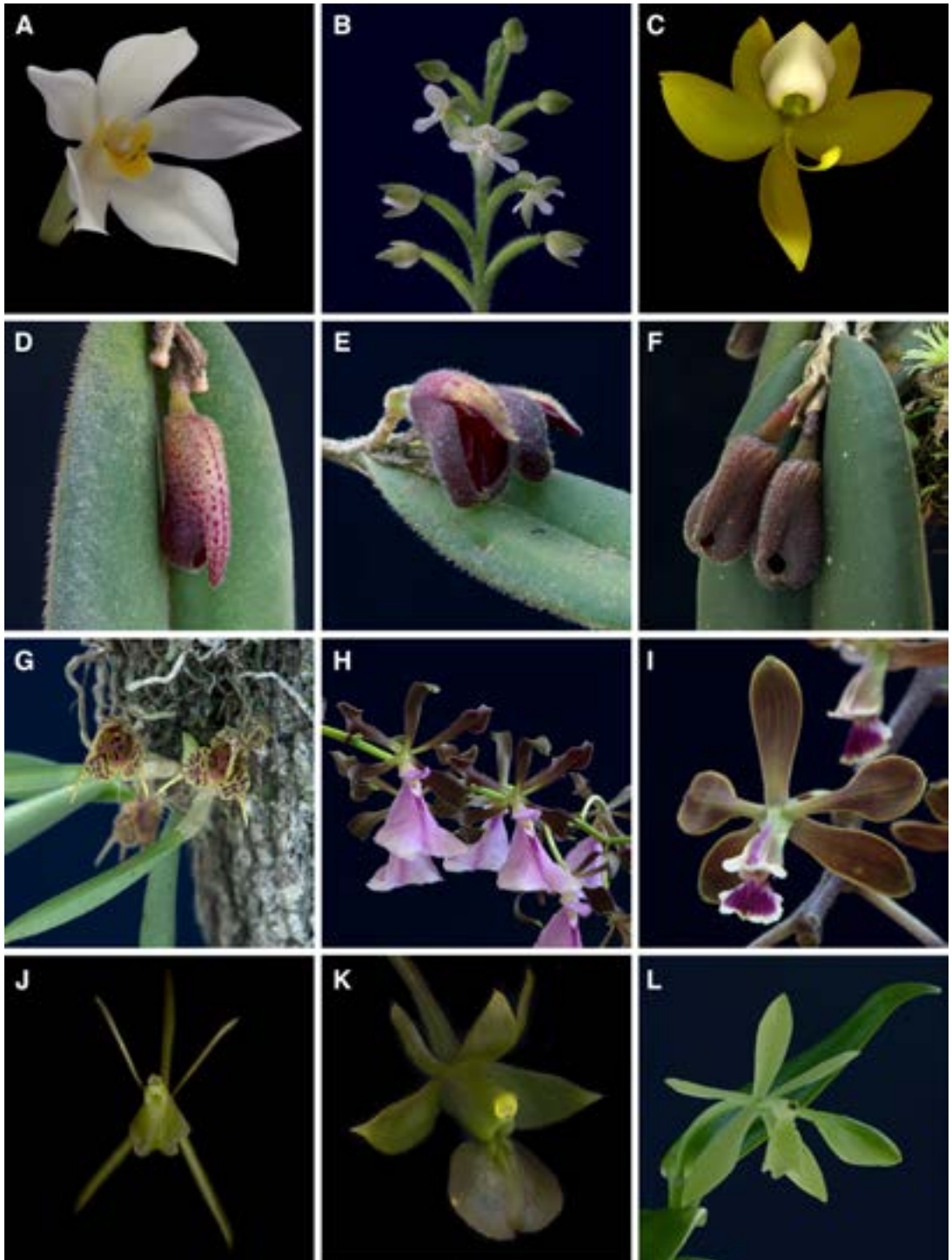


FIGURE 21. A — *Camaridium ochroleucum*. B — *Cranichis diphylla*. C — *Cycnoches warscewiczii*. D — *Dresslerella elvallensis*. E — *D. hispida*. F — *D. pertusa*. G — *Dryadella butcheri*. H — *Encyclia cordigera* f. *rosea*. I — *E. elegantula*. J — *Epidendrum atwoodii*. K — *E. bisulcatum*. L — *E. candelabrum*. Photos by D. Bogarín and Z. Serracín.

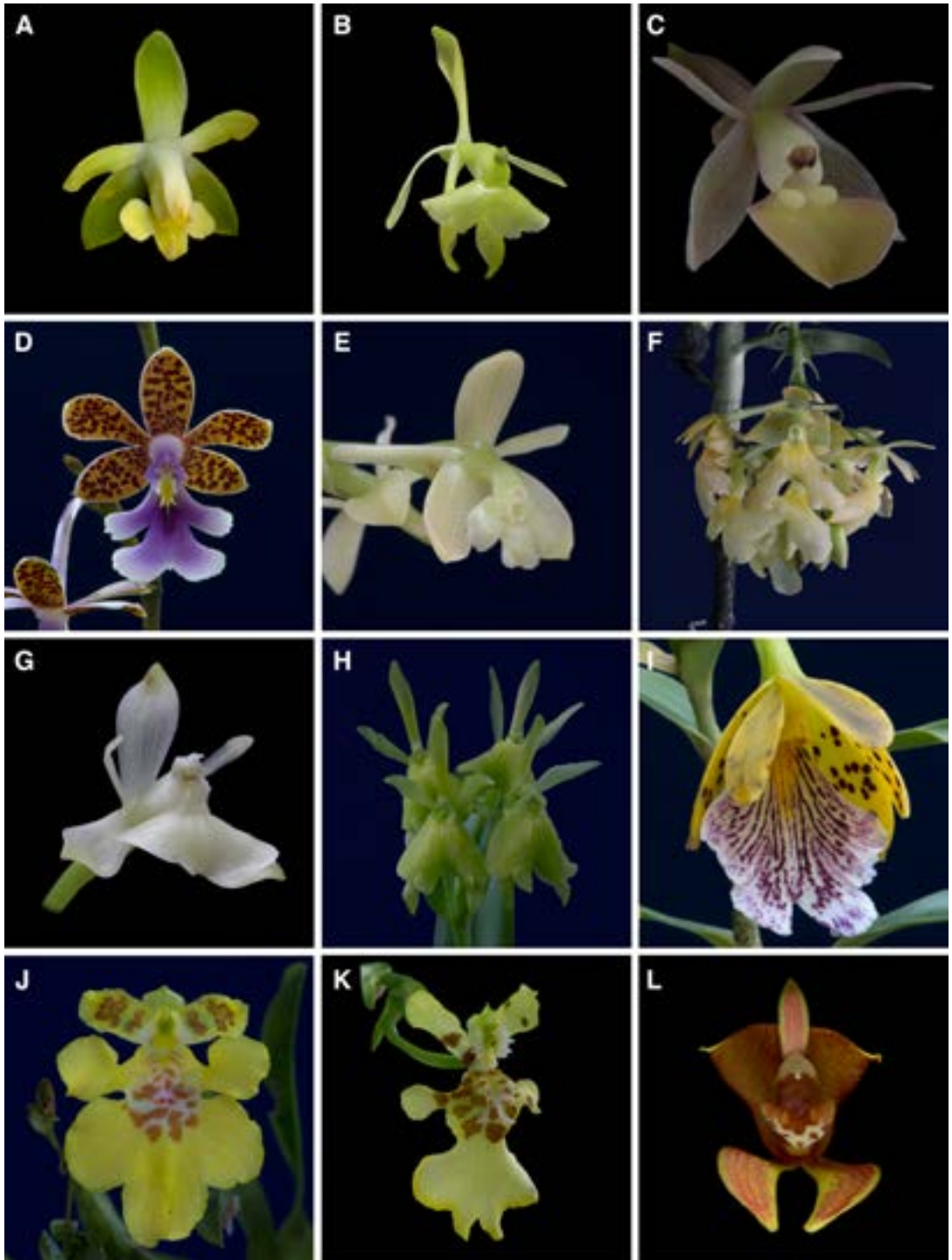


FIGURE 22. A — *Epidendrum intermixtum*. B — *E. montis-narae*. C — *E. physodes*. D — *E. pseudoshumannianum*. E — *Epidendrum rousseauae*. F — *E. sotoanum*. G — *E. trialatum*. H — *E. vulgoamparoanum*. I — *E. wallisii*. J — *Erycina crista-galli*. K — *E. pusilla*. L — *Govenia viaria*. Photos by D. Bogarín and Z. Serracín.

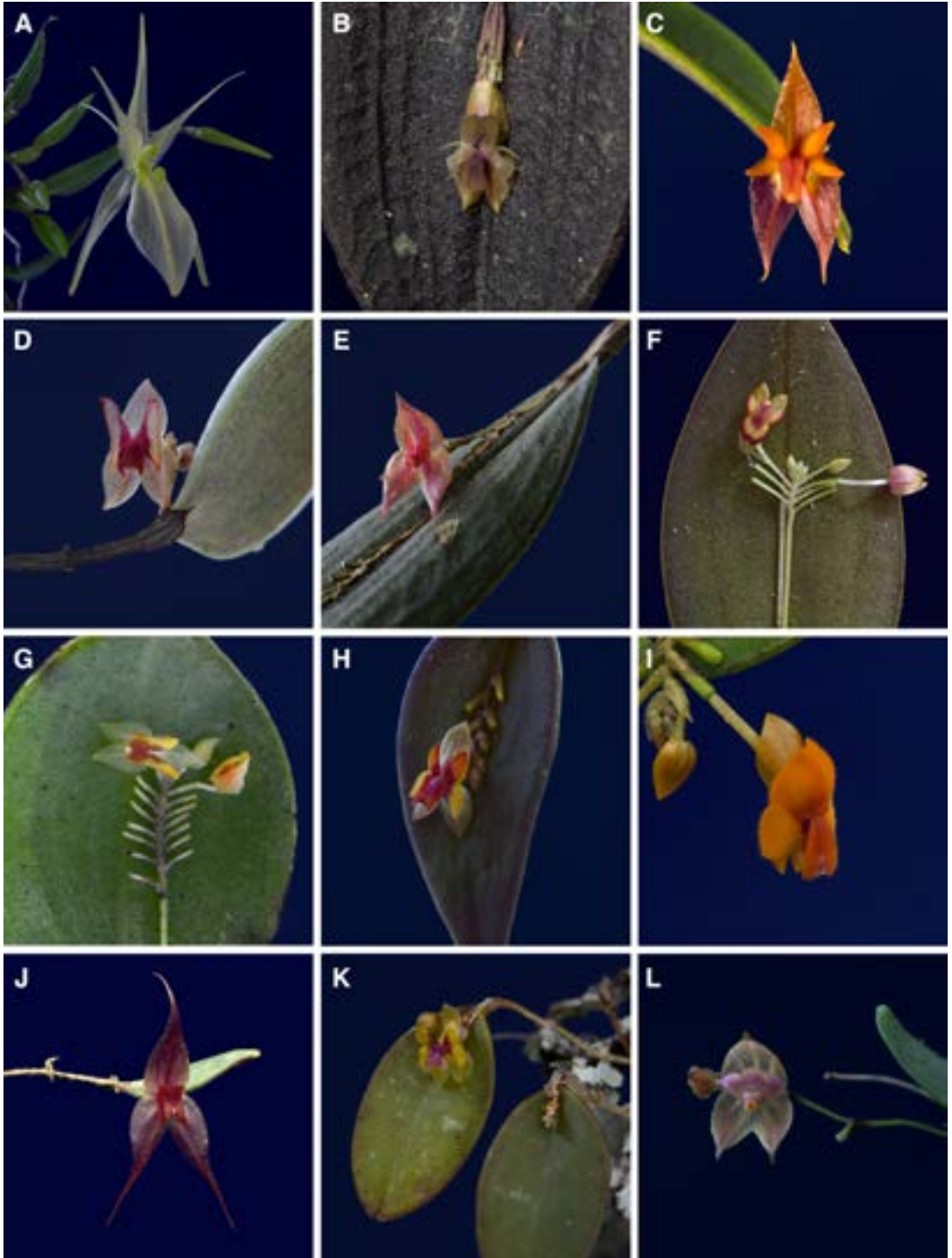


FIGURE 23. A—*Homalopetalum pumilio*. B—*Lepanthes ankistra*. C—*L. antilocapra*. D—*L. candida*. E—*L. demissa*. F—*L. disticha*. G—*L. droseroides*. H—*L. exasperata*. I—*L. fimbriata*. J—*L. grandiflora*. K—*L. mariposa*. L—*L. minutilabia*. Photos by D. Bogarín.

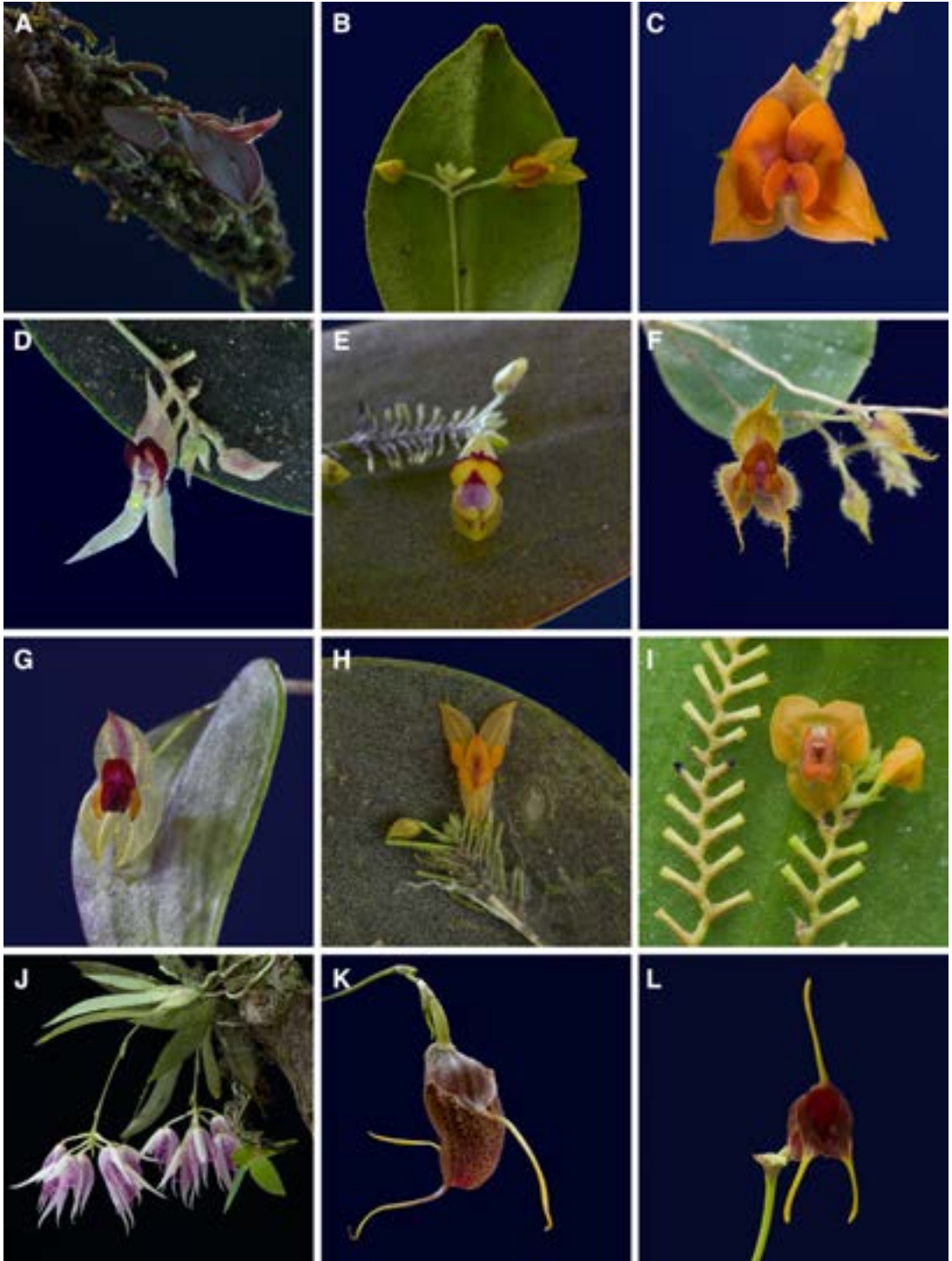


FIGURE 24. A — *Lepanthes minutissima*. B — *L. minyglossa*. C — *L. olmosii*. D — *L. otopetala*. E — *L. pexa*. F — *L. L. pulcherrima*. G — *L. regularis*. H — *L. schizocardia*. I — *L. seegeri*. J — *Macroclinium lineare*. K — *Masdevallia andresiana*. L — *M. collina*. Photos by D. Bogarín.

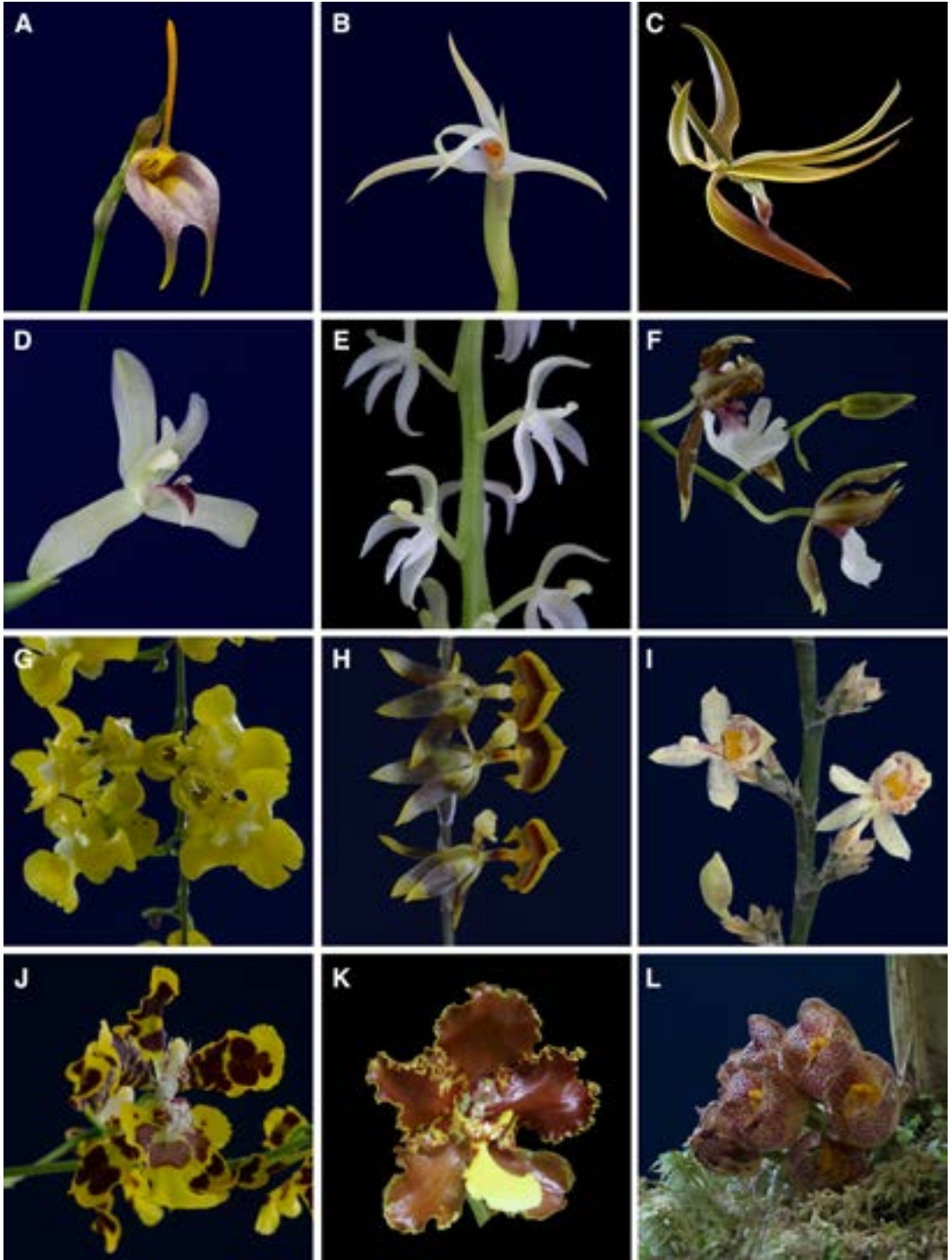


FIGURE 25. *Masdevallia ostaurina*. B — *Maxillaria galantha*. C — *Mormodes powellii*. D — *Mormolyca culebrica*. E — *Notylia pittieri*. F — *Oncidium cariniferum*. G — *Oncidium cheirophorum*. H — *O. dulcinea*. I — *O. picturatissimum*. J — *O. zelenkoanum*. K — *Otoglossum chiriquense*. L — *Peristeria cerina*. Photos by D. Bogarín and Z. Serracín.

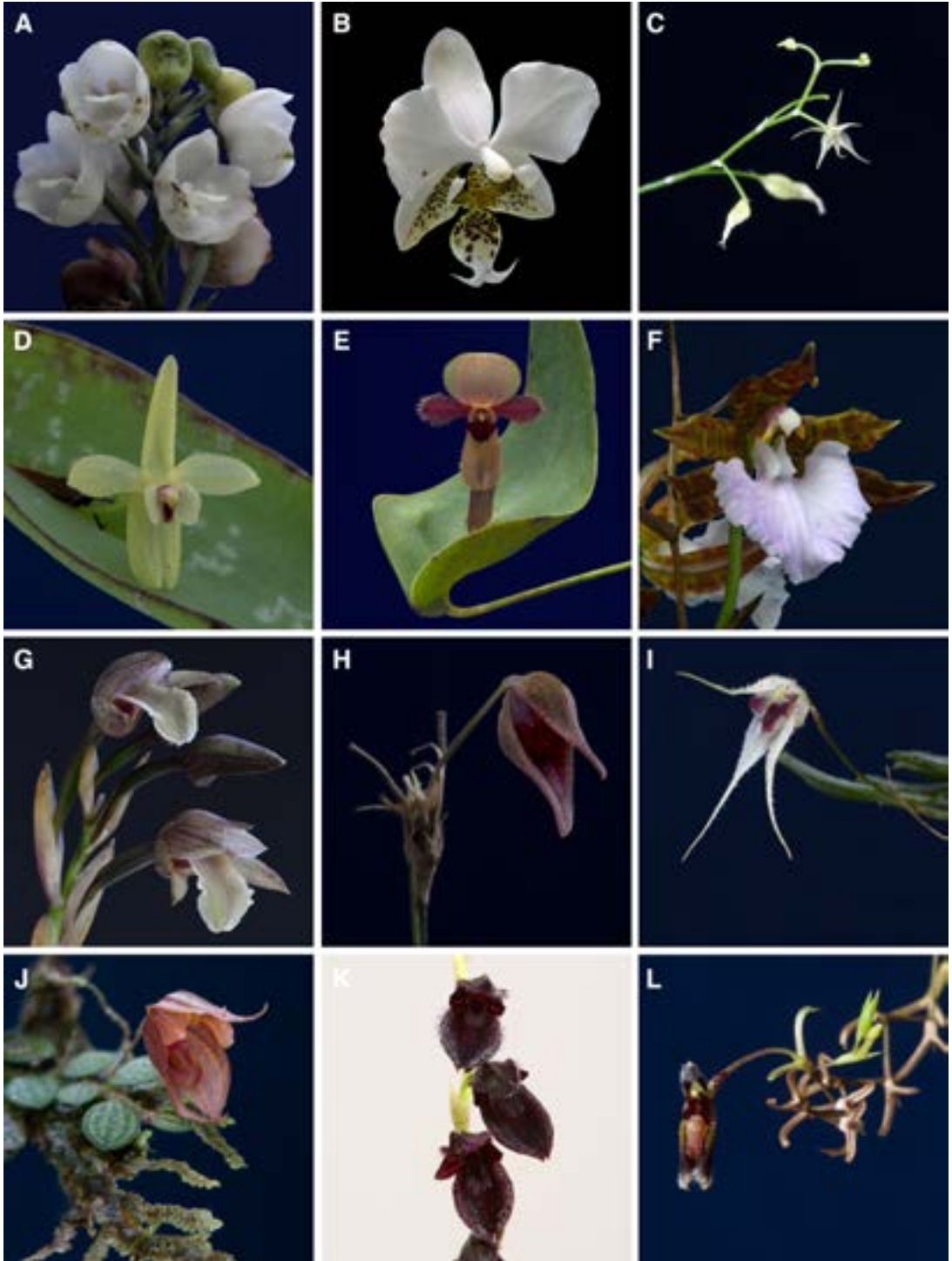


FIGURE 26. A — *Peristeria elata*. B — *Phalaenopsis stuartiana*. C — *Platystele sylvestrei*. D — *Pleurothallis fantastica*. E — *P. peculiaris*. F — *Rhynchosstele bictoniense*. G — *Scaphyglottis coriacea*. H — *Specklinia areldii*. I — *S. cactantha*. J — *Specklinia dressleri*. K — *Stelis falcatiloba*. L — *S. furculifera*. Photos by D. Bogarín and Z. Serracín.

APPENDIX 1

List of basionyms of the orchid flora of Panama

Acineta mireyae G.Gerlach & M.H.Weber, J. Orchideenfr. 10(3): 230. 2003.

TYPE: Panama. Coclé: El Valle de Antón, Jun 2000, *A. Maduro 330* (holotype, PMA; isotype, M).

Acineta sella-turcica Rchb.f., Bot. Zeit. (Berlin) 10: 705. 1852.

TYPE: Panama. Chiriquí: Cordillereuketten. Juli. 6 -8000', *J. Warszewicz s.n.* (holotype, W; drawings of type, K, AMES).

Acostaea bicornis Luer, Phytologia 54: 379. 1983. = *Specklinia bicornis* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Panama: Epiphytic in cloud forest, Cerro Jefe, alt. 1000 m, 2 Mar 1976, *C. Luer, J. Luer, P. Taylor & R. Dressler 744* (holotype, SEL).

Acostaea unicornis Luer, Phytologia 54: 379. 1983. = *Specklinia unicornis* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Coclé: Epiphytic in cloud forest above El Valle, alt. 1000 m, 6 Mar 1976, *C. Luer, J. Luer, R.L. Dressler & P. Taylor 760* (holotype, SEL).

Acronia folsomii Luer & Endara, Monogr. Syst. Bot. Missouri Bot. Gard. 103: 134. 2005. = *Pleurothallis folsomii* (Luer & Endara) Bogarín

TYPE: Panama. Chiriquí: Cerro Colorado, along ridge road near border with Bocas del Toro, 1400-1700 m, 24 Oct 1977, *J.A. Folsom 6096* (holotype, MO).

Acronia orygmoglossa Luer & Dressler, Monogr. Syst. Bot. Missouri Bot. Gard. 103: 167. 2005. *Pleurothallis orygmoglossa* (Luer & Dressler) Bogarín

TYPE: Panama. Chiriquí: Camp Hornito. Fortuna dam site, 1000-1200 m, 13 Aug 1976, *R.L. Dressler 5351* (holotype, SEL).

Acrorchis roseola Dressler, Orquídea (Mexico City) 12: 14. 1990.

TYPE: Panama. Chiriquí: Cerro Colorado, approx. 1650 m, 15 Feb 1985, *R.L. Dressler 6103* (holotype, MO; isotypes, MO, AMO, F, FLAS, PMA, US).

Ancipitia dressleri Kolan. & Szlach., Richardiana 14: 104. 2014. = *Pleurothallis dressleriana* Bogarín

TYPE: Panama. San Blas/Darién: mountains between Tubualá (San Blas) and Masargandi (Darién), 400-500 m, 2 Feb 1997, *R. L. Dressler 5591* (holotype, FLAS).

Aspasia epidendroides Lindl., J. Bot. (Hooker) 1: 6. 1834.

TYPE: Habitat in Panama et Columbia occidentali, *Cuming 1297* (holotype, K).

Aspasia principissa Rchb.f., Bot. Zeitung (Berlin) 10: 637. 1852.

TYPE: Panama. Veraguas, *J. Warszewicz s.n.* (holotype, W; drawing of type, AMES).

Aspasia pusilla C.Schweinf., Bot. Mus. Leaf. 10: 21. 1941. = *Cischweinfia pusilla* (C.Schweinf.) Dressler & N.H.Williams

TYPE: Panama. Darien Province: Chepigana District, Cana Cuasi Trail (Camp 2), epiphyte "4 to 8 inches high", at 2000 feet altitude, March 11, 1940, *M.E. & R.A. Terry 1502* (holotype, AMES; isotypes, AMES, F, MO).

Aspasia rousseauae Schltr., Gartenflora 71: 76. 1922. = *Aspasia principissa* Rchb.f.

TYPE: Panama. *Mrs. Rousseau s.n.* (holotype, B, destroyed; lectotype cited by Mora de Retana (1993), illustration in Gartenflora 72: t. 10 (1922)).

- Barbosella circinata*** Luer, Selbyana 3(3/4): 204. 1977.
 TYPE: Panama. Chiriquí: epiphytic in the cloud forest along the continental divide, above Camp Escopeta, Cerro Colorado, alt. 1700 m, 16 Feb 1977, *C. Luer, J. Luer & R.L. Dressler 1575* (holotype, SEL).
- Barbosella orbicularis*** Luer, Selbyana 3(1/2): 10. 1976.
 TYPE: Panama. Panama: epiphytic, La Eneida, region of Cerro Jefe, alt. 1000 m, 25 Dec 1967, *R. L. Dressler 3285* (holotype, SEL).
- Baskervilla stenopetala*** Dressler, Bol. Inst. Bot. Univ. Guadalajara 5: 70. 1998.
 TYPE: Panama. Darién: Cerro Pirre, 1050-1400 m, 10 Nov 1977, flowers very pale green, *J. Folsom s.n.* (holotype, MO).
- Bletia purpurea*** var. *pittieri* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 50. 1922. = ***Bletia purpurea*** (Lam.) A.DC.
 TYPE: Panama. Auf Hügeln bei Panama-City, *C.W. Powell 128* (holotype, B, lectotype designated by Christenson (1991b), K; isolectotype, AMES).
- Brachionidium calypso*** Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 24. 1995.
 TYPE: Panama. Chiriquí: La Chumblada above Guadalupe, 15 July 1979, *R.L. Dressler 5838* (holotype, MO).
- Brachionidium dentatum*** Luer & Dressler, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 34. 1995.
 TYPE: Panama. Chiriquí: above Cerro Punta, alt. ca. 2800 m, collected and cultivated by A. Maduro, flowered in cultivation at Cerro Punta, July 1979, *R.L. Dressler s.n.* (holotype, MO).
- Brachionidium dressleri*** Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 40. 1995.
 TYPE: Panama. Chiriquí: La Chumbada, above Guadalupe, 15 July 1979, *R. L. Dressler 5837* (holotype, MO).
- Brachionidium folsomii*** Dressler, Orquideologia 15: 154. 1982.
 TYPE: Panama. Coclé: vertiente norte del Alto del Calvario, al norte del Aserradero El Copé, aprox. 9 km al norte de El Copé, elev. 800-850 m, 23 Feb 1982, *R.L. Dressler 6032* (holotype, US; isotype, PMA).
- Brachionidium lucanoideum*** Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 78. 1995.
 TYPE: Panama. Chiriquí: elfin forest along the ridge of the continental divide northeast of Cerro Pate Macho above Palo Alto, alt. 2200 m, 24 Apr 1982, *S. Knapp & R. Schmalzel 4829* (holotype, MO; isotype, AMES, K, US).
- Brachionidium peltarion*** Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 92-93. 1995.
 TYPE: Panama. Coclé: Cerro Gaital, mesa north of El Valle de Antón, near western peak, alt. ca. 900 m, 14 Mar 1981, *R.L. Dressler & E. Hagsater 6005* (holotype, MO).
- Brachionidium polypodium*** Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 98. 1995.
 TYPE: Panama. Chiriquí: Cerro Colorado, alt. 1400 m, growing in dense moss on side of tree, 25 Jul 1979, *T. Antonio 1413* (holotype, MO).
- Brachionidium satyrium*** Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 112. 1995.
 TYPE: Panama. Bocas del Toro: Trocha 3 de noviembre, near Paso de la Zorra over the continental divide, alt. 1500 m, 5 April 1977, *R.L. Dressler, K. Dressler & N. H. Williams 5809* (holotype, MO).
- Brassia allenii*** L.O. Williams ex C. Schweinf., Bot. Mus. Leafl. 13: 145. 1948.
 TYPE: Panama. Panama: summit of Cerro Campana near Campana, ca. 1000 m alt., in cloud forest, 2 Oct 1947, *P.H. Allen 5150* (holotype, AMES).
- Brassia longissima*** (Rchb.f.) Nash var. *minor* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 80. 1922. = ***Brassia caudata*** (L.) Lindl.
 TYPE: Panama. auf Hügeln bei Panama City, *C.W. Powell 72* (holotype, B, destroyed; lectotype designated by

Christenson (1991b), AMES-23903; isoelectotypes, K, MO-955925).

Bulbophyllum wagneri Schltr., Repert. Spec. Nov. Regni Veg. 17: 142. 1921. = *Bulbophyllum pachyrachis* (A.Rich.) Griseb.

SYNTYPES: Panama. Muame and Gorgone, in Januar 1858, *M. Wagner s.n.* (B, destroyed). Panama. vicinity of San Felix, eastern Chiriquí, 0-120 m, Dec 1911, *H. Pittier 5285* (B, destroyed), lectotype designated by Hamer & Garay (1995) [1997].

Camaridium affine Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 72. 1922. = *Camaridium ochroleucum* Lindl.
TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 7* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23884; isoelectotypes, AMES-43843, MO-955879; drawing of type, AMES-26830; drawing published in Mansfeld [1931: t. 66, nr. 264].).

Camaridium arachnites Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 73. 1922. = *Camaridium ctenostachys* (Rchb.f.) Schltr.

TYPE: Panama. Chiriquí, c. 4000 Fuss ü. M., *C.W. Powell 210* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23886; isoelectotypes, AMES-23885, AMES-30308, AMES-30309, AMES-30310, MO-956027; drawing of type, AMES-26893; drawing published in Mansfeld [1931: t. 67, nr. 265].).

Camaridium grandiflorum Ames, Proc. Biol. Soc. Washington 34: 149. 1921. *nom. illeg. hom.* = *Camaridium ampliflorum* (C.Schweinf.) M.A.Blanco

TYPE: Panama. Chiririquí: in humid forest of the Cordillera, east of the Río Caldera, 17-19 Feb 1918, 2000 m alt., *P. Killip 3565* (holotype, AMES; isotype, AMES, US; photo of isotype ex US, AMES).

Camaridium latifolium Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 74. 1922.

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 8* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES; isoelectotypes, AMES, K-K000079347, K-K000079346, MO, S-0707871, S-0707870; drawing published in Mansfeld [1931: t. 68, nr. 269].).

Campylocentrum dressleri H.Dietr. & M.A.Díaz, Orchidee (Hamburg) 35(1): 28–30, f. 1984. = *Campylocentrum tyrridion* Garay & Dunst.

TYPE: Panama. Darién: margins of the Tschkonake river, 5 km W of Yavisa, tropical rain forest, April 1980, flowering in cultivation in Jardín Botánico Nacional de Cuba, May 1983, *J. Bisse, A. Álvarez & A. Díaz s.n. sub H. Dietrich s.n.* (holotype, HAJB).

Campylocentrum panamense Ames, Orchidaceae 7: 88. 1922.

TYPE: [Panama]. In woods near Gatún, on trees, Jan 10, 1860, *Sutton Hayes 958* (holotype, NY; illustration of type, AMES).

Campylocentrum peniculus Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 91. 1922. = *Campylocentrum micranthum* (Lindl.) Maury

TYPE: Panama. auf Hügeln bei Panama City, *C.W. Powell 184* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23936; detail of type, AMES; drawing of type, AMES-26798, isoelectotype, MO-956017; drawing published in Mansfeld [1931: t. 80, nr. 318].).

Campylocentrum tenellum Todzia, Ann. Missouri Bot. Gard. 72: 877. 1985.

TYPE: Panama. Panama. La Eneida, region of Cerro Jefe, 26 Oct 1969, *R.L. Dressler 3758* (holotype, CR; isotype, CR).

Catasetum warczewitzii Lindl. & Paxton, Paxton's Fl. Gard. 1: 45. 1850. *Clowesia warczewitzii* (Lindl. & Paxton) Dodson

TYPE: A most fragrant terrestrial orchid from Panama. Introduced by Mr. Skinner. Flowers pale green. Discovered by Warczewitz; blossomed at Penllergaré in April with J. D. Llewelyn, Esq. (holotype, K).

- Cattleya skinneri* var. *autumnalis* P.H.Allen ex L.O.Williams, Ann. Missouri Bot. Gard. 29: 345. 1942. = ***Guarianthe patinii*** (Cogn.) Dressler & W.E. Higgins
 TYPE: Panama. vicinity of Bejuca, alt. ca. 30 m, 15 Aug 1941, *P. H. Allen 2668* (holotype, AMES; isotypes, AMES-217940, AMES-217941, AMES-217942).
- Chondrorhyncha crassa* Dressler, Orchidee (Hamb.) 34: 222. 1983. = ***Daiotyla crassa*** (Dressler) Dressler
 TYPE: Panama. Chiriquí: Fortuna Valley, north side of river near La Sierpe, 11 May 1982, flowered in cult. 20 May through July, *R.L. Dressler 6055* (holotype, US; isotype, PMA).
- Chondrorhyncha eburnea* Dressler, Orchidee (Hamburg) 34: 224. 1983. = ***Chondroscaphe eburnea*** (Dressler) Dressler
 TYPE: Panama. Coclé: Cerro Caracoral, hills north of El Valle de Antón, ca. 850 m, 9 July 1982, *R.L. Dressler 6070* (holotype, US; isotype, PMA).
- Chondrorhyncha lipscombiae* Rolfe, Bull. Misc. Inform. Kew 1912: 133. = ***Warczewiczella lipscombiae*** (Rolfe) Fowlie
 TYPE: Panama. “It was found by ... Mr. Lancelot Lipscomb, when helping to clear some bush for rubber and cocoa planting, and was sent home with a good many other in 1910”, flowered in the collection of Mrs. Lipscomb, Milton Grove, Wimbledon, Dec. 1911, *Lipscomb s.n.* (holotype, K).
- Chondroscaphe atrilinguis*** Dressler, Orquideología 22(1): 16. 2001.
 TYPE: Panama. Bocas del Toro: floreció en cultivo, 8 Sept. 2000, *R.L. Dressler 6289* (holotype, MO).
- Chysis pluricostata*** Dressler, Orquideología 24(2): 142. 2006.
 TYPE: Panama. Darién: cerca de Metetí, de Porfirio Martínez, prensado de cultivo, 8 Jun 2005, *M. Whitten 2968* (holotype, PMA).
- Chysis violacea*** Dressler, Orquideología 22(3): 237. 2003.
 TYPE: Panama, prov. Panama, Dist. de Chimán, Río Tuti, Cerro Chucantí, creciendo en risco, colectado por Neal G. Smith; preparado de cultivo Sept. 2001, *R. L. Dressler 6340* (holotype, MO; isotype, PMA; clonotype, SEL; photo of type).
- Cischweinfia nana*** Dressler, Selbyana 22(1): 9. 2001.
 TYPE: Panama. Chiriquí: Camp Hornito, Fortuna dam site, 82°10'W, 8°44'N, elev. 1000-1200 m, 17 September 1977, *R.L. Dressler 5700* (holotype, MO; isotype, PMA).
- Cischweinfia pusilla*** (C.Schweinf.) Dressler & N.H.Williams subsp. ***furcata*** Dressler & Dalström, Selbyana 25(1): 5. 2004.
 TYPE: Panama. Veraguas: El Pantano, N.E. of Santa Fe; flowered in cult. 16 Oct. 2002, *R.L. Dressler 6396A* (holotype, MO).
- Cischweinfia sheehaniae* Christenson, Orchids (West Palm Beach) 72: 126. 2003. = ***Cischweinfia pusilla*** (C.Schweinf.) Dressler & N.H.Williams
 TYPE: Hort. Andy's Orchids (2553): Panama and Colombia, but may also occur in Costa Rica, *Christenson 2057* (holotype, NY).
- Coccineorchis cristata*** Szlach., Rutk. & Mytnik, Ann. Bot. Fenn. 41(6): 482. 2004
 TYPE: Panama. Panama: Cerro Jefe, ca. 800 m, 16 Dec 1972, *R.L. Dressler 4233* (holotype, FLAS).
- Coccineorchis dressleri*** Szlach., Rutk. & Mytnik, Ann. Bot. Fenn. 41(6): 481. 2004
 TYPE: Panama. Chiriquí: Cerro Hornito, 1700 m, 14 Dec 1976, *C.A. Luer, J. Luer, R.L. Dressler & N.H. Williams 1322* (holotype, SEL).
- Cochleanthes anatonum* Dressler, Orchidee (Hamburg) 34: 160. 1983. = ***Euryblema anatonum*** (Dressler) Dressler
 TYPE: Panama. Coclé, near Aserradero El Copé; ca. 8 km. NO of El Copé, 750-850 m, very wet cloud forest,

1 September 1977, epiphyte, *R.L. Dressler 5690* (holotype, US; isotype, PMA).

Cocleorchis sarcoglottidis Szlach., *Fragm. Florist. Geobot.* 39: 558-560. 1994. = *Cyclopogon dressleri* Szlach.

TYPE: Panama. Cocle: El Cope, Atlantic slope E of sawmill, high ridge E of sawmill, 26 Feb 1979, *B.E. Hammel 6275* (holotype, MO; isotype, MO).

Coeliopsis hyacinthosma Rchb. f., *Gard. Chron.* 9. 1872.

TYPE: Panama. Flowered in the garden of W. Wilson Saunders, who got it from Panama, *W. Wilson Saunders s.n.* (holotype, W; illustration of type, AMES).

Condylago furculifera Dressler & Bogarín, *Harvard Pap. Bot.* 12(1): 2. 2007. = *Stelis furculifera* (Dressler & Bogarín) Bogarín

TYPE: Panama. Veraguas: Chilagro, near Cerro Arizona, west of Santa Fé, 1000–1200 m, flowered in cultivation at Finca Dracula, Cerro Punta, Chiriquí, 14 December 2006, *R. L. Dressler 6835* (holotype, PMA; isotype, JBL-spirit).

Coryanthes hunteriana Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 63. 1922.

TYPE: Panama. An Wasserläufen zwischen Hügeln bei Panama City, *C.W. Powell 19* (holotype, B, destroyed), lectotype designated by Christenson (1991b), AMES-26894; isolectotypes, AMES-25007, AMES-25008, AMES-31853[?], AMES-*s.n.* [?], K, MO-955890; illustration of type, AMES).

Coryanthes maduroana G.Gerlach, *Lankesteriana* 4(1): 70. 2004.

TYPE: Panama. Coclé: El Valle de Antón, floreció en cultivo en Panama, 4 de diciembre 2002, *A. Maduro & E. Olmos 512* (holotype, PMA).

Coryanthes panamensis G.Gerlach, *Trop. Subtrop. Pflanzenwelt* 83: 141. 1993.

TYPE: Panama. Kanal Zone, Rio Piedras, kultiviert in Botanischen Garten Heidelberg unter der Nr. O-18594, *H.G. Seeger O-18594* (holotype, HEID).

Coryanthes powellii Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 64. 1922. = *Coryanthes hunteriana* Schltr.

TYPE: Panama. Auf Hügeln bei Panama-City, *C.W. Powell 156* (holotype, B, destroyed; lectotype designated by Christenson (1991b), K; isolectotype, AMES-26893).

Crossoglossa bifida Dressler, *Orquideología* 20: 255. 1997.

TYPE: Panama. Panama: Cerro Jefe, 22 Sept. 1970; on mossy trunk in cloud forest; sepals and petals pale green, lip orange-tan; *R.L. Dressler 3890* (holotype, MO; isotype, PMA).

Crossoglossa elliptica Dressler, *Orquideología* 20: 256, fig. 1997.

TYPE: Panama. Coclé: near Aserradero El Copé, ca. 8 km N of El Copé, Jan 1978, *J.P. Folsom s.n.* (holotype, MO; isotype, FLAS).

Cryptocentrum caespitosum Carnevali, *Harvard Pap. Bot.* 5(2): 472. 2001.

TYPE: Panama. Coclé: North rim of El Valle, 9 July 1939, *P.H. Allen 1911* (holotype, US; isotypes, AMES, F, MO, NY, SEL, VEN).

Cryptophoranthus lepidotus L.O.Williams, *Ann. Missouri Bot. Gard.* 29: 340. 1942. = *Zootrophion gracilentum* (Rchb.f.) Luer

TYPE: Panama. Coclé: trail to Las Minas, hills north of El Valle de Antón, alt. ca. 1000 m, 1 Sep 1941, epiphytic, lower sides of many leaves deep purple, flowers white with very heavy purple stripes, *P. H. Allen 2718* (holotype, AMES; isotype, MO).

Cryptophoranthus powellii Ames, *Schedul. Orchid.* 4: 8. 1925. = *Dresslerella powellii* (Ames) Luer

TYPE: Panama. Foothills east of Panama. Grows in shady places. Leaves dark velvety green, lying flat on the limbs of trees. Flowers in February. Sea level. *C.W. Powell 278* (holotype, AMES [not located]; isotype, MO).

Cyclopogon dressleri Szlach., *Novon* 4: 172-173. 1994.

TYPE: Panama. Coclé: upper Rio Blanco, NW of El Cope (Caribbean slope), 600-800 m, *R.L. Dressler 5986* (holotype, FLAS).

Cycnoches diana Rchb.f., *Bot. Zeitung* (Berlin) 10: 636. 1852.

TYPE: Mittelamerika. *J. Warszewicz s.n.* (holotype, W).

Cycnoches guttulatum Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 56. 1922.

TYPE: Panama. Auf Hügeln bei Panama-City, *C.W. Powell 14* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23843; isolectotypes, K, MO-955885; drawing published in Mansfeld [1931: t. 61, nr. 242].).

Cycnoches pachydactylon Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 57. 1922.

TYPE: Panama. Chiriquí, c. 5000 fuss u.m., am Vulkan, *C.W. Powell 159* (holotype, B, destroyed; lectotype designated by Christenson (1991b), K; drawing of type, AMES-26807; drawing published in Mansfeld [1931: t. 61, nr. 243].).

Cycnoches powellii Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 58. 1922.

TYPE: Panama. Ohne nähere Herkunftsangabe, *C.W. Powell 111* (holotype, B, destroyed; lectotype designated by Christenson (1991b), drawing of type, AMES-26761).

Cycnoches stenodactylon Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 59. 1922.

TYPE: Panama. Chiriquí, 3000-3500 fuss um.m., *C.W. Powell 173* (holotype, B, destroyed; lectotype designated by Christenson (1991b), K; drawing of type, AMES-26823; drawing published in Mansfeld [1931: t. 61, nr. 244].).

Cycnoches warszewiczii Rchb.f., *Bot. Zeitung* (Berlin) 10: 734. 1852.

TYPE: [Panama]: Chiriquí, *J. Warszewicz s.n.* (holotype, W).

Cypripedium dariense Rchb.f., *Gard. Chron.*, n.s., 9: 202. 1878. = ***Phragmipedium longifolium*** (Warsz. & Rchb.f.) Rolfe

TYPE: [Panama]. (holotype, W).

Cypripedium humboldtii Warsz., *Bot. Zeitung* (Berlin) 10: 691. 1852. = ***Phragmipedium humboldtii*** (Warsz. ex Rchb.f.) J.T. Atwood & Dressler

TYPE: Panama. In *Quercubus montium* Chiriquí; lectotype designated by Atwood & Dressler (1998), W: “Mai Juni Juli [1848–1851]/Cordill. Chiriquí”, *J. Warszewicz* 41, W).

Diacrium bilamellatum var. ***reichenbachiana*** Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17:47. 1922. =

Caularthron bilamellatum (Rchb.f.) R.E. Schult.

TYPE: Panama. von Panama langs der pazifischen Küste ziemlich häufig, *C.W. Powell 67* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23966; isolectotype, AMES-23965).

Dichaea dressleri Folsom, *Novon* 16(3): 336. 2006.

TYPE: Panama. Chiriquí: forest near Fortuna Lake, just beyond bridge, 1100 m, 9 Apr. 1995, *J.P. Folsom 11278A* (holotype, PMA; isotypes, HNT, MO).

Dichaea eligulata Folsom, *Orchid Digest* 58(4): 185–186. 1994.

TYPE: Costa Rica[or adjacent Panama]. locality of original collection unknown--growing on trees at Las Cruces Botanical Garden, probably collected in Costa Rica or adjacent Panama, 8 Jul 1981, *J.R. Folsom 10261* (holotype, CR; isotype, TEX).

Dichaea elliptica Dressler & Folsom, *Lankesteriana* 3: 25. 2002.

TYPE: Panama. Coclé, Aserradero El Copé, ca. 8 km N of El Copé, 800-900 m, 9-10 April 1977, *R.L. Dressler 5641* (holotype, MO; isotype, PMA).

Dichaea obovatipetala Folsom, Orchid Digest 58: 186. 1994.

TYPE: Panama. Bocas del Toro: 15 km N of border with Chiriquí, road from Fortuna to Chiriquí Grande, 100 m, 10 Apr 1985, *J.P. Folsom 11302M* (holotype, PMA; isotypes, HNT, TEX).

Dichaea panamensis Lindl., Gen. Sp. Orchid. Pl. 209. 1833.

TYPE: Hab. in Panama, et Columbia occidentali, *H. Cuming 1292* (holotype, K).

Dichaea powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 90. 1922. = ***Dichaea trulla*** Rehb.f.

TYPE: Panama, auf Hügeln bei Alt. Bohio, unweit Panama City, in einem Tal., *C. W. Powell 23* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES; drawing of type, AMES-26859; drawing published in Mansfeld [1931: t. 79, nr. 316].).

Dichaea retroflexiligula Folsom, Orchid Digest 58: 187. 1994.

TYPE: Panama. Bocas del Toro: 12 km N of Chiriquí border, en route to Chiriquí Grande, 340 m, 10 Apr 1985, *J.P. Folsom 11301K* (holotype, PMA; isotypes, HNT, PMA, TEX).

Dichaea violacea Folsom, Orchid Digest 58: 190. 1994.

TYPE: Panama. Cocle: at continental divide, 7 km N of El Cope, 850-950 m, 6 Apr 1985, *J.P. Folsom 11283MM* (holotype, PMA; isotypes, HNT, TEX).

Dimerandra isthmi Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 44. 1922. = ***Dimerandra emarginata*** (G.Mey.) Hoehne

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 17* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23816; isolectotypes, K, MO, S; drawing of type, AMES-26749; drawing published in Mansfeld [1931: t. 59, nr. 235].).

Dracula agnosia A.Doucette, Phytotaxa 56: 23. 2012.

TYPE: Panama. Chiriquí: Guadalupe, gathered from material cultivated at Finca Dracula, 1 Nov 2011, *A. Doucette 4011* (holotype, BH; isotypes, PMA, WIS).

Dracula immunda A.Doucette, Phytotaxa 16: 38. 2011.

TYPE: Panama. Veraguas: gathered from material cultivated at Finca Dracula, reported from the Province of Veraguas from cloud forest above Santa Fé, *A. Doucette 3389* (holotype, BH; isotype, PMA; photo of type).

Dracula maduroi Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 234. 2004.

TYPE: Panama. Bocas del Toro: Velorio area, alt. 1100-1500 m, 10 August 2003, *A. Maduro & E. Olmos 410* (holotype, MO).

Dracula olmosii Luer & Maduro, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 136. 1999.

TYPE: Panama. Bocas del Toro: alt. 2000 m, collected by E. Olmos, 1994, cultivated at Finca Dracula, Cerro Punta, *C. Luer 18990* (holotype, MO).

Dresslerella elvallensis Luer, Selbyana 3(1/2): 2. 1976.

TYPE: Panama. Coclé: epiphytic in the cloud forest in the hills above El Valle, ca. 1000 m, 6 Mar. 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 1079* (holotype, SEL, not located; clonotype, K).

Dressleria allenii H.G.Hills, Lindleyana 15(3): 171. 2000.

TYPE: Panama. Without locality, N.H. Williams field collection, ex hort. Selby Gardens living accession 76-56-19, 18 Sep 1978, *J. Ackerman 1336* (holotype, SEL).

Dressleria kerryae H.G.Hills, Lindleyana 15(3): 175. 2000.

TYPE: Panama. Prov. Panama: Cerro Jefe, 1968, *R.L. Dressler 3515* (holotype, FLAS).

Dressleria severiniana H.G.Hills, Amer. Orchid Soc. Bull. 62: 616, figs. 1993.

TYPE: Panama. Prov. Coclé: El Valle de Antón, leg. R.L. Dressler, 12 May 1990, hort. FLAS #F1757, *H.G. Hills 90015* (holotype, AMES).

Dryadella butcheri Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 160. 1999.

TYPE: Panama. Chiriquí: without locality, collected by H. Butcher, flowered in cultivation by P. & A. Jesup in Bristol, CT., 10 December 1988, *C. Luer 13804A* (holotype, MO).

Dryadella dressleri Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 162. 1999.

TYPE: Panama. Canal Zone: epiphytic in forest along Río Piedras near Colón, alt. ca. 100 m, collected by R.L. Dressler, cultivated in Balboa, 18 Feb. 1985, *C. Luer 10627* (holotype, MO).

Dryadella odontostele Luer, Lindleyana 11: 54, fig. 1996.

TYPE: Panama. Panama: Cerro Jefe, epiphytic, alt. ca. 1000 m, 22 Sep 1972, *A. Gentry 6178* (holotype, MO).

Dryadella sororcula Luer, Lindleyana 11: 56, fig. 1996.

TYPE: Panama. Bocas del Toro: epiphytic in tall, wet forest between Fortuna and Chiriquí Grande, alt. 350 m, 17 Feb 1985, *C. Luer, J. Luer, R. Dressler & K. Dressler 10606* (holotype, MO).

Elleanthus capitatus Dressler, J. Orchideenfr. 11(2): 143. 2004.

TYPE: Panama. Coclé: Area of El Valle de Antón, flowered in cult. 3 July 2003, *R.L. Dressler 6387* (holotype, MO; isotype, PMA).

Elleanthus decipiens Dressler, J. Orchideenfr. 11(2): 146. 2004.

TYPE: Panama. Chiriquí, along trail to summit ridge of Cerro Pate Macho, ca. 6-8 km NE of Boquete, cloud forest and wind-swept ridge, corolla cream, pollinarium purple, infrequent at summit, elev. 1750-2100 m, 13 Mar 1988, *T.F. Daniel, F. Almeda & G. McPherson 5574* (holotype, CAS).

Elleanthus laxus Schltr., Repert. Spec. Nov. Regni Veg. 12: 213. 1913. = ***Elleanthus lancifolius*** C.Presl.

TYPE: Panama. Cerro de Garagara, Samba basin (Süddarien) zwischen 500 und 974 m, blühend im Feb 1911, *H. Pittier 5640* (holotype, B, destroyed; drawing of type, AMES).

Elleanthus stolonifer Barringer, Brittonia 37: 287. 1985.

TYPE: Panama. Prov. Chiriquí: La Fortuna Hydroelectric project, in cloud forest on ridge behind camp, 1300-1400 m, 23 Mar 1978, *B. Hammel 2280* (holotype, MO).

Elleanthus trilobatus Ames & C.Schweinf., Schedul. Orchid. 8: 53. 1925. = ***Elleanthus longibracteatus*** (Lindl. ex Griseb.) Fawc.

TYPE: Panama. San Juan. Epiphyte at sea level. April 1923, *C.W. Powell 3267* (Hort. Powell 97) (holotype, AMES).

Encyclia atropurpurea var. ***leucantha*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 45. 1922. = ***Encyclia cordigera*** (Kunth) Dressler

TYPE: Panama. sehr selten auf Hügeln bei Panama City, *C.W. Powell 149* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23942, isolectotypes, K, MO-955992).

Encyclia atropurpurea Schltr. var. ***rhodoglossa*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 45. 1922. = ***Encyclia cordigera***

TYPE: Panama. sehr häufig auf Hügeln bei Panama City, *C.W. Powell 80* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23940; isolectotypes, AMES-23941, K).

Encyclia elegantula Dressler, Orchid Digest 68(4): 244. 2004.

TYPE: Panama. Panama, Altos de Pacora, 930 m, cloud forest, 18 Sept 2002, *A. Maduro & E. Olmos 303* (holotype, MO).

Encyclia fortuneae Dressler, Orquídea (Mexico City) 7: 359. 1980. = ***Prosthechea fortuneae*** (Dressler) W.E.Higgins

TYPE: Panama. Chiriquí: near Camp Hornito, Fortuna dam site, 82°13' W, 8°44' N, 1000-1400 m, 27 Sept. 1976, *R.L. Dressler 5520* (holotype, US; isotype, PMA).

Encyclia hunteriana Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 46. 1922. = ***Encyclia stellata*** (Lindl.) Schltr.

TYPE: Panama. Bei David, im Chiriquí-Distrikt, etwa in Meereshöhe, *C.W. Powell 84* (holotype, B, destroyed);

lectotype designated by Christenson (1991b), AMES-23937; drawing, AMES; isoelectotypes, AMES-955939, K, MO).

Encyclia powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 46. 1922. = *Encyclia ceratistes* (Lindl.) Schltr.
TYPE: Panama. Chiriquí-Bezirk; 4000-5000 fuss, *C.W. Powell 83* (holotype, B, destroyed, lectotype designated by Christenson (1987), AMES-23812; isoelectotypes, AMES-26874, AMES-27875, K, MO-955937, MO-955938).

Encyclia sima Dressler, Orquideología 4: 91, fig. 1969. = *Prosthechea sima* (Dressler) W.E.Higgins
TYPE: Panama. Panama, Cerro Jefe, 12 Nov 1967. Selva nublada a aprox. 950 m, *R. L. Dressler 3160* (holotype, US; isotypes, MO, PMA).

Encyclia silverarum Leopardi & Carnevali, Phytotaxa 183 (3): 161. 2014.

TYPE: Panama. Panamá: Capira, Bajo Bonito, 13 April 2012, *G. & K. Silvera, s.n.* (holotype, PMA).

Epidanthus crassus Dressler, Orquídea (Mexico City) 9: 15. 1983. = *Epidendrum insolatum* Barringer
TYPE: Panama. Coclé: al norte del Asserradero El Copé, 9-10 km al norte de El Copé, vertiente del Atlántico, elev. 800-850m, selva de neblina muy húmeda, 1 Sep 1977, epífita, *R.L. Dressler 5686* (holotype, US; isotypes, F, MO, PMA).

Epidendrum acrostigma Hágsater & García-Cruz, Icon. Orchid. 3(2): t. 301. 1999. = *Epidendrum gibbosum* L.O.Williams

TYPE: Panama. Chiriquí: W end of high N of Barú summit, ca. 3000 m, col. 8 Apr. 1979, *B. Hammel 6910, W. D'Arcy, E. C. Hills, S. Schwartz & O. & H. Wolcott* (holotype, AMO; isotype, MO).

Epidendrum alanjense Ames, Schedul. Orchid. 1: 13. 1922. = *Encyclia stellata* (Lindl.) Schltr.

TYPE: Panama. Chiriquí: Alanje, *H. Pittier s.n.* (holotype, US).

Epidendrum allenii L.O.Williams in Woodson & Schery, Ann. Missouri Bot. Gard. 28: 418. 1941.

TYPE: Panama. Coclé: epiphytic, leaves and stem red, sepals and petals pale pink, labellum white, hills north of El Valle de Antón, ca. 1000 m, 14 Jul 1940, *P. Allen 2203* (holotype, AMES).

Epidendrum amandum Ames, Schedul. Orchid. 4: 36. 1923. = *Encyclia chloroleuca* (Hook.) Neumann

TYPE: Panama. foothills east of Panama. Flowers in January and February, sea level, *C.W. Powell 271* (holotype, AMES; isotype, MO).

Epidendrum antonense Hágsater, Icon. Orchid. 2: 108 fig. 1993.

TYPE: Panama. Colón: near Río Guanche, 10 Aug 1971, *R.L. Dressler 4071* (holotype, AMO).

Epidendrum atropurpureum var. *laciniatum* Ames, F.T.Hubb. & C.Schweinf., Bot. Mus. Leafl. 3: 63. 1935. = *Encyclia cordigera*

TYPE: Panama, foothills east of the city. "Sepals and petals are the same as *Epid. atropurpureum*, lip is a pink with dentate or notched margin, the lateral lobes are very small and do not meet over the column. color rose pink." At sea-level. *C. W. Powell 287* (holotype, AMES).

Epidendrum bilamellatum Rchb.f. in W.G.Walpers, Ann. Bot. Syst. 6: 345. 1862. = *Caularthron bilamellatum* (Rchb.f.) R.E.Schult.

SYNTYPES: [Venezuela]. *Wagner s.n.* (syntype, W; fragment of syntype, AMES), [Panama] *P. Chagres, Behr s.n.* (syntype, W).

Epidendrum bisulcatum Ames, Schedul. Orchid. 5: 24. 1923.

TYPE: Panama. Chiriquí: Palo Alto Hill, 6000 feet altitude, February to March 1923, *C.W. Powell 280* (holotype, AMES; isotype, AMES).

Epidendrum brachybotrys Ackerman & Montalvo, Selbyana 9: 129. 1986.

TYPE: Panama. Coclé: N of El Copé, near sawmill, edge of continental divide, elev. 1,200-1,400 m, windward slope, 22 Jan 1980, *A. Montalvo 383* (holotype, SEL).

Epidendrum brassavolae Rchb.f., Bot. Zeitung (Berlin) 10: 729. 1852. = *Prosthechea brassavolae* (Rchb.f.) W.E.Higgins

TYPE: Panama. Chiriquí Vulcan. 8000', *J. Warszewicz s.n.* (holotype, W).

Epidendrum brevicaule Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 30. 1922. = *Epidendrum schlechterianum* Ames

TYPE: Panama. hills east of the [Panama] City, at sea level, *C. W. Powell 18* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23944; isolectotypes, K, MO-955889, S; illustration of type, AMES; drawing published in Mansfeld [1931: t. 47, nr. 187].). Superfluously designated by Santiago & Hágsater (2007), MO-955889.

Epidendrum bugabense Hágsater, Icon. Orchid. 2: 115. 1993.

TYPE: Panama. Chiriquí: Distrito Bugaba: Cerro Punta, 8°52'N, 82°33'W, 2200 m, along ridge to watershed to Bocas del Toro, 26 January 1985, *H. van der Werff & J. Herrera 6427* (holotype, AMO; isotypes, MO, PMA).

Epidendrum caligarium Rchb.f., Gard. Chron. 1869: 1110. 1869.

TYPE: New Granada. *Wentworth W. Buller s.n.* (holotype, W; isotypes, K, W; drawing of type, AMES).

Epidendrum caluerorum Hágsater, Icon. Orchid. 2: 116. 1993.

TYPE: Panama. Coclé: north of El Copé, 700 m, vertiente atlántica, preparado de material cultivado 23 junio 1986, *R.L Dressler sub E. Hágsater 6299* (holotype, AMO).

Epidendrum campylostalix Rchb.f., Bot. Zeitung (Berlin) 10: 730. 1852. = *Prosthechea campylostalix* (Rchb.f.) W.E.Higgins

SYNTYPES: "Costa Rica und Chiriquí"; Costa Rica, *Warszewicz s.n.* (W; isosyntype, K); Panama. Chiriquí, *J. Warszewicz s.n.* (W).

Epidendrum chiriquense Rchb.f., Bot. Zeitung (Berlin) 10: 730. 1852. = *Prosthechea varicosa* (Bateman ex Lindl.) W.E.Higgins

TYPE: Costa Rica un [Panama] Chiriquí, *J. Warszewicz s.n.* (holotype, W).

Epidendrum chlorocorymbos Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 30. 1922.

TYPE: Panama. Am Gatun-See, unweit Panama-City, *C.W. Powell 82* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23950, illustration of type, AMES-26780; isolectotypes BM, K, MO-955935; drawing published in Mansfeld [1931: t. 48, nr. 190].).

Epidendrum centropetalum Rchb.f., Bot. Zeitung (Berlin) 10: 732. 1852.

TYPE: Panama. Chiriquí: Vulkan, 4000', *J. Warszewicz s.n.* (holotype, W).

Epidendrum cirrhochiloides Hágsater & E.Santiago, Icon. Orchid. 11: t. 1112. 2008.

TYPE: Panama. Coclé: Continental Divide above El Copé, 650-750 m, 27 Nov 1985, *G. de Nevers, A. Henderson, H. Herrera, G. McPherson & L. Brako 6396* (holotype, MO; isotype, AMO).

Epidendrum cocleense Ames, F.T.Hubb. & C.Schweinf., Bot. Mus. Leafl. 4: 6. 1936. = *Epidendrum guanacastense* Ames & C.Schweinf.

TYPE: Panama. Coclé: lower portion of valley and marshes along R. Antón, alt. 500 m, Feb 1935, *A.A. Hunter & P.H. Allen 389* (holotype, AMES; isotypes, BM, BR, CAS, F, G, K, MICH, MO, NY, P, S, SEL, U, UC, US).

Epidendrum colonense Ames, Schedul. Orchid. 1: 14. 1922. = *Epidendrum sculptum* Rchb.f.

TYPE: Panama. Colón: Río Indio de Fató, near sea level, 24 Aug 1911, *H. Pittier 4265* (holotype, US; illustration of type, AMES).

Epidendrum coriifolium var. *purpurascens* Schltr., Repert. Spec. Nov. Regni Veg. 17: 31. 1922 2490 = *Epidendrum allochronum* Hágsater

TYPE: Panama. Chiriquí, 3800-4500', *C.W. Powell 119* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23949; isolectotype, K; photo and drawing, AMES). Superfluously designated by Hágsater (1993).

Epidendrum croatii Hágsater, *Icon. Orchid.* 3(2): t. 328. 1999.

TYPE: Panama. Coclé: north slope and summit of Cerro Pilón, 900-1173 m, 16 Mar 1973, *T.B. Croat 23240* (holotype, MO).

Epidendrum cryptanthum L.O. Williams, *Amer. Orchid Soc. Bull.* 11: [249], tab. 7. 1942.

TYPE: Panama. Coclé: hills north of El Valle de Antón, epiphytic, alt. 800-1000 m., 21 Nov 1942, *P.H. Allen 2262* (holotype, AMES).

Epidendrum curvicolonna Ames, F.T. Hubb. & C. Schweinf., *Bot. Mus. Leafl.* 3: 67. 1935. = ***Epidendrum simulacrum*** Ames

TYPE: Panama. Chiriquí: "Lino Hill," at 4000-4500 ft. alt. Grows in exposed places in considerable sun. Flowers green. Flowers May-July, *C.W. Powell 296* (holotype, AMES; isotype, MO).

Epidendrum curvisepalum Hágsater & Dressler, *Icon. Orchid.* 2: 125 fig. 1993.

TYPE: Panama. Chiriquí: Cerro Colorado, about 50 km north of San Félix, ca. 1400 m, 17 Aug 1975, *R.L. Dressler 5087* (holotype, AMO).

Epidendrum cynnostalix Rehb.f., *Bot. Zeitung (Berlin)* 10: 731. 1852. = ***Epidendrum stamfordianum*** Bateman

TYPE: Panama. Chiriquí, *J. Warszewicz s.n.* (holotype, W).

Epidendrum cymbiglossum Hágsater, *Icon. Orchid.* 2: 126 fig. 1993.

TYPE: Panama. Chiriquí: Distr. Bugaba: Santa Clara, 8°50'N, 82°44'W, to Cerro Pando, *H. van der Werff & J. Herrera 7186* (holotype, SEL).

Epidendrum dariense Hágsater, Kolan. & L. Sánchez, *Icon. Orchid.* 14(10): t. 1421. 2013.

TYPE: Panama. Prov. Darién: About 10 km from Pavarandó, about 150-200 m, 29 March 2012, *M. Kolanowska 410*, (holotype, AMO; isotype, UGDA, flower in spirit).

Epidendrum dentilobum Ames, F.T. Hubb. & C. Schweinf., *Bot. Mus. Leafl.* 3: 69. 1935.

TYPE: Panama. range of hills back of San Juan, upper reaches of the Chagres River. About sea-level. Late September, *C.W. Powell 342* (holotype, AMES).

Epidendrum dosbocasense Hágsater, *Orquídea (Mexico City)* 12: 282. 1992.

TYPE: Panama. Veraguas: Guabal, Río Dos Bocas, about 16 km NW of Santa Fé, ca. 500 m., 15-16 Nov 1974, *R.L. Dressler 4814* (holotype, AMO; isotypes, MO, PMA).

Epidendrum dunnii A.D. Hawkes, *Orchid J.* 1: 39. 1952. = ***Epidendrum pansamala*** Schltr.

TYPE: Panama. Coclé, rain forest on side of Cerro Grande at headwaters of Río Ceri, 2000 ft. alt., 15 Oct 1950, *H.A. Dunn s.n.* (Alex D. Hawkes 2392) (holotype, UC).

Epidendrum dwyeri Hágsater, *Icon. Orchid.* 2: 130 fig. 1993.

TYPE: Panama. Chiriquí: Boquete, Cerro Horqueta, 5000-6000 ft, 8 Aug 1967, *J.D. Dwyer & S.M.V. Hayden 7733* (holotype, MO).

Epidendrum dwyerioides Hágsater & E. Santiago, *Icon. Orchid.* 9: t. 929. 2007.

TYPE: Panama. Bocas del Toro: Changuinola, Sierra Madre, 2200 m, 5 Mar 2000, Jardín Finca Drácula 483 y 476, *E. Olmos & J. Nuñez 202* (holotype, AMO).

Epidendrum elephantinum Hágsater, *Icon. Orchid.* 7: t. 734. 2005.

TYPE: Panama. Darién: Parque Nacional del Darién W slope of Cerro Mali, on ridge between N & S branches of Río Púculo; ca. 18 km E of Púculo, 8°4'N 77°16'W, 1000-1200 m., 22 Oct 1987, *B. Hammel, G. de Nevers, H. Cuadros & H. Herrera 16421* (holotype, MO).

- Epidendrum ellipsophyllum*** L.O. Williams in Woodson & Schery, Ann. Missouri Bot. Gard. 28: 419, tab. 22, fig. 1, 2. 1941.
 TYPE: Panama. Coclé: epiphytic, flowers green, hills north of El Valle de Antón, 1000 m alt., 23 Jun 1940, *P. Allen 2178* (holotype, AMES).
- Epidendrum erythrostigma*** Hágsater, Icon. Orchid. 3(2): t. 331. 1999.
 TYPE: Panama. Chiriquí, northwest of Cerro Punta, at INRENARE station in Parque Amistad, 8°54'N, 82°35'W, 2300 m, 17 Oct 1992, M. Richardson sub G. McPherson 15905 (holotype, AMO; isotypes, MO, PMA).
- Epidendrum flexuosissimum*** C. Schweinf., Bot. Mus. Leaft. 14: 55, tab. 14. 1949.
 TYPE: Panama. Coclé, Cerro Pajita, hills north of El Valle, at 1100 m. alt., 27 Oct 1946, *Paul H. Allen 3780* (holotype, AMES; isotypes, BM, G, MO).
- Epidendrum folsomii*** Hágsater & E. Santiago, Icon. Orchid. 8: 832. 2006.
 TYPE: Panama. Coclé: sawmill 7 km NE of El Copé, 1800 ft., 22 Jun 1979, *T. Antonio 1123* (holotype, AMO).
- Epidendrum fortunae*** Hágsater & Dressler, Icon. Orchid. 8: 833. 2006.
 TYPE: Panama. Chiriquí: Boquete, Fortuna dam site, epiphytic, in cloud forest, 10 Feb 1985, *H. van der Werff & Cor van Hardeveld 6855* (holotype, AMO; isotype, MO).
- Epidendrum fragrans*** var. *pachypus* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 32. 1922. = ***Prosthechea fragrans*** (Sw.) W.E. Higgins
 TYPE: Panama. Chiriquí: ca. 4000 ft, *C.W. Powell 208* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23961; isolectotype, MO-956025).
- Epidendrum fuscopurpureum*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 32. 1922. = ***Epidendrum coriifolium*** Lindl.
 TYPE: Panama. Chiriquí, c. 4500', blühend im Oktober, *C.W. Powell 257* (holotype, B, destroyed; lectotype designated by Christenson (1991b), photograph at AMES-39206).
- Epidendrum galeochilum*** Hágsater & Dressler, Icon. Orchid. 7: t. 738. 2005.
 TYPE: Panama. Coclé: El Copé, April 1978, *R.L. Dressler s.n.* (holotype, AMO (color illustration prepared from slides; photo, AMES, COL, CR, JAUM, K, MO, PMA, SEL).
- Epidendrum gibbosum*** L.O. Williams in Woodson & Schery, Ann. Missouri Bot. Gard. 28: 420. 1941.
 TYPE: Panama. Chiriquí: terrestrial, flowers maroon, Casita Alta to Cerro Copete, alt. 2300-3300 m, 10 Jul 1940, *Woodson & Schery 367* (holotype, MO).
- Epidendrum glandulosum*** Ames, Schedul. Orchid. 7: 5, pl. 20. 1924. = ***Epidendrum stangeanum*** Rchb.f.
 TYPE: Panama. on trail from Colon, 1923. Sepals and petals olive green, labellum white. Flowering in September. Sea level, *C.W. Powell 338* (holotype, AMES).
- Epidendrum gregorii*** Hágsater, Icon. Orchid. 2: 138 fig. 1993.
 TYPE: Panama. Valle de Antón, comprada a Gregorio [Ruiz] en la Mesa, prensada 30 agosto 1981, *E. Hágsater 6410* (holotype, AMO; isotype, MEXU).
- Epidendrum gymnochlams*** Hágsater & E. Santiago, Icon. Orchid. 8: 839. 2006.
 TYPE: Panama. Chiriquí: aboye Boquete, on trail to Pate Macho on continental divide, 1850-2100 m, 13 March 1988, *G. McPherson 12323* (holotype, MO).
- Epidendrum gymnopodum*** Hágsater, Icon. Orchid. 7: t. 741. 2005. = ***Epidendrum cancanae*** (P. Ortiz) Hágsater
 TYPE: Panama. Darién: Parque Nacional del Darién Ridge between N & S branches of Río Púculo, across river from old Kuna village of Tacarcuna; ca. 18 km E of Púculo, 8°04' N 71°16' W, 600-1000 m, 21 October 1987, *B. Hammel, G. de Nevers, H. Cuadros & H. Herrera 16342* (holotype, MO).

Epidendrum hammelii Hágsater & L.Sánchez, Icon. Orchid. 2: 143 fig. 1993.

TYPE: Panama. Coclé: near sawmill 16.7 km north of turnoff to Coclesito from Llano Grande, alt. 700 ft, 6 March 1978, *B. Hammel 1809* (holotype, MO).

Epidendrum hornitense Hágsater & L.Sánchez, Icon. Orchid. 8: 841. 2006.

TYPE: Panama. Chiriquí: Camp Hornito, Fortuna Dam site, 8°44'N 82°13'W, 1000-1200 m, 12 Aug 1976, *R.L. Dressler 5326* (holotype, AMO; isotype, PMA).

Epidendrum hunterianum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 33. 1922.

TYPE: Panama. Im Überschwemmungsgebiete des Gatun-Sees, *C.W. Powell 29* (holotype, B, destroyed), lectotype designated by Christenson (1991b), K; drawing of type, AMES-26778; drawing published in Mansfeld [1931 : t. 50, nr. 198]).

Epidendrum incomptum Rchb.f., Bot. Zeitung (Berlin) 10: 733. 1852.

TYPE: [Panama]. Chiriquí: *J. Warszewicz s.n.* (holotype, W; illustration of type, AMES).

Epidendrum infundibulum Hágsater & E.Santiago, Icon. Orchid. 9: t. 946. 2007.

TYPE: Panama. Chiriquí: Vicinity of Fortuna Dam along trail below highway and across the valley of the Hornito, 8°45'N 82°15'W, 1100-1350 m, 24 Jan 1988, *G. McPherson 11986* (holotype, MO).

Epidendrum isthmi Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 34. 1922.

TYPE: Panama. Auf Hügeln bei Panama-City, *C.W. Powell 104* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23956; isolectotypes, AMES-23957, K, MO; drawing of type, AMES-26750; drawing published in Mansfeld [1931: t. 51, nr. 201]).

Epidendrum jefestigma Hágsater & García-Cruz, Icon. Orchid. 3(2): t. 340. 1999.

TYPE: Panama. Panama: Cerro Jefe, ca. 800 m, col. 11 Apr. 1977, *W. G. D'Arcy 11379* (holotype, MO).

Epidendrum jefellenii Hágsater & García-Cruz, Icon. Orchid. 3(2): t. 339. 1999.

TYPE: Panama. Provincia Panama: Cerro Jefe, alt. 1000 m, 13 Feb. 1977, *C. Luer & J. Luer 1400* (holotype, SEL; isotype, F).

Epidendrum kerichilum Hágsater, Orquídea (Mexico City), n.s., 11: 26. 1988.

TYPE: Panama. Chiriquí: Cerro Horqueta, al E de Volcán Barú, 1700-2300 m, selva alta. Colectada March 1981. Preparado de material cultivado, 4 June 1981, *E. Hágsater & R.L. Dressler 6519* (holotype, AMO; isotypes, K, MO).

Epidendrum lacteum Dressler, Orquídeología 11(2): 108-109, photo. 1976.

TYPE: Panama. Veraguas, cerca de la divisa continental, aprox. 12-15 km al noroeste de Santa Fé; alt. aprox. 700 m.; selva muy húmeda, 17 May 1975, *R.L. Dressler 5030* (holotype, US).

Epidendrum leucocardium Schltr., Repert. Spec. Nov. Regni Veg. 12: 206. 1913. = ***Epidendrum eburneum*** Rchb.f.

TYPE: Panama. Colón: Río Fato, etwa bei Meereshöhe, blühend im Aug 1911, *H. Pittier 4266* (holotype, B, destroyed; isotype, US).

Epidendrum longibracteatum Hágsater, Icon. Orchid. 3(2): t. 347. 1999.

TYPE: Panama. Chiriquí: Cerro Horqueta, detrás de Boquete, al E del Volcán Barú, ca. 2000 m, col 15 Mar 1981, pressed 7 June 1981, *E. Hágsater, R.L. Dressler & C. Castro 6526* (holotype, AMO; isotypes, PMA, SEL, AMES, COL, CR, ENCB, F, G, INB, K, MEXU, MO, NY, P, QCNE, S, SCZ, US, USM, WIS).

Epidendrum lorifolium Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 35. 1922. = ***Epidendrum flexuosum*** G.Mey

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 138* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23962; isolectotypes, AMES-27945, K, MO-955980; drawing of type, AMES-26766; drawing published in Mansfeld [1931: t. 52, nr. 205]).

Epidendrum lutheri Hágsater, Icon. Orchid. 2: 155 fig. 1993.

TYPE: Panama. Chiriquí-Bocas del Toro: Cerro Colorado, above the Copper Mine, ca. 1600 m, June 1986 [as 1989], *H. Luther, Besse, Halton & Kress 1059* (holotype, SEL; isotypes, AMES, AMO, AMO, US).

Epidendrum maduroi Hágsater & García-Cruz, Icon. Orchid. 3(2): t. 352. 1999.

TYPE: Panama. Chiriquí: Norte de Guadalupe, Cerro Punta, Volcán Barú, 2000-3000 M, collected 15 Mar 1981, pressed 22 Feb 1983, *E. Hágsater & R.L. Dressler 6468* (holotype, AMO; isotype, MO).

Epidendrum mantis-religiosae Hágsater, Orquidea (Mexico City), n.s., 11: 27. 1988.

TYPE: Panama. Panama: El Llano-Cartí. Colectado 18 Mar 1981. Preparado de material cultivado. 25 Sep 1982, *R.L. Dressler sub Hágsater 6304* (holotype, AMO; isotype, MO).

Epidendrum microanoglossum Hágsater & Karremans, Icon. Orchid. 14(10): t. 1457. 2013.

TYPE: Costa Rica-Panama. Puntarenas-Chiriquí: Coto Brus-Renacimiento, línea fronteriza entre Cerro Quijada del Diablo y Cerro Pando, entre mojones N.336-338, 8°54'51.9" N 82°43'59.13" W, 2205 m, bosque muy húmedo premontano, epífitas en bosque primario, "in itinere per limitem Costa Rica et Panama inter montis Quijada del Diablo et montis Pando", 19 Abril 2011, *A. P. Karremans, D. Bogarín & D. Jiménez 4010* (holotype, CR; isotype JBL-Spirit).

Epidendrum microrigidiflorum Hágsater, Icon. Orchid. 8: 853. 2006.

TYPE: Panama. Chiriquí: Valle de Fortuna, 1100-1200 m, 27 Oct. 1999, *R.L. Dressler 6259* (holotype, AMO).

Epidendrum mora-retanae Hágsater, Icon. Orchid. 2: 161 fig. 1993.

TYPE: Panama. Chiriquí: Cuesta de Piedra-Finca El Milagro, 800-1000 m, prepared from cultivated material, 27 February 1984, *E. Hágsater & R.L. Dressler 6499* (holotype, AMO).

Epidendrum niveocaligarium Hágsater, Icon. Orchid. 8: 860. 2006.

TYPE: Panama. Darién: 10 km NE of Jaqué, ridge between Río Tabuelita and Río Pavarandó, 1400-1600 ft., 1 Feb 1981, *W.G. D'Arcy & K. Sytsma 14547* (holotype, MO).

Epidendrum* × *nocturnum Hágsater & L.Sánchez, Icon. Orchid. 11: t. 1148. 2008.

TYPE: Panama. Comarca de San Blas, Nusagandi, El Llano Cartí, carretera, pressed 5 Mar 1981, *R.L. Dressler sub E. Hágsater 6285* (holotype, AMO).

Epidendrum nocturnum Jacq. var. *panamense* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 36. 1922. =

Epidendrum buenaventurae F.Lehm. & Kraenzl.

TYPE: Panama. Gatun-See, ungefähr in Seehöhe, *C.W. Powell 35* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23803; isolectotypes, K, MO).

Epidendrum orthodontum Hágsater & L.Sánchez, Icon. Orchid. 3(2): t. 361. 1999.

TYPE: Panama. Chiriquí: Cuesta de Las Palmas, southern slopes of Cerro de La Horqueta, humid forest, 1700-2100 m, 17 Mar 1911, *H. Pittier 3220* (holotype, US; isotype, AMES).

Epidendrum pajitense C.Schweinf., Bot. Mus. Leaf. 14: 56, t. 1949.

TYPE: Panama. Coclé: Cerro Pajita, hills north of El Valle, at 1100 m. alt., 27 Oct 1946, *Paul H. Allen 3784* (holotype, AMES).

Epidendrum panamense Schltr., Repert. Spec. Nov. Regni Veg. 12: 212. 1913.

TYPE: Panama. Cerro de Garagara, Sambu-basin (Süd-Darién), 500-974 m, blühend in Feb 1902, *H. Pittier 5635* (holotype, B, destroyed; isotypes, US, AMES).

Epidendrum pendens L.O.Williams, Ann. Missouri Bot. Gard. 28: 421, tab. 23. 1941.

TYPE: Panama. Coclé: epiphytic, pendant plants, foliage gray, flower terminal, green, La Mesa, El Valle de Antón, alt. ca. 1000 m, 22 Jun 1941, *Allen 2570* (holotype, AMES).

Epidendrum philowercklei Hágsater & E.Santiago, Icon. Orchid. 8: 870. 2006.

TYPE: Panama. Bocas del Toro: Changuinola, Sierra Madre, 2200 m, 5 Feb. 2000, Jardín Finca Drácula 482, A. Maduro & E. Olmos 200 (holotype, AMO).

Epidendrum piliferum Rchb.f., Linnaea 41: 83. 1876.

TYPE: Costa Rica. [Panama]. Chiriquí v. *J. Warszewicz s.n.* Cultum miserunt dom Linden a Wallisio, dom. Veitch a Zahnio lectum, lectotype designated by Santiago & Hágsater (2008), W-49570; isolectotype, W-49582).

Epidendrum pirrense Hágsater, Icon. Orchid. 4(3): t. 471. 2001.

TYPE: Panama. Darién: Top of ridge leading to Cerro Pirre. Area near Rancho Plástico, 1200-1400 m, 13 Nov 1977, J.P. Folsom, José Contrerra & Brijilio (of Piji Vasal) 6276 (holotype, MO).

Epidendrum plagiophyllum Hágsater, Icon. Orchid. 3(2): t. 370. 1999.

TYPE: Panama. Chiriquí: Volcán Barú, Cerro Punta, al N de Guadalupe, 2000-2300 m, collected 15 Mar 1981, pressed 19 Dec 1981, E. Hágsater, R.L. Dressler & C. Castro 6481 (holotype, AMO; isotype, STRI).

Epidendrum platycardium Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 36. 1922. = ***Prosthechea spondiada*** (Rchb.f.) W.E.Higgins

TYPE: Panama. Chiriquí: ca. 4000 ft Panama, C.W. Powell 141 (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES; isolectotypes, AMES, K; drawing of type, AMES-26748; drawing published in Mansfeld [1931: t. 54, nr. 216].).

Epidendrum platyphyllostigma Hágsater & García-Cruz, Icon. Orchid. 3(2): t. 372. 1999.

TYPE: Panama. Chiriquí: Cerro Colorado, ca. 50 km NO of San Félix, 1400-1450 m, 20 Sep. 1977, R. L. Dressler 5713 (holotype, AMO).

Epidendrum platystomum Hágsater & L.Sánchez, Icon. Orchid. 8: 873. 2006.

TYPE: Panama. Chiriquí: along Boquete Trail, Cerro Respingo, East of town of Cerro Punta, ca. 2000-2500 m., 11 Sept 1972, A. Gentry 5948 (holotype, MO; isotype, MO).

Epidendrum pleurothalloides Hágsater, Icon. Orchid. 2: t. 174. 1993.

TYPE: Panama. Chiriquí: Cerro Horqueta, detrás de Boquete, 1700-2300 m, prensado en cultivo 25 septiembre 1983, E. Hágsater & R.L. Dressler 6524 (holotype, AMO; isotypes, F, K, MO, US).

Epidendrum porphyrophyllum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 37. 1922. = ***Epidendrum porpax*** Rchb.f.

TYPE: Panama. Auf Hügeln bei Panama City, C.W. Powell 183 (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23806; isolectotype, MO-956016; drawing published in Mansfeld [1931: t. 55, nr. 217].).

Epidendrum powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 38. 1922.

TYPE: Panama. Chiriquí, c. 4000', C.W. Powell 228 (holotype, B, destroyed; neotype designated by Santiago & Hágsater (2008), lectotype designated by Christenson (1991b), AMES-23808; illustration of type, AMES-26768; drawing published in Mansfeld [1931: t. 55, nr. 218].).

Epidendrum prismatocarpum Rchb.f., Bot. Zeitung (Berlin) 10: 729. 1852. = ***Prosthechea prismatocarpa*** (Rchb.f.) W.E.Higgins

TYPE: [Panama]. Chiriquí, *J. Warszewicz s.n.* (holotype, W).

Epidendrum probiflorum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 39. 1922.

TYPE: Panama. Chiriquí gegen 4500', C.W. Powell 250 (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-27066; isolectotype, MO-956056).

Epidendrum pseudoschumannianum Fowlie, Orchid Digest 33: 255. 1969.

TYPE: Panama. Coclé: Beyond la Loma del Tigre, District of El Valle de Anton, on very tall trees of a warm, humid jungle, 800-1000 m, *C.K. Horich s.n.* (holotype, UCLA).

Epidendrum pudicum Ames, *Schedul. Orchid.* 6: 71, fig. 10. 1923.

TYPE: Panama. Chiriquí: Palo Alto, flowered under cultivation at Balboa in Aug 1923, *C.W. Powell 319* (holotype, AMES).

Epidendrum radicans var. *chiriquense* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 39. 1922. = ***Epidendrum radicans*** Pav. ex Lindl.

TYPE: Panama. Chiriquí, terrestrisch an Wegrändern zwischen Kraut und Gebüsch, c. 4000 ft. und darunter, *C.W. Powell 61* (holotype, B, destroyed; lectotype designated by Hágsater & Salazar (1990), MO-955940; isolectotypes, AMES-23811, K).

Epidendrum radlkoferianum Schltr., *Repert. Spec. Nov. Regni Veg.* 17: 142. 1921. = ***Epidendrum volutum*** Lindl. & Paxton

TYPE: Panama. Provinz Chiriquí, April 1858, *Dr. Moritz Wagner s.n.* (holotype, B, destroyed; photo of type, AMES; isotype, M).

Epidendrum rafael-lucasii Hágsater, *Icon. Orchid.* 2: 179. 1993.

TYPE: Panama. Sin localidad, preparado de material cultivado 15 abril 1983, *R.L. Dressler sub E. Hágsater 6293* (holotype, AMO).

Epidendrum resectum Rchb.f., *Linnaea* 41: 83. 1876.

TYPE: Ex America centrali, vix dubie ex [Panama] Chiriquí vivum misit b. Zahn ad hortulanos Veitch, Londinenses, qui bis specimina mecum communicavere viva. *Zahn ex Veitch s.n.* (holotype, W; illustration of type, AMES).

Epidendrum rigidum Jacq. var. *angustisegmentum* L.O. Williams, *Ann. Missouri Bot. Gard.* 33: 371. 1946. = ***Epidendrum angustisegmentum*** (L.O. Williams) Hágsater

TYPE: Panama. Bocas del Toro: Water Valley, vicinity of Chiriquí Lagoon, *von Wedel 1708* (holotype, AMES).

Epidendrum rousseauae Schltr., *Beih. Bot. Centralbl.* 36, Ab. 2: 407. 1918.

TYPE: Panama. Am Isthmus. *Mrs. Rousseau s.n.* (holotype, B, destroyed).

Epidendrum schistostemum Hágsater, Laube & L.Sánchez, *Icon. Orchid.* 11: t. 1177. 2008.

TYPE: Panama. Bocas del Toro: on a hill slope at Boca Chica creek (9°11'20"; 82°32'13"W), 5.8 km south east of the community Charco La Pava at the Río Changuinola, 550 m., Oct 2007, *S. Laube 563* (holotype, PMA).

Epidendrum sculptum Rchb.f., *Bonplandia* (Hannover) 2: 89. 1854.

TYPE: Panama. von Chagres von Herrn Keferstein eingeführt von Herrn Lehmann cultivirt, *Lehmann s.n.* (holotype, W; illustration of type, AMES).

Epidendrum simulacrum Ames, *Schedul. Orchid.* 6: 75. 1923.

TYPE: Panama. Chiriquí: Lino Hill, alt 4000-4500 ft, growing in exposed place, flowering in May and June, *C.W. Powell 298* (holotype, AMES).

Epidendrum spathulipetalum Hágsater & Dressler, *Icon. Orchid.* 4(3): t. 486. 2001.

TYPE: Panama. Chiriquí: de arriba de Boquete, cultivada en Finca Dracula, Cerro Punta, 20 Aug 1998, *Robert L. Dressler 6230* (holotype, AMO; isotype, PMA).

Epidendrum spenostele Hágsater & E.Santiago, *Icon. Orchid.* 9: t. 989. 2007.

TYPE: Panama. Chiriquí: Boquete, Valle Fortuna; received flowers 1 Oct 1987, cultivated by Andres Maduro, sent to Robert L. Dressler, who in turn sent it to E. Hágsater, *E. Hágsater 9361* (holotype, AMO).

Epidendrum stangeanum Rchb.f., *Gard. Chron.*, n.s., 15: 462. 1881.

TYPE: Panama. *F.F. Stange s.n.* (holotype, W; drawing of type, AMES).

Epidendrum subpatens Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 40. 1922. = *Epidendrum coronatum* Ruiz & Pav.

TYPE: Panama. Im Gebiete des Gatun-Sees und auch in Veraguas bei Santiago, *C.W. Powell 86* (holotype, B, destroyed lectotype designated by Christenson (1991b), AMES-23943; isolectotypes, MO-955940, illustration of type, AMES-26812; drawing published in Mansfeld [1931: t. 56, nr. 223].).

Epidendrum suturatum Hágsater & Dressler, Icon. Orchid. 2: 190 fig. 1993.

TYPE: Panama. Veraguas: ridge east of Cerro Tute, northwest of Santa Fé, 800-1000 m elev., 12 October 1975, *R.L. Dressler 5187* (holotype, AMO; isotype, AMES).

Epidendrum tacarcunense Hágsater, Icon. Orchid. 3(2): t. 384. 1999.

TYPE: Panama. Darién: vicinity of Cerro Tacarcuna summit camp, 1500-1750 m, 31 Jan 1975, *A. Gentry & S. Mori 14043* (holotype, MO).

Epidendrum teretifolium Sw. var. *powellianum* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 41. 1922. = *Jacquinella teretifolia* (Sw.) Britton & P. Wilson

TYPE: Panama. Chiriquí, 4000-4500 ft., *C.W. Powell 240* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-27067; isolectotype, MO-956048).

Epidendrum tetraceros Rchb.f., Bot. Zeitung (Berlin) 10: 733. 1852.

TYPE: [Panama]. Chiriquí, *J. Warszewicz 2721* (holotype, W; illustration of type, AMES; photo of type, AMO; isotype, K; photo of isotype, AMES).

Epidendrum transversellipticum Hágsater, Icon. Orchid. 4(3): t. 492. 2001.

TYPE: Panama. Chiriquí/Bocas del Toro: Cerro Colorado, along intersection of Bocas Rd. with main ridge rd., 15.4 km from Chami, 1400-1700 m, 24 Oct 1977, *J. P. Folsom 6101* (holotype, MO).

Epidendrum trialatum Hágsater, Orquídea (Mexico City), n.s., 9: 356. 1984.

TYPE: Panama. Coclé: Valle de Antón, Nov 1981, *R.L. Dressler sub Hágsater 4674* (holotype, AMO; isotypes, AMES, CR, K, PMA, US; illustration of type; photo of type).

Epidendrum unicallosum Hágsater & E.Santiago, Icon. Orchid. 8: 895. 2006.

TYPE: Panama. Chiriquí: Guadalupe, 20 Feb 2001, *A. Maduro & E. Olmos 179* (holotype, AMO).

Epidendrum veraguasense Hágsater, Orquídea (Mexico City) 12: 286. 1992.

TYPE: Panama. Veraguas: Along steep trail to summit of Cerro Tute, ca. 3 km above Escuela Agricultura Alto Piedra near Santa Fé, 3000-3100 ft., 4 Jan 1981, *K. Sytsma & T. Antonio 3046* (holotype, AMO; isotype, MO).

Epidendrum verecundum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 42. 1922. = *Epidendrum strobiliferum* Rchb.f.

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 209* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23817; isolectotype, MO-956026; drawing of type, AMES-26767; drawing published in Mansfeld [1931: t. 58, nr. 232].).

Epidendrum warszewiczii Rchb.f., Bot. Zeitung (Berlin) 10: 742. 1852.

TYPE: Costa Rica. [Panama] Veraguas, *J. Warszewicz s.n.* (holotype, W-50158 (drawing, AMES)).

Epidendrum witherspooniorum Hágsater & Dressler, Icon. Orchid. 7: t. 798. 2005.

TYPE: Panama. Panama, Cerro Jefe, trail leading W from summit, 24 Sept 1975, *J.T. & F. Witherspoon 8489* (holotype, MO).

Erythroides epiphytica Dressler, Orquídea (Mexico City) 13: 257. 1993. = *Microchilus epiphyticus* (Dressler) Ormerod

TYPE: Panama. Coclé: Hills N of El Valle de Antón, 12 May 1973, *R.L. Dressler 4383* (holotype, MO; isotype, PMA).

- Erythrodes killipii* Ames, Proc. Biol. Soc. Washington 34: 150. 1921. = *Microchilus nigrescens* (Schltr.) Ormerod
 TYPE: Panama. Chiriquí: valley of the Río Caldera, from El Boquete to the Cordillera, 1 Feb 1918, *Killip 3561* (holotype, AMES; isotypes, AMES, US, Rochester Academy of Science; illustration and photo of type).
- Erythrodes roseoalba* Dressler, Orquidea (Mexico City) 13: 257. 1993. = *Aspidogyne roseoalba* (Dressler) Ormerod
 TYPE: Panama. Veraguas: Ridge east of Cerro Tute [actually C. Arizona], NW of Santa Fé, elev. 1000-1200 m; 30 Oct 1977, *R.L. Dressler 5736* (holotype, MO).
- Eurystyles cornu-bovis* Szlach., Fragm. Florist. Geobot. 37: 16. 1992.
 TYPE: Panama. Veraguas: between second and third branches of Río Santa María, 10-12 km NW of Santa Fe, 4 Aug 1975, *R.L. Dressler 5077* (holotype, FLAS).
- Evelyna hymenophora* Rchb.f., Bot. Zeitung (Berlin) 10: 710. 1852. = *Elleanthus hymenophorus* (Rchb.f.) Rchb.f.
 TYPE: [Panama]. “Chiriquí Cordilleren. 6-7000’. Decbr.”, *J. Warszewicz s.n.* (holotype, W).
- Fregea amabilis* Rchb.f., Bot. Zeitung (Berlin) 10: 712. 1852. = *Sobralia amabilis* (Rchb.f.) L.O. Williams
 TYPE: [Panama]: Cordilleren von Chiriquí, Herrn *Dr. Klotzsch s.n.* (holotype, W).
- Gongora armeniaca* var. *bicornuta* C.Schweinf. & P.H.Allen, Bot. Mus. Leafl. 13: 139. 1948. = *Gongora horichiana* Fowlie
 TYPE: Panama. Veraguas: region west of Santa Fé, Cerro Tute, at 1000 m alt., 24 Jun 1947, *P.H. Allen 4648* (holotype, AMES; isotype, MO).
- Gongora dressleri* Jenny, Monogr. Gen. Gongora 90. 1993.
 TYPE: Panama. Tacaruma [Tacarcuna?]: 1500 m, *R.L. Dressler s.n.*, 1980, ex cult. R. Jenny, Bern (holotype, G; isotype, K).
- Gongora gibba* Dressler, Orquideología 7: 72. 1972.
 TYPE: Panama. Colón camino madero de Santa Rita, aprox. 15 km al este de Colón; floreció en cultivo 16 Apr 1968, *R.L. Dressler s.n.* (holotype, US; isotype, PMA).
- Gongora maculata* var. *latibasis* C.Schweinf. & P.H.Allen, Bot. Mus. Leafl. 13: 144. 1948. = *Gongora latibasis* (C.Schweinf. & P.H.Allen) Jenny
 TYPE: Panama. Canal Zone: ca. 2 mi W of Gatún Dam, at ca. 184 m alt., 1 Apr 1939, blooming time, *H. Butcher s.n.* (holotype, AMES).
- Gongora powellii* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 62. 1922.
 TYPE: Panama. Auf Hügeln bei Panama-City, *C.W. Powell 76* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23856; isolectotypes, AMES-23855, MO; drawing of type, AMES-26848; drawing published in Mansfeld [1931: t. 62, nr. 247].).
- Govenia powellii* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 51. 1922.
 TYPE: Panama. Chiriquí, in Schluchten, c. 4000 fuss, *C.W. Powell 205* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23837; isolectotype, MO-956022; drawing of type, AMES-26851; drawing published in Mansfeld [1931: t. 60, nr. 240].).
- Habenaria avicula* Schltr., Repert. Spec. Nov. Regni Veg. 17: 138. 1921.
 TYPE: Panama. Ohne nähere Standortsangabe, Dec 1900, *W. Joseph s.n.* (holotype, B, destroyed).
- Habenaria mediocris* Dressler, Bol. Inst. Bot. Univ. Guadalajara 7(1-3): 96. 1999.
 TYPE: Panama. Chiriquí: Llanos del Volcán, in rocky grassland, flowers pale green, lip yellowish, 16 Jul 1979, *R.L. Dressler 5845* (holotype, MO).

Habenaria patentiloba Ames, Proc. Biol. Soc. Washington 34: 151. 1921.

TYPE: Panama. Panama. Orange River Valley, 7 Oct 1917, 60 m alt., dense forest, *Killip 3124* (holotype, AMES; illustration of type, AMES; isotype, Rochester Academy of Science, US).

Habenaria petalodes var. *micrantha* Rehb.f., Beitr. Orchid.-K. C. Amer. 5. 1866. = ***Habenaria warszewiczii*** Schltr.

TYPE: Lectam in Panama. *J. Warszewicz s.n.* (holotype, W).

Hexadesmia pachybulbon Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 26. 1922. = ***Scaphyglottis pachybulbon*** (Schltr.) Dressler

TYPE: Panama. Chiriquí, 4500 ft., *C.W. Powell 229* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23833; drawing of type, AMES-26779; isolectotype, MO-956040; drawing published in Mansfeld [1931: t. 45, nr. 180].).

Hexadesmia powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 27. 1922. = ***Scaphyglottis acostae*** (Schltr.) C.Schweinf.

TYPE: Panama. Chiriquí, c. 5000 Fuss ü. M., *C.W. Powell 225* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23822; isolectotypes, AMES, MO-956038; drawing of type, AMES-26769; drawing published in Mansfeld [1931: t. 46, nr. 181].).

Hexisea arctata Dressler, Orquidea (Mexico City) 7: 233. 1979. = ***Scaphyglottis arctata*** (Dressler) B.R.Adams

TYPE: Panama. Veraguas: ridge of Cerro Tute, about 1000 m, about 7 km NW of Santa Fe, 12 Oct 1975, *R.L. Dressler 5185* (holotype, US; isotypes, AMO, PMA, SEL, MO).

Hexisea bidentata Lindl., J. Bot. (Hooker) 1: 8. 1834. = ***Scaphyglottis bidentata*** (Lindl.) Dressler

TYPE: Panama et Columbia occidentali, *H. Cuming s.n.* (holotype, K).

Horichia dressleri Jenny, Orchidee (Hamburg) 32: 108. 1981.

TYPE: Panama. Aus Kultur (JE-29, Cons. Jard. Bot. Chambesey, Genf). Pflanze aus Panama, Provinz Bocas, 8 km nördlich von Almirante, nahe der Strasse von Almirante nach Changuinola, 200 m höhe, 10 Dec 1979, *R. Jenny JE-29* (holotype, G).

Huntleya cerina Lindl. & Paxton, Paxton's Fl. Gard. 3: 62. 1852. = ***Pescatoria cerina*** (Lindl. & Paxton) Rehb.f.

TYPE: [Panama]. It was found in Veragua, by Mr. Warszewicz, on the Chiriquí Volcano, at 8000 feet above the level of the sea, and was sold by auction by Mr. Stevens sometime in 1851. Mr. Rucker has been the first to flower it, *J. Warszewicz s.n.* (holotype, K).

Huntleya fasciata Fowlie, Orchid Digest 30: 281. 1966.

TYPE: Panama. Cocle. El Valle de Anton, 3000 ft., Sept 1964, *Edna Jackson J64 P23* (holotype, UCLA).

Ionopsis utricularioides var. *parviflora* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 74. 1922. = ***Ionopsis utricularioides*** (Sw.) Lindl.

TYPE: Panama. auf Hügeln bei Panama City, *C.W. Powell 181* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23889; isolectotypes, MO-956014, MO-961312).

Isochilus chiriquensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 25. 1922.

TYPE: Panama. Chiriquí-Distrikt, c. 4000', *C.W. Powell 98* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23831; isolectotypes, K, MO-955949; drawing of type, AMES-26817; drawing published in Mansfeld [1931: t. 45, nr. 178].).

Jacquiiniella pedunculata Dressler, Orquideología 5: 24. 1970.

TYPE: Panama. Colón: Camino maderero de Santa Rita; preparada de cultivo 28 Jan 1966, *R.L. Dressler 2986* (holotype, US; topotype, K).

Kefersteinia alata Pupulin, Harvard Pap. Bot. 8(2):161. 2004.

TYPE: Panama. Bocas del Toro: road from David to Chiriquí Grande, around km. 74, ca. 450 m, epiphytic in

premontane moist forest, 10 April 2001, flowered in cultivation at Gaia Botanical Garden, 18 August 2001, *F. Pupulin, D. Castelfranco & E. Salas 3119* (holotype, USJ; isotype, USJ-Spirit).

Kefersteinia angustifolia Pupulin & Dressler, *Harvard Pap. Bot.* 8(2):164. 2004.

TYPE: Panama. Chiriquí: Laguna, near El Hato del Volcán, 21 Oct. 1967, *H. Butcher s.n.* (holotype, MO).

Kefersteinia auriculata Dressler, *Orquideología* 16: 49. 1983.

TYPE: Panama. Coclé: cerros al N de El Valle de Antón, preparada de cultivo, junio, julio, 1971, *R.L. Dressler 4063* (holotype, US; isotype, PMA).

Kefersteinia maculosa Dressler, *Orquideología* 16: 52. 1983.

TYPE: Panama. Veraguas: filo de Cerro Arizona, arriba de Escuela Alto de Piedra, al Oeste de Santa Fe, 850–950 m; flores de cultivo, junio y Julio, *R.L. Dressler 6061* (holotype, US; isotype, PMA).

Kreodanthus bugabae Ormerod, *Harvard Pap. Bot.* 13(1): 59. 2008.

TYPE: Panama. Chiriquí: Distrito Bugaba, Cerro Punta, along ridge to watershed to Bocas del Toro Province, 2200 m, 26 Jan 1985, *H. van der Werff & J. Herrera 6441* (holotype, MO).

Kreodanthus sytsmae Ormerod, *Harvard Pap. Bot.* 13(1): 61. 2008.

TYPE: Panama. Bocas del Toro: NW ridge of Cerro Pate Macho, from summit to Finca Serrano, 1200–2100 m, 27 May 1981, *K. Sytsma, S. Knapp & L. Andersson 4945* (holotype, MO).

Leochilus powellii Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 81. 1922. = ***Leochilus scriptus*** (Scheidw.) Rehb.f.

TYPE: Panama. Veragua-Provinz und auf Calabash-Bäumen auf der Westseite des Kanals *C.W. Powell 129* (holotype, B, destroyed; lectotype designated by Chase (1986), AMES-23926; isolectotypes, K, MO-955972; drawing of type, AMES-26796; drawing published in Mansfeld [1931: t. 81, nr. 324].).

Lepanthes ankistra Luer & Dressler, *Orquideología* 16(3): 12. 1986.

TYPE: Panama. Prov. of Chiriquí: epiphytic in cloud forest on Cerro Colorado, alt. 1500 m, 15 February 1985, *C. Luer, J. Luer, R.L. Dressler & K. Dressler 10534* (holotype, MO).

Lepanthes antilocapra Luer & Dressler, *Orquideología* 16(3): 15. 1986.

TYPE: Panama. Prov. of Chiriquí: epiphytic in cloud forest on Cerro Colorado, alt. 1750 m, 15 February 1985, *C. Luer, J. Luer, R.L. Dressler & K. Dressler 10544* (holotype, MO).

Lepanthes arachnion Luer & Dressler, *Orquideología* 16(3): 6–9, 20–22. 1986. = ***Lepanthes pantomima*** Luer & Dressler

TYPE: Panama. Prov. of Bocas del Toro: epiphytic in wet forest between Fortuna and Chiriquí Grande, alt. 350 m, 17 February 1985, *C. Luer, J. Luer, R.L. Dressler & K. Dressler 10615* (holotype, MO).

Lepanthes brunnescens Luer, *Phytologia* 55: 179. 1984.

TYPE: Panama. Prov. of Panama: epiphytic in cloud forest, Cerro Jefe, alt. 900 m, 1 Dec 1983, *C. Luer, J. Luer, A. Maduro & H. Butcher 9200* (holotype, SEL).

Lepanthes caloptera Luer, *Phytologia* 55: 180. 1984.

TYPE: Panama. Prov. of Panama: epiphytic in cloud forest, Cerro Jefe, alt. 900 m, 1 Dec. 1983, *C. Luer, J. Luer, A. Maduro & H. Butcher 9194* (holotype, SEL).

Lepanthes chiriquensis Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 17. 1922.

TYPE: Panama. Chiriquí: c. 5000 ft in feuchten Schluchten, *C.W. Powell 254* (holotype, B; lectotype designated by Christenson (1991b), AMES-23781; drawing published in Mansfeld [1931: t. 39, nr. 154].).

Lepanthes coeloglossa Luer, *Phytologia* 55: 180. 1984.

TYPE: Panama. Prov. of Chiriquí: epiphytic in elfin forest on Cerro Hornito, alt. 1700 m, 15 Dec. 1976, *C. Luer, A. Luer, R.L. Dressler & N.H. Williams 1357* (holotype, SEL).

- Lepanthes collaris* Luer, Lindleyana 2(4): 185. 1987. = *Lepanthes blephariglossa* Schltr.
TYPE: Panama. Prov. of Chiriquí: epiphytic in forest on Cerro Colorado, alt. 1500 m, 15 February 1986, C. Luer, J. Luer, R.L. Dressler & K. Dressler 10563 (holotype, MO).
- Lepanthes confusoides* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 165. 1999.
TYPE: Panama. Bocas del Toro, forest at alt. 900 m, collected by E. Olmos, cultivated at finca Dracula, Cerro Punta, 15 November 1998., C. Luer 18975 (holotype, MO).
- Lepanthes crossota* Luer, Lindleyana 2(4): 188. 1987. = *Lepanthes jimenezii* Schltr.
TYPE: Panama. Prov. of Chiriquí: Cerro Punta, collected and cultivated by A. Maduro, 1986, C. Luer 11630 (holotype, MO).
- Lepanthes demissa* Luer, Phytologia 55: 182. 1984.
TYPE: Panama. Chiriquí: epiphytic in cloud forest above Guadalupe, 2300 m, 8 Dec. 1983, C. Luer, J. Luer & A. Maduro 9292 (holotype, SEL).
- Lepanthes droseroides* Luer, Lindleyana 2: 188. 1987.
TYPE: Panama. Prov. of Chiriquí: Cerro Punta, collected by A. Maduro 19-M., C. Luer 11632 (holotype, MO).
- Lepanthes eciliata* Schltr., Repert. Spec. Nov. Regni Veg. 12: 203. 1913.
TYPE: Panama. Chiriquí: Epiphyte im feuchten Walde bei Los Signas Camp, am Südabhang des Cerro de la Horqueta, 1700 m, bühend im Mar 1911, H. Pittier 3173 (holotype, B, destroyed; drawing of type, AMES; isotype, US).
- Lepanthes edentula* Luer, Lindleyana 10: 143, fig. 1995.
TYPE: Panama. Chiriquí: epiphytic near the Fortuna s\dam site, alt. 1100 m, 16 Feb 1985, C. Luer, R. Dressler & K. Dressler 10587 (holotype, MO).
- Lepanthes empis* Luer, Phytologia 55: 183. 1984. = *Lepanthes excedens* Ames & Correll
TYPE: Panama. Prov. of Chiriquí: epiphytic in small trees near Volcan, "La Cordillera," alt. 1300 m, 9 Dec. 1983, C. Luer, J. Luer, A. Maduro & H. Butcher 9314 (holotype, SEL).
- Lepanthes exposita* Luer, Lindleyana 2(4): 191. 1987.
TYPE: Panama. Prov. of Chiriquí: Cerro Punta, collected by A. Maduro 23-M., C. Luer 11634 (holotype, MO).
- Lepanthes incantata* Luer, Lindleyana 2: 194. 1987.
TYPE: Panama. Prov. of Panama: epiphytic in cloud forest on Cerro Jefe, alt. 900 m, 1 Dec. 1983., C. Luer, J. Luer & A. Maduro 9195 (holotype, SEL).
- Lepanthes infundibulum* Luer, Phytologia 55: 186. 1984. = *Lepanthes helleri* A.D.Hawkes
TYPE: Panama. Prov. oc Chiriquí: epiphytic in elfin forest, Cerro Hornito, alt. 1700 m, 15 Dec 1976, C. Luer; A. Luer, R.L. Dressler & N.H. Williams 1331 (holotype, SEL).
- Lepanthes insectiflora* C.Schweinf., Bot. Mus. Leaf. 7: 152. 1939 = *Lepanthes tipulifera* Rchb.f.
TYPE: Panama. Chiriquí: Boquete: Bajo Chorro, at 6000 ft alt., epiphyte in rain forest, 2-4 inches high, flowers burnt orange (?), 22 Jan 1938, M.E. Davidson 185 (holotype, F; isotype, AMES).
- Lepanthes laevis* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 168. 1999.
TYPE: Panama. Chiriquí, obtained from A. Maduro, cultivated at J & L Orchids, Easton, CT, 19 June 1998., C. Luer 18823 (holotype, MO).
- Lepanthes luerorum* B.T.Larsen, Phytotaxa 175(5) 279-280. 2014.
TYPE: Panama. Prov. of Chiriquí: epiphytic in forest above Boquete, 1,300-1,400 m, 6 May 2013, collected in the wild by Peter H. Peeters & André De Jonghe 023, flowered in cultivation in Bertem, Belgium, 9 July 2013, P. Peeters s.n. (holotype, LISI).
- Lepanthes maduroi* Luer, Phytologia 55: 186. 1984.

TYPE: Panama. Prov. of Chiriquí: epiphytic in cloud forest above Guadalupe, alt. 2300 m, 8 Dec. 1983, *C. Luer, J. Luer, A. Maduro 9305* (holotype, SEL).

Lepanthes mariposa Luer, *Phytologia* 55: 187. 1984.

TYPE: Panama. Prov. of Chiriquí: epiphytic in scrubby trees near Volcan, alt. 1350 m, 7 Dec 1983, *C. Luer, J. Luer & H. Butcher 9278* (holotype, SEL).

Lepanthes maxonii Schltr., *Repert. Spec. Nov. Regni Veg.* 12: 204. 1913.

TYPE: Panama. An Gaumstämmen in feuchten Wäldern zwischen Alto de Las Palmas und dem Gipfel des Cerro de Horqueta (Chiriquí), 2100-2268 m, blühend im Mar 1911, *W.R. Maxon 5494* (holotype, B; destroyed, illustration of type, AMES, isotypes, NY, US).

Lepanthes minyglossa Luer, *Selbyana* 23: 15. 2002.

TYPE: Panama. Chiriquí: epiphytic in cloud forest, Cerro Colorado, alt. 1650 m, 15 February 1985, *C. Luer et al. 10540* (holotype, MO).

Lepanthes mollis Luer, *Selbyana* 23: 15. 2002.

TYPE: Panama. Chiriquí: epiphytic in forest, Cerro Colorado, alt. 1500 m, 15 February 1985, *C. Luer et al. 10532* (holotype, MO; isotype, MO).

Lepanthes myiophora Luer, *Lindleyana* 2: 204. 1987.

TYPE: Panama. Prov. of Chiriquí: near the Fortuna dam site, alt. ca. 1000 m, collected Dec. 1976 by C. Luer et al., flowered in cultivation by P. & A. Jesup in Bristol, CT., 26 April 1987., *C. Luer 12879* (holotype, MO).

Lepanthes odontolabis Luer, *Lindleyana* 2: 207. 1987.

TYPE: Panama. Prov. of Chiriquí: Cerro Punta, collected by A. Maduro 20-M., *C. Luer 11633* (holotype, MO).

Lepanthes olmosii Bogarín, *Orchid Digest* 73(3): 141. 2009.

TYPE: Panama. Chiriquí: Boquete, Bajo Chorro, Alto Chiquero, collected by Erick Olmos, without further locality data, flowered in cultivation at Finca Dracula, Cerro Punta, Guadalupe, 12 December 2006, *D. Bogarín 3005* (holotype, PMA; isotypes, CR, JBL).

Lepanthes otopetala Luer, *Lindleyana* 6: 76. 1991.

TYPE: Panama. Chiriquí, collected by A. Maduro, without locality, flowered in cultivation by J & L Orchids, Easton, CT, May 1990, *C. Luer 14741* (holotype, MO).

Lepanthes pachyglossa Luer, *Phytologia* 57: 59. 1985.

TYPE: Panama. Prov. of Panama: epiphytic in cloud forest on Cerro Jefe, alt. 880 m, 1 Dec. 1983, flowered in cultivation in Sarasota, FL. 27 April 1984., *C. Luer, J. Luer, H. Butcher & A. Maduro 10029* (holotype, MO).

Lepanthes pexa Luer, *Lindleyana* 2: 181. 1987.

TYPE: Panama. Prov. of Bocas del Toro: epiphytic in cloud forest between Fortuna and Chiriquí Grande, alt. 1000 m. 17 February 1985, *C. Luer, J. Luer, R. Dressler & K. Dressler 10622* (holotype, MO).

Lepanthes prora Luer, *Phytologia* 55: 191. 1984.

TYPE: Panama. Prov. of Panama: epiphytic in cloud forest, Cerro Jefe, alt. 900 m, 1 Dec. 1983, *C. Luer, J. Luer, A. Maduro & H. Butcher 9207* (holotype, SEL).

Lepanthes psyche Luer, *Phytologia* 55: 192. 1984.

TYPE: Panama. Prov. of Chiriquí, epiphytic in small trees near Volcan, “La Cordillera,” alt. 1300 m, 9 Dec. 1983, *C. Luer, J. Luer, A. Maduro & H. Butcher 9317* (holotype, SEL).

Lepanthes pycnogenia Luer, *Lindleyana* 7: 114. 1992.

TYPE: Panama. Prov. of Chiriquí collected by R. & K. Dressler & C. & J. Luer in Feb. 1985, flowered in cultivation by P. & A. Jesup in Bristol, CT, 10 Dec. 1988., *C. Luer 13782* (holotype, MO).

Lepanthes rauhii Luer, *Orchidee* (Hamburg) 38: 59. 1987.

TYPE: Panama. Prov. of Panama: epiphytic in forest above Chepo, La Margarita, south of the Cordillera San Blas, alt. ca. 800 m, May 1980, collected by W. Rauh 65025, flowered in cultivation at Heidelberg University 16 Oct. 1985, *C. Luer 11423* (holotype, MO).

Lepanthes regularis Luer, *Lindleyana* 2: 210. 1987.

TYPE: Panama. Prov. of Chiriquí: Cerro Punta, Las Nubes, collected by A. Maduro 6-B., *C. Luer 11631* (holotype, MO).

Lepanthes ridicula Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 76: 168. 1999.

TYPE: Panama. Chiriquí, obtained from A. Maduro, cultivated at J & L Orchids, Easton, CT, 19 June 1998., *C. Luer 18827* (holotype, MO).

Lepanthes rotundifolia L.O. Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 275. 1940.

TYPE: Panama. Coclé: epiphytic, wet north rim, vicinity of el Valle, 800-1000 m alt., 21 May 1939, *P.H. Allen 1835* (holotype, MO).

Lepanthes schizocardia Luer, *Phytologia* 55: 193. 1984.

TYPE: Panama. Panama: epiphytic in cloud forest, Cerro Jefe, 900 m, 1 Dec. 1983, *C. Luer; J. Luer; H. Butcher & A. Maduro 9193* (holotype, SEL).

Lepanthes seegeri Luer, *Orchidee* (Hamburg) 38: 60, fig. 1987.

TYPE: Panama. Prov. of Chiriquí: epiphytic in forest above Boquete, alt. 1600-1700 m, April 1985, collected by H. Seeger 678A, flowered in cultivation at Heidelberg University 16 Oct. 1985., *C. Luer 11424* (holotype, MO).

Lepanthes setos Luer, *Phytologia* 55: 193. 1984. = ***Lepanthes fimbriata*** Ames

TYPE: Panama. Prov. of Chiriquí: epiphytic in scrubby trees near Volcan, alt. 1350 m, 7 Dec. 1983, *C. Luer; J. Luer & H. Butcher 9279* (holotype, SEL).

Lepanthes tetroptera Luer, *Lindleyana* 2: 214. 1987.

TYPE: Panama. Prov. of Chiriquí: Cerro Punta, collected by A. Maduro 2-B, *C. Luer 11628*, (holotype, MO).

Lepanthes trichidion Luer, *Phytologia* 55: 194. 1984.

TYPE: Panama. Prov. of Chiriquí: epiphytic in cloud forest above Guadalupe, alt. 2300 m, 8 Dec. 1983, *C. Luer; J. Luer & A. Maduro 9307* (holotype, SEL).

Lepanthes truncata Luer & Dressler, *Orquideología* 16(3): 9. 1986.

TYPE: Panama. Prov. of Bocas del Toro: epiphytic in wet forest between Fortuna and Chiriquí Grande, alt. 350 m, 17 February 1985., *C. Luer; J. Luer; R.L. Dressler & K. Dressler 10618* (holotype, MO).

Lepanthopsis rinkei Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 88: 104. 2002.

TYPE: Panama?: without collection data, purchased from Andy's Orchids, who had obtained the plant from Maduro in Panama, cultivated in Wichita, Kansas by Bryon Rinke, *C. Luer 20048* (holotype, MO).

Ligeophila grandis Ormerod, *Harvard Pap. Bot.* 9(2): 395. 2005. = ***Aspidogyne grandis*** (Ormerod) Ormerod

TYPE: Panama. Bajo Mono to Roblado trail, 2135 m, 24 Jul 1947, *P.H. Allen 4857* (holotype, AMES; isotype, US).

Lindsayella amabilis Ames & C. Schweinf., *Bot. Mus. Leaf.* 5: 34. 1937. = ***Sobralia callosa*** L.O. Williams

TYPE: Panama. Chiriquí: El Valle, alt. 2000 ft, in crevices of rocks or more rarely on a very large dead tree. 22 Jul 1935, *W.R. Lindsay & G.H. Bevins s.n.* (holotype, AMES).

Lockhartia chiriquiensis Schltr., *Repert. Spec. Nov. Regni Veg.* 12: 215. 1913. = ***Lockhartia micrantha*** Rehb. f.

TYPE: Panama. in der Nähe von San Félix, am östlichen Chiriquí, bis 120 m, blühend im Dec 1911, *H. Pittier 5286* (holotype, B, destroyed; illustration of type, AMES; isotype, NY).

- Lockhartia micrantha*** Rchb.f., Bot. Zeitung (Berlin) 10: 768. 1852.
TYPE: Panama. Veragua Hinds. *Cuming* (holotype, W).
- Lockhartia obtusata*** L.O.Williams, Amer. Orchid Soc. Bull. 9: [209], tab. 8. 1941.
TYPE: Panama. Coclé: hills north of El Valle de Antón, at 1000 m. alt., flowers bright yellow, the lip with raised orange ridges at the base, 23 Jun 1940, *P.H. Allen 2160* (holotype, AMES)
- Lockhartia pittieri*** Schltr., Repert. Spec. Nov. Regni Veg. 12: 216. 1913. = ***Lockhartia parthenoglossa*** Rchb.f.
TYPE: Panama. cultiviert in Culebra von Mrs. Rousseau, ursprünglich von Bohis stammend, blühend im Apr 1911, *H. Pittier (B.S.P.C.Z.) 3401* (holotype, B, destroyed; illustration of type, AMES).
- Lockhartia triangulabia*** Ames & C.Schweinf., Schedul. Orchid. 8: 80. 1925. = ***Lockhartia grandibractea*** Kraenzl.
TYPE: Panama. Chiriquí: alt. 4000-5000 ft, *C.W. Powell 362a* (holotype, AMES).
- Lockhartia variabilis*** Ames & C.Schweinf., Schedul. Orchid. 8: 81. 1925. = ***Lockhartia parthenoglossa***
TYPE: Panama. wooded hills near Frijoles, Jan-Feb 1924, sea level, *C.W. Powell 355* (holotype, AMES).
- Lophiaris silverarum*** Carnevali & Cetzal, Phytotaxa 162(3): 166. 2014. = ***Trichocentrum silverarum*** (Carnevali & Cetzal) J.M.H.Shaw
TYPE: Panama. Veraguas: Distrito de La Mesa, Palo Verde, Río Subí, Costa Pacífica, 8°13'N, 81°10'W, approx. 180 m, December 2005, vegetación primaria a orillas del río, *Silvera & Rodríguez s.n.* (holotype, PMA; isotypes, AMES, CICY).
- Lycaste campbellii*** C.Schweinf. in I.M.Johnst., Sargentia 8: 103. 1949.
TYPE: Panama. San Jose Island, epiphyte from streamside forest in Area 11B, *I.M. Johnston 1371* (holotype, AMES; paratype, AMES).
- Lycaste macrophylla*** Lindl. subsp. *panamanensis* Fowlie, Lasca Leaves 14: 40. 1964. = ***Lycaste panamanensis*** (Fowlie) Archila
TYPE: Panama. Coclé: El Valle de Antón, 3,000 ft., "F62P8" (holotype, LASCA).
- Lycaste powellii*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 65. 1922.
TYPE: Panama. Auf Hügeln bei Panama-City, *C. Powell 15* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23869; isolectotypes, K, MO-955886).
- Malaxis brevis*** Dressler, Selbyana 24(2): 141. 2003.
TYPE: Panama. Chiriquí: W slopes of Cerro Respingo, NE of Cerro Punta Village, approx. 82°34'W, 08°52'N, 8000-8500 ft, flowers yellowish green, 15 June 1971, *G.L. Webster & G. Brecken 16599* (holotype, MO).
- Malaxis rostratula*** Dressler, Selbyana 24(2): 142. 2003
TYPE: Panama. San Félix: Cerro Colorado, about 50 km N of San Félix, ca. 1400, 17 August 1975, cloud forest, flowers pale green, *R.L. Dressler 5102* (holotype, MO).
- Malaxis woodsonii*** L.O.Williams in Woodson & Seibert, Ann. Missouri Bot. Gard. 26: 281. 1939.
TYPE: Panama. Chiriquí: terrestrial, vic. of Casita Alta, Volcán de Chiriquí, alt. about 1500-2000 m, June 28-July 2, 1938, *R.E. Woodson, P.H. Allen & R.J. Seibert 831 and 832* (holotype, AMES; isotype, MO).
- Masdevallia allenii*** L.O.Williams in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 273. 1940. = ***Trisetella trigloch*** (Rchb.f.) Luer
TYPE: Panama. Coclé: vicinity of El Valle, 600-1000 m alt., 8 Dec 1938, *P.H. Allen 1230* (holotype, MO).
- Masdevallia andresiana*** Luer & Maduro, Monogr. Syst. Bot. Missouri Bot. Gard. 103: 283. 2005.
TYPE: Panama. Bocas del Toro: alt. 1200 m, collected and Andrew Maduro and son, cultivated by A. Maduro at Finca Dracula, Cerro Punta, Chiriquí, Panama, flowered in cultivation in Wilmington, DE, 16 Oct 1998, *M. Rao 96* (holotype, MO).

Masdevallia attenuata Rchb.f., Gard. Chron. 1871: 834. 1871.

SYNTYPES: Costa Rica [?]. “Z[ahn?] 178”, cultivated by Veitch 192; Panama [?], *Zahn s.n.* lectotype designated by Smith & Pupulin (2012), W: Panama [?]. Without collecting data, drawing of a syntype, based on *Zahn s.n.* (W 28837, Rchb-Orch 50775, upper part of the drawing).

Masdevallia butcheri Luer, Selbyana 3(1/2): 16. 1976. = *Trisetella tenuissima* (C.Schweinf.) Luer

TYPE: Panama. Coclé: epiphytic in old orange trees above El Valle, alt. ca. 1000 m, 2 Sept 1976, C. Luer & H. Butcher 1119 (holotype, SEL).

Masdevallia collina L.O.Williams, Amer. Orchid Soc. Bull. 11: [93], tab. 3. 1942.

TYPE: Panama. Coclé: epiphytic, hills north of El Valle de Antón, alt. ca. 1000 m, sepals and petals maroon-purple, sepaline tails yellow, 23 Jun 1940, P.H. Allen 2158 (holotype, AMES; isotype, MO).

Masdevallia dressleri Luer, Selbyana 3: 20. 1976. = *Trisetella dressleri* (Luer) Luer

TYPE: Panama. Panama: epiphytic along the Altos de Pacora road, alt. 650 m, 4 Mar 1976, C. Luer, J. Luer, P. Taylor & R.L. Dressler 730 (holotype, SEL).

Masdevallia eburnea Luer & Maduro, Monogr. Syst. Bot. Missouri Bot. Gard. 91: 409a. 2003.

TYPE: Panama. Chiriquí: alt. 1900-2000 m, collected by E. Olmos, spring 2000, cultivated at Finca Dracula, Cerro Punta, spring 2001, E. Olmos 157 (holotype, MO).

Masdevallia gloriae Luer & Maduro, Monogr. Syst. Bot. Missouri Bot. Gard. 91: 413a. 2003.

TYPE: Panama. Chiriquí: Cerro Punta, Guadalupe, alt. 2000 m, collected by A. Maduro and E. Olmos, cultivated at Finca Dracula at Cerro Punta, A. Maduro s.n. (holotype, MO).

Masdevallia livingstoneana Rchb.f. & Roezl, Gard. Chron. n.s., 2: 322. 1874.

TYPE: Panama. It was discovered in Panama by M. Roezl, and was sold lately at a sale in Mr. Stevens' rooms. B. Roezl s.n. (holotype, W).

Masdevallia maduroi Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 72: 110. 1998.

TYPE: Panama. Chiriquí: “Fortuna,” alt. 1200 m, collected & cultivated by Maduro's Tropical Flowers, flowered in cultivation at J & L Orchids, Easton, CT, 16 October 1998, C. Luer 18932 (holotype, MO).

Masdevallia olmosii Königer & Sijm, Arcula 12: 303. 2003.

TYPE: Panama. Bocas del Toro: Culebra, 1000 m, gesammelt von Sr. Erick Olmos, in Kultur bei Sr. Andrés Maduro auf der Finca Dracula in Cerro Punta, Panama, in Kultur in Blüte bei Herrn Ton Sijm in Hem, Niederlande, W. Königer WK-115 (holotype, M; isotype, PMA).

Masdevallia ostaurina Luer & V.N.M.Rao, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 249. 2004.

TYPE: Panama. Chiriquí: without more exact locality, alt. 1900-2000 m, collected by A. Maduro and E. Olmos, cultivated at Finca Dracula since 2000, flowered in cultivation in Wilmington, DE, 6 December 2003, V.N.M. Rao 161 (holotype, MO).

Masdevallia pelecanceps Luer, Selbyana 3: 22. 1976. = *Phloeophila pelecanceps* (Luer) Pridgeon

TYPE: Panama. Panama: epiphytic in the cloud forest of Cerro Jefe, alt. 1000 m, 19 Aug 1967, R.L. Dressler 3028 (holotype, SEL).

Masdevallia pleurothalloides Luer, Selbyana 3 (3/4): 218. 1977.

TYPE: Panama. epiphytic in cloud forest on Cerro Jefe, alt. 1000 m, 12 Nov 1967, R.L. Dressler 3155 (holotype, SEL).

Masdevallia scabrilinguis Luer, Phytologia 44: 168. 1979. = *Masdevallia attenuata* Rchb.f.

TYPE: Panama. Chiriquí: Cerro Gordo, collected by R.L. Dressler s.n., 1977, cultivated at SEL-77-1707, flowered in cult. 6 Mar. 1978, C. Luer 2788 (holotype, SEL).

Masdevallia tenuissima C.Schweinf., Bot. Mus. Leafl. 4: 11. 1937. = *Trisetella tenuissima* (C.Schweinf.) Luer

TYPE: Panama. Coclé: mountains beyond La Pintada, alt 400-600 m, Feb 1935, *A.A. Hunter & P.H. Allen 587* (holotype, AMES; isotype, MO).

Masdevallia tokachiorum Luer, *Lindleyana* 6: 90. 1991.

TYPE: Panama. Chiriquí: epiphytic in forest near the Fortuna dam site, alt. ca. 1000 m, collected March 1985 by R. Tokach, flowered in cultivation by K. Tokach in Tacoma, Washington, Sept. 1990, *C. Luer 14943* (holotype, MO).

Masdevallia utriculata Luer, *Phytologia* 44: 169. 1979.

TYPE: Panama. Chiriquí: epiphytic in cloud forest on Cerro Pate Macho, alt. ca. 2200 m, 27 Feb 1979, *R.L. Dressler & J. Kuhn s.n.* (holotype, SEL).

Maxillaria allenii L.O. Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 282, tab. 35. 1940. =

Camaridium allenii (L.O. Williams) M.A. Blanco

TYPE: Panama. Coclé: epiphytic, N rim of El Valle de Antón, 600-1000 m alt., flowers yellow, 12 Feb 1939, *P.H. Allen 1650* (holotype, MO).

Maxillaria chionantha J.T. Atwood, *Selbyana* 16: 242, fig. 1995.

TYPE: Panama. Prov. Veraguas: Vicinity of Continental Divide, third branch of Río Santa María to drop-off to lowlands, 12-15 km NW of Santa Fe, 650-750 m, 16-17 Nov 1974, *R.L. Dressler 4839* (holotype, SEL).

Maxillaria chiriquiensis Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 68. 1922. = ***Maxillariella variabilis*** (Bateman ex Lindl.) M.A. Blanco & Carnevali

TYPE: Panama. Chiriquí, c. 4000 ft., *C.W. Powell 125* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23878; isolectotypes, K, MO-955970, US; drawing of type, AMES-26773; drawing published in Mansfeld [1931: t. 64, nr. 254].).

Maxillaria curvicolonna M.A. Blanco & Neubig, *Orchids (West Palm Beach)* 76(6): 451. 2007.

TYPE: Panama. Bocas del Toro. Fortuna area? (cultivated in roadside garden north of Fortuna Dam site), *M. Whitten 2933* (holotype, FLAS).

Maxillaria darienensis J.T. Atwood, *Selbyana* 19: 254. 1998[1999].

TYPE: Panama. Prov. Darién: Cerro Pirre, valley between Pirre and next most southerly peak, 10-20 Jul 1977, *J. Folsom 4412* (holotype, MO; isotype, SEL).

Maxillaria diuturna Ames & C. Schweinf., *Schedul. Orchid.* 8: 58. 1925. = ***Maxillariella diuturna*** (Ames & C. Schweinf.) M.A. Blanco & Carnevali

TYPE: Panama. Cativa-Porto Bello Trail, Feb 1924, sea level, *C.W. Powell 376* (holotype, AMES).

Maxillaria dressleriana Carnevali & J.T. Atwood, *Lindleyana* 11: 29. 1996. = ***Mormolyca dressleriana*** (Carnevali & J.T. Atwood) M.A. Blanco

TYPE: Panama. Chiriquí: Fortuna Dam, near Rambola. Flowering in cultivation at the Marie Selby Botanical Gardens on January 3, 1995, Akers JJ (See OIC9304) Prepared by Atwood 95-1; s.d.; Cultivated at the Marie Selby Botanical Garden from material collected in Panama. Prov. Chiriquí, Fortuna (holotype, SEL; isotypes, AMES, INB, MO).

Maxillaria fragrans J.T. Atwood, *Selbyana* 22(2): 131. 2001. = ***Camaridium fragrans*** (J.T. Atwood) M.A. Blanco

TYPE: Panama. Prov. Panama: Cerro Jefe, cloud forest dominated by *Clusia* spp. and *Colpothrinax cookii*, premontane rain forest along trail on ridge running NE from summit, elev. ca. 1000 m, 18 Dec 1974, *Mori & Kallunki 3770* (holotype, SEL; isotypes, MO, WIS).

Maxillaria galantha J.T. Atwood & Carnevali, *Lindleyana* 9: 227. 1994.

TYPE: Panama. Top of Cerro Jefe, epiphytic herb, 9 June 1977, *J.P. Folsom 3608* (holotype, MO; isotype, SEL).

Maxillaria gatunensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 68. 1922. = *Heterotaxis sessilis* (Sw.) F.Barros

TYPE: Panama. Gatun-See-Gebiet bei Panama, *C. Powell 207* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-26946; isolectotype, MO-956024; drawing published in Mansfeld [1931: t. 64, nr. 255].).

Maxillaria insolita Dressler, Orquideología 14: 204. 1981. = *Camaridium insolitum* (Dressler) M.A.Blanco

TYPE: Panama. Panama: La Eneida, Altos de Pácora, Jul 1971, flores producidas en cultivo de junio a septiembre, *R.L. Dressler 4064* (holotype, US; photo of the flower from the plant that served as the holotype).

Maxillaria longicolumna J.T.Atwood, Selbyana 22(2): 132. 2001. = *Camaridium longicolumna* (J.T.Atwood) M.A.Blanco

TYPE: Panama. Prov. Veraguas: road from Santa Fe 1.5 km past Ag School to base of Cerro Tute, ca. 1000-1200 m elev., 4 Feb 1977, *J.P. Folsom 1574* (holotype, MO; isotype, MO).

Maxillaria longipetiolata Ames & C.Schweinf., Schedul. Orchid. 8: 61. 1925. = *Mapinguari longipetiolatus* (Ames & C.Schweinf.) Carnevali & R.B.Singer

TYPE: Panama. Hill east of Corozal, sea level, *C.W. Powell 307* (holotype, AMES).

Maxillaria lutheri J.T.Atwood, Selbyana 19: 257. 1998[1999]. = *Camaridium lutheri* (J.T.Atwood) M.A.Blanco

TYPE: Panama. Prov. Bocas del Toro: Cerro Colorado, above the Copper Mine, elev. ca. 1600 m, Jun 1986, *H. Luther et al. 1068* (holotype, SEL).

Maxillaria obscura Linden & Rchb.f., Beitr. Orchid.-K. C. Amer.: 31. 1866. = *Camaridium obscurum* (Linden & Rchb.f.) M.A.Blanco

TYPE: Floes obtinui ex horto Lindeniano Bruxellensi. Planta ex Columbia introducta fertur, *J. Linden s.n.* (holotype, W).

Maxillaria oreocharis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 69. 1922. = *Maxillariella oreocharis* (Schltr.) M.A.Blanco & Carnevali

TYPE: Panama. Chiriquí, 4000-5000 ft, *C.W. Powell 256* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23877; isolectotype, MO-956060).

Maxillaria panamensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 70. 1922. = *Maxillariella acervata* (Rchb.f.) M.A.Blanco & Carnevali

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 124* (holotype, B; lectotype designated by Christenson (1991b), K; isolectotype, K; drawing of type, AMES-26813; drawing published in Mansfeld [1931: t. 65, nr. 257].).

Maxillaria parvula Schltr., Repert. Spec. Nov. Regni Veg. Beih. 27: 176. 1924., *nom. illeg.* = *Maxillariella caucae* (Garay) Bogarín

TYPE: Colombia. Cauca: Pflanze gleich kletternden Rasen an den Baumstämmen nahe dem Boden, in den feuchtwarmen Ebenen nahe [Panama]. Bahía de Montijo (Veragua); häufig, *F. C. Lehmann no. 103*, blühend im Mai 1879 (B, destroyed).

Maxillaria powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 70. 1922.

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 28* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23880; isolectotypes, K, MO-955897; drawing of type, AMES-26794; drawing published in Mansfeld [1931: t. 65, nr. 258].).

Maxillaria pubilabia Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 71. 1922. = *Maxillaria ringens* Rchb.f.

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 214* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23881; isolectotype, MO-956030; drawing of type, AMES-26751; drawing published in Mansfeld [1931: t. 65, nr. 259].).

Maxillaria repens L.O.Williams, Amer. Orchid Soc. Bull. 10: [273], tab. 9. 1942. = *Ornithidium repens* (L.O.Williams) M.A.Blanco & Ojeda

TYPE: Panama. Coclé: Epiphytic, trail to Las Minas, north of El Valle de Antón, alt. 1000 m, 2 Dec 1941, *P. Allen 2868* (holotype, AMES; isotype, MO).

Maxillaria rodrigueziana J.T.Atwood & Mora-Ret., Icon. Pl. Trop. 14(1): t. 1361. 1989.

TYPE: Panama. Panama: El Cope, *T. Antonio 2137* (holotype, MO; isotype, SEL; detail of isotype, SEL).

Maxillaria rousseauae Schltr., Beih. Bot. Centralbl. 36, Ab. 2: 413. 1918. = *Maxillaria ringens* Rchb.f.

TYPE: Panama. Im Gebiete des Panama-Kanals, 1914, Rousseau s.n. (holotype, B, destroyed, neotype designated by Atwood (1999), *C.W. Powell 115*, MO).

Maxillaria sanguinea Rolfe, Bull. Misc. Inform. Kew 1895: 8. 1895. = *Maxillariella sanguinea* (Rolfe) M.A.Blanco & Carnevali

TYPE: Panama. Chiriquí: Chiriquí Lagoon, *James O'Brien s.n.* (holotype, K).

Maxillaria scalariformis J.T.Atwood, Selbyana 19: 257. 1998[1999]. = *Camaridium scalariforme* (J.T.Atwood) M.A.Blanco

TYPE: Panama. Prov. Chiriquí: near “Vivero,” 2-3 km S. of Fortuna dam site, Valle de Hornito, 10 May 1982, *R.L. Dressler 6050* (holotype, SEL).

Maxillaria stachyobiorum Rchb.f., Bot. Zeitung (Berlin) 10: 735. 1852. = *Xylobium foveatum* (Lindl.) G.Nicholson

TYPE: Panama. Chiriquí, *J. Warszewicz s.n.* (holotype, W).

Maxillaria synsepala J.T.Atwood, Selbyana 19: 260. 1998[1999]. = *Camaridium synsepalum* (J.T.Atwood) M.A.Blanco

TYPE: Panama. Prov. Chiriquí: Distrito Bugaba: Cerro Punta, 2200 m, 26 Jan 1985, *van der Werff & Herrera 6435* (holotype, SEL; isotype, MO).

Maxillaria tricarinata J.T.Atwood, Selbyana 19: 260. 1998[1999]. = *Camaridium tricarinatum* (J.T.Atwood) M.A.Blanco

TYPE: Panama. Prov. Bocas del Toro: Trocha 3 de noviembre, near pass over continental divide (Paso de la Zorra), elev. ca. 1500 m, 5 Apr 1978, *R.L. Dressler 5810* (holotype, SEL).

Maxillaria tubercularis J.T.Atwood, Lindleyana 9(4): 229. 1994. *Camaridium tuberculare* (J.T.Atwood) M.A.Blanco

TYPE: Panama. Chiriquí: Fortuna Dam region, along trail to Cerro Hornito (Pate de Macho) on southern ridge of watershed, short dense forest, 1800-1950 m, *G. McPherson 13567* (holotype, MO).

Maxillaria tutae J.T.Atwood, Selbyana 19: 262. 1998[1999]. = *Camaridium tutae* (J.T.Atwood) M.A.Blanco

TYPE: Panama. Prov. Veraguas: trail on ridge to summit of Cerro Tute [possibly Cerro Arizona Cordillera de Tute, 1 km past Escuela la Agrícola Alto de Piedras, W of Santa Fe, upper montane and elfin forest, 1250-1410 m, *S. Knapp & K. Sytsma 2641* (holotype, SEL; isotype, MO).

Maxillaria vagans Ames & C.Schweinf., Schedul. Orchid. 8: 65. 1925. = *Camaridium bracteatum* (Schltr.) Schltr.

TYPE: Panama. Chiriquí, Palo Alto, alt 4500-5000 ft, Nov 1923, *C.W. Powell 348* (holotype, AMES).

Mesospinidium panamense Garay, Orchidee (Hamburg) 24: 185. 1973. = *Brassia panamensis* (Garay) M.W.Chase

TYPE: Panama. prov. Coclé, im Norden von El valle de Antón, in der Nähe von La Mesa, 1000 m, *P.H. Allen 2785* (holotype, AMES).

Microchilus fuscatus Ormerod, Harvard Pap. Bot. 11(2): 161. 2007.

TYPE: Panama. Panama: Gorgas Memorial Labs, Yellow Fever research camp, “Campamento Quatro”, 5-10 km NE of Altos de Pacora, 600 m, 21-24 Nov 1974, *S. Mori & J. Kallunki 3412* (holotype, MO).

Microchilus ovalis Ormerod, Harvard Pap. Bot. 11(2): 164. 2007.

TYPE: Panama. Darien: Cana region, on trail above Cana, leading to Pirre Massif, 800-900 m, 5 May 1990, *G. McPherson 15047* (holotype, MO).

Microchilus panamanicus Ormerod, Harvard Pap. Bot. 9(2): 414. 2005.

TYPE: Panama. Panama: Cerro Trinidad, 800-1000 m, 20 Oct 1946, *P.H. Allen 3768* (holotype, AMES; isotype, MO).

Microchilus subquadratus Ormerod, Harvard Pap. Bot. 11(2): 172. 2007.

TYPE: Panama. Darien: Serrania del Darien, track from Cerro Mali to Río Pucuro base camp, 20 Jul 1976, *A. Gentry, H. Leon & L. Forero 16834* (holotype, MO).

Microchilus whitefoordiae Ormerod, Harvard Pap. Bot. 11(2): 173. 2007.

TYPE: Panama. Chiriquí: Fortune Lake to Chiriquí Grande road, trail W of continental divide, 1200 m, 22 Mar 1985, *R.J. Hampshire & C. Whitefoord 867* (holotype, BM).

Microstylis blephariglottis Schltr., Repert. Spec. Nov. Regni Veg. 12(317–321): 202. 1913. = *Crossoglossa blephariglottis* (Schltr.) Dressler ex Dodson

SYNTYPES: Costa Rica. *Brade s.n.* (B, destroyed). Panama. Chiriquí: an Baumstämmen in feuchten Wäldern der oberen Caldera Wasserschiede, oberhalb El Boquete, 1650-1925, Mar 1911, *W.R. Maxon 5667* (B, destroyed, US; illustration of type, AMES-21081; AMES-24380; photo of type, AMES).

Microstylis pittieri Schltr., Repert. Spec. Nov. Regni Veg. 12: 203. 1913. = *Malaxis pittieri* (Schltr.) Ames

TYPE: Panama. Chiriquí: feuchte Wälder zwischen Alto de las Palmas und dem Gipfel des Cerro de Horqueta (Chiriquí), 2100-2268 m, blühend Mar 1911, *H. Pittier 3277* (holotype, US; illustration of type, AMES-101737, illustration of type, AMES-24153).

Mormodes hookeri Lem., Jard. Fleur 1: 116. 1851.

TYPE: Panama. (holotype, K).

Mormodes lancilabris Pabst, Ann. Missouri Bot. Gard. 62: 510, f. 1. 1975.

TYPE: Panama. Coclé: Atlantic side of El Valle de Antón, floruit in cultura, 22 Nov 1965, *R. Dressler s.n.* (holotype, RB).

Mormodes powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 55. 1922.

TYPE: Panama. an den Hinterwässern des Gatun-Sees, *C.W. Powell 59* (holotype, B, destroyed; lectotype designated by Christenson (1991b), MO-955917; isoelectotype, AMES-23840, K; drawing of type, AMES-26826).

Mormolyca culebrica Bogarín & Pupulin, Orchid Digest 74(1): 44. 2010.

TYPE: Panama. Bocas del Toro: Culebra, between rivers Estrella and Changuinola, 1200 m, a plant collected by Erick Olmos, without further locality data, in cultivation at Finca Dracula, Cerro Punta, Chiriquí, Panama, 12 Dec. 2006, *D. Bogarín 2951* (holotype, PMA; isotypes, JBL-spirit).

Neowilliamsia cuneata Dressler, Orquídea (Mexico City) 8: 24. 1983. = *Epidendrum cuneatoides* Dodson ex Hágsater

TYPE: Panama. Veraguas: Pico de Cerro Arizona, arriba de la Escuela Alto de Piedra, oeste de Santa Fé, alt. 1300 m, 5 Jun 1982, *R.L. Dressler 6066* (holotype, US; isotypes, AMO, F, MO, PMA, SEL).

Neowilliamsia tenuisulcata Dressler, Orquídea (Mexico City) 8: 29. 1981. = *Epidendrum tenuisulcatum* (Dressler) Hágsater

TYPE: Panama. Coclé: cerca del Aserradero El Copé, a unos 8 km al norte de El Copé; 12 Aug 1977, *R.L. Dressler 5673* (holotype, US).

Nidema boothii Schltr. var. *triandrum* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 43. 1922. = *Nidema ottonis* (Rchb.f.) Britton & Millsp

TYPE: Panama. auf Hügeln östlich Panama City, etwa in Meereshöhe, *C.W. Powell 131*. (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23804; isolectotypes, K, MO-955974).

Notylia cordesii L.O. Williams in Woodson & Seibert, Ann. Missouri Bot. Gard. 26: 286. 1939. = ***Macroclinium cordesii*** (L.O. Williams) Dodson

TYPE: Panama. Bocas Del Toro: epiphytic, Mosquito Hill, 12-16 Aug 1938, *Woodson, Allen & Seibert 1932* (holotype, MO; illustration of type, AMES).

Notylia gracilispica Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 75. 1922. = ***Notylia pentachne*** Rchb.f.

TYPE: Panama. auf Hügeln bei Panama City, *C.W. Powell 185* (holotype, B, destroyed; lectotype designated by Christenson (1991b), MO-956018; drawing of type, AMES-26829; drawing published in Mansfeld [1931: t. 81, nr. 322].).

Notylia juncta Dressler, Orquideología 4: 164. 1969. = ***Macroclinium junctum*** (Dressler) Dodson

TYPE: Panama. Panama: La Eneida, región de Cerro Jefe, 15 Oct. 1967, *R.L. Dressler 3092* (holotype, US).

Notylia latilabia Ames & C. Schweinf., Schedul. Orchid. 8: 71. 1925.

TYPE: Panama. Frijoles, Apr 1924, sea level. Grows in full sunlight, usually on Calabash trees. Petals white without the orange dot on them characteristic of *N. pentachne* Reichb. f., *C.W. Powell 406* (holotype, AMES).

Notylia panamensis Ames, Orchidaceae 7: 112. 1922. = ***Notylia albida*** Klotzsch

TYPE: Panama. Marraganti and vicinity, 10-200 feet altitude, April 3-9, 1908, *R. S. Williams 977* (holotype, NY; photo of type, AMES).

Notylia pentachne Rchb.f., Bonplandia (Hannover) 2: 90. 1854.

TYPE: [Panama]. Von Chagres von Herrn Keferstein bezogen, von Herrn Lehmann cultivirt (holotype, W).

Notylia simplex Dressler, Orquideología 4: 166. 1969. = ***Macroclinium simplex*** (Dressler) Dodson

TYPE: Panama. Panama: La Eneida, región de Cerro Jefe; 25 Mar. 1968, *R.L. Dressler 3460* (holotype, US).

Oakes-amesia cryptantha C. Schweinf. & P.H. Allen, Bot. Mus. Leaflet 13(6): 134. 1948. = ***Ornithocephalus cryptanthus*** (C. Schweinf. & P.H. Allen) Toscano & Dressler

TYPE: Panama. Coclé: summit of Cerro Pajita, hills north of El Valle de Antón, 1000-1200 m alt., epiphyte on small trees in dwarf cloud forest, 7 Jan 1947, *P.H. Allen & D.O. Allen 4196* (holotype, AMES).

Odontoglossum chiriquense Rchb.f., Bot. Zeitung (Berlin) 10: 692. 1852. = ***Otoglossum chiriquense*** (Rchb.f.) Garay & Dunst.

TYPE: [Panama]. Cordillera von Chiriquí. 9000'. Auf verfaulten Baumstämmen. October (holotype, W).

Odontoglossum powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 129. 1922. ***Rossioglossum schlieperianum*** (Rchb.f.) Garay & G.C. Kenn

TYPE: Panama. Chiriquí Distrito: etwa 3800 ft, *C.W. Powell 178* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-25014, drawing of type; isolectotypes, MO-956010, MO-956011; drawing of type, AMES-26840; drawing published in Mansfeld [1931: t. 72, nr. 285].).

Odontoglossum warszewiczii Rchb.f., Bot. Zeitung (Berlin) 10: 692. 1852. = ***Miltoniopsis warszewiczii*** (Rchb.f.) Garay & Dunst.

TYPE: [Panama]. Cordillera de Chiriquí. 8000' auf Leguminosen. October-Januar, *J. Warszewicz s.n.* (holotype, W).

Oerstedella ornata Dressler, Orquídea (Mexico City), n.s., 8: 345. 1982. = ***Epidendrum stolidium*** Hágsater

TYPE: Panama. Chiriquí: arriba de Guadalupe, alt. 2200-2300 m, Oct 1980, *R.L. Dressler 5930* (holotype, US; isotypes, AMO, MO, MO, PMA, U).

Oerstedella fuscina Dressler, Orquídea (Mexico City), n.s., 8: 347. 1982. = ***Epidendrum fuscinum*** (Dressler) Hágsater

TYPE: Panama. Coclé: comprado en el mercado, El Valle de Antón, se dice que proviene de las montañas al norte de El Valle, 22, 29 Mar 1981, *R.L. Dressler 6010* (holotype, US; isotypes, AMO, MO, PMA).

Oncidium allenii Dressler, *Selbyana* 22(1): 9. 2001.

TYPE: Panama. Coclé: region north of El Valle de Antón. elev. ca. 1000 m. 20 February 1942, *P.H. Allen s.n.* (holotype, AMES; isotypes, SEL, US).

Oncidium ampliatum Lindl., *Gen. Sp. Orchid. Pl.* 202. 1833. = ***Rossioglossum ampliatum*** (Lindl.) M.W.Chase & N.H.Williams

TYPE: Hab. in Panama, et Columbia occidentali, *H. Cuming 1312* (holotype, K).

Oncidium ansiferum Rchb.f., *Bot. Zeitung* (Berlin) 10: 696. 1852.

TYPE: [Panama]. Chiriquí, *J. Warscewicz s.n.* (holotype, W).

Oncidium bracteatum Warsz. & Rchb.f., *Bot. Zeitung* (Berlin) 10: 695. 1852.

TYPE: [Panama]. Chiriquí Cordilleren 6-9000' auf Bäumen, *J. Warscewiczii s.n.* (holotype, W).

Oncidium castaneum Rchb.f. ex Kraenzl. in H.G.A.Engler (ed.), *Pflanzenr.*, IV, 50(80): 287. 1922. = ***Oncidium dichromaticum*** Rchb.f.

SYNTYPES: Subäquatoriale andine Provinz. Costa Rica, *A.R. Endres s.n.* [Panama]. Subäquatoriale andine Provinz. Chiriquí, *R. Pfau s.n.* (lectotype designated by Pupulin (2011), W, Costa Rica. Without specific locality, 1867, *A.R. Endrés s.n.* «N.o 108 Oncd.m» [W 0019929 / Rchb. Orch. 18381]; isolectotypes, W-0019925, W-0019930).

Oncidium cerebriferum Rchb.f., *Bot. Zeitung* (Berlin) 10: 696. 1852. = ***Oncidium ensatum*** Lindl.

TYPE: [Panama]. Chiriquí, *J. Warscewicz s.n.* (holotype, W).

Oncidium cheiroporum Rchb.f., *Bot. Zeitung* (Berlin) 10: 695. 1852.

TYPE: [Panama]. Chiriquí Vulkan, *J. Warscewicz s.n.* (holotype, W).

Oncidium confusum Rchb.f., *Xenia Orchid.* 1: 234. 1858. = ***Oncidium ensatum***

TYPE: Panama. Chiriquí, October. 3-6000', *J. Warscewicz s.n.* (holotype, W).

Oncidium ebrachiatum Ames & C.Schweinf., *Schedul. Orchid.* 8: 75. 1925. = ***Trichocentrum nudum*** (Bateman ex Lindl.) M.W.Chase & N.H.Williams

TYPE: Panama. Cana and vicinity, 4 Apr 1908, alt 2000-6500 ft., *R.S. Williams 975* (holotype, AMES).

Oncidium exalatum Hágsater, *Orquídea* (Mexico City) 8: 98.1981.

TYPE: Panama. Veraguas: Cerro Tute, Dec 1975. Preparado de material cultivado, 1 Oct 1980, *R.L Dressler & Hágsater 4173* (holotype, AMO; isotype, MO).

Oncidium fulgens Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 83. 1922. = ***Oncidium klotzschianum*** Rchb.f.

TYPE: Panama. Chiriquí, 4000-5000 fuss, blühend im Februar-März, *C.W. Powell 157* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23918; isolectotypes, K, MO-955998, MO-955999; drawing of type, AMES-26799; drawing published in Mansfeld [1931: t. 73, nr. 290].).

Oncidium graciliforme C.Schweinf., *Bot. Mus. Leafl.* 5: 96. 1938. = ***Oncidium klotzschianum***

TYPE: Panama. Chiriquí: alt. 4000-5000 ft, Mar 1923, *C.W. Powell 3227* (referred to *Powell 157*) (holotype, AMES).

Oncidium isthmi Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 84. 1922.

TYPE: Panama. Sambo River, Süd-Darien, 200 m., blühend im Feb 1912, *H. Pittier 5569* (holotype, B, destroyed).

Oncidium klotzschianum Rchb.f., *Bot. Zeitung* (Berlin) 10: 695. 1852.

TYPE: Panama. Chiriquí Cordilleren 4-5000', *J. Warscewicz s.n.* (holotype, W).

- Oncidium lacerum* Lindl., Bot. Reg. 30. Misc. 38. 1844. = *Trichocentrum lacerum* (Lindl.) J.M.H.Shaw
TYPE: [Panama. Without precise locality] ex Hort. Loddigges (holotype, K).
- Oncidium maduroi* Dressler, Orchids (West Palm Beach) 69(8): 762. 2000.
TYPE: Panama. Bocas del Toro, elev. 1200-1400 m, cultivated in Finca Dracula, Cerro Punta, 17 Aug 1998, R. L. Dressler 6220 (holotype, MO; isotype, PMA).
- Oncidium martinezii* Königer, Arcula 15: 369. 2005.
TYPE: Panama. Darién: Chepigana: Cerro Pechito Berroa, 600-800 m, var einigen Jahren schon entdeckt von Sr. Porfirio Martínez aus Concepción, Panama, in Kultur bei Sr. Andrés Maduro, Panama, in Kultur in Blüte bei W. Königer WK-122 (holotype, M; isotypes, PMA, Herb. H. Königer).
- Oncidium mirabile* Rchb.f., Bot. Zeitung (Berlin) 10: 697. 1852., *nom. utique rej.* = *Lockhartia oerstedii* Rchb.f.
TYPE: Panama. [Without locality] J. Warszewicz s.n. (holotype, W).
- Oncidium ochmatochilum* Rchb.f., Bot. Zeitung (Berlin) 10: 698. 1852. = *Cyrtochiloides ochmatochila* (Rchb.f.) N.H. Williams & M.W. Chase
TYPE: Panama. [Without locality] J. Warszewicz s.n. (holotype, W).
- Oncidium oerstedii* Rchb.f. var. *crispiflorum* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 85. 1922. = *Trichocentrum crispiflorum* (Schltr.) Bogarín
TYPE: Panama. An der Küste des Pacifischen Ozeans bei Panama-City, C.W. Powell 1 (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23920; isolectotypes, K, MO-955973).
- Oncidium panamense* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 85. 1922.
TYPE: Panama. Auf Hügeln bei Panama City, C.W. Powell 4 (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23921; isolectotypes, AMES-23922, MO-955877, MO-955878; drawing of type, AMES-26800; drawing published in Mansfeld [1931: t. 74, nr. 294].).
- Oncidium parviflorum* L.O. Williams, Amer. Orchid Soc. Bull. 11: [32], tab. 1. 1942.
TYPE: Panama. Coclé: region north of El Valle de Antón, alt. about 1000 m, epiphyte, 20 Feb 1942, P.H. Allen 2937 (holotype, AMES).
- Oncidium peliogramma* Linden & Rchb.f., Gard. Chron. 1871: 1451. 1871. = *Oncidium polycladium* Rchb.f. ex Lindl.
TYPE: [Panama]. It flowered with Director Linden, who obtained it from Chiriquí through Mr. Wallis s.n. (holotype, W).
- Oncidium polycladium* Rchb.f. ex Lindl., Fol. Orchid. 6: 47. 1855.
TYPE: [Panama]. Wild in Costa Rica, Veragua, Chiriquí, Warszewicz s.n. (holotype, K; isotype, W; illustration of type, K).
- Oncidium powellii* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 86. 1922. = *Oncidium anthocrene* Rchb.f.
TYPE: Panama. an den Hinterwässern des Gatun-Sees unweit Panama-City, C.W. Powell 58 (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23923; isolectotypes K, MO-955916; drawing of type, AMES-26814; drawing published in Mansfeld [1931: t. 74, nr. 296].).
- Oncidium punctulatum* Dressler, Selbyana 22(1): 10. 2001.
TYPE: Panama. Chiriquí: Cerro Colorado, arriba de Chami, elev. 1300-1700 m. bosque nuboso, 1 November 1999, R.L. Dressler & J.T. Atwood 6274 (holotype, MO; isotype, PMA).
- Oncidium stipitatum* Lindl. in Benth., Bot. Voy. Sulphur [Bentham] 172. 1846. = *Trichocentrum lacerum* (Lindl.) J.M.H.Shaw
TYPE: [Panama. Island of Taboga, 30 Jan.–11 Feb. 1837], G.W. Barclay 958 (holotype, BM).
- Oncidium stipitatum* var. *platyonyx* Rchb.f., Gard. Chron. (n. s.) 9: 788. 1878. = *Trichocentrum lacerum*

TYPE: [Panama. Without precise locality] ex Hort. W. Bull. (holotype, W).

Oncidium teres Ames & C.Schweinf., *Schedul. Orchid.* 8: 78. 1925. = *Trichocentrum helicanthum* (Kraenzl.) J.M.H.Shaw

TYPE: Panama. Veraguas: San Francisco, Feb 1924, alt. 1000 ft., *C.W. Powell 383* (holotype, AMES).

Oncidium warszewiczii Rehb.f., *Bot. Zeitung* (Berlin) 10: 693. 1852.

SYNTYPES: [Panama]: Veragua, Chiriquí Vulkan, *J. Warszewicz s.n.*, lectotype designated by Mora de Retana (1993), W; Costa Rica: [Cartago]. Carthago Vulkan. An Eichen. 8-10,000', *J. Warszewicz s.n.* (W).

Oncidium zelenkoanum Dressler & Pupulin, *Lankesteriana* 8: 37. 2003.

TYPE: Panama. Bocas del Toro: Culebra (Velorio), 1000 m, Nov. 2000, epífita en árboles muy altos, floreció en cultivo julio 2001, *A. Maduro & E. Olmos 195* (holotype, MO; isotype, PMA).

Ornithidium conduplicatum Ames & C.Schweinf., *Schedul. Orchid.* 8: 66. 1925.

TYPE: Panama. Chiriquí: Palo Alto Hill, Sept-Oct 1923, alt. 4000-5000 ft, *C.W. Powell 341* (holotype, AMES).

Ornithocephalus aristatus Pupulin & Dressler, *Brittonia* 58(4): 314. 2006.

TYPE: Panama. Bocas del Toro: Changuinola, Valle Risco, 800 m, primary forest; at 3 m from the ground epiphytic on shrub, flowered in cult. Finca Drácula, 26 Sep. 2003, *A. Maduro & E. Olmos 327* (Holotype, PMA; isotype, CR).

Ornithocephalus cochleariformis C.Schweinf., *Bot. Mus. Leaflet* 4: 124. 1937.

TYPE: Panama. Coclé: lower portion of valley and marshes along Río Antón, El Valle de Antón, alt. 500 m, Feb 1935, *A.A. Hunter & P.H. Allen 383* (holotype, AMES).

Ornithocephalus diceras Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 87. 1922. = *Ornithocephalus bicornis* Lindl.

TYPE: Panama. Rep. of Panama, hills east of the city, *C.W. Powell 174* (holotype, B; destroyed, lectotype designated by Christenson (1991b), AMES-23935, isolectotype, MO-956007; drawing of type, AMES-26821; photo of the isolectotype ex MO, K; drawing published in Mansfeld [1931: t. 76, nr. 304].).

Ornithocephalus lanuginosus Ames, *Proc. Biol. Soc. Washington* 34: 152. 1921. = *Ornithocephalus bicornis*

TYPE: Panama. Panama: edge of forest along Panama-Pecora Road, near Tocumen River, 30 Dec 1917, 75 m alt., on trees, *E. Killip 3314* (holotype, AMES; isotype, ROCH).

Ornithocephalus powellii Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 88. 1922.

TYPE: Panama. Auf Hügeln östlich von Panama-City. 100-300 Fuss, blühend Februar bis März, *C.W. Powell 231*, lectotype designated by Christenson (1991b), AMES-23934; isolectotype, MO-956042; photo of isolectotype ex MO, K; drawing published in Mansfeld [1931: t. 77, nr. 305].).

Osmoglossum acuminatum Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 79. 1922. *Cuitlauzina egertonii* (Lindl.) Dressler & N.H. Williams

TYPE: Panama. Chiriquí: 5000 ft, *C.W. Powell 255* (holotype, B destroyed; lectotype designated by Christenson (1991b), AMES-23899; isolectotype, MO-956059; drawing of type, K). Superfluously designated by Yañez & Soto (2003).

Palmorchis trilobulata L.O.Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 28: 415. 1941.

TYPE: Panama. Coclé: terrestrial, flowers pure white, region north of El Valle de Antón, trail to Las Minas, alt. ca. 1000 m, 10 May 1941, *P. Allen 2463* (holotype, AMES).

Palmorchis trinotata Dressler, *Orquideología* 20: 263. 1997.

TYPE: Panama. Coclé: terrestrial, flowers pure white, region north of El Valle de Antón, trail to Las Minas, alt. ca. 1000 m, 10 May 1941, *P. Allen 2463* (holotype, AMES).

Paphinia vermiculifera G.Gerlach & Dressler, *Lankesteriana* 8: 27. 2003.

TYPE: Panama. Coclé: El Valle de Antón, 800-1000 m, floreció en cultivo el 6 de julio 2002, *R. L. Dressler 6350* (holotype, MO).

Pelexia ochryae Szlach., *Fragm. Florist. Geobot.* 41: 858. 1996.

TYPE: Panama. Chiriquí: Buenavista, 30 Mar 1974, *H. Butcher s.n.* (holotype, FLAS).

Peristeria elata Hook., *Bot. Mag.* 58: t. 3116. 1831.

TYPE: Panama. In the year 1826, Henry Barnard, Esq. of Truxillo in Peru, communicated to Richard Harrison, Esq. of Liverpool, a bulb of a remarkable, parasitical, orchideous plant, which he had found in the neighbourhood of Panama (holotype, K).

Phragmipedium extaminodium Castaño, Hágsater & E.Aguirre subsp. *warszewiczii* Dressler, *Orchid Digest* 69(2): 89. 2005. = ***Phragmipedium humboldtii*** (Warsz. ex Rchb.f.) J.T.Atwood & Dressler

TYPE: Panama. Bocas del Toro: Cerro Colorado, along road between Río San Felix and mining exploration camp, 7 ml W of Chame, along trail through Guaymi village, 8°35'N 81°50'W, 1500 m, 8 July 1988, *T. Croat 69170* (holotype, MO).

Phragmipedium popowii Braem, Ohlund & Quéné, *Richardiana* 4(4): 185. 2004. *nom. illeg.* = ***Phragmipedium humboldtii***

TYPE: Panama. Chiriquí, *Warszewicz 41* (holotype, W).

Phymatidium panamense Dressler, *Orquideología* 6: 142. 1971. = ***Eloyella panamensis*** (Dressler) Dodson

TYPE: Panama. prov. Panama, La Eneida, región de Cerro Jefe; 6 Aug 1968; *R.L. Dressler 3570* (holotype, US).

Physosiphon minutiflorus Ames & C.Schweinf., *Schedul. Orchid.* 8: 11. 1925. = ***Stelis deregularis*** Barb.Rodr

TYPE: Panama. Chiriquí: Jaramillo, Oct 1923, alt 5000 ft, *C.W. Powell 345* (holotype, AMES).

Platyglottis coriacea L.O.Williams, *Ann. Missouri Bot. Gard.* 29: 347. 1942. = ***Scaphyglottis coriacea*** (L.O.Williams) Dressler

TYPE: Panama. Coclé: region north of El Valle de Antón, alt. c. 1000 m, 20 Feb 1942, *P. H. Allen 2936* (holotype, AMES).

Platystele calymma Luer, *Selbyana* 3(3/4): 226. 1977.

TYPE: Panama. Panama: epiphytic in the cloud forest along the El Llano-Carti road, alt. ca. 650 m, Feb. 1977, *R.L. Dressler s.n.* (holotype, SEL; isotype, MO).

Platystele dressleri Luer, *Selbyana* 3(1/2): 26, fig. 116. 1976.

TYPE: Panama. Panama: epiphytic along the Altos de Pacora road, alt. ca. 650 m., collected 4 Mar 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 963* (holotype, SEL).

Platystele hampshireae Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 65: 113, fig. 1998.

TYPE: Panama. Chiriquí: wet forest between Fortuna Lake and Chiriquí Grande, 1 km south of the continental divide, alt. 1200 m, 10 Mar 1985, *R.J. Hampshire & C. Whitefoord 414* (holotype, BM).

Platystele speckmaieri Luer & Sijm, *Monogr. Syst. Bot. Missouri Bot. Gard.* 120: 146. 2010.

TYPE: Panama. Panama: El Valle de Anton, flowered in cultivation at Wien, Sept. 2009, *A.P Sijm 290815* (holotype, MO).

Platystele taylorii Luer, *Selbyana* 3(1/2): 30. 1976.

TYPE: Panama. Panama: Epiphytic along the Altos de Pacora road, alt. 650 m., 4 Mar 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 741* (holotype, SEL).

Pleurothallis aberrans Luer, *Selbyana* 2: 382. 1978. = ***Acianthera aberrans*** (Luer) Pupulin & Bogarín

TYPE: Panama. Veraguas: epiphytic in tree north of the continental divide, alt. ca. 700 m., above Santa Fé, 6 Sept 1976, *C. Luer & R.L. Dressler 1628* (holotype, SEL).

Pleurothallis acrisepala Ames & C.Schweinf., *Schedul. Orchid.* 8: 22. 1925. = *Specklinia acrisepala* (Ames & C.Schweinf.) Pridgeon & M.W.Chase

TYPE: Panama. without exact locality, *C.W. Powell 420* (holotype, AMES; isotype, AMES).

Pleurothallis allenii L.O.Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 275. 1940.

TYPE: Panama. Coclé: vicinity of El Valle, alt. 600-1000 m, 8 Dec. 1938, *P.H. Allen 1240* (holotype, MO; isotype, AMES; drawing of type, AMES).

Pleurothallis alpina Ames, *Schedul. Orchid.* 5: 14. 1923. = *Acianthera sicaria* (Lindl.) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: "Caramillia" [Jaramillo?], alt 4500 ft, 1923, *C.W. Powell 282* (holotype, AMES; isotype, MO).

Pleurothallis annectens Luer, *Selbyana* 3 (3/4): 240. 1977.

TYPE: Panama. Chiriquí: epiphytic in cloud forest along the continental divide above Camp Escopeta, Cerro Colorado, alt. 1700 m, 16 Feb 1977, *C. Luer; J. Luer & R.L. Dressler 1583* (holotype, SEL).

Pleurothallis antonensis L.O.Williams, *Ann. Missouri Bot. Gard.* 29: 341. 1942. = *Pleurothallis bivalvis* Lindl.

TYPE: Panama. Coclé: hills north of El Valle de Antón, alt. ca. 1000 m, 1 Sep 1941, *P.H. Allen 2701* (holotype, AMES).

Pleurothallis archicolonae Luer, *Selbyana* 3(1/2): 52. 129. 1976.

TYPE: Panama. Panama: epiphytic on Cerro Jefe, alt. 1000 m, 2 Mar 1976, *C. Luer; J. Luer; P. Taylor & H. Butcher 964* (holotype, SEL).

Pleurothallis areldii Luer, *Selbyana* 2: 383. 1978. = *Specklinia areldii* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: epiphytic in cloud forest at the Fortuna dam site, alt. ca. 750 m, Feb 1977, R.L. Dressler s.n., greenhouse acc. no. 77-1787, flowered in cult. 9 Aug 1977, *C. Luer 1653* (holotype, SEL).

Pleurothallis balaeniceps Luer & Dressler, *Orquideología* 16: 47. 1986. = *Echinosepala balaeniceps* (Luer & Dressler) Pridgeon & M.W.Chase

TYPE: Panama. Veraguas: epiphytic in cloud forest on Cerro Arizona above Escuela Alto de Piedra, west of Santa Fe, alt. 850-950 m, June 5, 1982, flowered in cultivation 23 May 1984, *R.L. Dressler 6063* (holotype, MO; isotype, MO).

Pleurothallis barboselloides Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 18. 1922. = *Specklinia corniculata* (Sw.) Steud

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 98* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23792; isolectotypes, K, MO-955946; drawing of type, AMES-26760; drawing published in Mansfeld [1931: t. 29, nr. 113].).

Pleurothallis brighamella Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 76: 171. 1999. = *Specklinia brighamella* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. without collection data, cultivated by Maduro's Tropical Flowers at Cerro Punta, 18 Nov 1998, *C. Luer 19005* (holotype, MO).

Pleurothallis butcheri L.O.Williams, *Fieldiana, Bot.* 29(6): 346. 1961. = *Acianthera butcheri* (L.O.Williams) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: in mossy cloud forest along branch Río Machomonte, Cordillera, vicinity Volcán, slopes of Chiriquí volcano, alt. 4000 m, 19 Jan 1961, *H.P. Butcher 651* (holotype, F).

Pleurothallis cactantha Luer, *Selbyana* 3(1/2): 72. 1976. = *Specklinia cactantha* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Panama: epiphytic along the Altos de Pacora road, alt. 650 m., 4 Mar 1976, *C. Luer; J. Luer; P. Taylor & R.L. Dressler 743* (holotype, SEL).

Pleurothallis caligularis Luer, *Selbyana* 3(1/2): 74. 1976. = *Stelis carnosilabia* (A.H.Heller & A.D.Hawkes)

Pridgeon & M.W.Chase

TYPE: Panama. Veraguas: Guabal, Río Dos Bocas, 16 km NW of Santa Fé, alt. 500 m, 15 Nov 1974, *R.L. Dressler 4808* (holotype, SEL).

Pleurothallis campicola Luer, Selbyana 5: 161. 1979. = *Stelis listerophora* (Schltr.) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: epiphytic in scrubby trees on the llanos del volcán, a few km W of El Hato del Volcán, alt. 1500 m, 20 Feb 1977, greenhouse acc. no. 77-1754, flowered in cult. 15 Sept 1977, *C. Luer, J. Luer & H. Butcher 1830* (holotype, SEL).

Pleurothallis canae Ames, Schedul. Orchid. 2: 18. 1923. = *Stelis canae* (Ames) Pridgeon & M.W.Chase

TYPE: Panama. Cana and vicinity, April 27, 1908. On trees. Flowers purplish. 6000 feet altitude, *R. S. Williams 971* (holotype, AMES).

Pleurothallis cardiochila L.O.Williams, Ann. Missouri Bot. Gard. 29: 343. 1942.

TYPE: Panama. Chiriquí: rain forest, Bajo Chorro, Boquete District, alt. ca. 1800 m, 13 Jan 1938, *M.E. Davidson 119* (holotype, AMES; isotype, MO).

Pleurothallis chiriquensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 19. 1922. = *Stelis gelida* (Lindl.) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí, 4000-5000 Fuss.ü M., blühend im Feb, *C.W. Powell 227* (holotype, B, destroyed lectotype designated by Christenson (1991b), AMES-26783).

Pleurothallis citrophila Luer, Selbyana 3 (3/4): 266. 1977. = *Acianthera lojiae* (Schltr.) Luer

TYPE: Panama. Coclé: epiphytic in old orange grove near the mesa above El Valle, alt. ca. 1000 m, 2 Sept 1976, *C. Luer & H. Butcher 1375* (holotype, SEL).

Pleurothallis cleistogama Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 72: 41. 1998.

TYPE: Panama. Chiriquí: Bajo Grande, above Cerro Punta, alt. 2400 m, 13 Feb 1985, *C. Luer, J. Luer, R. Dressler & K. Dressler 10527* (holotype, MO).

Pleurothallis cobriformis L.O.Williams in Woodson & Schery, Ann. Missouri Bot. Gard. 27: 277. 1940.

TYPE: Panama. Coclé: epiphytic, vicinity of El Valle de Antón, ca. 600 m alt, flower tan spotted with maroon, 19 Dec 1939, *P.H. Allen 2057* (holotype, AMES).

Pleurothallis condylata Luer, Selbyana 3(1/2): 80. 1976. = *Specklinia condylata* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: epiphytic in trees along the stream near San Vicente, alt. 500 m., between Concepción and Volcán, 11 Sept 1976, *C. Luer & Butcher 1198* (holotype, SEL).

Pleurothallis congruens Luer, Selbyana 2: 391. 1978. = *Acianthera cogniauxiana* (Schltr.) Pridgeon & M.W.Chase

TYPE: Panama. Panama: epiphytic in cloud forest along the El Llano-Carti road, alt. 300 m, 3 Mar 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 987* (holotype, SEL).

Pleurothallis corynophora Luer, Phytologia 55: 201. 1984. = *Lankesteriana fractiflexa* (Ames & C.Schweinf.) Karremans

TYPE: Panama. Prov. of Chiriquí: epiphytic in cloud forest above Guadalupe, alt. 2300 m, 8 Dec. 1983, *C. Luer, J. Luer & A. Maduro 9299* (holotype, SEL).

Pleurothallis croatii Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 65: 18. 1998. = *Stelis decurrens* Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: Cerro Pate Macho, along the continental divide, northeast of Boquete, alt. ca. 2200 m, 23 Nov 1979, *T.B. Croat 48506* (holotype, MO).

Pleurothallis cucumeris Luer, Selbyana 5: 162. 1979. = *Specklinia cucumeris* (Luer) Bogarín & Karremans

TYPE: Panama. Chiriquí: epiphytic in cloud forest, Cerro Colorado, alt. ca. 1700 m, Feb 1977, greenhouse acc.

no. 77-1825, flowered in cult. 10 Dec 1977, *C. Luer, J. Luer & R.L. Dressler 2258* (holotype, SEL).

Pleurothallis cuspidata Luer, Selbyana 3(3/4): 282. 1977. = ***Lankesteriana cuspidata*** (Luer) Karremans

TYPE: Panama. Chiriquí: epiphytic in elfin cloud forest on Cerro Hornito, alt. ca. 1700 m, 15 Dec 1976, *C. Luer, R.L. Dressler, N.H. Williams & F.L. Stevenson 1335* (holotype, SEL).

Pleurothallis displosa Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 172. 1999. = ***Specklinia displosa*** (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Coclé: El Valle del Antón, alt. ca. 1000 m, collected by George Kennedy, flowered in cultivation, 20 Oct 1981, *C. Luer 6533* (holotype, SEL).

Pleurothallis diuturna Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 19. 1922. = ***Kraenzlinella erinacea*** (Rchb.f.) Solano

TYPE: Panama. Veragua-Distrikt, etwa in Meereshöhe, *C.W. Powell 172* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23787; isolectotypes, K, MO-956006; drawing of type, AMES-26864; drawing published in Mansfeld [1931: t. 30, nr. 119].)

Pleurothallis dressleri Luer, Selbyana 3(1/2): 98. 1976. = ***Specklinia dressleri*** (Luer) Bogarín & Karremans

TYPE: Panama. Panama: epiphytic on mossy limbs, Cerro Jefe, alt. 1000 m., 20 Aug 1967, *R.L. Dressler 3033* (holotype, SEL).

Pleurothallis dukei Luer, Lindleyana 12: 45. 1997.

TYPE: Panama. Darién: cloud forest, Cerro Pirre, alt. 2500-4500 ft, 9-10 Aug 1967, *J.A. Duke & T.S. Elias 13845* (holotype, MO; isotypes, GH, SEL, US).

Pleurothallis ellipsophylla L.O.Williams, Ann. Missouri Bot. Gard. 29: 344. 1942. = ***Acianthera ellipsophylla*** (L.O.Williams) Pridgeon & M.W.Chase

TYPE: Panama. Bocas del Toro: epiphyte, SW of Bocas at Maccaw Hill, Isla Colón, alt. 0-125 m, 25 Aug 1940, flowers greenish-brown, *H. von Wedel 560* (holotype, AMES).

Pleurothallis falcatiloba Ames, Proc. Biol. Soc. Washington 34: 152. 1921. = ***Stelis falcatiloba*** (Ames) Bogarín & Serracín

TYPE: Panama. Chiriquí: valley of the Río Quebrada, 8 Feb 1918, 1700 m alt., on trees in deep woods, *Killip 3540* (holotype, AMES; isotype, ROCH).

Pleurothallis fortunae Luer & Dressler, Lindleyana 6: 97. 1991. = ***Stelis fortunae*** (Luer & Dressler) Pridgeon & M.W.Chase

TYPE: Panama. Prov. of Chiriquí: epiphytic in cloud forest around the Fortuna dam site, alt. ca. 1000 m, collected Aug. 1976, flowered in cultivation 13 Nov. 1976, *R.L. Dressler s.n.* (holotype, SEL).

Pleurothallis fuegi Rchb.f. var. *echinata* L.O.Williams, Ann. Missouri Bot. Gard. 33: 120. 1946. = ***Specklinia fuegi*** (Rchb.f.) Solano & Soto Arenas

TYPE: Panama. Chiriquí: Volcán de Chiriquí, alt. ca. 2720 m, *M.E. Davidson 981* (holotype, AMES; isotype, AMES).

Pleurothallis glandulosa Ames, Schedul. Orchid. 6: 60. 1923. = ***Specklinia glandulosa*** (Ames) Pridgeon & M.W.Chase

TYPE: Panama. Juna Grande range, sea level, *C.W. Powell 306* (holotype, AMES; isotypes, AMES, MO).

Pleurothallis gnomonifera Ames, Schedul. Orchid. 6: 61. 1923. = ***Trichosalpinx memor*** (Rchb.f.) Luer

TYPE: Panama. Chiriquí, Cerro Norquita [Horqueta], alt 5000-6000 ft, *C.W. Powell 311* (holotype, AMES).

Pleurothallis guttata Luer, Selbyana 3(1/2): 116. 1976. = ***Stelis guttata*** (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Panama: epiphytic in the region of Cerro Jefe, alt. 1000 m, 15 Oct 1967, *R.L. Dressler 3086* (holotype, SEL).

- Pleurothallis hammelii*** Luer, *Lindleyana* 12: 48. 1997.
 TYPE: Panama. Panama: epiphytic in forest along the Llano-Cartí road, alt. 1200 m, 13 Jan 1978, *B. Hammel 868* (holotype, SEL; isotype, MO).
- Pleurothallis harpago*** Luer, *Selbyana* 5: 167. 1979.
 TYPE: Panama. Darien: Cerro Pirre, July 1977, R.L. Dressler s.n., cultivated at SEL, greenhouse acc. no. 77-2600A, flowered in cult. 20 Mar 1978, *C. Luer 2798* (holotype, SEL).
- Pleurothallis hemileuca*** Luer, *Selbyana* 7: 118. 1982.
 TYPE: Panama. Chiriquí: epiphytic in cloud forest at the Fortuna dam site, alt. ca. 1000 m, Aug 1976, R.L. Dressler s.n., cultivated at SEL, 114-76-11, flowered in cult. 23 Dec 1976, *C. Luer 1274* (holotype, SEL).
- Pleurothallis hispida*** L.O. Williams, *Ann. Missouri Bot. Gard.* 27: 277. 1940. = ***Dresslerella hispida*** (L.O. Williams) Luer
 TYPE: Panama. Coclé: vicinity of El Valle, 800-1000 m, 5 Sept. 1939, *P.H. Allen 782* (holotype, AMES).
- Pleurothallis hunteriana*** Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 20. 1922. = ***Pabstiella tripterantha*** (Rchb.f.) F. Barros
 TYPE: Panama. Chiriquí, 4000 ft., *C.W. Powell 245* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-27296; isolectotype, K). Superfluously designated by Luer (2000).
- Pleurothallis imago*** Luer, *Selbyana* 3 (3/4): 318. 1977. = ***Pleurothallis excavata*** Schltr.
 TYPE: Panama. Panama: epiphytic along the Altos de Pacora road, 650 m, 4 Mar. 1976, *C.A. Luer 732, J. Luer, R.L. Dressler & P. Taylor* (holotype, SEL).
- Pleurothallis instar*** Luer, *Selbyana* 3 (3/4): 320. 1977.
 TYPE: Panama. Chiriquí: epiphytic in cloud forest on Cerro Hornito, alt. ca. 1700 m, 15 Dec 1976, *C. Luer, A. Luer, R.L. Dressler, N.H. Williams & F.L. Stevenson 1389* (holotype, SEL).
- Pleurothallis isthmica*** Luer, *Selbyana* 3(3/4): 322. 1977.
 TYPE: Panama. Veraguas: near continental divide above Santa Fe, 750 m, 4 Sept. 1976, *C.A. Luer 1140 & R.L. Dressler* (holotype, SEL).
- Pleurothallis juxtaposita*** Luer, *Lindleyana* 6: 103-105. 1991. = ***Acianthera juxtaposita*** (Luer) Luer
 TYPE: Panama. Chiriquí: epiphytic in cloud forest near the Fortuna dam site, alt. 1100 m, 16 Feb 1985, *C. Luer, J. Luer, R.L. Dressler & K. Dressler 10585* (holotype, SEL; isotype MO).
- Pleurothallis knappiae*** Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 79: 128. 2000.
 TYPE: Panama. Veraguas: Cerro Tute, Altos de Piedras, west of Santa Fe, alt. 1250-1410 m, 15 Dec 1981, *S. Knapp & K. Sytsma 2653* (holotype, MO; isotype, PMA).
- Pleurothallis lepidota*** L.O. Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 279. 1940. = ***Acianthera lepidota*** (L.O. Williams) Pridgeon & M.W. Chase
 TYPE: Panama. Chiriquí: epiphytic, Llanos del Volcán, ca. 1300 m alt., flowers green striped maroon, 23 Jan 1939, *P.H. Allen 1552* (holotype, AMES).
- Pleurothallis macrantha*** L.O. Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 28: 417. 1941. = ***Stelis cylindrata*** Pridgeon & M.W. Chase
 TYPE: Panama. Chiriquí: terrestrial, flowers pale greenish-yellow, spotted chocolate, vicinity of Bajo Chorro, alt. 1900 m, 20-22 Jul 1940, *R. E. Woodson, Jr. & R. W. Schery 666* (holotype, AMES; isotype, MO).
- Pleurothallis maduroi*** Luer, *Lindleyana* 12: 51. 1997.
 TYPE: Panama. Chiriquí: Guadalupe, May 1992, *A. Maduro 18* (holotype, MO).
- Pleurothallis mammillata*** Luer, *Selbyana* 3(1/2): 138. 1976.
 TYPE: Panama. Panama: epiphytic on Cerro Jefe, alt. 1000 m, 2 Mar 1976, *C. Luer, H. Butcher, J. Luer & P.*

Taylor 951 (holotype, SEL).

Pleurothallis mystax Luer, Selbyana 3(1/2): 146. 1976. = *Stelis mystax* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Veraguas: epiphytic in cloud forest near the continental divide, above Santa Fé, alt. 650-750 m, 5 Sept 1976, *C. Luer & R.L. Dressler 1261* (holotype, SEL).

Pleurothallis nitida Luer, Selbyana 3 (3/4): 352. 1977.

TYPE: Panama. Chiriquí: epiphytic in elfin cloud forest on Cerro Hornito, ca. 1700 m, 15 Dec. 1976, *C. Luer; A. Luer; R.L. Dressler; N.H. Williams & F.L. Stevenson 1337* (holotype, SEL).

Pleurothallis octomeriae Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 21. 1922. = *Myoxanthus octomeriae* (Schltr.) Luer

TYPE: Panama. An Bäumen in Schluchten des Chiriquí, c. 5000 ft., *C.W. Powell 252* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23789; isoelectotypes, K, MO-956057).

Pleurothallis operculata Luer, Phytologia 49: 213. 1981. = *Trichosalpinx rotundata* (C.Schweinf.) Dressler

TYPE: Panama. Coclé: epiphytic in cloud forest, El Copé, R.L. Dressler s.n., cultivated at SEL-78-480, flowered 18 Jul 1979, *C. Luer 4075* (holotype, SEL).

Pleurothallis pallida Luer, Selbyana 3(3/4): 358. 1977.

TYPE: Panama. Coclé: epiphytic in the hills north of El Valle, alt. 1000 m, 6 Mar 1976, *C. Luer; R. Dressler; J. Luer & P. Taylor 954* (holotype, SEL).

Pleurothallis pan Luer, Selbyana 3(3/4): 360. 1977. = *Echinosepala pan* (Luer) Pridgeon & M.W.Chase

TYPE: Panama. Veraguas: epiphytic in cloud forest NW of Santa Fé, alt. ca. 750 m, *R.L. Dressler s.n.* (holotype, SEL).

Pleurothallis panamensis Schltr., Repert. Spec. Nov. Regni Veg. 17: 140. 1921. = *Specklinia microphylla* (A.Rich. & Galeotti) Pridgeon & M.W.Chase

TYPE: Panama. Auf Pampasbäumen in der Provinz Chiriquí und Veragua, blühend im Apr 1858, *M. Wagner 24* (holotype, B, destroyed; illustration of type, AMES).

Pleurothallis peculiaris Luer, Selbyana 3(1/2): 158. 1976.

TYPE: Panama. Veraguas: epiphytic in the cloud forest near the continental divide above Santa Fé, alt. ca. 700 m, Sept 1976, *C. Luer & R.L. Dressler 1142* (holotype, SEL).

Pleurothallis perpusilla Rchb.f. in Seem., Bot. Voy. Herald [Seemann] 6: 215. 1854. = *Platystele perpusilla* (Rchb.f.) Garay

TYPE: Panama. Near Panama, on trees, Feb. 1848, *B. Seemann 1565* (holotype, W; isotypes, BR, K).

Pleurothallis pertusa Dressler, Orquideología 5: 76. 1970. = *Dresslerella pertusa* (Dressler) Luer

TYPE: Panama. Panama: Cerro Jefe, 12 Nov 1967, epífita péndula en selva nebulosa, *R.L. Dressler 3152* (holotype, US; isotypes, MO, PMA).

Pleurothallis pfavii Rchb.f., Flora 69 (n. s. 44): 555. 1886. = *Specklinia pfavii* (Rchb.f.) Pupulin & Karremans

TYPE: [Costa Rica or Panama]. Chiriquí, *R. Pfau. s.n.* (holotype, W).

Pleurothallis polysticta Luer, Selbyana 5: 176. 1979.

TYPE: Panama. Darien: Cerro Pirre, Jul 1977, R.L. Dressler s.n., cult. at SEL, *C. Luer 2799* (holotype, SEL).

Pleurothallis powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 22. 1922. = *Stelis gigantea* Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí, 4000 ft, *C.W. Powell 146* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23785; isoelectotypes K, MO-955986, MO-961317; drawing of type, AMES-26775; drawing published in Mansfeld [1931: t. 35, nr. 138].).

- Pleurothallis praegrans* Ames, *Schedul. Orchid.* 5: 17. 1923. = *Pleurothallis colossus* Kraenzl. ex Kerch
 TYPE: Panama. Cana and vicinity, 17 Apr-8 Jun 1908, on trees, 6000 ft alt., *R.S. Williams 973* (holotype, NY; illustration of type, AMES).
- Pleurothallis pterocaulis* L.O.Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 280. 1940. = *Acianthera decipiens* (Ames & C.Schweinf.) Pridgeon & M.W.Chase
 TYPE: Panama. Coclé: vicinity of El Valle, 600-1000 m alt., flowers dull red, 8 Dec 1938, *P.H. Allen 1239* (holotype, AMES; isotype, MO).
- Pleurothallis rhodoglossa* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17:22. 1922.
 TYPE: Panama, auf Hügeln bei Panama City, *C.W. Powell 182* (holotype, B, destroyed; lectotype designated by Christenson (1991b), MO-956015; isolectotypes AMES-23793?; drawing of type, AMES-26845).
- Pleurothallis rotundata* C.Schweinf., *Bot. Mus. Leafl.* 4: 115. 1937. = *Trichosalpinx rotundata* (C.Schweinf.) Dressler
 TYPE: Panama. Coclé: mountains beyond La Pintada, alt. 400-600 m, Feb 1935, *A.A. Hunter & P.H. Allen 561 D* (holotype, AMES; isotype, MO).
- Pleurothallis rubella* Luer, *Selbyana* 3 (3/4): 378. 1977. = *Platystele aurea* Garay
 TYPE: Panama. Chiriquí: epiphytic, Fortuna dam site, alt. ca. 1000 m, Oct 1976, *R.L. Dressler s.n.* (holotype, SEL).
- Pleurothallis scitula* Luer, *Selbyana* 3 (3/4): 384. 1977. = *Pleurothallis rectipetala* Ames & C.Schweinf.
 TYPE: Panama. Chiriquí: epiphytic in cloud forest on Cerro Hornito, alt. ca. 1700 m, 15 Dec 1976, *C. Luer, A. Luer, R.L. Dressler, N.H. Williams & F.L. Stevenson 1361* (holotype, SEL).
- Pleurothallis sempergemmata* Luer, *Selbyana* 3: 386. 1977. = *Echinosepala sempergemmata* (Luer) Pridgeon & M.W.Chase
 TYPE: Panama. Chiriquí: epiphytic in valley of cloud forest above Guadalupe, alt. ca. 2200 m, 17 Dec 1976, *C. Luer, A. Luer, R.L. Dressler, N.H. Williams & F.L. Stevenson 1360* (holotype, SEL).
- Pleurothallis simulans* L.O.Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 281. 1940.
 TYPE: Panama. Coclé: epiphyte, north rim of El Valle, flowers maroon, 9 Jul 1939, *Allen 1912* (holotype, MO).
- Pleurothallis speciosa* Luer, *Selbyana* 3: 392. 1977. = *Myoxanthus speciosus* (Luer) Luer
 TYPE: Panama. Chiriquí: epiphytic in cloud forest above Guadalupe, alt. ca. 2000 m, 13 Sep 1976, *C. Luer & H. Butcher 1371* (holotype, SEL).
- Pleurothallis spectabilis* Ames & C.Schweinf., *Schedul. Orchid.* 8: 34. 1925. = *Specklinia spectabilis* (Ames & C.Schweinf.) Pupulin & Karremans
 TYPE: Panama. Veraguas: Santa Fé, Feb. 1924, 1500 ft, *C.W. Powell 382* (holotype, AMES; isotype, MO).
- Pleurothallis tantilla* Luer, *Selbyana* 5: 183. 1979. = *Trichosalpinx tantilla* (Luer) Luer
 TYPE: Panama. Coclé: epiphytic in cloud forest above El Valle, alt. 1000 m, 6 Mar 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 1078* (holotype, SEL).
- Pleurothallis telamon* Luer, *Selbyana* 5: 185. 1979.
 TYPE: Panama. Coclé: epiphytic in cloud forest near El Copé, May 1977, *R.L. Dressler s.n.*, cultivated at SEL, *C. Luer 2112* (holotype, SEL).
- Pleurothallis thymochila* Luer, *Selbyana* 3(3/4): 398. 1977. = *Stelis thymochila* (Luer) Pridgeon & M.W.Chase
 TYPE: Panama. Panama: epiphytic along the El Llano-Carti road, alt. ca. 350 m, 3 Mar 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 992* (holotype, SEL; detail of type, SEL).
- Pleurothallis titan* Luer, *Selbyana* 3 (3/4): 400. 1977.

TYPE: Panama. Chiriquí: epiphytic in cloud forest above the Fortuna dam camp site, alt. 1000 m, Aug 1976, cult. at SEL, greenhouse acc. no. 123-76-20, *R.L. Dressler s.n.* (holotype, SEL).

Pleurothallis trachyklamys Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 23. 1922. = *Myoxanthus trachyklamys* (Schltr.) Luer

TYPE: Panama. Panama: “auf Hügeln bei Panama-City”, *C.W. Powell 215* (holotype, B, destroyed), lectotype designated by Christenson (1991b), AMES; isolectotypes, AMES, MO). Superfluously designated by Luer (1992).

Pleurothallis tropida Luer, Phytologia 49: 219. 1981. = *Trichosalpinx tropida* (Luer) Luer

TYPE: Panama. Coclé: epiphytic in an old orange grove in the hills above El Valle, alt. 1000 m, 2 Sept 1976, *C. Luer & H. Butcher 1120* (holotype, SEL).

Pleurothallis veraguacensis Luer, Selbyana 3(3/4): 402. 1977. = *Pleurothallis cordifolia* Rchb.f. & H. Wagnere

TYPE: Panama. Veraguas: epiphytic in the cloud forest near the continental divide above Santa Fé, alt. ca. 700 m, 5 Sept 1976, *C. Luer & R.L. Dressler 1141* (holotype, SEL).

Pleurothallis verecunda Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 24. 1922. = *Acianthera verecunda* (Schltr.) Pridgeon & M.W.Chase

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 91* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23795; isolectotype, MO-955945; drawing of type, AMES-26852; drawing published in Mansfeld [1931: t. 37, nr. 147].).

Pleurothallis volcanica Luer, Selbyana 3(3/4): 406. 1977.

TYPE: Panama. Chiriquí: epiphytic in cloud forest near Río Chiriquí west of Volcán, alt. 1500 m, 12 Sept 1976, *C. Luer & H. Butcher 1260* (holotype, SEL).

Pleurothallis wagneri Schltr., Repert. Spec. Nov. Regni Veg. 17: 141. 1921. = *Stelis wagneri* (Schltr.) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí, Apr 1858, *M. Wagner 25* (holotype, B, destroyed; lectotype designated by Luer (1998), AMES).

Pleurothallis williamsii Ames, Orchidaceae 7: 120. 1922. = *Trichosalpinx dura* (Lindl.) Luer

TYPE: Panama. Cana and vicinity, 17 Apr-8 Jun 1908, 2000-6500 ft alt., *R.S. Williams 976* (holotype, AMES; isotype, NY).

Polycynis tortuosa Dressler, Orquideología 12: 120. 1977.

TYPE: Panama. Coclé, cerca del Aserradero El Copé, aprox. 9 km al norte de El Copé; 2 Oct 1977, *R.L. Dressler 5731* (holotype, US).

Polystachya panamensis Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 49. 1922. = *Polystachya foliosa* (Hook.) Rchb.f.

TYPE: Panama. auf Hügeln bei Panama, *C.W. Powell 122* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23834; isolectotype, MO-955968).

Polystachya powellii Ames, Schedul. Orchid. 7: 31. 1924. = *Polystachya foliosa*

TYPE: Panama. Chiriquí, west side of Caldera River, in gulch opposite Lino, alt 4000 ft, *C.W. Powell 343* (holotype, AMES).

Ponera amethystina Rchb.f. in W.W.Saunders, Refug. Bot. 2(1): 93. 1872. = *Scaphyglottis stellata* Lodd. ex Lindl.

TYPE: [Panama]. Sent from Santa Fé de Veraguas, by the late Mr. Skinner, to W. Wilson Saunders, *G.U. Skinner s.n.* (holotype, W).

Ponera behrii Rchb.f., Bonplandia 3: 220. 1855. = *Scaphyglottis behrii* (Rchb.f.) Benth. & Hook.f. ex Hemsl.

TYPE: [Panama]. Chagres: Dr. Med. Behr. Eingeführt durch Hrn. Keferstein, cultivirt von Hrn. Lehmann (holotype, W; illustration of type, AMES).

Prescottia panamensis Schltr., Repert. Spec. Nov. Regni Veg. 16: 357. 1920. = *Prescottia oligantha* (Sw.) Lindl.
TYPE: Panama. In savannas, Cerro Vaca, Chiriquí, 900–1100 m, Dez. 1911, *H. Pittier 5358* (holotype, B, destroyed; illustration of type, AMES).

Pseudepidendrum spectabile Rchb.f., Bot. Zeitung (Berlin) 10: 733. 1852. = *Epidendrum pseudepidendrum* Rchb.f.
TYPE: Panama. *J. Warscewicz s.n.* (holotype, W).

Psilochilus dressleri Kolan., Phytotaxa 175 (1): 55–57. 2014.

TYPE: Panama. Darién: Ridge north of Cerro Pirre, 1050–1200 m, 12 July 1977. *R.L. Dressler 5663* (holotype, FLAS).

Restrepia aberrans Luer, Orquideología 20: 117. 1996.

TYPE: Panama. Bocas del Toro: epiphytic in forest above Chiriquí Grande, alt. 350 m, 17 Feb 1985, collected by C Luer, J. Luer, R. Dressler & K. Dressler, flowered in cultivation by A. & P. Jesup in Bristol, CT., 26 Apr 1987, *C. Luer 10612* (holotype, MO).

Restrepia filamentosa Ames & C.Schweinf., Schedul. Orchid. 8: 19, fig. 3. 1925. = *Restrepia trichoglossa* F.Lehm. ex Sander

TYPE: Panama. Chiriquí: Cerro Horquita, Oct 1923, *C.W. Powell 344* (holotype, AMES).

Restrepia powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 25. 1922. = *Restrepia muscifera* (Lindl.) Rchb.f. ex Lindl.

TYPE: Panama. Chiriquí auf umgefallenen Bäumen, 4000 ft., *C.W. Powell 123* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-26759; isolectotypes, AMES, MO).

Rodriguezia secunda var. *panamensis* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 75. 1922. = *Rodriguezia lanceolata* Ruiz & Pav.

TYPE: Panama. auf Hügeln bei Panama City, *C.W. Powell 79* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-28148; isolectotypes, AMES, K, MO-955932).

Rolfia powellii Ames, Schedul. Orchid. 7: 32, fig. 6. 1924. = *Palmorchis powellii* (Ames) C.Schweinf. & Correll

TYPE: Panama. Juan Diaz: near Panama City, found in damp places in dense shade. Aug–Sept 1923, *C.W. Powell 325* (holotype, AMES; isotype, AMES).

Salpistele adrianae Luer & Sijm, Selbyana 30(1): 18. 2009. = *Stelis adrianae* Bogarín & Serracín

TYPE: Panama. Chiriquí: near San Felix, alt. 1700 m., collected by T. & A. Sijm, 16 Oct 2001, flowered in cult. in Vanhuizen, the Netherlands, Oct 2008, *A.P. Sijm 220411* (holotype, MO).

Salpistele brunnea Dressler, Orquideología 14: 6. 1979. = *Stelis brunnea* (Dressler) Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: Cerro Colorado, aprox. 50 km al norte de San Félix, aprox. 1300 m alt.; 19 Aug 1975, *R.L. Dressler 5124* (holotype, US; isotype, PMA).

Salpistele dressleri Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 39: 128. 1991. = *Stelis cymbisepala* Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: Fortuna, collected by R.L. Dressler, sent to J&L Orchids, Easton, CT, ca. 1979, flowered in cult. 25 Apr 1987, *C. Luer 12820* (holotype, MO).

Salpistele lutea Dressler, Orquideología 14: 8. 1979. = *Stelis maculata* Pridgeon & M.W.Chase

TYPE: Panama. Chiriquí: Cerro Colorado, aprox. 50 km al norte de San Félix, alt. 1300 m, 19 Aug 1975, *R.L. Dressler 5125* (holotype, US).

Salpistele parvula Luer & Dressler, Monogr. Syst. Bot. Missouri Bot. Gard. 39: 132. 1991. = *Stelis gnoma*

Pridgeon & M.W.Chase

TYPE: Panama. Prov. of Coclé: hills north of El Valle de Antón, alt. ca. 900 m, 3 Dec 1978, *R.L. Dressler 5832* (holotype, MO; isotype, FLAS).

Sarcoglottis hunteriana Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 13. 1922.

TYPE: Panama. In Tälern zwischen Hügeln bei Panama City, *C.W. Powell 147* (holotype, B, destroyed, lectotype designated by Christenson (1991a), AMES-23776; isolectotypes, K, MO-955987; drawing of type, AMES-26776).

Sarcoglottis neglecta Christenson, Lindleyana 6: 133. 1991.

TYPE: Panama. San Juan, upper reaches of the Chagres river, sea level, flowers green, Feb 1924, *C.W. Powell 388* (holotype, AMES; isotypes, AMES, MO).

Sarcoglottis powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 14. 1922.

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 179* (holotype, B, destroyed, lectotype designated by Christenson (1991a), AMES-25015; isolectotype, MO-956012; drawing published in Mansfeld [1931: t. 11, nr. 41].).

Scaphosepalum clavellatum Luer, Selbyana 3(1/2): 32. 1976.

TYPE: Panama. Panama: epiphytic along the Altos de Pacora road, alt. 650 m, 4 Mar 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 748* (holotype, SEL).

Scaphosepalum elasmatopus Schltr., Repert. Spec. Nov. Regni Veg. 12: 204. 1913. = ***Scaphosepalum microdactylum*** Rolfe

SYNTYPES: Panama. Chiriquí: epiphytic in damp forest between Alto de las Palmas and Cerro de Horqueta, alt. 2100-2300 m, Mar 1911, *H. Pittier & W.R. Maxon 3229*, *H. Pittier & W.R. Maxon 5730*, *H. Pittier & W.R. Maxon 5484* (B, destroyed; lectotype designated by Luer (1988), drawing of type, AMES; isolectotype, US).

Scaphosepalum longirepens Ames, Proc. Biol. Soc. Washington 34: 153. 1921. = ***Scaphosepalum microdactylum*** Rolfe

TYPE: Panama. Chiriquí: humid forest of the Cordillera, east of the Río Caldera, 17-19 Feb 1918, 2000 m alt., *Killip 3567* (holotype, AMES; isotype, Rochester Academy of Science, US).

Scaphosepalum panamense Schltr., Repert. Spec. Nov. Regni Veg. 12: 205. 1913. = ***Masdevallia livingstoneana*** Roez. ex Rchb.f.

TYPE: Panama. im Wäldern am Río Indio de Gatún, ungefähr bei Meereshöhe, blühend im Feb 1911, *H. Pittier 2803* (holotype, B, destroyed; drawing of type, AMES).

Scaphosepalum viviparum Luer, Selbyana 2: 390. 1978.

TYPE: Panama. Veraguas: epiphytic in cloud forest on Cerro Tute, alt. 900 m, Jan 1977, *R.L. Dressler s.n.*, cultivated at SEL-77-3, flowered in cult. 21 Aug 1977, *C. Luer 1820* (holotype, SEL).

Scaphyglottis chlorantha B.R.Adams, Phytologia 64: 249. 1988.

TYPE: Panama. Panama: Cerro Jefe, 29 Oct 1980, *K. Sytsma 2003* (holotype, MO).

Scaphyglottis clavata Dressler, J. Orchideenfr. 11(4): 311. 2004.

TYPE: Panama. Chiriquí: San Félix, arriba de San Félix, flowered in cult. April 2000, *R.L. Dressler 6287* (holotype, MO; isotype, PMA).

Scaphyglottis dolichophylla Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 28. 1922. = ***Scaphyglottis laevilabium*** Ames

TYPE: Panama. auf Hügeln östlich von Panama City, *C.W. Powell 126* (holotype, B, destroyed, lectotype designated by Christenson (1991b), K; drawing of type, AMES-26781; drawing published in Mansfeld [1931: t. 43, nr. 171].).

Scaphyglottis gigantea Dressler, *Orquidea* (Mexico City) 7: 234. 1979.

TYPE: Panama. Chiriquí, Cerro Hornito, NNE of Gualaca, about 1700 m., semi-cloud forest, 15 Dec 1976, *R.L. Dressler 5533* (holotype, US; isotypes, PMA, SEL).

Scaphyglottis laevilabium Ames, *Proc. Biol. Soc. Washington* 34: 154. 1921.

TYPE: Panama. on branch of tree in dense forest, 2 miles east of Juan Diaz, 60 m, 2 October 1917, *Ellsworth P. Killip 3113* (holotype, AMES; isotype, AMES, Rochester Academy of Science, US).

Scaphyglottis monspirrae Dressler, *Novon* 10(3): 199. 2000.

TYPE: Panama. Darién: Cerro Pirre, elev. 1200-1400 m, 15-16 July 1977, *R.L. Dressler 5668* (holotype, MO).

Scaphyglottis panamensis B.R.Adams, *Phytologia* 64: 251. 1988.

TYPE: Panama. Panama: summit of Cerro Jefe near Radio Towers, 30 Nov 1983, *H.W. Churchill 3942* (holotype, MO),

Scaphyglottis powellii Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 28. 1922. = ***Scaphyglottis mesocopis*** (Endrés & Rchb.f.) Benth. & Hook.f. ex Hemsl.

TYPE: Panama. Chiriquí, 3000-4000 ft. *C.W. Powell 134* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES; isotypes, AMES, MO-955976, K; drawing published in Mansfeld [1931: t. 44, nr. 173].).

Scaphyglottis robusta B.R.Adams, *Phytologia* 64: 253. 1988.

TYPE: Panama. Panama: El Llano-Carti-Tupile road, 10-12 km N of Inter-Am. Highway, 9 Jan 1975, *J.L. Luteyn & R.L. Wilbur 4679* (holotype, DUKE).

Scaphyglottis tenella L.O.Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 28: 423, tab. 24. 1941.

TYPE: Panama. Coclé: epiphytic, hills north of El Valle de Antón, alt. 800-1000 m, 21 Nov 1940, *P.H. Allen 2276* (holotype, AMES; photo of type, K).

Scaphyglottis unguiculata Schltr., *Repert. Spec. Nov. Regni Veg.* 12: 206. 1913. = ***Scaphyglottis longicaulis*** S.Watson

TYPE: Panama. Colón: Loma de la Gloria, bei Fato, in Wäldern, 10-104 m, blühend im Jul-Aug 1911, *H. Pittier 4090* (holotype, B, destroyed; isotype, US).

Selenipedium chica Rchb.f., *Xenia Orchid.* 1: 3. 1854.

TYPE: Panama. Vanilla en árbol des Panaméniens. *E.P. Duchassaing s.n. misit 1851* (holotype, W; isotype, P; illustration of type *Xenia Orch.* 1: 3, t. 2. 1854; GOET).

Sievekingia butcheri Dressler, *Orquideología* 13: 221. 1979.

TYPE: Panama. Coclé, La Mesa, al norte de El Valle de Antón, 6 nov 1976, *H. Butcher s.n.* (holotype, US).

Sigmatostalix abortiva L.O.Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 284. 1940. = ***Oncidium abortivoides*** M.W.Chase & N.H.Williams

TYPE: Panama. Canal Zone: Quebrada López, 30 m alt., sepals and petals yellow, lip white, 11 Feb 1940, *P.H. Allen 2121* (holotype, MO).

Sigmatostalix brownii Garay, *Caldasia* 10: 236. 1968. = ***Oncidium brownii*** (Garay) M.W.Chase & N.H.Williams

TYPE: Panama. without proper locality. Cultivated by Mr. Henry Brown, Miami, *H. Brown s.n.* (holotype, AMES).

Sigmatostalix racemifera L.O.Williams in Woodson & Schery, *Ann. Missouri Bot. Gard.* 27: 285 (t. 36). 1940. = ***Oncidium picturatissimum*** (Kraenzl.) M.W.Chase & N.H.Williams

TYPE: Panama. Coclé: vicinity of El Valle, 600-100 m alt., flowers yellow, 8 Dec 1938, *P.H. Allen 1232* (holotype, MO).

Sobralia allenii L.O.Williams, *Ann. Missouri Bot. Gard.* 29: 336. 1942.

TYPE: Panama. Coclé: epiphytic, trail to La Mesa, hills north of El Valle de Antón, alt. ca. 1000 m, 31 Aug 1941, sepals and petals white, labellum pale yellow, *P.H. Allen 2686* (holotype, AMES).

Sobralia bletiae Rchb.f., Bot. Zeitung (Berlin) 10: 713. 1852.

TYPE: "Chiriquí" Panama, Warszewicz s.n. (holotype, W; illustration of type, AMES).

Sobralia bouchei Ames & C.Schweinf., Schedul. Orchid. 10: 4. 1930. = ***Sobralia wilsoniana*** Rolfe

TYPE: Panama. March-April 1930, alt 2200 ft, terrestrial and epiphytic, *A.M. Bouché s.n.* (holotype, AMES).

Sobralia citrea Dressler, Orchids (West Palm Beach) 74(12): 937. 2005.

TYPE: Panama. Coclé: El Valle de Antón, 800-1000 m, flowered in cult. Aug 2001, *R.L. Dressler 6338* (holotype, MO; isotypes, FLAS, PMA, SEL).

Sobralia crispissima Dressler, Lankesteriana 5: 10. 2002.

TYPE: Panama. Chiriquí: al oeste de Volcán, carretera a Río Sereno, alt. 1200 m, 25 August 2001, *A. Maduro & E. Olmos 223* (holotype, MO; isotypes, PMA, FLAS).

Sobralia decora var. *aerata* P.H.Allen & L.O.Williams, Ann. Missouri Bot. Gard. 29: 337, tab. 31. 1942. =

Sobralia atropubescens Ames & C.Schweinf.

TYPE: Panama. Coclé: bad lands south of El Valle de Antón, alt. ca. 500 m, 18 Sep 1941, flowered in collection of A. M. Bouché, Pedro Miguel, Canal Zone, *P. H. Allen 2755* (holotype, AMES).

Sobralia epiphytica Schltr., Repert. Spec. Nov. Regni Veg. 12: 213. 1913. = ***Sobralia bletiae*** Rchb.f.

SYNTYPES: Panama. in der Umgebung von Culebra, Kanalzone, 50-150 m, *H. Pittier 4780* (B, destroyed, US, W). Panama. an Baumstämmen in den Wäldern am Río Indio de Gatún, Kanalzone, *R. Maxon 4829* (B, destroyed, US, W).

Sobralia exigua Dressler, Orchids (West Palm Beach) 74(12): 938. 2005.

TYPE: Panama. Chiriquí: Cordillera, epiphytic, 800-1100 m, flowered in cult. 12 Jul 2003, *R.L. Dressler 6365B* (holotype, MO).

Sobralia fenziiana Rchb.f., Bot. Zeitung (Berlin) 10: 714. 1852.

TYPE: Panama. "Chiriquí Cordillera 1-2000", *J. Warszewicz s.n.* (holotype, W; illustration of type, AMES).

Sobralia fuzukiae Dressler & Bogarín, Orchids (West Palm Beach) 76(9): 696. 2007. = ***Sobralia quinata*** Dressler

TYPE: Panama. Bocas del Toro: Culebra, pressed from cult. 9 Jan 2007, *R. L. Dressler 6810* (holotype, PMA; isotype, JBL-spirit).

Sobralia gloriana Dressler, Lankesteriana 5: 11. 2002.

TYPE: Panama. Coclé: Area de El Valle de Antón, Alt. 800-1000 m, 23 julio 2001, *A. Maduro & E. Olmos 212* (holotype, MO; isotype, PMA).

Sobralia* × *intermedia P.H.Allen, Amer. Orchid Soc. Bull. 27: 534. 1958.

TYPE: Panama. Cabeceras del Río Mata Ahogado, near El Valle de Antón, Rep. de Panama, 1200 ft. *P.H. Allen 2670* (holotype, not stated).

Sobralia kruskayae Dressler, Orchids (West Palm Beach) 74(12): 939. 2005.

TYPE: Panama. Coclé: El Valle de Antón, flowered in cultivation Jul-Aug 2003, *R.L. Dressler 6383* (holotype, MO; isotype, PMA).

Sobralia labiata Warsz. & Rchb.f., Bot. Zeitung (Berlin) 10: 714. 1852.

TYPE: Panama. "Schorche Berg in Chiriquí", *J. Warszewicz s.n.* (holotype, W; illustration of type, AMES).

Sobralia lindleyana Rchb.f., Bot. Zeitung (Berlin) 10: 713. 1852.

TYPE: [Panama]. "Chiriquí", *J. Warszewicz s.n.* (holotype, W).

Sobralia macrophylla Rchb.f., Bot. Zeitung (Berlin) 10: 713. 1852.

TYPE: [Panama]. Chiriquí, *J. Warszewicz s.n.* (holotype, W).

Sobralia maduroi Dressler, *Orchids (West Palm Beach)* 73(10): 776. 2004.

TYPE: Panama. Chiriquí, region of Boquete, 1800-2200 m, 19 Jul 2001, *A. Maduro & E. Olmos 206* (holotype, MO; isotype, PMA).

Sobralia mariannae Dressler, *Lankesteriana* 5: 13. 2002.

TYPE: Panama. Panama: Cerro Jefe, flowered in cultivation 24 May 2002, epiphyte, flower white, callus yellow, brown at base, fragrant, *R.L. Dressler 6352* (holotype, MO).

Sobralia mireyae Dressler, *Orchids (West Palm Beach)* 76: 700–701. 2007. = ***Sobralia citrea*** Dressler

TYPE: Panama. Coclé: La Pintada; flowered in cult. 30 May 2006, *R. L. Dressler 6707* (holotype, PMA; isotype, JBL-spirit).

Sobralia nutans Dressler, *Lankesteriana* 5: 13. 2002.

TYPE: Panama. Bocas del Toro: Km. 63, al norte de Fortuna, alt. 1050 m, 9 sep. 2001, *A. Maduro & E. Olmos 236* (holotype, MO; isotypes, PMA, SEL).

Sobralia panamensis Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 11. 1922. = ***Sobralia fenzliana*** Rchb.f.

TYPE: Panama. Bei Panama-City, in Tälern; auch längs der Hinterwässer des Gatun-Sees, ziemlich häufig, *C.W. Powell 21* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23770; isolectotypes, AMES-23769, K-K000463288, K000463289, MO-955891, MO-961330).

Sobralia panamensis Schltr. var. ***albiflos*** Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 11. 1922. = ***Sobralia fenzliana***

TYPE: Panama. Auf Hügeln bei Panama-City, *Powell 31* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23711; isolectotype, K).

Sobralia powellii Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 11. 1922.

TYPE: Panama. An den Hinterwässern des Gatun-Sees, selten *C.W. Powell 2*. (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23774, isolectotypes, AMES-23773, MO-955874, MO-955875).

Sobralia recta Dressler, *Orchids (West Palm Beach)* 74(12): 939. 2005.

TYPE: Panama. Bocas del Toro, 800 m., floreció en cultivo 12 Sept 2002, *A. Maduro & E. Olmos 295* (holotype, MO; isotype, PMA).

Sobralia rolfeana Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 17: 12. 1922. = ***Sobralia macrophylla*** Rchb.f.

TYPE: Panama. Am Gatun-See, *C.W. Powell 3* (holotype, B, lectotype designated by Christenson (1991b), AMES-23768; isolectotype, MO-955876).

Sobralia sanfelicii Dressler, *Orchids (West Palm Beach)* 73(10): 777. 2004.

TYPE: Panama. Chiriquí: Cerro Colorado, Dist. San Félix, cult. Finca Drácula, flowered in cultivation 20 Aug 2002, *A. Maduro & E. Olmos 269* (holotype, MO; isotype, PMA).

Sobralia sororcula Dressler, *Orquideología* 25(1): 39. 2007.

TYPE: Panama. Veraguas: Los González, Noreste de Santa Fé, probablemente de 800-1000 m, floreció en cult. Aug 2004, *R.L. Dressler 6415* (holotype, PMA; illustration of type; photo of type).

Sobralia sotoana Dressler & Bogarín, *Lankesteriana* 9(3): 482. 2010.

TYPE: Panama. Veraguas, collected near road north of Santa Fé de Veraguas, flowered in culture in Jardín Botánico Lankester, pressed from cultivation, 8 August 2009, *R.L. Dressler 7168* (holotype, CR; isotype, JBL-spirit).

Sobralia suaveolens Rchb.f., *Gard. Chron.*, n.s., 9: 622. 1878. = ***Sobralia bletiae***

TYPE: [Panama]. It was introduced from Colon (Aspinwell) in Central America by Mr. Stanger (once the Orchid grower of late Consul Schiller, now professor of a good nursery, and a member of the directorial committee of our Gartenbau Gesellschaft), who presented it to the Botanical Garden, where it flowered in March under M. Donat's care (holotype, W).

Sobralia theobromina Dressler, Orchids (West Palm Beach) 74(12): 940. 2005.

TYPE: Panama. Coclé: El Valle de Antón, 800-1000 m, cult. en Finca Drácula, floreció 12 Sept 2002 “la chocolatosa”, *A. Maduro & E. Olmos 293* (holotype, MO; isotype, PMA).

Sobralia tricolor Dressler, Orchids (West Palm Beach) 74(12): 941. 2005.

TYPE: Panama. Coclé: El Valle de Antón, 800-1000 m, floreció en Finca Drácula, 12 Sept 2002, *Maduro & Olmos 297* (holotype, MO; isotype, PMA).

Sobralia valida Rolfe, Bull. Misc. Inform. Kew 1909: 65.

TYPE: Panama. near the Darien Gold Mines. Received from Messrs. Sander & Sons and flowered at Kew in June 1907. It was obtained by Dr. Hodgkinson, The Grange, Wilmslow, *Sander & Sons s.n.* (holotype, K).

Sobralia warszewiczii Rchb.f., Bot. Zeitung (Berlin) 10: 714. 1852.

TYPE: Panama. “Chiriquí 6000”, *J. Warszewicz s.n.* (holotype, W).

Specklinia absurda Bogarín, Karremans & R.Rincón, Phytotaxa 115 (2): 31–41. 2013.

TYPE: Costa Rica-Panama. Puntarenas-Chiriquí: Coto Brus-Renacimiento, línea fronteriza hacia el Cerro Pando, después del mojón N.338, 8°55'11.22" N 82°43'18.18" W, 2446 m, bosque muy húmedo montano bajo, epífita en bosque primario, “in sylvis virginis versus montium Pando in itinere ad summum Costa Rica austro-orientalis in finibus utrimque Costa Rica et Panama”, 19 April 2011, *D. Bogarín 8711, D. Jiménez & A. Karremans* (holotype, CR; isotypes, JBL, PMA, UCH, USJ).

Sphyrastylis dressleri Toscano, Lindleyana 14: 24. 1999. = ***Ornithocephalus dressleri*** (Toscano) Toscano & Dressler

TYPE: Panama. Province of Panama: top of Cerro Jefe near antenna, elev. 1000 m, 17 Oct 1977, *J.P. Folsom & R. Page 5942* (holotype, MO).

Spiranthes subpandurata Ames & C.Schweinf., Schedul. Orchid. 8: 4. 1925. = ***Beloglottis subpandurata*** (Ames & C.Schweinf.) Garay

TYPE: Panama. Upper Chagres River Range, Jan-Feb 1924, *C.W. Powell 377* (holotype, AMES).

Spiranthes woodsonii L.O.Williams, Ann. Missouri Bot. Gard. 29: 337. 1942. = ***Sarcoglottis woodsonii*** (L.O.Williams) Garay

TYPE: Panama. Chiriquí: vicinity of Boquete, alt. 1200-1500 m, 24-26 Jul 1940, flowers pale green, *R.E. Woodson, Jr. & R.W. Schery 753* (holotype, AMES).

Stanhopea avicula Dressler, Amer. Orchid Soc. Bull. 58: 885. 1989.

TYPE: Panama. Darién: Cerro Tacarcuna, elev. about 1500 m.; Feb 1980; flowered in cult. 13 Feb 1982, *K.R. Reading & R.R. Tasker s.n.* (holotype, MO; isotype, FLAS; photo of the plant that served as the holotype).

Stanhopea maduroi Dodson & Dressler, Orquideología 21: 62. 1998.

TYPE: Panama. collected by Andrés Maduro at Valle de Antón, ca. 1000 m, 28 Nov 1985, *C.H. Dodson 16259* (holotype, RPSC).

Stanhopea panamensis N.H.Williams & Whitten, Lindleyana 3(1): 9. 1988.

TYPE: Panama. Panama: epiphytic in cloud forest on Cerro Campana approx. 50 km SW of Panama City, elev. ca. 900 m, Flowered in cultivation at University of Florida, accession number UF-80, *M.W. Whitten 909* (holotype, FLAS; isotype, SEL).

Stanhopea warszewicziana Klotzsch, Allg. Gartenzeitung 20: 274. 1852.

TYPE: [Panama]. Der Herr Kunzt und handlungsgärtner Mathieu, in dessen Orchideenhaus diese Pflanze ende Juli in voller Blüte steht, erhielt sie von dem Herrn von Warszewicz, dessen Namen sie sührt, aus dem Chiriquí Gebirge in Central America, *Warszewicz s.n.* (holotype, B).

Steliopsis anneliesae Brieger, Die Orchideen 8(1A): 458. 1976. *nom. nud.*

TYPE: Panama. 1972, *Anon s.n.* (holotype, not stated).

Stelis allenii L.O. Williams, Ann. Missouri Bot. Gard. 29: 338. 1942.

TYPE: Panama. Coclé: hills north of El Valle de Antón, alt. 800 m, 10 Apr 1942, flowers nearly black, *P. H. Allen 2952* (holotype, AMES; isotype, AMES).

Stelis atrorubens L.O. Williams, Ann. Missouri Bot. Gard. 29: 239. 1942.

TYPE: Panama. Coclé: hills north of El Valle de Antón, trail to LAs Minas, 2 Dec 1941, flowers maroon, *P. H. Allen 2876* (holotype, AMES; isotype, MO).

Stelis butcheri Luer, Phytologia 49: 224. 1981.

TYPE: Panama. Chiriquí: epiphytic in cloud forest above Guadalupe, alt. ca. 2000 m, 1 Sept 1976, *H. Butcher s.n. sub C. Luer 1101* (holotype, SEL).

Stelis chiriquensis Schltr., Beih. Bot. Centralbl. 36, Ab. 2: 386. 1918. = ***Stelis despectans*** Schltr.

TYPE: Panama. Chiriquí: Humid forest between Alto de las Palmas and top of Cerro de la Horqueta, 2100-2268 m, Mar 1911, *H. Pittier 3228* (holotype, B, destroyed; isotype, AMES; drawing and photo of type, AMES).

Stelis collina Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 15. 1922.

TYPE: Panama. Auf Hügeln bei Panama City, *C.W. Powell 180* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23780, AMES; isolecotype, MO-956013; drawing published in Mansfeld [1931: t. 21, nr. 83].).

Stelis crescenticola Schltr., Repert. Spec. Nov. Regni Veg. 16: 442. 1920.

TYPE: Panama. An Bäumen, besonders Crescentia, am Río Chagres, April, *F.C. Lehmann 4540* (holotype, B, destroyed, illustration of type, AMES).

Stelis dressleri Luer, Phytologia 49: 227. 1981.

TYPE: Panama. Veraguas: epiphytic in cloud forest above Santa Fé, alt. ca. 700 m, 5 Sept 1976, *C. Luer & R.L. Dressler 1146* (holotype, SEL; detail of holotype, SEL).

Stelis eximia Ames, Schedul. Orchid. 6: 54. 1923. = ***Stelis superbiens*** Lindl.

TYPE: Panama. Chiriquí, Caramilla [Jaramillo?], *C.W. Powell 312* (holotype, AMES).

Stelis fimbriata R.K. Baker, Ann. Missouri Bot. Gard. 55: 68, fig. 1. 1968. = ***Stelis ciliaris*** Lindl.

TYPE: Panama. Cerro Jefe, in mossy forest near summit, alt. 2900 ft, 11 Feb 1967, *R.K. Baker 249* (holotype, MO).

Stelis gratiosa Luer, Selbyana 5: 192. 1979. = ***Stelis ciliaris***

TYPE: Panama. Panama: epiphytic in cloud forest on Cerro Jefe, alt. 1000 m, 2 March 1976, cult. at SEL, greenhouse acc. no. 43-76-155, flowered in cult. 8 May 1977, *C. Luer, J. Luer & P. Taylor 1619* (holotype, SEL).

Stelis inaequalis Ames, Schedul. Orchid. 4: 12. 1923. = ***Stelis glossula*** Rchb.f.

TYPE: Panama. Near San Juan in the foothills of the upper reaches of the Chagres River, sea level, *C.W. Powell 272* (holotype, AMES).

Stelis isthmi Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 16. 1922.

TYPE: Panama. Bei Arrajan, westlich des Kanals, ungefähr auf Seehöhe, *C.W. Powell 232* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23777; isolecotype, MO-956043).

Stelis loculifera Luer, Phytologia 49: 229. 1981.

TYPE: Panama. Chiriquí: epiphytic in cloud forest on Cerro Colorado above Camp Escopeta, alt. 1700 m, Feb 1977, cult. at SEL-77-1901, flowered in cult. 4 May 1977, *C. Luer, J. Luer & R.L. Dressler 1614* (holotype, SEL; detail of the holotype, SEL).

Stelis longipetiolata Ames, Schedul. Orchid. 1: 6. 1922.

TYPE: Panama. Chiriquí, humid forest between Alto de las Palmas and top of Cerro de la Horqueta, alt 2100-2268 m, 18 Mar 1911, *W.R. Maxon 5460* (holotype, US).

Stelis maduroi Luer & Sijm, Monogr. Syst. Bot. Missouri Bot. Gard. 112: 111. 2007.

TYPE: Panama. Bocas del Toro, obtained from Finca Dracula 7 Oct.2001, cultivated in the Netherlands, Oct 2006, *T. Sijm 220728* (holotype, MO).

Stelis maxonii Schltr., Beih. Bot. Centralbl. 36, Ab. 2: 389. 1918.

TYPE: Panama. Humid forest along 'the upper Caldera-River, Holcombs trail, above El Boquete, Chiriquí, 1450-1650 m, March 1911, *William R. Maxon 5697* (holotype, B, destroyed; drawing and photo of type, AMES).

Stelis meganthera Luer, Selbyana 22: 122. 2001.

TYPE: Panama. Chiriquí: Cerro Colorado, alt. 650-700 m, 16 Feb 1977, *C. Luer, J. Luer & R. & K. Dressler 1453* (holotype, SEL).

Stelis megapetala Luer, Selbyana 22(2): 124. 2001.

TYPE: Panama. Coclé: El Valle, alt. ca. 1000 m, Sept 1976, *C. Luer & H. Butcher 1264* (holotype, SEL).

Stelis montana L.O.Williams, Ann. Missouri Bot. Gard. 27: 272. 1940.

TYPE: Panama. Chiriquí: trail from Cerro Punta to headwaters of Río Caldera, 2250-2500 m, 4 Jan 1939, *P.H. Allen 1463* (holotype, MO).

Stelis oscitans Luer, Lindleyana 11: 105. 1996.

TYPE: Panama. Chiriquí: forest near the Fortuna Dam, alt. 1100 m, 16 Feb 1985, *C. Luer, J. Luer, R. Dressler & K. Dressler 10575* (holotype, MO).

Stelis panamensis Schltr., Beih. Bot. Centralbl. 36, Ab. 2: 391. 1918. = ***Stelis gracilis*** Ames

TYPE: Panama. Forests of the upper Mamoni-River, 150-400 m, Oct 1911, *H. Pittier 4490* (holotype, B, destroyed; isotype, AMES).

Stelis parvibracteata Ames, Orchidaceae 7: 131. 1922. = ***Stelis argentata*** Lindl.

TYPE: Panama. Cana and vicinity, 27 Apr 1908. On trees, flowers purplish, 6000 ft. alt., *R.S. Williams 972* (holotype, AMES).

Stelis powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17:16. 1922. = ***Stelis gigantea*** Pridgeon & M.W.Chase

TYPE: Panama, Chiriquí, c. 4000 Fuss ü. M., *C. W. Powell 247* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23778; isolectotype, MO-956053).

Stelis praemorsa Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 17. 1922.

TYPE: Panama. Auf Hügeln, östlich von Panama City, *C.W. Powell 234* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23799; drawing of type, AMES-26805).

Stelis sarcophylla Luer, Phytologia 49: 238. 1981.

TYPE: Panama. Chiriquí: epiphytic in scrubby trees on the Llanos del Volcán, alt. 1500 m, 10 Sept 1976, cult. at SEL, flowered in cult. 15 Oct 1976, *C. Luer & H. Butcher 1245* (holotype, SEL; detail of holotype, SEL).

Stelis semperflorens Luer, Phytologia 49: 238. 1981.

TYPE: Panama. Panama: epiphytic in cloud forest on Cerro Jefe, alt. 1000 m, 2 Mar 1976, *C. Luer, J. Luer, P. Taylor & R.L. Dressler 966* (holotype, SEL; detail of the holotype).

Stelis triaristata Luer, Selbyana 5: 193. 1979.

TYPE: Panama. Panama: epiphytic in cloud forest along the Altos de Pacora road, alt. ca. 350 m, March 1976, *C. Luer, J. Luer, R.L. Dressler & P. Taylor 2109* (holotype, SEL; detail of the holotype, SEL).

Stelis umbelliformis Hespénh. & Dressler, *Orquideología* 6: 21. 1971.

TYPE: Panama. Colón: camino madero de Santa Rita, aprox. 20 kms al este de Colón; 15 Oct 1969, con baño morado, *H.A. Hespénheide & R.L. Dressler 2266* (holotype, US; isotypes, K, MO, PH).

Stelis veraguasensis Luer, *Selbyana* 22(2): 126. 2001.

TYPE: Panama. Veraguas: alt. ca. 500 m, 5 Sept 1976, *C. Luer & R. Dressler 1235* (holotype, SEL).

Stelis williamsii Ames, *Orchidaceae* 7: 133. 1922.

TYPE: Panama. Cana and vicinity, 27 Apr 1908. On trees, flowers purplish, 2000-6500 ft. alt., *R.S. Williams 970* (holotype, AMES).

Stellilabium aciculare Dressler, *Harvard Pap. Bot.* 4(2): 471. 1999. = ***Telipogon acicularis*** (Dressler) N.H. Williams & Dressler

TYPE: Panama. Panama: Cerro Jefe (lower cafetal), 12 Mar 1969, on smaller branches of tree near stream, inflorescence to 15 cm, unbranched, flowers wine-red, *R.L. Dressler 3617* (holotype, AMES; isotypes, MO, PMA).

Stellilabium butcheri Dressler, *Harvard Pap. Bot.* 4(2): 472. 1999. = ***Telipogon butcherii*** N.H. Williams & Dressler

TYPE: Panama. Chiriquí: epiphytic on orange tree about 1/2 mi SW of highway near Cuesta Piedra, 9 Apr 1961, flowers dull purple, *H.P. Butcher 654* (holotype, SEL).

Stellilabium fortuneae Dressler, *Harvard Pap. Bot.* 4(2): 473. 1999. = ***Telipogon fortuneae*** (Dressler) N.H. Williams & Dressler

TYPE: Panama. Chiriquí: Camp Hornito, Fortuna Dam site, 8°44'N, 82°18'W, 1000-1200 m, 24 Sep 1976, epiphytic, flowers wine-red, *R.L. Dressler 5464* (holotype, MO).

Stellilabium morii Dressler, *Harvard Pap. Bot.* 4(2): 473. 1999. = ***Telipogon morii*** (Dressler) N.H. Williams & Dressler

TYPE: Panama. Chiriquí: N of San Félix at Chiriquí-Bocas del Toro border on Cerro Colorado copper mine road along continental divide, lower montane rain forest (cloud forest, trees to 5 m tall, 5000-5500 ft alt., 3 May 1977., epiphyte, leaves absent, flowers purple, nonresupinate, *S. Mori & J. Kallunki 5813* (holotype, MO).

Stenotyla panamensis Pupulin, *Orchid Rev.* 117(1287): 162. 2009.

TYPE: Panama. Without exact provenance, cultivated in san Vito de Java, Costa Rica, by W. Chacón at Happy Garden greenhouses, flowered on October 27, 2005, *F. Pupulin 5867* (holotype, PMA; isotype, JBL).

Systemoglossum panamense Dressler & N.H. Williams, *Amer. Orchid Soc. Bull.* 39: 326. 1970.

TYPE: Panama. Panama, La Eneida, region of Cerro Jefe; pressed 25 June 1969; epiphyte in tall forest; flowers bronzy green, *R.L. Dressler & N.H. Williams 3642* (holotype, US).

Telipogon bombiformis Dressler, *Orchids* 72: 114. 2003.

TYPE: Panama. Chiriquí: Cerro Punta, Bajo Grande, 2300 m, 10 Dic 2001, *A. Maduro & E. Olmos s.n.* (holotype, MO).

Telipogon butcheri Dodson & R. Escobar, *Orquideología* 18: 278. 1993.

TYPE: Panama. Chiriquí: Cordillera, unas 4 millas al este del Volcán, ca. 1500 m, 2 Oct 1960, *H.P. Butcher s.n.* (holotype, RPSC; isotype, AMES).

Telipogon caulescens Dressler, *Orchids* 72: 114. 2003.

TYPE: Panama. Chiriquí: Boquete, por la frontera con Bocas del Toro, 2000 m, 30 Jun 2000, *A. Maduro y E. Olmos 168* (holotype, MO; isotype, PMA).

Telipogon chiriquiensis Dodson & R. Escobar, *Orquideología* 18: 281. 1993.

TYPE: Panama. Chiriquí: Epífita, pocos km arriba de Guadalupe, 2500 m, 13 sept. 1976, *C.A. Luer & H. Butcher 1208* (holotype, RPSC).

Telipogon fractus Dressler, Orchideen J. 14(1): 12. 2007.

TYPE: Panama. Bocas del Toro: oberhalb Guadalupe (Chiriquí), 2000-2300 m, 10 Sept 2001, *A. Maduro & E. Olmos 243* (holotype, MO; isotype, PMA).

Telipogon griesbeckii Dressler, Orchids 72: 115. 2003.

TYPE: Panama. Chiriquí: Cerro Punta, Entre Ríos, 2100-2200 m, Aug. 1993, *A. Maduro & E. Olmos 169* (holotype, MO; isotype, PMA).

Telipogon maduroi Dressler, Orchids 72: 116. 2003.

TYPE: Panama. Chiriquí: Cerro Punta, Altos de Respingo, 2000-2500 m, 6 Jul 2001, *A. Maduro y E. Olmos 190* (holotype, MO; isotype, PMA).

Telipogon medusae Dressler, J. Orchideenfr. 13(3): 211. 2006.

TYPE: Panama. Chiriquí: Cerro Punta, arriba de Guadalupe, 2000-2200 m, 19 Jul. 2001, *A. Maduro & E. Olmos 209* (holotype, MO; isotypes, PMA, FLAS, SEL).

Telipogon nobilis Dressler, Orchideen J. 14(1): 12. 2007.

TYPE: Panama. Chiriquí: Cerro Punta, Las Nubes, Parque Internacional La Amistad, 3 Apr 2003, *A. Maduro & E. Olmos 305* (holotype, PMA).

Telipogon nunezii Dressler, Orchideen J. 14(1): 14. 2007.

TYPE: Panama. Chiriquí: San Félix, Cerro Colorado, prensado de cultivo, 11 Sept 2001, *A. Maduro & J. Nunez 249* (holotype, PMA).

Telipogon olmosii Dressler, J. Orchideenfr. 13(3): 212. 2006.

TYPE: Panama. Bocas del Toro: Sierra Madre, 1500-1750 m, 23 Jul. 2001, *A. Maduro & E. Olmos 213* (holotype, MO; isotype, PMA).

Telipogon panamensis Dodson & R.Escobar, Orquideología 18: 284. 1993.

TYPE: Panama. Chiriquí: Bajo Choro, 1900 m, 20 Jul 1940, *R.E. Woodson, Jr. & R.W. Schery 694* (holotype, MO).

Telipogon personatus Dressler, J. Orchideenfr. 13(3): 214. 2006.

TYPE: Panama. Chiriquí: Cerro Punta, arriba de Guadalupe, 2100-2200 m, 23 Jul. 2001, *A. Maduro & E. Olmos 214* (holotype, MO; isotype, PMA).

Telipogon reticulatus Dressler, Orchideen J. 14(1): 14. 2007.

TYPE: Panama. Bocas del Toro: above Guadalupe (Chiriquí), 2000-2300 m., Sept 2002, *A. Maduro & E. Olmos 310* (holotype, MO; isotype, PMA).

Telipogon seibertii Dodson & R.Escobar, Orquideología 18: 288. 1993.

TYPE: Panama. Chiriquí: Casita Alta, Volcán de Chiriquí, 1500-2000 m, 28 Jun-21 Jul 1938, *R.E. Woodson, P. Allen & R.J. Seibert 961* (holotype, MO).

Trichocentrum panamense Rolfe, Bull. Misc. Inform. Kew 1913: 341. = ***Trichocentrum capistratum*** Linden & Rchb.f.

TYPE: Panama. on bush-covered hills east of the Panama Canal, 255 m, *L.J. Lipscomb s.n.* (holotype, K).

Trichocentrum pfavii Rchb.f., Gard. Chron., n.s., 16: 70. 1881.

TYPE: Panama. Chiriquí, without specific locality, 19 Nov. 1980, *R. Pfau 80* (holotype, W).

Trichopilia amabilis Dressler, Orquideología 22(3): 245. 2003.

TYPE: Panama. prov. Panama: Dist. de Chimán, Río Tuti, Cerro Chucantí, colectado por N.G. Smith, floreció en cultivo 5 marzo 2000, *R.L. Dressler 6346* (holotype, MO).

Trichopilia eneidae Dressler, Orquideología 22(3): 246. 2003.

TYPE: Panama. Bocas del Toro: Culebra, colectada por Eneida Hurtado; floreció en cult. 28 marzo 2002, *R.L. Dressler 6348* (holotype, MO).

Trichopilia leucoxantha L.O. Williams, Amer. Orchid Soc. Bull. 10: 137. 1941.

TYPE: Panama. Coclé, hills south of El Valle de Antón, about 700 m. alt., flowers pure white with yellow in throat, 15 Aug 1940, *P.H. Allen 2401* (holotype, AMES).

Trichopilia maculata Rchb. f., Bonplandia 3(15-16): 215. 1855.

TYPE: [Panama] Port Chagres, gesammelt von Herrn Dr. Behr. Blühte in Herrn Keferstein's Sammlung zu Kröllwitz unter Hrn. Lehmann's Cultur, *H.A. Behr s.n.* (holotype, W).

Trichopilia marginata var. *olivacea* Rchb.f., Xenia Orchid. 2: 102. 1865. = ***Trichopilia marginata*** Henfr.

TYPE: [Panama]. Vulcano de Chiriquí auf *Quercus* und *Cupania glabra*, Januar, b. ebenda; Bilde von *J. Warszewicz* (holotype, W).

Trichopilia olmosii Dressler, Selbyana 22(1): 11. 2001.

TYPE: Panama. Bocas del Toro: region of Culebra, 1000-1200 m, collected by Erick Olmos; flowered in cultivation 4 August 2000, *R.L. Dressler 6288* (holotype, MO).

Trichopilia powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 77. 1922. = ***Trichopilia maculata*** Rchb.f.

TYPE: Panama. gewöhnlich auf Mango-Bäumen, in der Umgebung von Panama City, *C.W. Powell 9* (holotype, B, destroyed; lectotype designated by Christenson (1991b), AMES-23895; isolectotype K, MO-955882; drawing of type, AMES-26818; drawing published in Mansfeld [1931: t. 71, nr. 283].).

Trichopilia similis Dressler, Selbyana 22(1): 12. 2001.

TYPE: Panama. Panama: Cerro Jefe, 800-900 m, 3 December 1970, *R.L. Dressler 3907* (holotype, MO).

Trichosalpinx dressleri Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 64: 54. 1997.

TYPE: Panama. Prov. of Panama: epiphytic in forest of Cerro Jefe, alt. ca. 1000 m, 2 Dec. 1979, *R. L. Dressler 5855* (holotype, MO).

Trichosalpinx macphersonii Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 64: 66. 1997.

TYPE: Panama. Panama: vicinity of Cerro Jefe, alt. 700-800 m, 23 Jul 1988, *G. McPherson 12777* (holotype, MO).

Trichosalpinx ringens Luer, Lindleyana 11: 108. 1996.

TYPE: Panama. Chiriquí: epiphytic in cloud forest, Cerro Colorado, alt. 1670 m, 15 Feb 1985, *C. Luer, J. Luer, R. Dressler & K. Dressler 10539* (holotype, MO).

Trigonidium seemannii Rchb.f., Bot. Voy. Herald [Seemann] 6: 214. 1854. = ***Trigonidium egertonianum*** Bateman ex Lindl.

TYPE: Panama. Panama: rara videtur, *B. Seemann 539* (holotype, BM).

Tripthora wagneri Schltr., Repert. Spec. Nov. Regni Veg. 17: 139. 1921.

TYPE: Panama. Provinz Chiriquí und Veragua. Blühend im April 1858, *Moritz Wagner 1778* (holotype, B, destroyed; illustration of type, AMES).

Vanilla dressleri Soto Arenas, Lankesteriana 9(3): 303. 2010.

TYPE: Panama. Colón: end of Pipeline road on Río Agua Salud, 9-10 mi N of Gamboa. Tropical wet forest. Elev. 20-50 m. Vine. Flowers greenish-yellow, lower lip white. Column yellow. Sweet smelling, 15 April 1982, *S. Knapp & J. Mallet 4621* (holotype, MO).

Vanilla pauciflora Dressler, Orquideología 13: 229. 1979. = ***Vanilla trigonocarpa*** Hoehne

TYPE: Panama. Panama: carretera El Llano-Cartí, 10-15 km al N de El Llano; 3 Mar 1976, *R.L. Dressler 5290* (holotype, US).

Warczewiczella caloglossa Schltr., Repert. Spec. Nov. Regni Veg. Beih. 12: 216. 1913. = *Stenotyla picta* (Rchb.f.) Dressler

SYNTYPES: Panama. Chiriquí: feuchte Wälder von Cuesta de las Palmas an der Südseite von Cerro de la Horqueta, 1700-2100 m, blühend im März 1911, *H. Pittier 3214* (B, destroyed; drawings of type, AMES); blühend im März 1911, *W.R. Maxon 5510* (B, destroyed).

Xylobium powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 66. 1922. = *Xylobium sulfurinum* (Lem.) Schltr.

TYPE: Panama. Chiriquí, c. 4000', *C.W. Powell 117* (holotype, B, destroyed, lectotype designated by Christenson (1991b), AMES-23866; isolectotypes, K, MO-955964; drawing of type, AMES-26865; drawing published in Mansfeld [1931: t. 63, nr. 649].).

Zootrophion williamsii Luer, Selbyana 23: 41. 2002.

TYPE: Panama. Cerro Campana, collected by N.H. Williams, 20 March 1976, flowered in cultivation 30 May 1976, *C. Luer 0676* (holotype, SEL).

Zosterophyllanthos dariensis Kolan. & Szlach., Richardiana 14: 106–108. 2014. = *Pleurothallis dariensis* (Kolan. & Szlach.) Bogarín

TYPE: Panama. San Blas/Darién: mountains between Tubualá (San Blas) and Masargandi (Darién), 300-500 m, 2 Feb 1997, *R. L. Dressler 5589* (holotype, FLAS).

Zygopetalum lacteum Rchb.f., Gard. Chron. 2: 1290. 1872. = *Kefersteinia lactea* (Rchb.f.) Schltr.

SYNTYPES: Costa Rica [?]. [Panama]. Chiriquí [Panama, *Wallis s.n.*, not located]. Later, it was collected by M. Endrés [Costa Rica, *A. R. Endrés 334*, W 0019731 / Rchb. Orch. 49620]. It flowered some years ago with Director Linden [Panama or Costa Rica, *J. Linden s.n.*, W 0019731 / Rchb. Orch. 49620], and is now once more in flower with Messrs. Veitch [without locality, cult. *Veitch s.n.*, W 0019731 / Rchb. Orch. 49620]". Lectotype designated by Pupulin (2001), W, Panama or Costa Rica. Chiriquí, cultivated by *Linden s.n.* [W 0019731 / Rchb. Orch. 49620].

Zygopetalum parviflorum L.O.Williams, Ann. Missouri Bot. Gard. 28(4): 424, pl. 25. 1941. = *Warreopsis parviflora* (L.O.Williams) Garay

TYPE: Panama. Chiriquí: terrestrial, flowers purple, lip violet, column white, vicinity of Bajo Chorro, alt. 1900 m, 20-22 Jul 1940, *R.R.E. Woodson, Jr. & R.W. Schery 605* (holotype, AMES; isotypes, MO, US).

APPENDIX 2

List of orchid species endemic to Panama

- Acianthera juxtaposita* (Luer) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 253. 2004.
Acineta mireyae G.Gerlach & M.H.Weber, J. Orchideenfr. 10: 230. 2003.
Aspidogyne grandis (Ormerod) Ormerod, Harvard Pap. Bot. 11(2): 147. 2007.
Barbosella circinata Luer, Selbyana 3: 204. 1977.
Baskervilla stenopetala Dressler, Bol. Inst. Bot. (Guadalajara) 5: 70. 1998.
Brachionidium calypso Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 24. 1995.
Brachionidium dentatum Luer & Dressler, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 34. 1995.
Brachionidium lucanoideum Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 78. 1995.
Brachionidium peltarion Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 92. 1995.
Brachionidium satyrium Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 57: 112. 1995.
Brassia panamensis (Garay) M.W.Chase, Phytotaxa 20: 28. 2011.
Camaridium allenii (L.O.Williams) M.A.Blanco, Lankesteriana 7: 519. 2007.
Camaridium fragrans (J.T.Atwood) M.A.Blanco, Lankesteriana 7: 520. 2007.
Camaridium longicolumna (J.T.Atwood) M.A.Blanco, Lankesteriana 7: 520. 2007.
Camaridium lutheri (J.T.Atwood) M.A.Blanco, Lankesteriana 7: 520. 2007.
Camaridium scalariforme (J.T.Atwood) M.A.Blanco, Lankesteriana 7: 521. 2007.
Camaridium synsepalum (J.T.Atwood) M.A.Blanco, Lankesteriana 7: 521. 2007.
Camaridium tricarinatum (J.T.Atwood) M.A.Blanco, Lankesteriana 7: 522. 2007.
Camaridium tutae (J.T.Atwood) M.A.Blanco, Lankesteriana 7: 522. 2007.
Chondroscaphe eburnea (Dressler) Dressler, Orquideología 22: 22. 2001.
Chysis pluricostata Dressler, Orquideología 24(2): 142. 2006.
Chysis violacea Dressler, Orquideología 22: 237. 2003.
Cischweinfia nana Dressler, Selbyana 22: 9. 2001.
Cischweinfia pusilla subsp. *furcata* Dressler & Dalström, Selbyana 25(1): 5, 9, f. 12. 2004.
Coryanthes maduroana G.Gerlach, Lankesteriana 4: 70. 2004.
Coryanthes panamensis G.Gerlach, Trop. Subtrop. Pflanzenwelt 83: 141. 1993.
Crossoglossa bifida Dressler, Orquideología 20: 255. 1997.
Crossoglossa elliptica Dressler, Orquideología 20: 256. 1997.
Cryptocentrum caespitosum Carnevali, Harvard Pap. Bot. 5: 472. 2001.
Cyclopogon dressleri Szlach., Novon 4: 172. 1994.
Cynoches dianae Rchb.f., Bot. Zeitung (Berlin) 10: 636. 1852.
Cynoches powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 58. 1922.
Cynoches stenodactylon Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 59. 1922.
Dichaea dressleri Folsom, Novon 16: 336. 2006.
Dichaea retroflexiligula Folsom, Orchid Digest 58: 187. 1994.
Dichaea violacea Folsom, Orchid Digest 58: 190. 1994.
Dracula agnosia A.Doucette, Phytotaxa 56: 23. 2012.
Dracula immunda A.Doucette, Phytotaxa 16: 38. 2011.
Dracula olmosii Luer & Maduro, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 136. 1999.
Dresslerella elvallensis Luer, Selbyana 3: 2. 1976.
Dresslerella pertusa (Dressler) Luer, Selbyana 3: 6. 1976.
Dresslerella powellii (Ames) Luer, Selbyana 3: 8. 1976.

- Dressleria allenii* H.G.Hills, Lindleyana 15: 171. 2000.
- Dressleria kerryae* H.G.Hills, Lindleyana 15: 173. 2000.
- Dressleria severiniana* H.G.Hills, Amer. Orchid Soc. Bull. 62: 616. 1993.
- Dryadella butcheri* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 160. 1999.
- Dryadella dressleri* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 162. 1999.
- Echinosepala balaeniceps* (Luer & Dressler) Pridgeon & M.W.Chase, Lindleyana 17: 101. 2002.
- Elleanthus capitatellus* Dressler, J. Orchideenfr. 11: 143. 2004.
- Elleanthus decipiens* Dressler, J. Orchideenfr. 11: 146. 2004.
- Encyclia silverarum* Leopardi & Carnevali, Phytotaxa 183 (3): 161. 2014
- Epidendrum antonense* Hágsater, Icon. Orchid. 2: t. 108. 1993.
- Epidendrum brachybotrys* Ackerman & Montalvo, Selbyana 9: 129. 1986.
- Epidendrum caligarium* Rchb.f., Gard. Chron. 1869: 1110. 1869.
- Epidendrum caluerorum* Hágsater, Icon. Orchid. 2: t. 116. 1993.
- Epidendrum cirrhochiloides* Hágsater & E.Santiago, Icon. Orchid. 11: t. 1112. 2008.
- Epidendrum croatii* Hágsater, Icon. Orchid. 3: t. 328. 1999.
- Epidendrum cuneatoides* Dodson ex Hágsater, Orquídea (Mexico City), n.s., 13: 217. 1993.
- Epidendrum curvisepalum* Hágsater & Dressler, Icon. Orchid. 2: t. 125. 1993.
- Epidendrum cymbiglossum* Hágsater, Icon. Orchid. 2: t. 126. 1993.
- Epidendrum dariense* Hágsater, Kolan. & L.Sánchez, Icon. Orchid. 14(10): t. 1421. 2013.
- Epidendrum dosbocasense* Hágsater, Orquídea (Mexico City), n.s., 12: 282. 1992.
- Epidendrum dwyeri* Hágsater, Icon. Orchid. 2: t. 130. 1993.
- Epidendrum dwyerioides* Hágsater & E.Santiago, Icon. Orchid. 9: t. 929. 2007.
- Epidendrum elephantinum* Hágsater, Icon. Orchid. 7: t. 734. 2004.
- Epidendrum folsomii* Hágsater & E.Santiago, Icon. Orchid. 8: 832. 2006.
- Epidendrum fortunae* Hágsater & Dressler, Icon. Orchid. 8: 833. 2006.
- Epidendrum fuscinum* (Dressler) Hágsater, Lankesteriana 5: 73. 2005.
- Epidendrum galeochilum* Hágsater & Dressler, Icon. Orchid. 7: t. 738. 2004.
- Epidendrum gregorii* Hágsater, Icon. Orchid. 2: t. 138. 1993.
- Epidendrum gymnochlamys* Hágsater & E.Santiago, Icon. Orchid. 8: 839. 2006.
- Epidendrum hornitense* Hágsater & L.Sánchez, Icon. Orchid. 8: 841. 2006.
- Epidendrum infundibulum* Hágsater & E.Santiago, Icon. Orchid. 9: t. 946. 2007.
- Epidendrum insolatum* Barringer, Brittonia 43: 245. 1991[1992].
- Epidendrum jefeallenii* Hágsater & García-Cruz, Icon. Orchid. 3: t. 339. 1999.
- Epidendrum jefestigma* Hágsater & García-Cruz, Icon. Orchid. 3: t. 340. 1999.
- Epidendrum kerichilum* Hágsater, Orquídea (Mexico City), n.s., 11: 26. 1988.
- Epidendrum lacteum* Dressler, Orquideología 11: 108. 1978.
- Epidendrum longibracteatum* Hágsater, Icon. Orchid. 3: t. 347. 1999.
- Epidendrum lutheri* Hágsater, Icon. Orchid. 2: t. 154. 1993.
- Epidendrum mantis-religiosae* Hágsater, Orquídea (Mexico City), n.s., 11: 27. 1988.
- Epidendrum niveocaligarium* Hágsater, Icon. Orchid. 8: 860. 2006.
- Epidendrum pajitense* C.Schweinf., Bot. Mus. Leafl. 14: 56. 1949.
- Epidendrum panamense* Schltr., Repert. Spec. Nov. Regni Veg. 12: 212. 1913.
- Epidendrum pirrense* Hágsater, Icon. Orchid. 4: t. 471. 2001.
- Epidendrum plagiophyllum* Hágsater, Icon. Orchid. 3: t. 370. 1999.
- Epidendrum platyphyllostigma* Hágsater & García-Cruz, Icon. Orchid. 3: t. 372. 1999.
- Epidendrum platystomum* Hágsater & L.Sánchez, Icon. Orchid. 8: 873. 2006.
- Epidendrum pleurothalloides* Hágsater, Icon. Orchid. 2: t. 174. 1993.

- Epidendrum probiflorum* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 39. 1922.
Epidendrum pseudoschumannianum Fowlie, Orchid Digest 33: 255. 1969.
Epidendrum pudicum Ames, Schedul. Orchid. 6: 71, fig. 10. 1923.
Epidendrum schistostemum Hágsater, Laube & L.Sánchez, Icon. Orchid. 11: t. 1177. 2008.
Epidendrum simulacrum Ames, Schedul. Orchid. 6: 75. 1923.
Epidendrum spathulipetalum Hágsater & Dressler, Icon. Orchid. 4: t. 486. 2001.
Epidendrum sphenostele Hágsater & E.Santiago, Icon. Orchid. 9: t. 989. 2007.
Epidendrum suturatum Hágsater & Dressler, Icon. Orchid. 2: t. 190. 1993.
Epidendrum tacarcunense Hágsater, Icon. Orchid. 3: t. 384. 1999.
Epidendrum tenuisulcatum (Dressler) Hágsater, Orquídea (Mexico City), n.s., 13: 217. 1993.
Epidendrum transversellipticum Hágsater, Icon. Orchid. 4: t. 492. 2001.
Epidendrum tritropianthum Hágsater & E.Santiago, Icon. Orchid. 9: t. 998. 2007.
Epidendrum veraguasense Hágsater, Orquídea (Mexico City), n.s., 12: 286. 1992.
Epidendrum warszewiczii Rchb.f., Bot. Zeitung (Berlin) 10: 742. 1852.
Epidendrum witherspooniorum Hágsater & Dressler, Icon. Orchid. 7: t. 798. 2004.
Euryblema anatonum (Dressler) Dressler, Lankesteriana 5: 94. 2005.
Gongora powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 62. 1922.
Govenia powellii Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 51. 1922.
Habenaria avicula Schltr., Repert. Spec. Nov. Regni Veg. 17: 138. 1921.
Habenaria mediocris Dressler, Bol. Inst. Bot. (Guadalajara) 7: 96. 1999 [2000].
Habenaria patentiloba Ames, Proc. Biol. Soc. Washington 34: 151. 1921.
Habenaria warszewiczii Schltr., Anexos Mem. Inst. Butantan, Secç. Bot. 1(2): 25. 1921.
Jacquiiniella pedunculata Dressler, Orquideología 5: 24. 1970.
Kefersteinia alata Pupulin, Harvard Pap. Bot. 8: 161. 2004.
Kefersteinia angustifolia Pupulin & Dressler, Harvard Pap. Bot. 8: 164. 2004.
Kefersteinia auriculata Dressler, Orquideología 16: 49. 1983.
Kefersteinia maculosa Dressler, Orquideología 16: 52. 1983.
Kreodanthus bugabae Ormerod, Harvard Pap. Bot. 13(1): 59. 2008.
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Lepanthes brunnescens Luer, Phytologia 55: 179. 1984.
Lepanthes caloptera Luer, Phytologia 55: 180. 1984.
Lepanthes confusoides Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 165. 1999.
Lepanthes eciliata Schltr., Repert. Spec. Nov. Regni Veg. 12: 203. 1913.
Lepanthes exposita Luer, Lindleyana 2(4): 191. 1987.
Lepanthes incantata Luer, Lindleyana 2: 194. 1987.
Lepanthes laevis Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 168. 1999.
Lepanthes luerorum B.T.Larsen, Phytotaxa 175 (5) 279-280. 2014.
Lepanthes maduroi Luer, Phytologia 55: 186. 1984.
Lepanthes minyglossa Luer, Selbyana 23: 15. 2002.
Lepanthes mollis Luer, Selbyana 23: 15. 2002.
Lepanthes olmosii Bogarín, Orchid Digest 73(3): 141. 2009.
Lepanthes pachyglossa Luer, Phytologia 57: 59. 1985.
Lepanthes prora Luer, Phytologia 55: 191. 1984.
Lepanthes pycnogenia Luer, Lindleyana 7(2): 114, f. 10. 1992.
Lepanthes rauhii Luer, Orchidee (Hamburg) 38: 59. 1987.
Lepanthes ridicula Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 76: 168. 1999.
Lepanthes schizocardia Luer, Phytologia 55: 193. 1984.

- Lepanthes seegeri* Luer, Orchidee (Hamburg) 38: 60, fig. 1987.
- Lepanthes tetroptera* Luer, Lindleyana 2: 214. 1987.
- Lepanthes trichidion* Luer, Phytologia 55: 194. 1984.
- Lepanthopsis rinkei* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 88: 104. 2002.
- Lycaste panamanensis* (Fowlie) Archila, Revista Guatemal. 5(2): s.p. 2002.
- Macroclinium junctum* (Dressler) Dodson, Icon. Pl. Trop. 10: t. 938. 1984.
- Macroclinium simplex* (Dressler) Dodson, Icon. Pl. Trop. 10: t. 939. 1984.
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- Malaxis rostratula* Dressler, Lankesteriana 4(1): 97. 2004.
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- Masdevallia collina* L.O.Williams, Amer. Orchid Soc. Bull. 11: 93. 1942.
- Masdevallia eburnea* Luer & Maduro, Monogr. Syst. Bot. Missouri Bot. Gard. 91: 409a. 2003.
- Masdevallia gloriae* Luer & Maduro, Monogr. Syst. Bot. Missouri Bot. Gard. 91: 413a. 2003.
- Masdevallia maduroi* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 72: 110. 1998.
- Masdevallia olmosii* Königer & Sijm, Arcula 12: 303. 2003.
- Masdevallia ostaurina* Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 95: 249. 2004.
- Masdevallia pleurothalloides* Luer, Selbyana 3: 218. 1977.
- Masdevallia tokachiorum* Luer, Lindleyana 6: 90. 1991.
- Maxillaria curvicolonna* M.A.Blanco & Neubig, Orchids (West Palm Beach) 76(6): 451. 2007.
- Maxillaria darienensis* J.T.Atwood, Selbyana 19: 254. 1998 [1999].
- Maxillaria galantha* J.T.Atwood & Carnevali, Lindleyana 9: 227. 1994.
- Microchilus fuscatus* Ormerod, Harvard Pap. Bot. 11(2): 161. 2007.
- Microchilus maasii* Ormerod, Harvard Pap. Bot. 11(2): 161. 2007.
- Microchilus ovalis* Ormerod, Harvard Pap. Bot. 11(2): 164. 2007.
- Microchilus panamanicus* Ormerod, Harvard Pap. Bot. 9: 414. 2005.
- Microchilus subquadratus* Ormerod, Harvard Pap. Bot. 11(2): 172. 2007.
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- Notylia latilabia* Ames & C.Schweinf., Schedul. Orchid. 8: 71. 1925.
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- Oncidium allenii* Dressler, Selbyana 22: 9. 2001.
- Oncidium exalatum* Hágsater, Orquídea (Mexico City), n.s., 8: 98. 1981.
- Oncidium martinezii* Königer, Arcula 15: 369. 2005.
- Oncidium punctulatum* Dressler, Selbyana 22: 10. 2001.
- Oncidium zelenkoanum* Dressler & Pupulin, Lankesteriana 8: 37. 2003.
- Ornithidium repens* (L.O.Williams) M.A.Blanco & Ojeda, Lankesteriana 7: 533. 2007.
- Ornithocephalus aristatus* Pupulin & Dressler, Brittonia 58: 314. 2006.
- Ornithocephalus cryptanthus* (C.Schweinf. & P.H.Allen) Toscano & Dressler, Lindleyana 15: 255. 2000.
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Pleurothallis dressleriana Bogarín, Lankesteriana 14 (3): 241. 2014.
Pleurothallis dukei Luer, Lindleyana 12: 45. 1997.
Pleurothallis folsomii (Luer & Endara) Bogarín, Lankesteriana 14 (3): 241. 2014.
Pleurothallis hammelii Luer, Lindleyana 12: 48. 1997.
Pleurothallis harpago Luer, Selbyana 5: 167. 1979.
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- Specklinia cactantha* (Luer) Pridgeon & M.W.Chase, Lindleyana 16: 257. 2001.
- Specklinia cucumeris* (Luer) Bogarín & Karremans, Lankesteriana 14 (3): 261. 2014.
- Specklinia displosa* (Luer) Pridgeon & M.W.Chase, Lindleyana 16: 257. 2001.
- Specklinia dressleri* (Luer) Bogarín & Karremans, Lankesteriana 14 (3): 262. 2014.
- Specklinia unicornis* (Luer) Pridgeon & M.W.Chase, Lindleyana 16(4): 259. 2001.
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- Stanhopea panamensis* N.H.Williams & W.M.Whitten, Lindleyana 3: 9. 1988.
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- Stelis atrorubens* L.O.Williams, Ann. Missouri Bot. Gard. 29: 339. 1942.
- Stelis collina* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 15. 1922.
- Stelis cymbisepala* Pridgeon & M.W.Chase, Lindleyana 17: 98. 2002.
- Stelis decurrens* Pridgeon & M.W.Chase, Lindleyana 17: 99. 2002.
- Stelis falcatiloba* (Ames) Bogarín & Serracín, Lankesteriana 14 (3): 262. 2014.
- Stelis fortuneae* (Luer & Dressler) Pridgeon & M.W.Chase, Lindleyana 16: 263. 2001.
- Stelis furculifera* (Dressler & Bogarín) Bogarín, Lankesteriana 14 (3): 267. 2014.
- Stelis gnoma* Pridgeon & M.W.Chase, Lindleyana 17: 99. 2002.
- Stelis guttata* (Luer) Pridgeon & M.W.Chase, Lindleyana 16: 263. 2001.
- Stelis isthmi* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 17: 16. 1922.
- Stelis loculifera* Luer, Phytologia 49: 229. 1981.
- Stelis longipetiolata* Ames, Schedul. Orchid. 1: 6. 1922.
- Stelis maculata* Pridgeon & M.W.Chase, Lindleyana 17: 99. 2002.
- Stelis maduroi* Luer & Sijm, Monogr. Syst. Bot. Missouri Bot. Gard. 112: 111. 2007.
- Stelis meganthera* Luer, Selbyana 22: 122. 2001.
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- Stelis montana* L.O.Williams, Ann. Missouri Bot. Gard. 27: 272. 1940.
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- Telipogon butcheri* Dodson & R.Escobar, Orquideología 18: 278. 1993.
- Telipogon butchii* N.H.Williams & Dressler, Lankesteriana 5: 169. 2005.
- Telipogon caulescens* Dressler, Orchids 72: 114. 2003.
- Telipogon chiriquiensis* Dodson & R.Escobar, Orquideología 18: 281. 1993.
- Telipogon fractus* Dressler, Orchideen J. 14(1): 12. 2007.
- Telipogon griesbeckii* Dressler, Orchids 72: 115. 2003.
- Telipogon maduroi* Dressler, Orchids 72: 116. 2003.
- Telipogon medusae* Dressler, J. Orchideenfr. 13(3): 211. 2006.

- Telipogon morii* (Dressler) N.H. Williams & Dressler, Lankesteriana 5: 170. 2005.
Telipogon nobilis Dressler, Orchideen J. 14(1): 12. 2007.
Telipogon nunezii Dressler, Orchideen J. 14(1): 14. 2007.
Telipogon olmosii Dressler, J. Orchideenfr. 13(3): 212. 2006.
Telipogon panamensis Dodson & R. Escobar, Orquideología 18: 284. 1993.
Telipogon personatus Dressler, J. Orchideenfr. 13(3): 214. 2006.
Telipogon reticulatus Dressler, Orchideen J. 14(1): 14. 2007.
Telipogon seibertii Dodson & R. Escobar, Orquideología 18: 288. 1993.
Trichocentrum silverarum (Carnevali & Cetzal) J.M.H. Shaw, Orchid Rev. 122(1306): 37. 2014.
Trichopilia amabilis Dressler, Orquideología 22: 245. 2003.
Trichopilia eneidae Dressler, Orquideología 22(3): 246. 2003.
Trichopilia leucoxantha L.O. Williams, Amer. Orchid Soc. Bull. 10: 137. 1941.
Trichopilia olmosii Dressler, Selbyana 22: 11. 2001.
Trichopilia similis Dressler, Selbyana 22: 12. 2001.
Trichosalpinx dressleri Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 64: 54. 1997.
Trichosalpinx macphersonii Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 64: 66. 1997.
Trichosalpinx tantilla (Luer) Luer, Monogr. Syst. Bot. Missouri Bot. Gard. 64: 81. 1997.
Trichosalpinx tropida (Luer) Luer, Phytologia 54: 398/ 1983.
Trisetella dressleri (Luer) Luer, Phytologia 47: 57. 1980.

APPENDIX 3

Excluded taxa

- Acineta superba* (Kunth) Rchb.f. in W.G.Walpers, Ann. Bot. Syst. 6: 609. 1863.
This is a species from South America not yet recorded in Panama.
- Acianthera lanceana* (Lodd. ex Lindl.) Pridgeon & M.W.Chase, Lindleyana 16: 244. 2001.
A species widely distributed in Central and South America. Although expected in Panama, no vouchers have been found or cited for the country (Luer 2004).
- Anathallis polygonoides* (Griseb.) Pridgeon & M.W.Chase, Lindleyana 16: 250. 2001.
This species is distributed in Trinidad & Tobago, Venezuela, Suriname, French Guiana, Ecuador and Peru. No records have been found from Panama (Luer 2006). It can be confused with *A. sertularioides*.
- Bletia reflexa* Lindl., Edwards's Bot. Reg. 21: t. 1760. 1835.
We have not seen specimens recorded in Panama.
- Brassia lanceana* Lindl., Edwards's Bot. Reg. 21: t. 1754. 1835.
This is a species from South America not yet recorded in Panama.
- Brassia longissima* (Rchb.f.) Nash, L.H.Bailey, Stand. Cycl. Hort. 1: 541. 1914.
Specimens collected in Panama correspond to *B. arcuigera* Rchb.f.
- Campylocentrum schneeanum* Foldats, Bol. Soc. Venez. Ci. Nat. 22: 274. 1961.
We have not seen specimens recorded in Panama. Specimens under this name might correspond to *C. tenellum* Todzia (Correa *et al.* 2004).
- Chysis aurea* Lindl., Edwards's Bot. Reg. 23: t. 1937. 1837.
This is a species from South America not yet recorded in Panama.
- Coryanthes maculata* Hook., Bot. Mag. 58: t. 3102. 1831.
This is a species from South America not yet recorded in Panama.
- Coryanthes picturata* Rchb.f., Bot. Zeitung (Berlin) 22: 332. 1864.
This name was applied to Panama and Costa Rica populations now known as *C. kaiseriana* (Gerlach & Dressler 2003).
- Coryanthes speciosa* Hook., Bot. Mag. 58: t. 3102. 1831.
This is a species from South America not yet recorded in Panama.
- Cryptocentrum gracillimum* Ames & C. Schweinf., Schedul. Orch. 8: 68. 1925.
Specimens under this name correspond to *Cryptocentrum caespitosum* Carnevali.
- Cryptocentrum inaequisepalum* C.Schweinf., Bot. Mus. Leafl. 12: 186. 1946.
This is a South American species not recorded in Panama (Carnevali 2001).
- Cryptocentrum peruvianum* subsp. *minus* (Schltr.) Carnevali, Harvard Pap. Bot. 5: 482. 2001.
This is a subspecies from Colombia not yet recorded in Panama (Carnevali 2001).
- Cyclopogon millei* (Schltr.) Schltr., Beih. Bot. Centralbl. 37(2): 391. 1920.
This is a South American species not recorded in Panama.
- Cyclopogon olivaceous* (Rolfe) Schltr., Beih. Bot. Centralbl. 37(2): 392. 1920.
This species is restricted to Ecuador and Peru. According to Szlachetko *et al.* (2005) this name has been applied to Mesoamerican populations; however, they do not correspond to the type and protologue of *C. olivaceous*.
- Cynoches ventricosum* Bateman, Orchid. Mexico Guatemala: t. 5. 1838.
This is a species from South America not yet recorded in Panama.
- Cyrtopodium punctatum* (L.) Lindl., Gen. Sp. Orchid. Pl.: 188. 1833.
According to Romero-González & Carnevali-Fernández (1999) the correct name for the Panamanian populations is *Cyrtopodium macrobulbon*.
- Dichaea brachypoda* Rchb.f., Beitr. Orchid.-K. C. Amer.: 78. 1866.

This species is a synonym of *Dichaea panamensis* Lindl.. Other specimens in herbaria correspond to *D. elliptica* Dressler & Folsom (Correa *et al.* 2004).

Dichaea graminoides (Sw.) Lindl., Gen. Sp. Orchid. Pl.: 209. 1833.

We have not seen specimens in herbaria from Panama.

Dichaea tenuifolia Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 203. 1920.

This is a poorly known species distributed from Colombia to Ecuador (Pupulin 2005a, 2007). Costa Rican populations of *Dichaea* with undulate, thin-textured leaves and smooth ovary were recognized as distinct from South American material and, thus, described as *D. viridula* (Pupulin 2005a). We have not yet seen specimens of this group from Panama.

Dressleria dilecta (Rchb.f.) Dodson, Selbyana 1: 132. 1975.

According to Hills (2012), this species is endemic to Costa Rica.

Dressleria eburnea (Rolfe) Dodson, Selbyana 1: 132. 1975. = *Dressleria suavis* (Ames & C.Schweinf.) Dodson

According to Hills (2012), this species ranges from Nicaragua to Costa Rica.

Dressleria helleri Dodson, Selbyana 1: 132. 1975.

This species is native to Nicaragua and Costa Rica. It has not yet been recorded in Panama.

Dryadella linearifolia (Ames) Luer, Selbyana 2(2-3): 208. 1978.

A species from Guatemala not yet recorded in Panama.

Dryadella pusiola (Rchb. f.) Luer, Selbyana 2(2/3): 209. 1978.

A species from South America not yet recorded in Panama.

Dryadella simula (Rchb.f.) Luer, Selbyana 2: 209. 1978.

This species is distributed from Colombia to Peru. It has not yet been reported from Panama.

Elleanthus capitatus (Poepp. & Endl.) Rchb.f., in W.G.Walpers, Ann. Bot. Syst. 6: 475. 1862.

This is a species from the Antilles. The name has been applied to specimens of *E. cynarocephalus* (Rchb.f.) Rchb.f. in Panama.

Elleanthus linifolius C.Presl, Reliq. Haenk. 1: 97. 1827.

The name was applied to *E. graminifolius* (Barb.Rodr.) Lojtnant.

Elleanthus robustus (Rchb.f.) Rchb.f., in W.G.Walpers, Ann. Bot. Syst. 6: 474. 1862.

A species from South America not yet recorded in Panama.

Encyclia gravida (Lindl.) Schltr., Beih. Bot. Centralbl. 36(2): 472. 1918.

This name must be applied with some prudence because the paucity specimens examined in Costa Rica and in literature (Pupulin & Bogarín 2011, 2012) seem to correspond to self-pollinating forms of different taxa. This phenomenon is common within the species complex close to *E. ceratistes*, *E. chloroleuca* and other “greenish” *Encyclias*. Thus, *E. gravida* might not be considered strictly as a distinct species. This name has been erroneously applied to some fruiting specimens of *E. stellata* (Correa *et al.* 2004).

Epidendrum bangii Rolfe, Bull. New York Bot. Gard. 4: 451. 1907.

According to Hágsater (2013) this species is found in the Andean region of Colombia and Ecuador.

Epidendrum blepharistes Barker ex Lindl., Edwards’s Bot. Reg. 30(Misc.): 20. 1844.

Although this species most likely occur in Panama, no voucher exists from Panama (Hágsater 2008).

Epidendrum carpophorum Barb.Rodr., Gen. Spec. Orchid. 2: 148. 1882.

According to Hágsater (2010) this species is restricted to Venezuela, Guyanas and Brazil. It has been confused with *Epidendrum angustilobum*, which is found in Costa Rica and Panama and in the Pacific coast of Colombia and Venezuela.

Epidendrum concavilabium C.Schweinf., Bot. Mus. Leaf. 4: 118. 1937.

This species has been traditionally treated as synonym of *E. circinatum* (Hágsater *et al.* 2003). According to Karremans *et al.* (2012), both species are distinct, with *E. circinatum* restricted to the middle elevations areas of Valle Central in Costa Rica, while *E. circinatum* is distributed along the Caribbean lowlands of Nicaragua, Costa Rica and Panama. The Panamanian voucher studied corresponds to *E. circinatum* (S. Laube *et al.* 590, PMA).

Epidendrum congestum Rolfe, Bull. Misc. Inform. Kew 1913: 29. 1913.

According to Hágsater (2007) this species is restricted to Costa Rica.

Epidendrum crescentilobum Ames, Schedul. Orchid. 4: 38. 1923.

- This species is endemic to Costa Rica (Hágsater & Sánchez-Saldaña 2006).
- Epidendrum difforme*** Jacq., Enum. Syst. Pl.: 29. 1760.
This is a species from the Antilles. It is not recorded in Panama.
- Epidendrum ibaguense*** Kunth in F.W.H.von Humboldt, A.J.A.Bonpland & C.S.Kunth, Nov. Gen. Sp. 1: 352. 1816.
A species from South America not yet recorded in Panama.
- Epidendrum microphyllum*** Lindl., J. Bot. (Hooker) 3: 85. 1841.
This species is restricted to South America.
- Epidendrum obliquifolium*** Ames, F.T.Hubb. & C.Schweinf., Bot. Mus. Leaf. 3: 73. 1935.
According to Hágsater (1999), the voucher Dressler 5535 (PMA) determined as *E. obliquifolium* is *E. plagiophyllum*. Thus, this species is at the present only found in Costa Rica.
- Epidendrum paniculatum*** Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil.: 243. 1798.
A species from South America. It has not yet been recorded in Panama.
- Epidendrum peperomia*** Rchb.f., Bonplandia (Hannover) 2: 20. 1854.
This species is only found in Colombia and Venezuela. The name has been used in Panama for specimens that correspond to *E. porpax*.
- Epidendrum polyanthum*** Lindl., Gen. Sp. Orchid. Pl.: 106. 1831.
According to Hágsater (2008), this species ranges from Mexico to Honduras.
- Epidendrum ramonianum*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 217. 1923.
According to Hágsater (2003) this species is endemic to Costa Rica.
- Epidendrum repens*** Cogn., Repert. Spec. Nov. Regni Veg. 7: 122. 1909.
Although widely distributed in the Neotropics, Hágsater & Sánchez-Saldaña (2006) did not record this species in Panama.
- Epidendrum schumannianum*** Schltr., Repert. Spec. Nov. Regni Veg. 9: 215. 1911.
An endemic species to Costa Rica. It has not yet been recorded in Panama. Its sister species is *Epidendrum pseudoschumannianum*, an endemic to Panama.
- Epidendrum smaragdinum*** Lindl., Edwards's Bot. Reg. 24(Misc.): 32. 1838.
- This is a South American species not found in Panama (Hágsater & Sánchez-Saldaña 2006).
- Erycina glossomystax*** (Rchb.f.) N.H.Williams & M.W.Chase, Lindleyana 16: 136. 2001.
Widely distributed in South America; however, we have not seen vouchers from Panama.
- Galeandra batemannii*** Rolfe, Gard. Chron., ser. 3, 12: 431. 1892.
This is a species from Mexico. It has not yet been recorded in Panama.
- Galeandra bauerii*** Lindl., in F.A.Bauer, Ill. Orch. Pl.: t. 8. 1830.
This is a species from Guyana. It has not yet been recorded in Panama.
- Galeandra stylomisantha*** (Vell.) Hoehne, Arq. Bot. Estado São Paulo, n.s., f.m., 2: 146. 1952.
This is a South American species. The Panamanian specimen corresponds to *G. arundinis* (Garay & G.A.Romero 2005).
- Gomphichis hetaerioides*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 54. 1920.
This species ranges from Colombia to Ecuador. The correct name for the populations from western Panama is *G. adnata* (Dressler 2003c).
- Gongora charontis*** Rchb.f., Linnaea 41: 110. 1876.
This species is from Colombia. We have not seen vouchers of this species based on Panamanian material.
- Gongora claviodora*** Dressler, Orquideologia 7: 75. 1972.
According to Dressler (2003c), this species ranges from Nicaragua to Costa Rica. No vouchers of this species have been seen from Panama.
- Gongora maculata*** Lindl., Edwards's Bot. Reg. 19: t. 1616. 1833.
A species from South America. It has not yet been recorded in Panama.
- Gongora quinquenervis*** Ruiz & Pav., Syst. Veg. Fl. Peruv. Chil.: 227. 1798.
A species from South America. It has not yet been recorded in Panama.
- Goodyera bradeorum*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 88. 1923.
The type material of *G. bradeorum* is lost, and the application of this concept is still uncertain (Dressler 2003c).
- Goodyera striata*** Rchb.f., Linnaea 18: 409. 1845.
This species is recorded from Mexico to Nicaragua

- (Govaerts 2003).
- Govenia liliacea*** (Lex.) Lindl., Edwards's Bot. Reg. 21: t. 1795. 1835.
A species from northern Mesoamerica. It has not yet been recorded in Panama.
- Guarianthe deckeri*** (Klotzsch) Roeth, Orchidee (Hamburg) 57: 612. 2006.
Specimens collected in Panama correspond to *Guarianthe patinii* (Cogn.) Dressler & W.E.Higgins.
- Habenaria bractescens*** Lindl., Gen. Sp. Orchid. Pl.: 308. 1835.
This species has not yet been recorded in Panama.
- Habenaria entomantha*** (Lex.) Lindl., Gen. Sp. Orchid. Pl.: 311. 1835.
This species has not yet been recorded in Panama.
- Habenaria floribunda*** Lindl., Gen. Sp. Orchid. Pl.: 316. 1835.
This species has not yet been recorded in Panama.
- Habenaria quinqueseta*** (Michx.) Eaton, Man. Bot., ed. 5: 235. 1829.
This species has not yet been recorded in Panama.
- Huntleya meleagris*** Lindl., Edwards's Bot. Reg. 23: t. 1991. 1837.
The specimen cited in Flora of Panama (Williams & Allen 1980) corresponds to *H. burtii* (Endrés & Rchb.f.) Pfitzer (Correa *et al.* 2004).
- Isochilus major*** Cham. & Schltdl., Linnaea 6: 60. 1831.
This species was described from Mexico. We were unable to locate or identify Panamanian specimens of this species.
- Kefersteinia microcharis*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 19: 300. 1923.
According to Pupulin (2001) this species is endemic to Costa Rica.
- Kegeliella houtteana*** (Rchb.f.) L.O.Williams, Ann. Missouri Bot. Gard. 29: 347. 1942.
This name has been erroneously applied to specimens of *K. atropilosa* L.O. Williams & A.H. Heller.
- Laelia rubescens*** Lindl., Edwards's Bot. Reg. 26(Misc.): 20. 1840.
The voucher quoted by Williams & Allen (1980) comes from a cultivated plant from C.W. Powell apparently collected in the Chiriquí province, near the border with Costa Rica close to Golfo Dulce. However, this area is outside of the natural distribution of the species which ranges from Mexico to the Central Pacific of Costa Rica. In Costa Rica, we have not seen specimens along the southern Pacific coast (from Carara to Burica) towards Panama. No collections appeared in Panama other than the voucher cited.
- Laelia undulata*** (Lindl.) L.O. Williams, Darwiniana 5: 76. 1941.
This species is known from South America (Dressler 2003). We have not been able to see specimens from Panama.
- Lankesteriana barbulatea*** (Lindl.) Karremans, Lankesteriana 13(3): 326. 2014.
Although widely distributed through Central and South America, we have not seen vouchers from Panama. Luer (2006) did not cite any collection for the country. It is expected to be found in Panama.
- Lepanthes pristidis*** Rchb.f., Linnaea 22: 820. 1850.
This species was described from Mexico. Its is considered a synonym of *L. disticha* (Luer 2003a).
- Liparis nervosa*** (Thunb.) Lindl., Gen. Sp. Orchid. Pl.: 26. 1830.
Specimens from Costa Rica and Panama (Dressler 1993) correspond to *L. elata* (Dressler 2003c).
- Lycaste xytriophora*** Linden & Rchb.f. in W.W.Saunders, Refug. Bot. 2: t. 131. 1872.
Although it has been recorded from Costa Rica and Panama, this species is restricted to South America (Dressler 2003c). No vouchers of this species have been seen from Panama.
- Malaxis excavata*** (Lindl.) Kuntze, Revis. Gen. Pl. 2: 673. 1891.
This species was described from Mexico. In Costa Rica and Panama the name was applied to populations of *M. hastilabia*, which is considered a distinct species (Dressler 2003c).
- Malaxis fastigiata*** (Rchb.f.) Kuntze, Revis. Gen. Pl. 2: 673. 1891.
This name was misapplied to specimens of *M. brachyrrhynchos* (Dressler 2003c).
- Malaxis parthoni*** C.Morren, Bull. Acad. Roy. Sci. Bruxelles 5: 485. 1839.
This species is from Brazil. The name has been erroneously applied to specimens of *M. histionantha* (Link) Garay & Dunst.
- Maxillariella caespitiflora*** (Rchb.f.) M.A.Blanco & Carnevali, Lankesteriana 7: 528. 2007.
This species ranges from Nicaragua to Costa Rica. It has not yet been recorded in Panama (Atwood 2003).

- Maxillaria luteoalba** Lindl., *Orchid. Linden.*: 20. 1846.
A species from South America. It has not yet been recorded in Panama.
- Maxillaria meridensis** Lindl., *Orchid. Linden.*: 19. 1846.
This species known from Costa Rica, Venezuela, Colombia, Ecuador and Bolivia has not yet been recorded in Panama.
- Maxillaria speciosa** Rchb.f., *Gard. Chron.*, n.s., 6: 197. 1876.
This species is known from Colombia and Ecuador.
- Maxillaria splendens** Poepp. & Endl., *Nov. Gen. Sp. Pl.* 1: 38. 1836.
This species is known from Colombia and Venezuela to Peru and Brazil.
- Mormodes atropurpurea** Lindl., *Intr. Nat. Syst. Bot.*, ed. 2: 446. 1836.
A species from South America and has not yet been recorded in Panama. The name has been erroneously applied to specimens of *M. lobulata* Schltr.
- Mormodes cartonii** Hook., *Bot. Mag.* 72: t. 4214. 1846.
This is a species from Sierra Nevada de Santa Marta Colombia. No vouchers have been seen from Panama.
- Mormodes ignea** Lindl. & Paxton, *Paxton's Fl. Gard.* 3: 97. 1852.
A species from South America. It has not yet been recorded in Panama. The name has been erroneously applied to specimens of *M. fractiflexa* Rchb.f.
- Mormodes punctata** Rolfe, *Gard. Chron.*, ser. 3, 10: 696. 1891.
This name was published based on a plant of unknown origin. We have not seen the type specimen at K. The application of this name is obscure and its presence in Panama is uncertain.
- Mormolyca rufescens** (Lindl.) M.A.Blanco, *Lankesteriana* 7: 531. 2007.
A species from South America. It has not yet been recorded in Panama.
- Muscarella zephyrina** (Rchb.f.) Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 105: 124. 2006.
This species is widely distributed in South America but it has not yet been recorded in Panama (Luer 2006).
- Myoxanthus exasperatus** (Lindl.) Luer, *Selbyana* 7: 36. 1982.
This species is only known from South America (Luer 1997a).
- Notylia barkeri** Lindl., *Edwards's Bot. Reg.* 24(Misc.): 90. 1838.
This species ranges from Mexico to Honduras. No specimens were found in herbaria from Panama.
- Notylia lankesteri** Ames, *Schedul. Orchid.* 5: 34. 1923.
This is an endemic species to Costa Rica. It has not yet been recorded in Panama.
- Oncidium abortivum** Rchb.f., *Linnaea* 22: 847. 1850.
This species is restricted to South America (Govaerts 2003).
- Oncidium baueri** Lindl., *Gen. Sp. Orchid. Pl.*: 200. 1833.
No vouchers of this species has been seen from Panama. The species is restricted to South America.
- Oncidium heteranthum** Poepp. & Endl., *Nov. Gen. Sp. Pl.* 1: 34. 1836.
This species is restricted to South America. The name was misapplied to specimens of *O. bryolophotum* (Dressler 2003c).
- Oncidium hymenanthum** (Schltr.) M.W.Chase & N.H.Williams, *Lindleyana* 21(3): 25. 2008.
This is an enigmatic endemic species from Costa Rica. The specimens that we studied from Panama fit better with the concept of *Oncidium integrilabre* = *Sigmatostalix integrilabris* proposed by Pupulin (2003).
- Oncidium ornithorhynchum** Kunth in F.W.H.von Humboldt, A.J.A.Bonpland & C.S.Kunth, *Nov. Gen. Sp.* 1: 345. 1816.
According to Jiménez & Hágsater (2010), this species is from South America and the name was misapplied to the populations of Mexico and Central America. The correct name for this species in Panama is *O. sotoanum*.
- Oncidium planilabre** Lindl., *J. Hort. Soc. London* 6: 59. 1851.
This species is restricted to South America (Govaerts 2003).
- Oncidium stenoglossum** (Schltr.) Dressler & N.H.Williams, *Orquídea* (Mexico City), n.s., 4: 339. 1975.
This species ranges from Mexico to Costa Rica (Dressler 2003c). It is likely found in western Panama but no herbarium vouchers have been seen.
- Ornithidium aureum** Poepp. & Endl., *Nov. Gen. Sp. Pl.* 1: 57. 1836.
This species is restricted to South America (Govaerts 2003).

- Ornithocephalus gladius*** Hook., *Exot. Fl.* 2: t. 127. 1824.
This species is species from Trinidad and South America. The name has been applied to several specimens along the Neotropics. We have not seen Panamanian material regarding this species.
- Pabstiella uniflora*** (Lindl.) Luer, *Monogr. Syst. Bot. Missouri Bot. Gard.* 112: 121. 2007.
This species is restricted to South America and it is not recorded in Panama (Luer 1998b).
- Palmorchis sylvicola*** L.O.Williams, *Fieldiana, Bot.* 32: 199. 1970.
Specimens treated under this name correspond to *P. trinotata* Dressler.
- Paphinia clausula*** Dressler, *Taxon* 15: 242. 1966.
The specimens recorded in Panama under this name correspond to *P. subclausa* Dressler.
- Phloeophila peperomioides*** (Ames) Garay, *Orquideologia* 9: 118. 1974.
This species has been recorded only from Belize, Honduras and Costa Rica (Luer 2006). It has not been yet recorded from Panama. A voucher is cited in TROPICOS database (*J.P. Folsom 1496A*, MO); however, we were not able to study it.
- Phragmipedium caudatum*** (Lindl.) Rolfe, *Orchid Rev.* 4: 332. 1896.
This is a South American species. The name has been misapplied to specimens of *Phragmipedium humboldtii* (Warsz.) J.T.Atwood & Dressler (Atwood & Dressler 1998).
- Platythelys querceticola*** (Lindl.) Garay, *Bradea* 2: 197. 1977.
Although widely distributed in the Neotropics, Ormerod (2013) did not cite any specimen from Panama. We were unable to locate Panamanian specimens in the field or in herbaria.
- Platystele lancilabris*** (Rchb.f.) Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 19: 102. 1923.
This species is endemic to Costa Rica (Luer 1990).
- Pleurothallis crenata*** Lindl., *Gard. Chron.* 1846: 207. 1846.
This is a species from Mexico. This species was cited erroneously in *Flora of Panama* (Williams & Allen 1908, Correa *et al.* 2004).
- Pleurothallis luctuosa*** Rchb.f., *Linnaea* 41: 48. 1876.
Though no herbarium vouchers have been seen for Panama, it is expected to be found in the country (Luer 2003b, Pupulin *et al.* 2010a).
- Pleurothallis monocardia*** Rchb.f., *Bonplandia* (Hannover) 3: 72. 1855.
This species ranges from Colombia to Ecuador. It is not present in Panama (Govaerts 2003).
- Pleurothallis platysepala*** Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 7: 111. 1920.
This species is found in Colombia and it has not yet been recorded in Panama (Govaerts 2003).
- Polycynis lehmanni*** Rolfe, *Bull. Misc. Inform. Kew* 365. 1894.
This species is known from Colombia. It has not been recorded in Panama (Gerlach 2004).
- Polycynis muscifera*** (Lindl. & Paxton) Rchb. f., *Bonplandia* 3(15–16): 218. 1855.
This species is known from Venezuela, Colombia and Bolivia. It has not been recorded in Panama (Gerlach 2004).
- Polystachya cerea*** Lindl., *Edwards's Bot. Reg.* 26(Misc.): 86. 1840.
This species has not yet been recorded in Panama.
- Ponthieva ephippium*** Rchb.f., *Linnaea* 28: 382. 1857.
This species was described from Mexico and it is also present in Guatemala and Honduras (Govaerts 2003). Specimens from Panama may correspond to *P. racemosa*.
- Ponthieva maculata*** Lindl., *Ann. Mag. Nat. Hist.* 15: 385. 1845.
According to Dressler (2003c), this name based on Colombian material has been wrongly applied to Central American populations of *P. brenesii* Schltr. and *P. formosa* Schltr.
- Prescottia cordifolia*** Rchb.f., *Bonplandia* (Hannover) 3: 66. 1855.
The taxonomy of this genus in Panama is still unclear. This species is recorded from Colombia to Ecuador. We were unable to identify specimens in herbaria corresponding to this concept.
- Prosthechea vespa*** (Vell.) W.E.Higgins, *Phytologia* 82: 381.[1998].
The species complex related to *P. vespa* is still in need of a taxonomic revision. We have observed several specimens of this complex in the field with highly morphological variation in Panama. Some authors suggest the name *P. crassilabia* for the Central American species (Carnevali & Ramírez-Morillo 2003).
- Rhynchostele stellata*** (Lindl.) Soto Arenas & Salazar, *Orquidea* (Mexico City), n.s., 13: 151. 1993.

A species from Mexico, Guatemala, Honduras and El Salvador. A record from Costa Rica is dubious (Hágsater & Soto-Arenas 2003). No herbarium records from Panama were found for this species.

Sarcoglottis acaulis (Sm.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 6: 53. 1919.

In Costa Rica and Panama, some specimens have been treated erroneously as *Sarcoglottis acaulis* (J. E. Sm.) Schltr., a species from South America no longer considered to occur in Mesoamerica (Christenson 1991c).

Scaphyglottis graminifolia (Ruiz & Pav.) Poepp. & Endl., Nov. Gen. Sp. Pl. 1: 59. 1836.

A species from South America. It has not yet been recorded in Panama.

Sigmatostalix picta Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 5: 859. 1864.

A species from South America. It has not yet been recorded in Panama.

Sobralia candida (Poepp. & Endl.) Rchb.f., Fl. Serres Jard. Eur. 8: 247. 1853.

A species from Venezuela, Colombia, Ecuador and Peru not yet found in Panama (Govaerts 2003).

Sobralia decora Bateman, Orchid. Mexico Guatemala: t. 26. 1841.

According to Dressler (2012), *S. decora* is a species restricted to southern Mexico, Belize, Guatemala and northern Honduras, whereas the material identified as *S. decora* in Nicaragua, Costa Rica and Panama better correspond to *S. fenizliana*.

Specklinia alexii (A.H. Heller) Pridgeon & M.W. Chase, Lindleyana 16: 256. 2001.

This species is only known from Nicaragua (Luer 2006).

Specklinia endotrachys (Rchb.f.) Pridgeon & M.W. Chase, Lindleyana 16: 257. 2001.

The *S. endotrachys* complex was revised by Pupulin *et al.* (2013). *Specklinia endotrachys* is an endemic species to Costa Rica. Although *S. endotrachys* is not recorded in Panama, three species previously treated under that name are recognized: *S. pfavii*, *S. remotiflora* and *S. spectabilis*.

Specklinia lanceola (Sw.) Lindl., Gen. Sp. Orchid. Pl.: 8. 1830.

This species has been recorded from Mexico, Jamaica and Costa Rica (Luer 2006). No vouchers from Panama have been found.

Stanhopea graveolens Lindl., Edwards's Bot. Reg. 26(Misc.): 59. 1840.

This is a species distributed from Mexico to Honduras (Govaerts 2003).

Stanhopea oculata (Lodd.) Lindl., Gen. Sp. Orchid. Pl.: 158. 1832.

This species ranges from Mexico to northern Nicaragua (Hágsater & Soto-Arenas 2003). We have not seen specimens in herbaria of *S. oculata*. It was cited by Williams & Whitten (1988) in the key to the species of *Stanhopea* from Panama; however, no voucher was cited.

Stelis aprica Lindl., Companion Bot. Mag. 2: 353. 1837.

This is a South American species not found in Panama (Govaerts 2003).

Stelis alajuelensis Pridgeon & M.W. Chase, Lindleyana 17(2): 98. 2002.

According to Karremans (2012), several specimens in herbaria have been erroneously identified as *S. alajuelensis* (= *D. ramonensis*), an endemic species to Costa Rica. At the moment, no specimens referable to this concept have been found in Panama.

Stelis cooperi Schltr., Repert. Spec. Nov. Regni Veg. 3: 276. 1907.

This species is endemic to Costa Rica (Luer 2003c).

Stelis janetiae (Luer) Pridgeon & M.W. Chase, Lindleyana 16: 264. 2001.

This species is endemic to Costa Rica. It is likely found in Panama as the type specimen was collected in the southern region of Costa Rica near the border with Panama. It is related to the Panamanian endemic *S. guttata*.

Stelis maxima Lindl., Ann. Mag. Nat. Hist. 15: 106. 1845.

A South American species not recorded in Panama (Govaerts 2003).

Stelis rodrigo (Luer) Pridgeon & M.W. Chase, Lindleyana 16: 266. 2001.

Specimens from Panama correspond to *S. furculifera* (Dressler & Bogarin 2007a). No vouchers of *S. rodrigo* have been seen from Panama.

Stelis sclerophylla (Lindl.) Karremans, Lankesteriana 13(3): 330. 2014.

According to Luer (2003c) this name was applied erroneously in Costa Rica and Panama for specimens that correspond to *P. dolichopus* = *Stelis lamprophylla*.

- Stelis velaticaulis*** (Rchb.f.) Pridgeon & M.W.Chase, *Lindleyana* 16: 267. 2001.
This is a South American species not yet recorded in Panama (Luer 1998a).
- Telipogon dendriticus*** Rchb.f., *Otia Bot. Hamburg.*: 6. 1878.
A species from South America. It has not yet been recorded in Panama.
- Telipogon minutiflorus*** Kraenzl., *Ann. Naturhist. Mus. Wien* 33: 14. 1920.
This species is endemic to Costa Rica (Dressler 2003c).
- Telipogon radiatus*** Rchb.f., *Linnaea* 41: 70. 1876.
A species from South America. It has not yet been recorded in Panama.
- Trichocentrum carthagense*** (Jacq.) M.W.Chase & N.H.Williams, *Lindleyana* 16: 137. 2001.
This is a species from the Pacific coast of Colombia and Venezuela. Panamanian specimens correspond to *Trichocentrum crispiflorum* (Schltr.) Bogarín.
- Trichosalpinx ciliaris*** (Lindl.) Luer, *Phytologia* 54: 395. 1983.
This species ranges from Mexico to Costa Rica. It has not been recorded in Panama (Luer 1997a).
- Trichosalpinx intricata*** (Lindl.) Luer, *Phytologia* 54: 396. 1983.
This species is restricted to South America. Luer (1997a) did not record specimens from Panama.
- Triphora trianthophora*** subsp. *mexicana* (S.Watson) Medley, *Selbyana* 12: 102. 1991.
The genus *Triphora* is poorly known in Panama. This species has been recorded in the country (Correa *et al.* 2004) as *T. mexicana*; however, we were unable to study specimens in herbaria that fit with this concept. Goaverts (2003) accepted this species as *T. trianthophora* subsp. *mexicana*. Dressler (2003c) treated the Costa Rican vouchers of *T. trianthophora* subsp. *mexicana* (Pupulin 2002) as *T. debilis*.
- Trevoria glumacea*** Garay, *Orquideologia* 5: 8. 1970.
García-Castro *et al.* (1993) and Correa *et al.* (2004) recorded this species from Panama; however, no vouchers were cited. We have not found specimens in herbaria. Dressler (2003c) cited *T. glumacea* only from Nicaragua to Costa Rica. Although the genus is likely to be found in Panama it is excluded in absence of herbarium vouchers.
- Trevoria zahlbruckneriana*** (Schltr.) Garay, *Orquideología* 5: 8. 1970.
Dressler (2003c) cited *T. zahlbruckneriana* only from Nicaragua to Costa Rica. See the above discussion.
- Vanilla insignis*** Ames, *Bot. Mus. Leaflet* 2: 101. 1934.
This species ranges from Mexico, Belize, Guatemala and Honduras. It was recorded from Panama (Dressler 2003c, Correa *et al.* 2004); however, the report may correspond to *V. dressleri* (Soto-Arenas & Dressler 2010).
- Warczewiczella marginata*** Rchb.f., *Bot. Zeitung (Berlin)* 10: 636. 1852.
Warczewiczella marginata is a species found in Colombia and Venezuela. It has not yet recorded in Panama. Specimens of *W. lipscombiae* from Panama were erroneously treated under *W. marginata* (D'Arcy 1987, Correa *et al.* 2004).
- Zootrophion atropurpureum*** (Lindl.) Luer, *Selbyana* 7: 80. 1982.
According to (Luer 2004), this species is recorded from Jamaica, Cuba, Haiti, Dominican Republic and Brazil. It has not been recorded in Central America and Panama.
- Zootrophion hypodiscus*** (Rchb.f.) Luer, *Selbyana* 7: 84. 1982.
This species is known from Colombia and Ecuador. It has not been recorded in Panama (Luer 2004).

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